Chromosome differentiation and the radiation of the butterfly subgenus *Agrodiaetus* (Lepidoptera: Lycaenidae: *Polyommatus*) – a molecular phylogenetic approach

Dissertation

zur Erlangung des Doktorgrades (Dr. rer. nat.)

der

Mathematisch-Naturwissenschaftlichen Fakultät

der

Rheinischen Friedrich-Wilhelms-Universität Bonn

vorgelegt von

Martin Wiemers

aus

Münster (Westf.)

Bonn – September 2003

Angefertigt mit Genehmigung der Mathematisch-Naturwissenschaftlichen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn

1. Referent: Prof. Dr. Clas M. Naumann
2. Referent: Priv.-Doz. Dr. Bernhard Misof

Tag der Promotion: _________________

CONTENTS

Chapter 1: Introduction

The Holarctic butterfly genus *Polyommatus* Latreille, 1804 consists of approximately 120-180 species (Häuser & Eckweiler 1997), many of which have been placed into subgroups which are considered separate genera according to numerous authors (e.g. the subgenera *Meleageria, Cyaniris, Plebicula, Sublysandra, Neolysandra*). The subgenus *Agrodiaetus* Hübner, 1822, which is distributed in the southern Palaearctic, is the most rich in species. Eckweiler & Häuser (1997) recognize between 56 and 84 species whereas Bálint & Johnson (1997) list 102 species (including 8 species placed under *Paragrodiaetus* Rose & Schurian, 1977). Since 1997 alone, 23 further species rank taxa have been described from Anatolia and Iran. The distribution of this subgenus ranges from the Iberian Peninsula to northern Pakistan and Central Mongolia, but the majority of species is found in Anatolia, Transcaucasia and Iran. The characteristic morphological feature of this subgenus is the almost complete reduction of the submarginal elements of the complex wing pattern on the underside of both pairs of wings, and a prominent white streak on the underside of the hind wings (although this can be missing in some cases). Secondly the larval foodplants of all *Agrodiaetus* species as far as they are known belong to only two closely related genera of Fabaceae, *Onobrychis* and *Hedysarum* which are only used by few other *Polyommatus* species. However, the relevance of these two features for a presumed monophylum *Agrodiaetus* has never been checked systematically, and therefore the delimitation of this taxon in literature remains contentious. Higgins (1975) and Tolman & Lewington (1997) also include e.g. the taxa *thersites* Cantener, 1834 (larval foodplant *Onobrychis*), *escheri* Hübner, 1823 (larval foodplant *Astragalus*) and *amanda* Schneider, 1792 (larval foodplants *Vicia* and *Lathyrus*) within *Agrodiaetus*. Bálint & Johnson (1997) also place *thersites* with *Agrodiaetus*, but split off eight taxa (incl. *glaucias* (Lederer, 1871), *erschoffii* (Lederer, 1869) and *dagmara* (Grum-Grshimailo, 1888)) from *Agrodiaetus* and place them into *Paragrodiaetus* Rose & Schurian, 1977. This genus was synonymized with *Agrodiaetus* by Häuser & Eckweiler (1997). Despite a rather up-to-date species inventory (Eckweiler & Häuser 1997) the exact number of species is uncertain.

The reasons are threefold. First, this is the only Palaearctic group of butterflies in which a high number of new species is still being discovered, especially in remote parts of Iran. 15% of the almost 250 nominal taxa described in *Agrodiaetus* (Fig. 1) have been named the last five years, 2/3 of them of species rank.

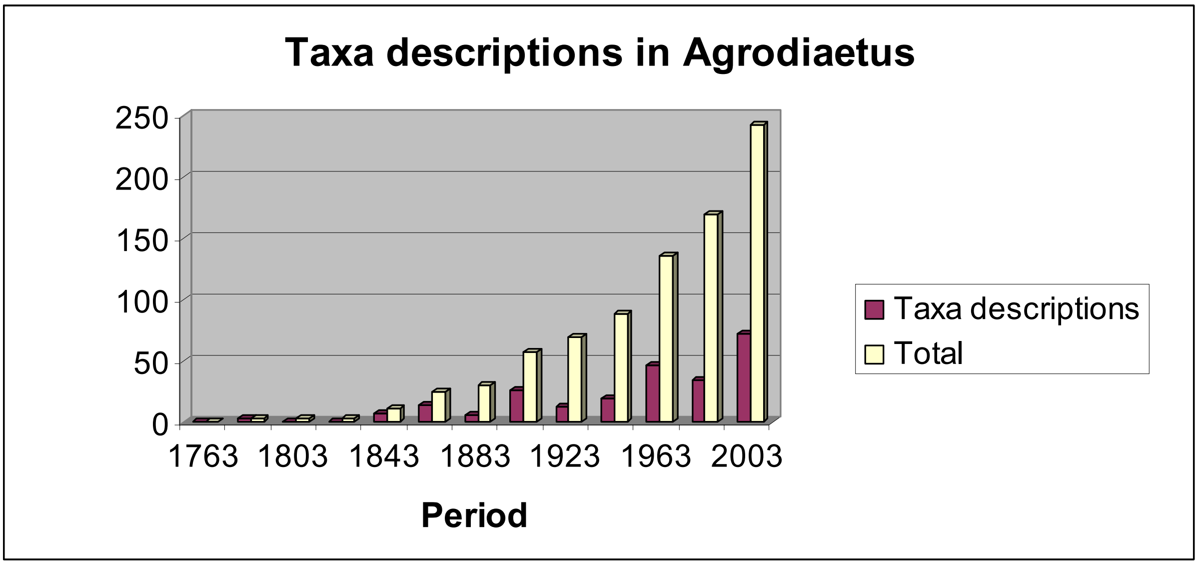


Fig. 1. Taxa descriptions in *Agrodiaetus* within periods of 20 years

Secondly, many taxa represent allopatric populations which differ only slightly in morphology or karyology (morphospecies and karyospecies) and a decision on their status as distinct species or subspecies is controversial and subjective. Thirdly and most importantly many *Agrodiaetus* taxa are extremely similar in phenotype (HESSELBARTH *et al.* 1995) and in contrast to other Lepidoptera taxa genitalia offer only few distinctive features. These slight differences can only be discovered by careful and time consuming preparation techniques, the results of which have been published only for some Greek taxa (COUTSIS 1986; WAKEHAM-DAWSON & SPURDENS 1994).

The discovery of different chromosome numbers in allopatric populations of various *Agrodiaetus* taxa has lead to the description of numerous “karyospecies” which hardly differ in phenotype. About half of all *Agrodiaetus* species were described within the last 40 years and differences in chromosome numbers have often been the main or even the only argument for the specific separation of taxa. Currently most authors assume that major differences in chromosome numbers usually lead to reproductive isolation of taxa although experiments in Saturniidae have shown that interspecific crossings between different karyospecies can lead to fertile offspring (NAGARAJU & JOLLY 1986). Variation in chromosome numbers between individuals or populations are also known in many other groups of animals, e.g. in the *Polyommatus* subgenus *Lysandra* (DE LESSE 1960a & 1969), in some ancestral genera of neotropical Nymphalidae (BROWN *et al.* 1992), in the ant genus *Leptothorax* (LOISELLE *et al.*1990), in the Australian grasshopper *Caledia* (GROETERS & SHAW, 1992 & 1996; MORAN & SHAW 1977; SHAW 1976), in the New Zealand stick insect *Hemideina* (MORGAN-RICHARDS 1997), in the Japanese daddy longleg *Gagrellopsis nodulifera* (TSURUSAKI *et al.* 1991), in Australian scorpions of the genus *Urodacus* (SHANAHAN 1989) or the African rodent *Otomys irroratus* (CONTRAFATTO *et al.* 1992). Although karyological studies in the subgenus *Agrodiaetus* have been important to discover species which are not or only slightly differentiated morphologically, these studies have also lead to a profusion of names and increased the chaos in the systematics of this group. The difficulties in uniting *Agrodiaetus* species into monophyletic units at or above the species category stem from the small number of usable characters and the high level of homoplasy in most of them. Not surprisingly, all systematic treatments of this group (FORSTER 1956-1961; HESSELBARTH *et al.* 1995; ECKWEILER & HÄUSER 1997; BÁLINT & JOHNSON 1997) have remained highly unsatisfactory.

Molecular methods appear very promising to unravel the relationships within *Agrodiaetus* in order to understand more about its origin and radiation. Such knowledge can also help to elucidate the karyotype evolution and biogeography of *Agrodiaetus*. Until now, only one such study on allozyme variation in 11 taxa, most of them from the Mediterranean region, has been published (MENSI *et al.* 1994). In Lycaenidae, only a few molecular studies have been conducted, which is apparent from the small number of sequences in GenBank (6 on 22/09/98 when this project started; 176 on 9/9/2003, compared to 1857 in Nymphalidae, a family with approximately the same number of species worldwide (ca. 5000) as in Lycaenidae). One of the few major ones is the thesis of MEGENS (2002) who used molecular markers (COI, COII, wingless, 12s & 16s) to infer the phylogeny of the Southeast Asian butterfly genus *Arhopala*. This case parallels *Agrodiaetus* with its high number of morphologically very similar species. Molecular data suggested a rapid radiation which started already in the Miocene (7-11 Million years ago) and was completed before the onset of the Pleistocene period. Thus glaciation events (e.g. the periodical flooding of the Sunda plateau) did not appear to be the key factors for this radiation as previously suggested. Instead, life-history parameters, i.e. shifts in larval foodplants and symbiosis with ants were assumed to have played a major role in creating the diversity of *Arhopala* species.

Life history parameters might also have been important in the radiation of *Agrodiaetus*. Although it is thought that the larvae only feed on two genera of Fabaceae (*Onobrychis* and *Hedysarum*), the food plant of most species is unknown. Even the few existing foodplant records can only be evaluated with great caution for various reasons:

1. Females of *Agrodiaetus* are often impossible to identify in the field. Therefore egg-laying records are prone to misidentification of the *Agrodiaetus* species.
2. Some *Agrodiaetus* species do not lay their eggs directly onto the foodplant but on dry plant material next to the foodplant (SCHURIAN 1976; 1999) which can easily result in erroneous records.
3. The larvae of most *Agrodiaetus* species are unknown and those which are known are very similar morphologically. If larvae are collected in the field they need to be reared until the eclosure of the adult butterfly for identification purposes. Apart from some European species (BOLOGNESI 2000), *Agrodiaetus* larvae have almost never been reared successfully. The main reason is that almost all *Agrodiaetus* are monovoltine, overwinter as small larvae and occur in areas with a continental climate much different from the Central European climate where most lepidopterists reside. The foodplants are also difficult to cultivate.
4. The plant genera *Onobrychis* and *Hedysarum* are very rich in species and taxonomically they pose the same puzzle to the botanist as *Agrodiaetus* to the zoologist. Without the help of specialist botanists, most identifications of larval foodplants will be erroneous.

In contrast to many other genera of Lycaenidae which are associated with ants in a sometimes very specific way, *Agrodiaetus* caterpillars seem to be only tended unspecifically by ants (facultative myrmecophily, v. FIEDLER 1995c). However, hardly anything is known about ant associations in this subgenus. The only way to increase the poor knowledge on its life-history would be intensive field studies such as those carried out by DANTCHENKO (1997) on two Russian taxa. Unfortunatly there are hardly any lepidopterists in the centre of *Agrodiaetus* distribution who could carry out such studies.

Scope and aims

In the course of this thesis the following issues and questions will be addressed:

Chapter 2 presents the results of the karyological studies and provides data for many taxa whose karyotype was unknown previously. It includes a synopsis of all available literature data, much of it published in many different small entomological journals which are difficult to access.

The molecular genetic approach in **Chapter 3** is the core of the thesis. Mitochondrial and nuclear DNA of the vast majority of *Agrodiaetus* species is analyzed by different methods (Maximum Parsimony, Bayesian, network) to infer the origins of and the phylogenetic relationships within *Agrodiaetus*. Results will be compared to current systematics which is mainly based on features of the adult phenotype. Here I will also address the question of hybridization in *Agrodiaetus*: Does it occur frequently causing extensive gene flow between different *Agrodiaetus* taxa? Another point of discussion are biogeographical issues: Where are the origins of *Agrodiaetus* and how old is its radiation? When was Europe colonized and how many times? Did *Agrodiaetus* recolonize Europe after the last glaciation or did they survive in South European refugia?

Chapter 4 aims to revise the systematics of *Agrodiaetus* on the basis of the molecular results, taking into account karyological data and morphology.

The relevance of morphological features for the phylogeny of *Agrodiaetus* will be re-evaluated on the basis of the molecular phylogeny in **Chapter 5:** Is the white streak an autapomorphy of *Agrodiaetus*? Do the monomorphic brown *Agrodiaetus* form a monophyletic unit? Is the development of androconial patches correlated with the loss of iridescent coloration does it thus replace a visual sexual communication system with an olfactorial one or is it independent of wing coloration?

Chapter 6 discusses the karyological results in the light of the new phylogenetic framework: Do we find phylogenetical or biogeographical patterns in chromosome number variation? Is chromosomal evolution a directional process towards increasing numbers caused by fission or decreasing numbers by repeated fusion events? Are such events confined to certain clades? Can low and/or high chromosome numbers even have an adaptive value? Do chromosomal changes occur as byproducts of speciation or are they the cause of it? Do we even find indications that speciation occurred without a biogeographical barrier, and that chromosomal mutations provide sufficient reproductive isolation for new species to evolve in sympatry?

Chapter 2: New karyological results in *Agrodiaetus*

Introduction

A peculiarity of *Agrodiaetus* is the incredible variation in chromosome numbers ranging from 10 to 130 for the haploid set. Currently the chromosome numbers of about 65% of all *Agrodiaetus* species are known. The fundamental works were done in the 1950s and 60s by DE LESSE (1952, 1957, 1959a-f, 1960a-c, 1961a-c, 1962a-b, 1963a-c, 1964, 1966) and in recent years by LUKHTANOV (LUKHTANOV 1989, HESSELBARTH *et al.* 1995, KANDUL & LUKHTANOV 1997, LUKHTANOV *et al.* 1997, 1998, LUKHTANOV & DANTCHENKO 2002a-b), besides BROWN (1976b, 1977), BROWN & COUTSIS (1978), COUTSIS *et al.* (1999), LARSEN (1974, 1975), MUNGUIRA *et al.* (1995), OLIVIER *et al.* (1999a-b, 2000), TROIANO *et al.* (1979) and TROIANO & GIRIBALDI (1979). The current knowledge is best of species from Europe and Southwest Asia whereas the chromosome number of most Central Asian species (which represent less than 30% of the total number of species) is still unknown. The haploid chromosome numbers range from n=10-11 in *A. birunii* Eckweiler & ten Hagen, 1998[1] to n=128-131 in *A. shahrami* Skala, 2001. Compared to the modal value of n=24 in Lycaenidae (LORKOVIĆ 1990), which is only found in very few *Agrodiaetus* species (like *A. poseidonides* (Staudinger, 1886) and *A. turcicus* (Koçak, 1977)) these numbers represent either a reduction (less than half) or a multiplication (up to a quintuple) of the probably plesiomorph modal chromosome number of Lycaenidae. The only Lepidoptera species where even higher numbers are known are the closely related *Polyommatus dorylas* (n=149-151), *P. nivescens* (n=190-191) from Spain and finally *P. atlantica* (n=221-223) from Morocco which has the highest chromosome number known in Metazoa. The mechanism which leads to the change in chromosome numbers is unknown, but it seems most probable that low chromosome numbers are caused by fusion and high numbers by fission of chromosomes (LORKOVIĆ, 1990). This is also indicated by the striking reciprocal correlation between the number of chromosomes and their size. Polyploidy, which was recently suggested as a possible mechanism in some *Coleophora* species (LUKHTANOV & PUPLESIENE 1999), is extremely unlikely in *Agrodiaetus*.

Material and methods

Material available for karyological studies is listed in Appendix 2. There was a total of 1155 chromosome fixations available for study (976 *Agrodiaetus* and 179 other specimens of Lycaenidae). These were fixed in the field by placing the testes or the posterior two thirds of the abdomens of freshly killed butterflies into Eppendorf vials (0.5ml) with a freshly prepared mixture of 100% Ethanol and 100% Acetic Acid (3:1). The vials were kept in ice water during travel and later on stored in the lab at +7°C. Karyological preparations were made with squash techniques according to the protocols in OLIVIER *et al.* (2000) or LUKHTANOV & DANTCHENKO (2002a) and carried out in cooperation with Dr. Jurate De Prins (Antwerpen), Karen Meusemann (Bonn) and Dr. Vladimir Lukhtanov (St. Petersburg). Digital images of preparations were obtained with an Olympus DP-50 digital camera attached to a Leica Aristoplan microscope using the software package "Analysis". The number of chromosomes was counted and peculiarities of the karyotype were recorded. A total of 624 preparations were made (586 *Agrodiaetus* and 38 other species of Lycaenidae).

---

[1] The even lower numbers of n=8-11 recorded for *A. nephohiptamenos* (Brown & Coutsis, 1978) have turned out to be erroneous (J. DE PRINS, pers. comm.) like those for *A. aroaniensis* (Brown, 1976), v. COUTSIS *et al.* (1999).

Results

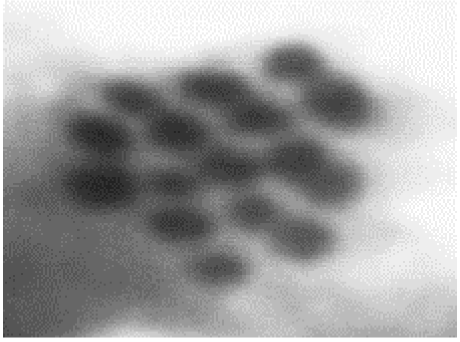
Meiotic cells with countable chromosome numbers were found in 282 preparations (45%) and chromosome counts are given in Appendix 1. The karyotype of many species was previously unknown (see discussion). A selection of karyotype photos of such species and of those specimens which are of special scientific interest are presented here (Tab. 1; Figs. 2-27).

Tab. 1. List of figured karyotypes

Species	**Chromosome number**	**Figure**	**Specimen codes***
Agrodiaetus actis	n=17	2	MW98166
Agrodiaetus ainsae	n=ca 108	3	MW01004
Agrodiaetus birunii	n=10-11	4	MW00267
Agrodiaetus caeruleus	n=20	5	MW00335
Agrodiaetus dizinensis	n=17	6 & 7	MW00539
Agrodiaetus ernesti	n=18	8	MW98097
Agrodiaetus erschoffii	n=13-14	9	MW00393
Agrodiaetus femininoides	n=27	11	WE02671
Agrodiaetus gorbunovi	n=20	10	MW00129
Agrodiaetus iphicarmon	n=29	12	MW98104
Agrodiaetus iphigenia	n=15	13	MW98106
Agrodiaetus (damocles) kanduli	n=25	14	MW99465
Agrodiaetus karindus	n=68	15	WE02611
Agrodiaetus klausschuriani	n=56	16	MW00262
Agrodiaetus lycius	n=22	17	MW98069
Agrodiaetus mofidii sorkhensis	n=ca 45	27	WE02453
Agrodiaetus peilei	n=39	18	WE02593
Agrodiaetus pierceae	n=22	19	MW99416
Agrodiaetus phyllis	n=82-86	20	MW00348
Agrodiaetus posthumus	n=ca 85	21	MW00347
Agrodiaetus pseudoxerxes	n=15	22	MW00330
Agrodiaetus sertavulensis	n=20	25	MW98305
Agrodiaetus valiabadi	n=23 (2n=46)	23 & 24	MW00498
Agrodiaetus zarathustra	n=ca.22	26	WE02531

* Specimen codes refer to those used in Appendix 2.

Karyotype photographs of *Agrodiaetus*



▲ ***Fig. 2. A. actis,*** n=17 (MW98166)

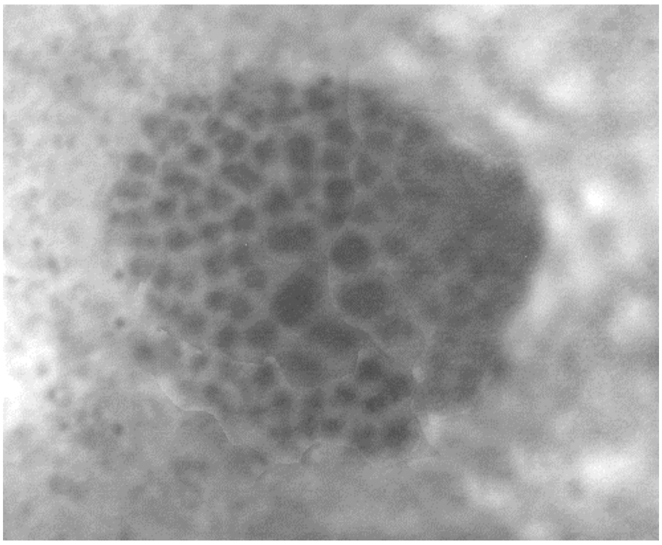
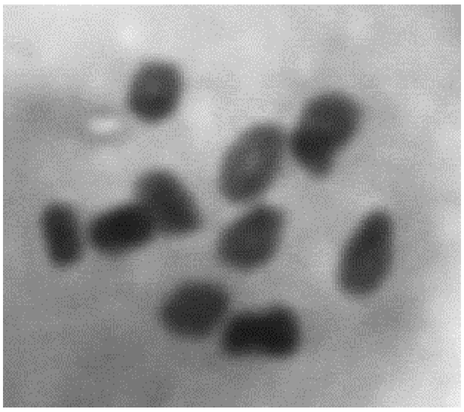
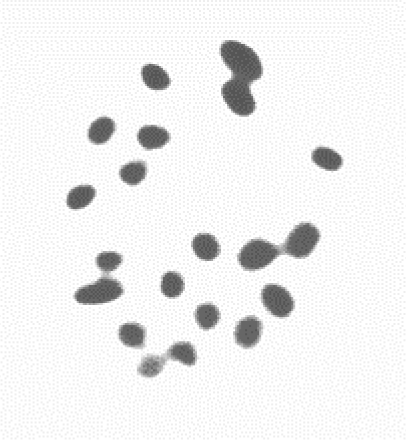


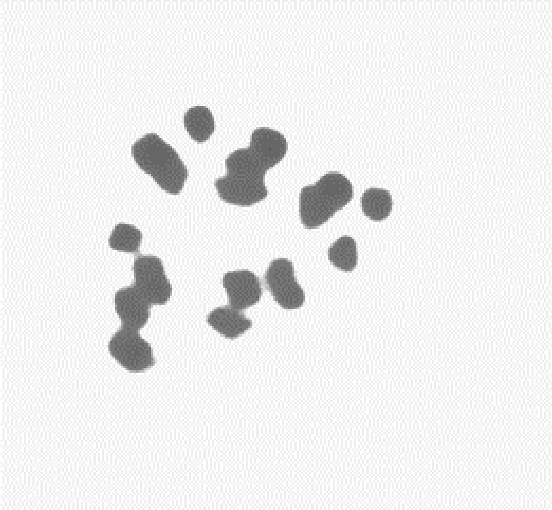
Fig. 3 ▶ ***Agrodiaetus ainsae***, n=ca 108 (MW01004)



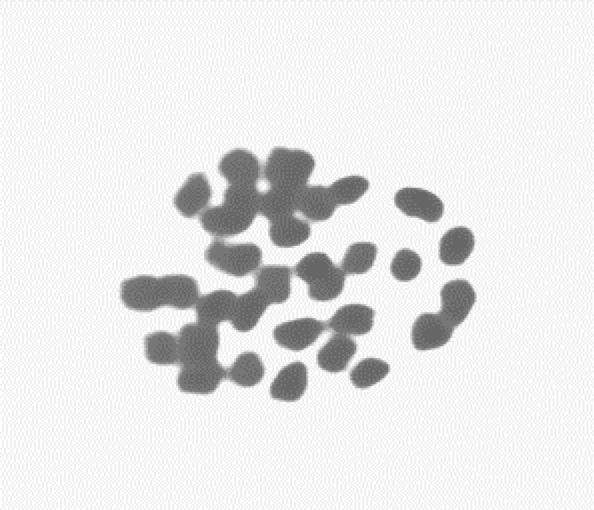
▲ ***Fig. 4. Agrodiaetus birunii,*** n=10 (MW00267)



▲ ***Fig. 5. Agrodiaetus caeruleus*** n=20 (MW00335)



▲ ***Fig. 6. Agrodiaetus dizinensis***, n=17 (MW00539)



▲ ***Fig. 7. Agrodiaetus dizinensis***, 2n=34 (MW00539)

▲ ***Fig. 8. Agrodiaetus ernesti,*** n=18 (MW98097)

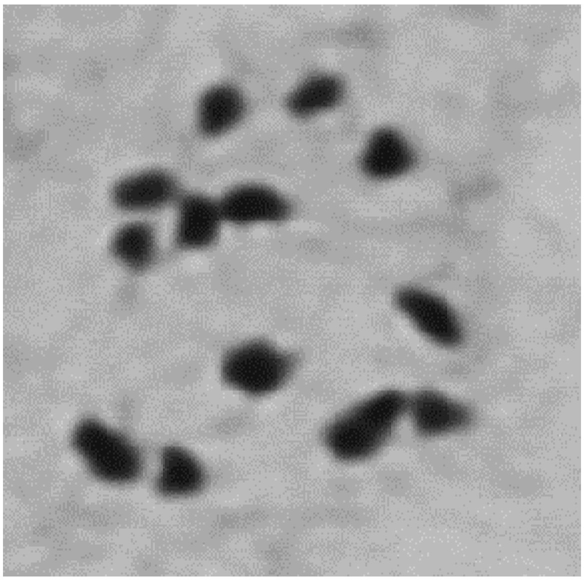
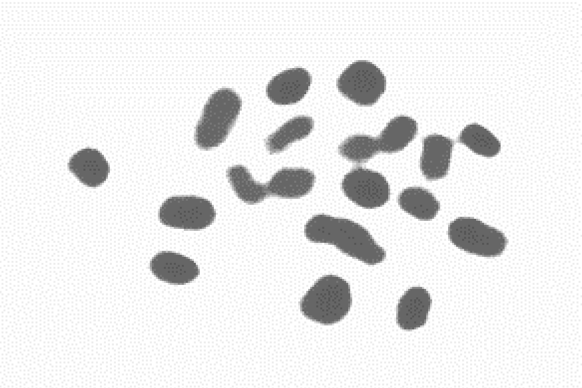


Fig. 9 ▶ ***Agrodiaetus erschoffii*** n=13-14 (MW00393)



▲ ***Fig. 10. Agrodiaetus gorbunovi,*** n=20 (MW00129)

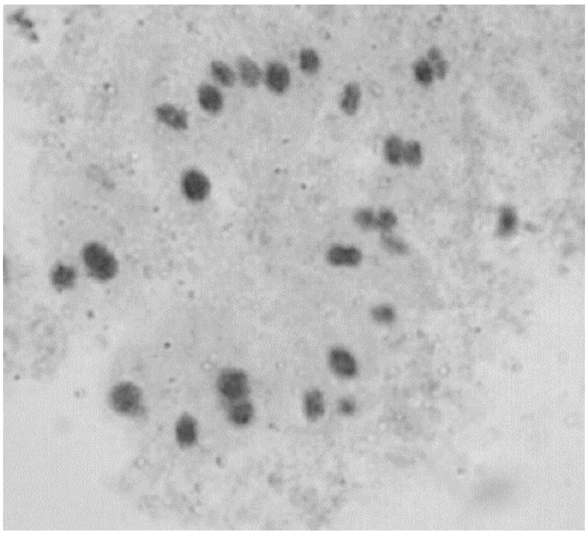
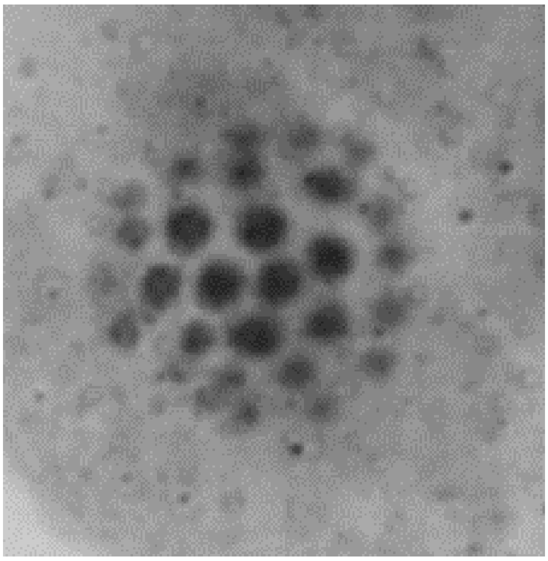
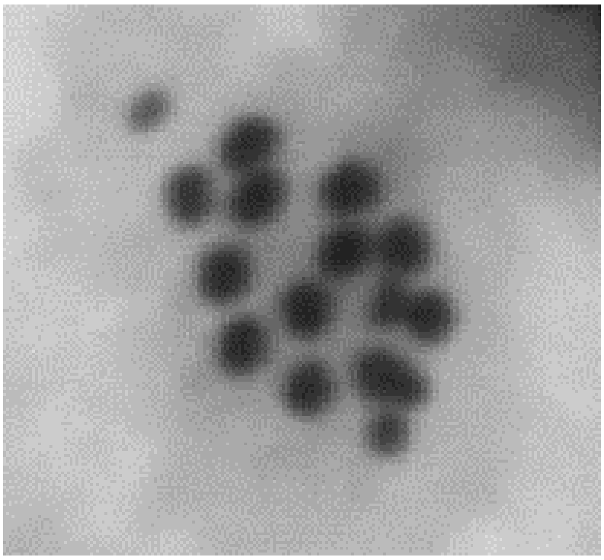


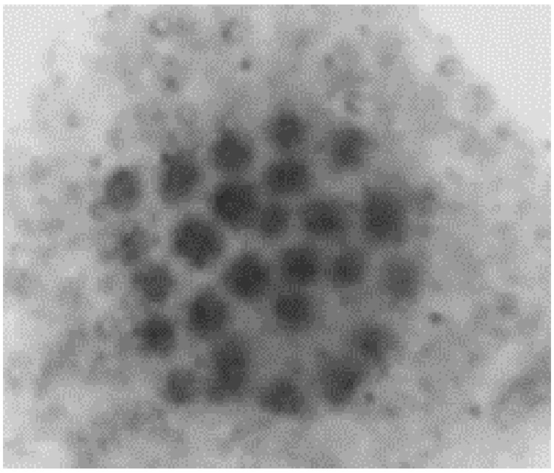
Fig. 11 ▶ ***Agrodiaetus femininoides***, n=27 (WE02671)



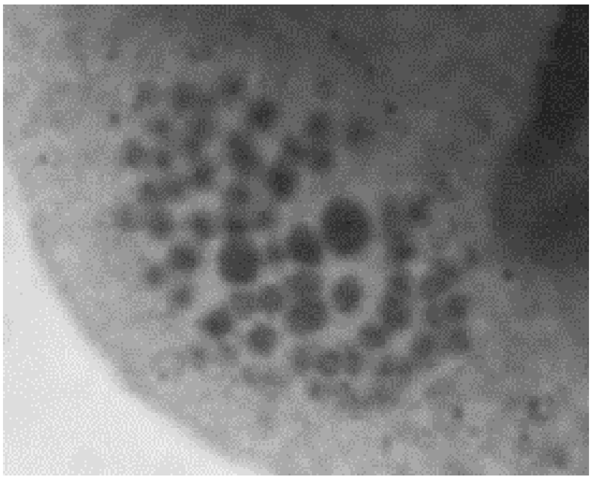
▲ ***Fig. 12. Agrodiaetus iphicarmon,*** n=29 (MW98104)



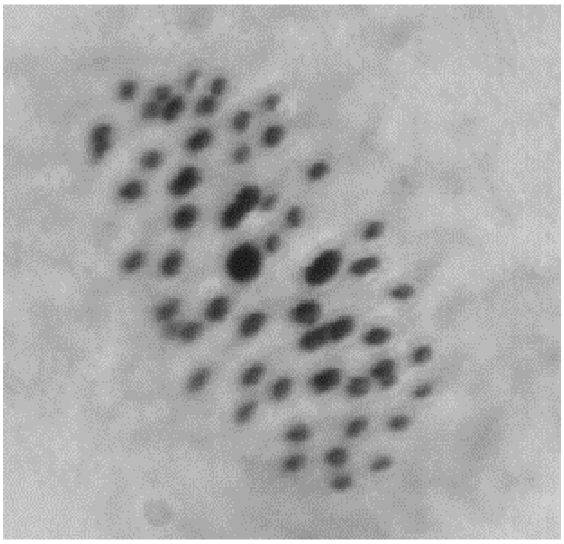
▲ ***Fig. 13. Agrodiaetus iphigenia***, n=15 (MW98106)



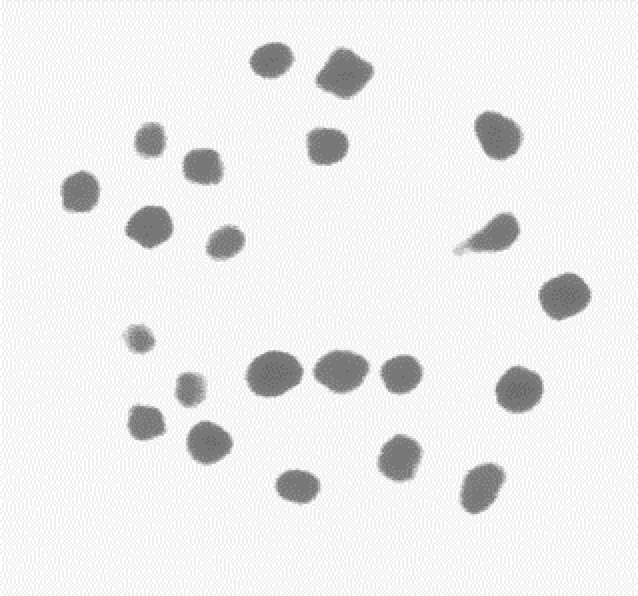
▲ ***Fig. 14. Agrodiaetus (damocles) kanduli*** n=25 (MW99465)



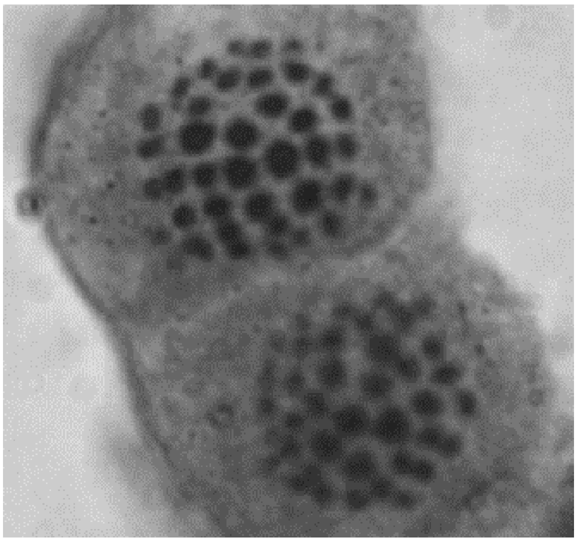
▲ ***Fig. 15. Agrodiaetus karindus***, n=68 (WE02611)



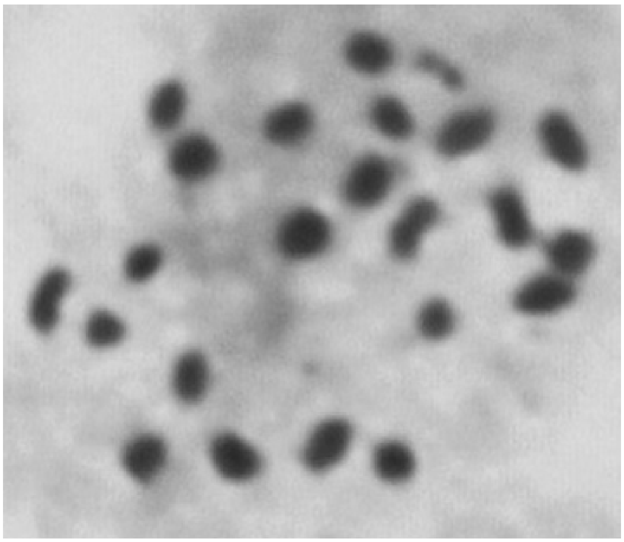
▲ ***Fig. 16. Agrodiaetus klausschuriani*** n=56 (MW00262)



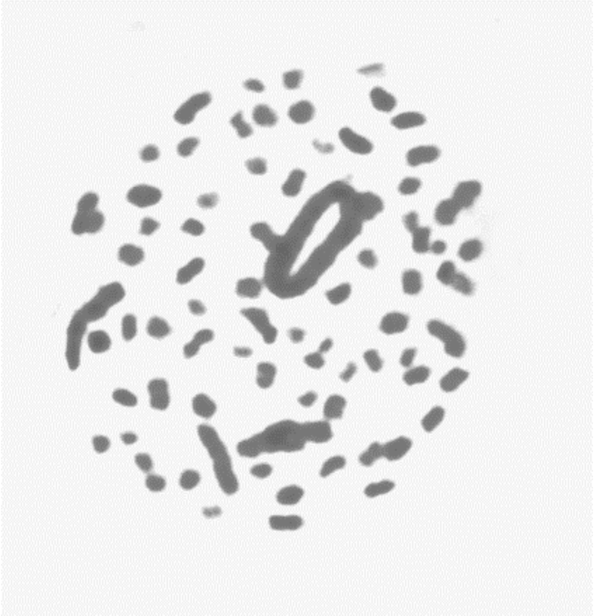
▲ ***Fig. 17. Agrodiaetus lycius*** n=22 (MW98069)

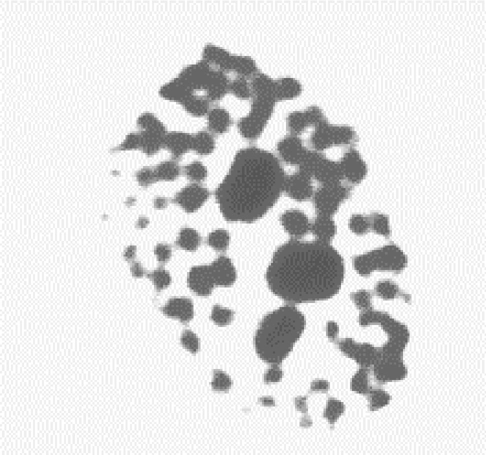


▲ ***Fig. 18. A. peilei****,* n=39 (WE02593)



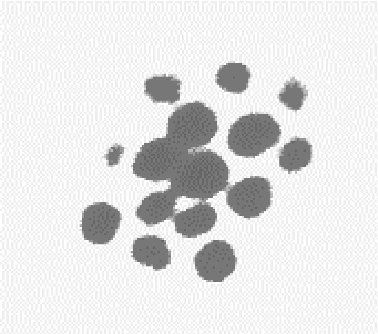
▲ ***Fig. 19. A. pierceae***, n=22 (MW99416)



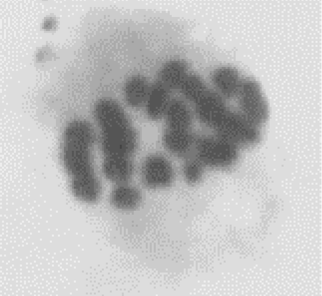


▲ ***Fig. 20. A. posthumus***, n= ca. 85 (MW00347)

◀ ***Fig. 21. A. phyllis***, n=82-86 (MW00348)

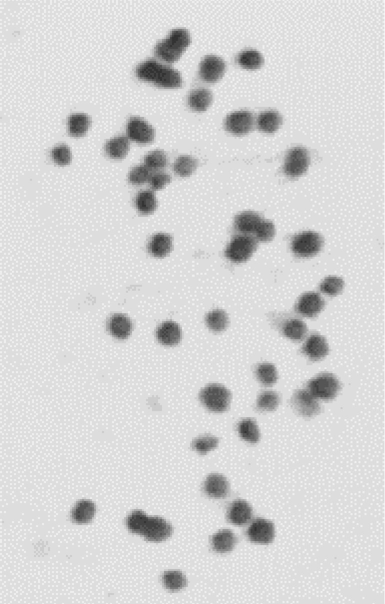


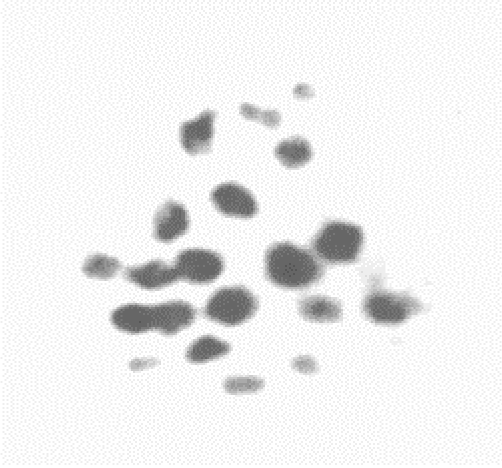
▲ ***Fig. 22. A. pseudoxerxes***
n=15 (MW00330)



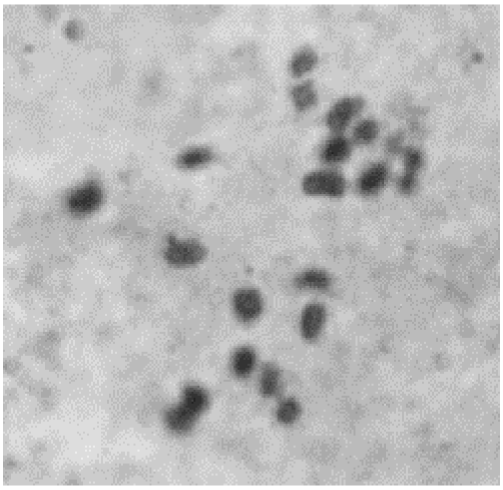
▲ ***Fig. 23. A. valiabadi***
n=23 (MW00498)

Fig. 24 ▶
Agrodiaetus valiabadi
2n=46 (MW00498)

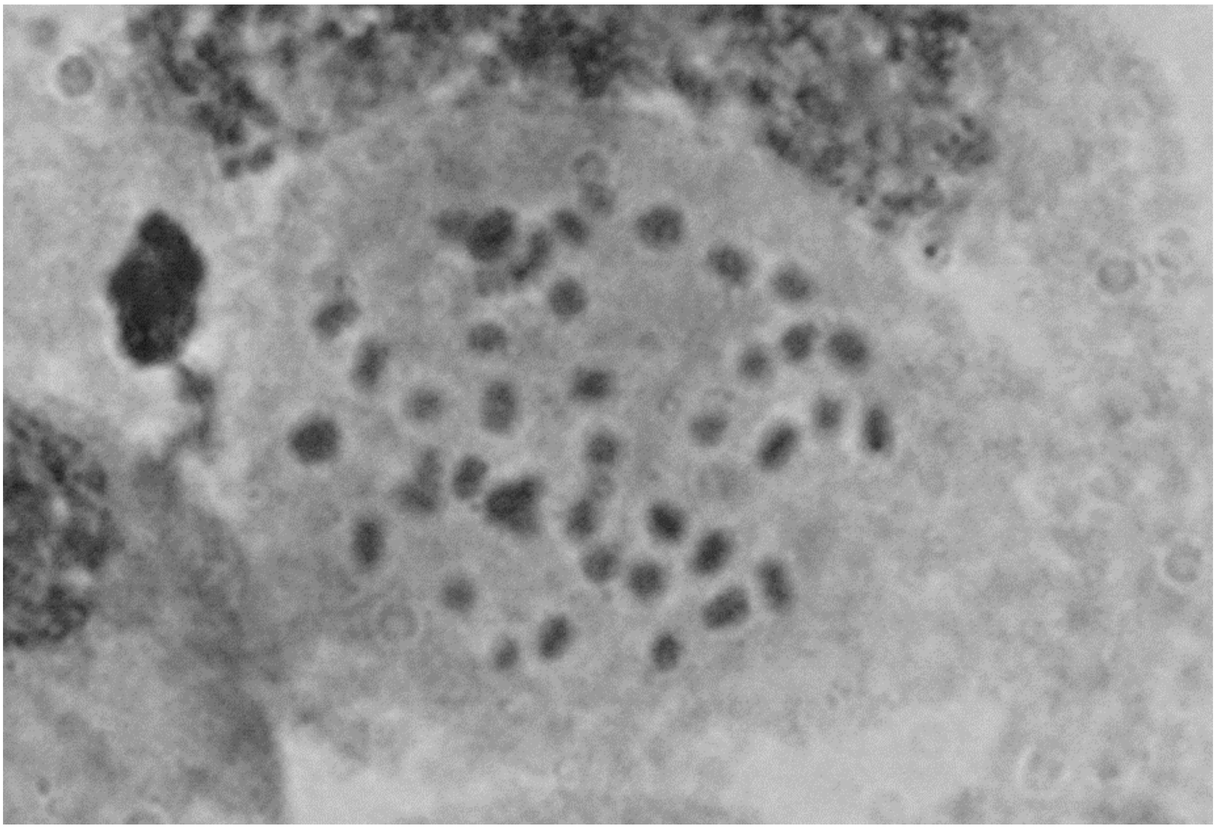




▲ ***Fig. 25. Agrodiaetus sertavulensis***
n=20 (MW98305)



▲ ***Fig. 26. Agrodiaetus zarathustra***
n=ca 22 (WE02531)



▲ **Fig. 27.** ***Agrodiaetus mofidii sorkhensis*, n=ca 45 (WE02453)**

The following list includes all species level taxa of *Agrodiaetus* which are included in the molecular study, even if no own karyological data are available. This list summarizes the current knowledge on their karyotypes. At this stage I adopt a splitter's attitude and consider any taxon which might represent a separate species, whether based on different morphology or karyology and including allopatric taxa which might only represent subspecies of another taxon. An evaluation of their status will be done later in the course of this thesis, taking into account the results of the molecular genetic studies.

Overview of karyotypes in the subgenus *Agrodiaetus* Hübner, 1822

***admetus*-group** (grouping according to ECKWEILER & HÄUSER, 1997)
This is a group of sexually monomorph brown *Agrodiaetus* taxa which are often difficult or even impossible to identify without the knowledge of their karyotypes.

admetus (Esper, [1783])
This species which is distributed from Hungary (type locality) to Siberia is one of the few exceptions and is easy to identify. A haploid chromosome number of n=80 is known from populations in Bulgaria, Western Anatolia and Armenia, and slightly lower numbers (n=77-79) from Eastern Anatolia (DE LESSE 1960b; LUKHTANOV & DANTCHENKO 2002a). One chromosome is larger and the others are gradually decreasing in size. We can confirm this karyotype with a chromosome number of ca. n=78-80 from three preparations from Antalya and Adana Province (Turkey), the two smallest chromosomes being minute in size.

ripartii (Freyer, 1830)
This species is known to have a constant chromosome number of n=90 throughout its vast range. Chromosome counts are known from Northern Spain, France (close to the type locality Digne), Greece, Turkey and Kazakhstan (DE LESSE 1960a, 1960b, 1961b, 1961c; LUKHTANOV & DANTCHENKO 2002a, 2002b; COUTSIS *et al.* 1999). There is one large and one medium sized chromosome while the others are all of similar small size. We were not able to determine the exact chromosome number in any specimen but counts around n=90 were obtained from populations in Spain (Burgos) and Turkey (Isparta, Adana, Artvin, Erzincan & Van). DE LESSE (1960b) remarks that most specimens from Turkey (although fresh) only had atypical divisions. We had the same problem and found typical divisions only in one fifth of the 17 preparations from Turkey.

fabressei (Oberthür, 1910)
According to DE LESSE (1960a, 1960b, 1961b) and MUNGUIRA *et al.* (1995) this Spanish taxon which replaces *ripartii* in Castile has the same chromosome number as *ripartii* (n=90) but a different number of large chromosomes, two large and two medium ones according to the first author, but three "macrochromosomes" according to the second author team. The metaphases in our preparations were not clear enough to establish the exact number of chromosomes or "macrochromosomes" but in cases of species with chromosomes gradually decreasing in size it is hardly possible to state a certain number of macrochromosomes. This is especially true for squash preparations (as done by MUNGUIRA (l.c.) and us), because the size depends also on how chromosomes were spread when pressing the cover slide. DE LESSE (1961d) found a contact zone of *fabressei* and *ripartii* in Teruel but both taxa have not been found sympatrically (DE LESSE 1968; MUNGUIRA *et al.* 1995).

humedasae (Toso & Baletto, 1976)
This endemic of Aosta valley (Italy) has a chromosome number of n=38 (TROIANO *et al.* 1979). We counted approximately the same number of chromosomes.

aroaniensis (Brown, 1976)
The chromosome number of this Greek taxon is n=48 (COUTSIS *et al.* 1999), not 15-16 as recorded by BROWN (1976b). No fixations were available to us.

nephohiptamenos (Brown & Coutsis, 1978)
The chromosome number of this Greek taxon was recorded as n=8-11 (BROWN & COUTSIS 1978), which would constitute the lowest number in *Agrodiaetus*, but according to DE PRINS (pers. comm.), the species has a very high chromosome number, possibly n=90 as in *ripartii*. No fixations were available to us.

alcestis (Zerny, 1932)
With n=19-21, this taxon has the lowest number of chromosomes of all brown *Agrodiaetus* (DE LESSE 1960A, 1960B; LARSEN 1975; LUKHTANOV *et al.* 1998; LUKHTANOV & DANTCHENKO 2002B). A haploid number of n=19 was found in Iran and Southeast Turkey, n=20(-21) in other Turkish provinces and Lebanon. Our results from Turkey and Iran confirm these results. The ssp. *karacetinae* Lukhtanov & Dantchenko, 2002 has been described recently from Dez valley (Hakkari) and Iran for the populations with a karyotype of n=19 chromosomes.

demavendi (Pfeiffer, 1938)
Variable chromosome counts of n=66-76 are known for this monomorphic *Agrodiaetus* species from various provinces in Iran, Turkey and Armenia (DE LESSE 1960A, 1960B;

LUKHTANOV *et al.* 1998; LUKHTANOV & DANTCHENKO 2002A) and our results from East Turkey and Northwest Iran fall within this range. DE LESSE (1960b) also notes the higher number of larger chromosomes (two large and several medium ones) in comparison with *ripartii* with only one large and one medium-sized chromosome. From the excellent photographs of LUKHTANOV & DANTCHENKO (2002) it is apparent that the chromosomes of *demavendi* gradually decrease in size. Populations from Kopet Dagh (Iran) with an even higher chromosome number of n=84 (DE LESSE 1963a) have been separated as *khorasanensis* (Carbonell, 2001). Our material from Tehran (Samqabad) is referable by external features to the newly described taxon *ahmadi* (Carbonell, 2001) from Zanjan and some specimens from Azarbayjan-e Sharqi are similar to the newly described taxon *urmiaensis* (Schurian & ten Hagen, 2003) from Urmia Lake (Northwest Iran). Although the ranges of *demavendi* and *ripartii* overlap in Eastern Anatolia a sympatric occurrence of these two taxa, verified karyologically, is not known.

interjectus (de Lesse, 1960)
This taxon from Eastern Turkey has been described only on the basis of its karyotype (n=29-32) and subsequent authors have doubted its status as a distinct species (HESSELBARTH *et al.* 1995; ECKWEILER & HÄUSER 1997). According to DE LESSE (1960b) it occurs sympatrically with *alcestis* and *demavendi* near Pertek. We were able to find a specimen close to the type locality near Erzincan which turned out to have n=31, confirming the results of DE LESSE (1960b).

dantchenkoi Lukhtanov & Wiemers, 2003
This is a newly discovered brown *Agrodiaetus* species discovered in Van (Southeast Turkey) with a chromosome number of n=40-42 (LUKHTANOV, WIEMERS & MEUSEMANN, in print). Specimens MW99274, MW99319 and MW99320 constitute paratypes. Externally and genetically this taxon is similar to *eriwanensis* (Forster, 1960) from Armenia, which has a chromosome number of n=28-35 (LUKHTANOV & DANTCHENKO, 2002a).

valiabadi (Rose & Schurian, 1977)
The karyotype of this local taxon from valleys of Northern Elburs (Iran) was previously unknown. We were able to establish the chromosome number as n=23.

***dolus*-group**

mithridates (Staudinger, 1878)
Variable chromosome numbers of n=21-27 have been recorded from different parts of its range in Turkey (DE LESSE 1960a, 1960b). Our result of n=23 from Malatya corresponds exactly with the result of DE LESSE (1960b) from the same place.

peilei Bethune-Baker, 1921
The chromosome number of this peculiar golden brown *Agrodiaetus* from Lorestan (Iran) was unknown previously. We were able to determine it from three specimens as n=39.

antidolus (Rebel, 1901)
This is the first of a group of four apparently closely related allopatric species which is known from Eastern Turkey and has a chromosome number of n=40-41 with chromosomes gradually decreasing in size (DE LESSE 1961b; HESSELBARTH *et al.*, 1995; LUKHTANOV *et al.* 1998). The taxon has been described from Kazikoparan (Iğdır Prov.) and chromosome counts are known from Pertek (Tunceli), Çatak (Van) and Bagishli (Hakkari). We tried to find the species at the

type locality without success but we can confirm the chromosome results for four populations from the province of Hakkari.

kurdistanicus (Forster, 1961)
Apparently this species is indistinguishable from the former taxon by external features, but its chromosome number is higher, n=61 was recorded from Görentach Köyu N of Van (DE LESSE (1960a) and n=ca. 57-62 from Çatak (Van Province) by DE LESSE (1960a) & LUKHTANOV *et al.* (1998). Interestingly the latter authors also found one specimen with *antidolus* karyotype at Çatak. We obtained similar chromosome counts from Çatak and Erek Dağı (Van Province), with one precise result from Çatak (n=62). Erek Dağı is the type locality of *kurdistanicus*. Although we did not obtain precise counts from this locality we can confirm that the karyotype with high chromosome number occurs at the type locality. This is important for the stability of the name *kurdistanicus* because *antidolus* populations with low chromosome number karyotype occur in close proximity.

morgani (Le Cerf, 1909)
The chromosome number of this taxon from Iranian Kordestan was determined as n=25-26 by DE LESSE (1961b) from a population near Sanandaj. Our result (n=27 from Saqqez) is very close to this figure.

femininoides (Eckweiler, 1987)
The chromosome number of this darkest member of the *antidolus* species group from Northwest Iran was unknown until now. We were able to determine its chromosome number from two populations in Zanjan and Ardabil with n=27 to be the same as in *morgani*.

sennanensis (De Lesse, 1959)
The chromosome number of this taxon from Iranian Kordestan which was described as a subspecies of *hopfferi* was established from the type series (including the holotype from Hamakasi, Sanandaj) as n=28-30 (DE LESSE 1959c). No fixations were available to us.

menalcas (Freyer, [1837])
The chromosome number of this Turkish taxon was recorded to be stable with n=85 in several populations throughout Turkey (DE LESSE 1960a, 1961a). Our results (the first ones from Fethiye and Van Province) confirm these results and we can also confirm that two of these chromosomes are much larger than the other ones (“macrochromosomes”).

dolus (Hübner, [1823])
We did not have material from Southern France where DE LESSE (1960a, 1961a, 1962b) recorded a chromosome number of n=123-125, the second highest number known in *Agrodiaetus*, but the following two Spanish taxa are very closely related. It should be noted that the type locality of *dolus* is unknown and could be Southern France (as often suggested), Italy or Spain.

ainsae (Forster, 1961)
This taxon represents *dolus* in Northern Spain and was separated from it because of its lower chromosome number of n=108-110 (DE LESSE 1962b; MUNGUIRA *et al.* 1995). We can confirm this chromosome number. According to MUNGUIRA *et al.* (1995) *ainsae* has two “macrochromosomes” compared to six in *fulgens* which is the reason to consider these allopatric taxa distinct species. This number is based on a single specimen from Burgos of which the number of chromosomes could not be established due to the poor quality of the preparation and probably for this reason it is also not figured. We obtained good metaphase

plates of two specimens from Illarduya (Alava) which display 108 chromosomes gradually decreasing in size, about six of them could be called “macrochromosomes” according to MUNGUIRA *et al.* (1995). DE LESSE (1962b) described a new subspecies (*A. dolus pseudovirgilia*) from Burgos, only based on the small wing size and slight differences in coloration.

fulgens (de Sagarra, 1925)
This taxon from Catalonia was separated by MUNGUIRA *et al.* (1995) from *ainsae* due to the higher number of “macrochromosomes” (six compared to two in *ainsae*) while the total number of chromosomes was found to be very similar (n=103, judged from three specimens). As is shown in the previous paragraph (under *ainsae*) this difference in “macrochromosomes” does not really exist. It should also be noted that a precise count of such high chromosome numbers and the identification of an exact number of macrochromosomes which gradually decrease in size is hardly possible when using the squash technique. DE LESSE (1966) already mentioned that (also with his technique) higher numbers of good metaphase plates are necessary to establish the exact chromosome number in species with such a high number of chromosomes. This taxon cannot be separated from *ainsae* by external characters either. We did not get precise counts from our metaphase plates because some chromosomes seem to overlap but the chromosome number of *fulgens* must be between n=100 and n=110.

***dama*-group**

dama (Staudinger, 1892)
This South Anatolian species has only been found in a few localities in Malatya, Maraş and Mardin Province (Turkey). DE LESSE (1959f) described its karyotype from Kahramanmaraş and OLIVIER *et al.* (1999b) confirmed his results from the type locality Malatya. It has an asymmetric karyotype with n=41 chromosomes, about eleven of them are large, gradually decreasing in size, the others medium-sized.

hamadanensis (de Lesse, 1959)
The chromosome number of this Iranian taxon was found by DE LESSE (1959a) to be n=21-22 in two populations from the type locality (Araj Pass) and from Sanandaj (Kordestan). We can confirm these results for two populations from Tehran province and a population from Ardabil (Azarbayjan-e Sharqi Province).

karindus (Riley, 1921)
The karyotype of this Iranian taxon was previously unknown and we were able to determine the chromosome number as n=66-68 for two specimens from Saqqez (Kordestan). This taxon has been treated as a subspecies of *dama* (Staudinger, 1892) which is only known from Malatya (Turkey), but the latter has a chromosome number of n=41-42 (DE LESSE 1959f; OLIVIER *et al.* 1999).

theresiae Schurian, van Oorschot & van den Brink, 1992
The karyotype of this taxon which was described from Saimbeyli in Adana Province (Turkey) was recorded as n=41-42 (HESSELBARTH *et al.* 1995; KANDUL & LUKHTANOV 1997), but the material came from another population near Taşkent (Konya Province). OLIVIER *et al.* (1999) proved with our material (specimens MW98240, MW98241, MW98243) that the chromosome number of true *theresiae* is n=63. The population from Taşkent was described accordingly as the following new species.

guezelmavi Olivier, Puplesiene, van der Poorten, De Prins & Wiemers, 1999
Separated from *theresiae* on the basis of its karyotype which is n=41-42 (KANDUL & LUKHTANOV 1997; OLIVIER *et al.* 1999) and only known from its type locality (Taşkent, Konya Prov., Turkey). Our material confirms these results. Externally this taxon cannot be separated from the allopatric *theresiae*.

***damon*-group**

hopfferi (Herrich-Schäffer, [1851])
For this Anatolian species a stable chromosome number of n=15 was recorded by DE LESSE (1959c, 1959f, 1960a) and LUKHTANOV *et al.* (1998) from different Turkish Provinces. We can confirm these results for Malatya, Van and Hakkari Province.

lycius (Carbonell, 1996)
This recently discovered species was only known from the type locality (Elmali in Antalya Province, Turkey) until a further population was discovered on the Turkey expedition 1998 near Güneykent (Isparta Province). Its haploid chromosome number was only approximately determined by CARBONELL (1996) as ca. 20-25. We can specify this number more precisely for three specimens from the type locality with n=21-22.

poseidon (Herrich-Schäffer, [1851])
DE LESSE (1963c) recorded different chromosome numbers from different localities: n=19 (Pozantı, Adana Prov.), n=20 (Kahramanmaraş) and n=21-22 (Amasya). KANDUL & LUKHTANOV (1997) recorded n=19 from Yusufeli (Artvin) and OLIVIER *et al.* (1999) n=20 from Malatya. We also obtained different results for populations from Zelve (Nevşehir) with n=20-21 and from Gökpinar (Sivas) with n=19. A clear geographical pattern does not emerge from these results. In one population from Ağrı DE LESSE (1963c) found a much higher chromosome number (n=24-26) but did not describe it as a new taxon. Only recently it was named as the following new karyospecies:

putnami (Dantchenko & Lukhtanov, 2002)
This taxon was separated from *poseidon* and described as a new species because of its different karyotype. The holotype from Kayabaşı (Prov. Erzurum) had a haploid chromosome number of n=26 and 4 males from Ağrı (2.VIII.1958, De Lesse leg., n=24-27) were included in the type series. We checked material from Ağrı and found n=25 in one specimen, thus specifying the results of DE LESSE (1963c). In another specimen from Yusufeli (Artvin) the chromosome number could be only approximately established as n=23-25. This specimen was attributed to *putnami* by LUKHTANOV (pers. comm.). If this is correct, both the karyospecies *putnami* and *poseidon* would occur in sympatry at Yusufeli, but in the author's opinion the plates are not clear enough to rule out a lower number of only n=21 chromosomes as found in *poseidon*.

damocles (Herrich-Schäffer, [1844])
Until recently, this species was only known from the South Ural Mts. (ssp. *damocles* (Herrich-Schäffer, [1844]), the Crimean Peninsula (ssp. *krymaeus* (Sheljuzhko, 1928) with n=25-27 according to KANDUL & LUKHTANOV (1997)) and the Volga river (ssp. *rossicus* Dantchenko & Lukhtanov, 1993) with n=24-26 according to LUKHTANOV *et al.* 1997). LUKHTANOV & DANTCHENKO (2002b) recorded this species for the first time from Turkey and described it as a new subspecies of *damocles:*

kanduli (Dantchenko & Lukhtanov, 2002)
This taxon was described as a subspecies of *damocles* (Herrich-Schäffer, [1844]). The chromosome number of the holotype from Yildiz (Erzincan, Turkey) was determined as n=25. Three other males from the same locality were included in the type series but without karyological data. Specimens with similar phenotype have been found before in Eastern Turkey but were assigned to *wagneri* (HESSELBARTH *et al.*, 1995). We found one specimen (MW99465) near Çatak (Van Province) which resembles this taxon closely in its phenotype and which turned out to have the same karyotype (n=25). It was assigned to *damocles* by LUKHTANOV (pers. comm.).

caeruleus (Staudinger, 1871)
The karyotype of this species was unknown until now. We were able to determine a haploid chromosome number of n=20 from two specimens of both type localities, Schakuh and Hajiabad (Prov. Golestan, Iran).

transcaspicus (Heyne, [1895])
A haploid chromosome number of n=52-53 has been recorded by DE LESSE (1963a, 1963c) for this species from Kopet Dagh. The following six taxa are very similar to it in phenotype but have very different chromosome numbers:

elbursicus (Forster, 1956)
DE LESSE (1963c) checked material from the type locality of this taxon at Kendevan Pass (Elburs, Iran) and recorded a haploid chromosome number of n=16-17. Our results from four populations around Kendevan Pass (n=16-18) confirm these results. We also obtained a result of one specimen similar to *elbursicus* from Zanjan with n=18. A slightly higher chromosome number of n=19-20 was found by DE LESSE (1963c) in populations from the Eastern Elburs Mts. from Āb Ali (Demavend) and Firuzkuh.

zapvadi (Carbonell, 1993)
This taxon was described as a subspecies of *elbursicus* from Güzelsu (Van Province, Turkey) with a haploid chromosome number of n=18-19 (DE LESSE 1963c). LUKHTANOV *et al.* (1998) recorded a chromosome number of n=17-18 from the type locality and we can confirm a number of n=18-19 for the same locality. HESSELBARTH *et al.* (1995) synonymized this taxon with *elbursicus.*

ninae (Forster, 1956)
The karyotype of this taxon was recorded to be n=34 in Armenia near the type locality (Daralagez Mts.) by LUKHTANOV (1989) and LUKHTANOV & DANTCHENKO (2002a) and n=33-37 in Northeast Turkey (Doğubayazıt, Ararat, Ağrı) by DE LESSE (1963c). Chromosomes are gradually decreasing in size. Our result of a specimen from Ağrı (n=34) confirms these figures.

turcicola (Koçak, 1977)
This taxon was described as a subspecies of *transcaspicus* from Van (Turkey). Its phenotype seems to be indistinguishable from the allopatric *ninae* but its chromosome number is n=(19-)20 (DE LESSE 1960a, 1963c; LUKHTANOV *et al.* 1998). Our results confirm a chromosome number of n=20 for three populations in Van Province but one specimen from Çatak had a higher number (n=22) which is the same as in the closely related *aserbaidschanus* (Forster, 1956) from Azarbaijan. Sympatric occurrence with *zapvadi* has been reported from many locations in Van Province, and at one of them (Güzelsu)

LUKHTANOV *et al.* (1998) reported a chromosome number of n=19-20 compared to n=17-18 for *zapvadi* at the same location.

huberti (Carbonell, 1993)
This species was separated from *ninae* based on slight differences in phenotype while the karyotype is hardly different. A chromosome number of n=33-34 was recorded by DE LESSE (1963c) from the type locality at Ağrı and LUKHTANOV & DANTCHENKO (2002a) recorded n=35-37 for Armenia. We obtained chromosome counts of n=33-36 from populations in Northeast Turkey (Artvin, Kars & Bayburt Provinces).

pierceae (Lukhtanov & Dantchenko, 2002)
LUKHTANOV *et al.* (1998) discovered that *huberti* from Güzeldere Geçidi (Van Prov.) has a divergent karyotype with n=22 and therefore it was described as a distinct species four years later. We obtained chromosome counts of n=ca.22 also from Çatak (Van Prov.) and Dez valley (Hakkari).

carmon (Herrich-Schäffer, [1851])
DE LESSE (1960a, 1963b) investigated material of this Anatolian species from the type locality (Amasya) and from Gümüşhane and Kayseri and found a haploid chromosome number of n=81-82. One chromosome is much larger than all the other ones. We obtained only an approximate result from Artvin Province which is similar (n>=79) while two specimens from Antalya Province gave no results at all.

schuriani (Rose, 1978)
This taxon was described as a subspecies of *carmon* from Nevşehir but sunk into synonymy by HESSELBARTH *et al.* (1995). We found a specimen at Gezbeli Geçidi (Kayseri) which might represent this taxon and the chromosome number was only approximately identified as n=75-80 which does not exclude the possibility that the true number is n=81-82 as established by DE LESSE (1963b) from Kayseri.

surakovi Dantchenko & Lukhtanov, 1994
This taxon was described as a subspecies of *carmon* from Azarbaijan but later raised to species status because of its different karyotype with n=50 recorded from three Armenian populations. The chromosomes gradually decrease in size (LUKHTANOV & DANTCHENKO 2002a). LUKHTANOV & DANTCHENKO (2002b) recorded this species also from Turkey and named it as a different subspecies:

sekercioglui (Dantchenko & Lukhtanov, 2002)
Described from Çatak (Van Province, Turkey) as a subspecies of *surakovi* with the same chromosome number of n=50 (LUKHTANOV & DANTCHENKO 2002b). We obtained only an approximate chromosome count from one specimen collected near the type locality which is close to that figure.

pseudoxerxes (Forster, 1956)
This species was described as a subspecies of *carmon* from Schakuh in Eastern Elburs Mts. (Iran) and at the same time *kendevani* (Forster, 1956) was described as another subspecies of *carmon* from Kendevan Pass in Central Elburs Mts. (Iran). DE LESSE (1962a) ruled out conspecifity of both taxa (as recently suggested again by ECKWEILER & HÄUSER 1997) because he found both taxa sympatric at Kendevan pass and treats *pseudoxerxes* as a subspecies of *altivagans*. He established a chromosome number of n=16 for *pseudoxerxes* from Kendevan Pass. The chromosome number of populations from East Elburs was

unknown until now. We were able to determine a haploid chromosome number of n=15 in a specimen from the type locality Schakuh.

dizinensis (Schurian, 1982)
The karyotype of this species was unknown until now. We found a haploid chromosome number of n=17 in a specimen from the type locality Dizin (Tehran, Iran), the only known locality of this species.

cyaneus (Staudinger, 1899)
Variable chromosome numbers of n=16-20 were found in different populations from Iran, Azarbaijan, Armenia and Turkey (Van Province) (DE LESSE 1960a, 1963b; LUKHTANOV *et al.* 1998; LUKHTANOV 1989; LUKHTANOV & DANTCHENKO (2002a)). Our results from Van Province (n=18) and Kars Province (n=17) fall within this range. Several subspecies of *cyaneus* have been described from Iran which are sometimes treated as distinct species (ssp. *xerxes* (Staudinger, 1899) from Elburs Mts., ssp. *paracyaneus* (De Lesse, 1963) from Hamadan, ssp. *damalis* (Riley, 1921) from Karind Gorge (Zagros Mts.), ssp. *fredi* Eckweiler, 1997 from Fars and ssp. *kermansis* (De Lesse, 1962) from Kerman).

merhaba De Prins, van der Poorten, Borie, Oorschot, Riemis & Coenen, 1991
This species is only known from its type locality at Yusufeli (Artvin Province). Its chromosome number is n=16-17 (LUKHTANOV *et al.* 1998) and this figure can be confirmed by our data.

zarathustra Eckweiler, 1997
The karyotype of this species from Dorud (Lorestan, Iran) was unknown until now. According to our results, it has a haploid chromosome number of n=ca 22.

actis (Herrich-Schäffer, [1851])
OLIVIER (2000a) discovered the syntypes of this species and designated a lectotype from Tokat. This was important because the type locality of this taxon was very imprecisely stated as “Kleinasien” (= Asia minor) in its original description. Several recent authors including HESSELBARTH *et al.* (1995) and ECKWEILER & HÄUSER (1997) treated a different taxon under the name *actis* (see under *sigberti*). The chromosome number of *actis* from the type locality or surroundings is unknown and the expedition to Central Turkey in 1998 did not succeed in finding this species near Tokat or Amasya. The closest population we found was near Gürün (Sivas Province) of which we established a haploid chromosome number of n=17 from two specimens. This came as a surprise because only much higher chromosome numbers (n=24-34) are known from phenotypically similar populations in other parts of Turkey, all of them more distant from Tokat. These populations are provisionally treated under the following name:

firdussii (Forster, 1956)
An extraordinary variation of chromosome numbers (n=21-34) has been recorded for this taxon and several authors suggested that it consists of different species, but there is no clear geographical pattern and populations with different karyotypes have no distinctive phenotypic features. The chromosome number of this species from the type locality Schakuh (East Elburs Mts., Iran) is unknown, but DE LESSE (1960a, 1962a) obtained counts of relatively high numbers (n=31-34) from Demavend (East Elburs). He recorded similar chromosome numbers also from Kop Dağı in Turkey (n=30-32), but in another location just 80km to the west (25 km N Erzincan) he obtained chromosome numbers of only n=24-25. This material from Erzincan was included in the type series of *Agrodiaetus bilgini* Dantchenko & Lukhtanov,

2002. The description of this taxon, with the holotype from Torul (Gümüşhane Prov., Turkey) was based only on the difference in chromosome numbers (n=25). We checked a population 25 km SE Erzincan (Çağlayan) and obtained chromosome counts of n=30-32 in three specimens. LUKHTANOV *et al.* (1998) found low chromosome numbers also in Van Province (n=21-23 at Güzeldere Geçidi and n=25 at Çatak) and Bitlis Province (n=25 at Kuzgunkiran Geçidi). The material of the latter two populations was included in the type series of *Agrodiaetus haigi* Dantchenko & Lukhtanov, 2000, together with the holotype from Çatak (n=25) and further paratypes from Çatak (n=25-26), Kurubas Geçidi (n=25) and Güzeldere Geçidi (n=25). Our chromosome counts from Van Province (n=25 from Çatak and n=26 from Güzeldere Geçidi) confirm these results. The picture is complicated by the fact that intermediate chromosome numbers of n=27-29 are also known from populations in northwest Iran and eastern Turkey. DE LESSE (1960a, 1962a) found a haploid chromosome number of n=28 near Tabriz (Azarbayjan-e Sharqi, Iran) and n=27-29 at Mirgemir Dağı (Ağrı, Turkey). We also found a population with n=28-29 near Zanjan (Iran) and with n=25-27 in Dez valley (Hakkari Prov., Turkey).

pseudactis (Forster, 1960)
This taxon which was described from Daralagez Mts. in Nachichevan (Azerbaydzhan) is very similar to *firdussii* and its status (species, subspecies or synonym) is in dispute. LUKHTANOV & DANTCHENKO (2002a) obtained a chromosome number of n=29 from Armenian populations.

artvinensis (Carbonell, 1997)
Another species which is closely related to *firdussii* and only known from Erzurum Prov. (type locality: Tortum) and Artvin Prov. in Turkey. Its chromosome number was found to be n=21-22 at Kilizkaya in Artvin Prov. (OLIVIER *et al.* 2000) and we can confirm these results from the same locality.

sigberti Olivier, van der Poorten, Puplesiene & De Prins, 2000
This name was introduced to denote a taxon previously referred to under the name *actis*. It is mainly distributed in the Taurus Mts. and a few locations in the Pontic chain. The karyotype was described by LUKHTANOV & DANTCHENKO (2002b) who counted n=29 chromosomes in two paratypes from the type locality (Aladaglari, Niğde Prov., Turkey). We checked males from the same locality and obtained n=25 and n=28 in two different specimens. DE LESSE (1962a) found n=27 in a population from Bürücek (İçel Prov.) which probably belongs to this taxon.

ernesti Eckweiler, 1989
This taxon which was described as a subspecies of *firdussii* was only known from the type locality (Kohu Dağı in Antalya Prov., Turkey) and its karyotype was unknown until now. We found two specimens at a new locality (Dedegöl Geçidi, Isparta Prov.) of which one revealed its karyotype which is n=18.

sertavulensis (Koçak, 1979)
The karyotype of this taxon described as a subspecies of *pseudactis* and only known from the Taurus mountains was unknown until now. We were able to establish its karyotype from two specimens from Yellibelli Geçidi (Karaman Prov.) which is 33 km West of the type locality (Sertavul Pass) as n=20.

maraschi (Forster, 1956)
This taxon has been described from Kahramanmaraş as a subspecies of *damone* and treated as a distinct species (KOÇAK 1979), as a synonym of *wagneri* (s. HESSELBARTH *et al.* 1995) or as a subspecies of *firdussii* (s. ECKWEILER & HÄUSER 1997). DE LESSE (1962a) found a specimen of this taxon at Erciyes Dağı (Kayseri) and established a haploid chromosome number of n=16. We can confirm this result from a specimen found near Gürün which is 40 km closer to the type locality.

altivagans (Forster, 1956)
This taxon was described from the high altitudes (2800m) of Daralagez Mts. (Nachichevan, Azerbaydzhan). DE LESSE (1962a) records a variable chromosome number from Turkish populations: n=21-23 in Erzurum and Ağrı Prov., but a lower number of n=18 in two populations near Erzincan. LUKHTANOV & DANTCHENKO (2002a) confirmed the first figure for two Armenian populations (n=20-23) and we can confirm it for Güzeldere Geçidi in Van Province of Turkey (n=21-23). DE LESSE (1962a) also checked Iranian populations which he referred to as "*A. altivagans* ssp." from Marand (n=19-22), Tabriz (n=18), Hamadan (n=18) and Sanandadj (n=17-18). The latter two were described as ssp. *ectabanensis* (de Lesse, 1963) while the first two were left undescribed due to lack of sufficient material. The one from Marand probably belongs to the following taxon:

gorbunovi Dantchenko & Lukhtanov, 1994
This taxon was described as a new species which is closely related to *ectabanensis* from Talysh Mts. in Azerbaydzhan. Its chromosome number has not been reported, but the specimens of "*altivagans* ssp." which DE LESSE (1962a) caught east of Marand (n=19-22) might represent this taxon. We collected two specimens at Dugijan (30 km East of Marand) and obtained a chromosome number of n=ca. 20. Another specimen from Ahar Pass (Azarbayjan-e Sharqi) gave the same result and a specimen from Khalkhal, Gollijeh (Ardabil) had n=19 chromosomes.

wagneri (Forster, 1956)
This taxon was described as a subspecies of *damone* and elevated to species rank by HESSELBARTH *et al.* (1995). DE LESSE (1960a, 1962a) karyotyped a specimen from the type locality Aksehir (Konya Prov., Turkey) and found n=16 chromosomes. Other results have not been published, yet. We found a specimen at Zelve (Nevşehir) which resembles the holotype but has n=18 chromosomes.

turcicus (Koçak, 1977)
The karyotype of this Eastern Anatolian species has been described by LUKHTANOV *et al.* (1998) of populations from Erzurum and Çatak (Van Prov.). It is one of only two species of *Agrodiaetus* known to have a stable haploid chromosome number of n=24 which is the modal chromosome number in Lycaenidae. (The other species is *poseidonides* (Staudinger, 1886)). We can confirm this result from Çağlayan (Erzincan Prov.).

baytopi (de Lesse, 1959)
DE LESSE (1959d) established the karyotype of this Eastern Anatolian species in his original description as n=27 from the type locality (Doğubayazıt, Ağrı Prov.). We can confirm this result from Güzeldere Geçidi (Van Prov.). DE LESSE (1959d) had problems to find eupyrene spermatogonia in this species and we also managed to find a good metaphase in only one out of 13 investigated specimens.

rovshani Dantchenko & Lukhtanov, 1994
The karyotype of this species which has been described from Talysh mts. in Azerbaidzhan and which seems to be closely related to *baytopi* remains unknown. We did not obtain a result from a specimen collected in Dugijan (Azarbayjan-e Sharqi, Iran).

tankeri (de Lesse, 1960)
DE LESSE (1960c) described this species after he discovered (DE LESSE 1957, 1959e) that populations externally similar to *iphigenia* from Kop Dağı Geçidi and Mirgemir Dağı have a different karyotype with n=20-21 chromosomes and both taxa occur sympatrically on Mirgemir Dağı. The karyotype is asymmetric with nine chromosomes much larger than the other ones. We checked nine specimens from the type locality (Kopdağı Geçidi) and one from Gölyurt Geçidi (Erzurum) but were unable to find any eupyrene metaphases.

iphigenia (Herrich-Schäffer, [1847])
A variable chromosome number of n=12-16 has been found in Anatolian populations. The lowest numbers (n=12) were found in NE Turkey, n=13 mainly in SE Turkey and n=15-16 in Eastern Taurus (DE LESSE 1959e; LUKHTANOV *et al.* 1998). We can confirm n=12 for Erzincan and found n=14-15 in Western Taurus (Fethiye and Isparta Prov.). The ssp. *nonacriensis* (Brown, 1977) has been described from Peleponnesos, Greece, at the Western distributional limit of this species. The separation was made partly due to its lower chromosome numbers of n=10-13 (BROWN 1977), but most other chromosome counts of this author have turned out to be erroneous, thus it should be verified again.

iphicarmon Eckweiler & Rose, 1993
This taxon was described as a subspecies of *iphigenia* although it was found sympatrically with the latter taxon at the type locality Dedegöl Geçidi (Isparta Prov., Turkey), its only known locality (ECKWEILER & ROSE 1993). We revealed its karyotype which has a chromosome number of n=29. We were also able to check a specimen of *iphigenia* from the same locality which turned out to have n=15. This proves that *iphicarmon* cannot be conspecific with *iphigenia*.

iphidamon (Staudinger, 1899)
This North Iranian taxon is often treated as a subspecies of *iphigenia* (e.g. HESSELBARTH *et al.* 1995) because of its similar chromosome number (n=14 at Āb Ali and Firuzkuh in Eastern Elburs according to DE LESSE 1959e). We can confirm this number now for the type locality Schakuh and for Hajiabad (Golestan, Iran).

damon ([Denis & Schiffermüller], 1775)
The most widespread *Agrodiaetus* species which is found from Northern Spain to Mongolia seems to have a stable chromosome number of n=45 (with one large chromosome) throughout its range. Counts have been made in populations from the French Pyrenees, French Alps, Mt. Ararat (Turkey) and Altai Mts. (DE LESSE 1960a; LUKHTANOV 1989). We did not obtain cells with typical divisions from our four preparations from Eastern Turkey.

mofidii (de Lesse, 1963)
DE LESSE (1963a) described this species from Kopet Dağı, Iran with a chromosome number of n=34-35 (n=34 in the holotype). We checked two specimens from Kuh-e-Sorkh (Khorasan) of the newly described ssp. *sorkhensis* Eckweiler, 2003. These turned out to have a higher chromosome number of n=ca.42-45 and might therefore represent a different species.

phyllis (Christoph, 1877)
DE LESSE (1959b) studied material from Kendevan Pass and Demavend (Elburs Mts., Iran) and found only a slight variation in chromosome numbers (n=79-82) and a very peculiar karyotype with one extremely large and three other large chromosomes while the rest was very small. A very similar karyotype with n=78 was found by DE LESSE (1957, 1959b) in several Eastern Anatolian populations (ssp. *vanensis* (de Lesse, 1957)) and by LUKHTANOV & DANTCHENKO (2002a) with n=79-80 in Armenia (ssp. *sheljuzhkoi* (Forster, 1960)) while the karyotype of *dagestanicus* (Forster, 1960) from Dagestan (Russia) turned out to be very different (n=40) and represents another species (LUKHTANOV & DANTCHENKO 2002a). We are able to confirm this karyotype not only from Kendevan Pass and Demavend but also from Schakuh, the type locality of *phyllis.* We found n>=82 chromosomes in specimen MW00348 and can confirm the existence of one huge outstanding bivalent, which is 10 times larger than the mid-size bivalents as well as three large bivalents which are 3-4 times larger than the mid-size bivalents.

posthumus (Christoph, 1877)
DE LESSE (1957, 1959b) checked the karyotype of specimens which he thought to represent this taxon and found their karyotype to be very different from *phyllis* with n=10-11 chromosomes. However he did not check topotypical material from Schakuh, but from other localities in Elburs Mts. (Kendevan Pass, Demavend, Firuzkuh) and these populations belong to a different taxon later named *birunii* (see the next paragraph). We were first to examine material from the type locality of *posthumus* and found a peculiar karyotype totally different from *birunii* with a high number of n=ca 85 chromosomes, two of them about 15 and a third about 10 times bigger than the remaining chromosomes. The karyotype of *phyllis* which occurs sympatrically at Schakuh has a very similar number of chromosomes but a very different karyotype (see previous paragraph). Both species are easy to identify at Schakuh whereas *birunii* and *phyllis* can easily be confused with each other (DE LESSE 1959b: 9).

birunii Eckweiler & ten Hagen, 1998
This taxon was described as a subspecies of *posthumus* from Firuzkuh, East Elburs, but due to the totally different karyotype it must be regarded as specifically distinct from *posthumus* as well as from *phyllis.* A specimen from the type locality was karyotyped by DE LESSE (1959b) who found a haploid chromosome number of n=10 which is the lowest chromosome number known in *Agrodiaetus.* Further material of this taxon was karyotyped by DE LESSE (1959b) from Demavend and Kendevan Pass. We are able to confirm a chromosome number of n=10-11 (or 2n=20-22) from Veresk (near the type locality), from Polur (Demavend), from three populations near Kendevan Pass (Pul-e Zanguleh, Gardaneh-ye Lavashm, Golestanak Nature Reserve) as well as from two new localities: Dizin Pass and Takht-e Suleyman.

darius Eckweiler & ten Hagen, 1998
This taxon from Elburs Mts. (Iran) was described as a new species because it was found sympatrically with *birunii* which was regarded as a subspecies of *posthumus* by ECKWEILER & TEN HAGEN (1998). However, *birunii* is specifically distinct from *posthumus* (see previous paragraph) and thus it cannot be ruled out that *darius* is a subspecies of *posthumus*. Both taxa are allopatric and have a similar phenotype. Unfortunately the karyotype of *darius* remains unknown. We checked a specimen from the type locality (Polur) and from Dizin, but were unable to find typical meiotic divisions. Recently a population attributed to *darius* was discovered in the Iranian Talysh Mts. (Azerbaijan-e Sharqi) near Masuleh and described as a new subspecies (*masulensis* ten Hagen & Schurian, 2000).

iphigenides-group

iphigenides (Staudinger, 1886)
The chromosome number of this Central Asian species was found to be n=65-67 in different populations from Kirgizia and Uzbekistan (LUKHTANOV & DANTCHENKO 2002a). No chromosome fixations were available to us.

poseidonides (Staudinger, 1886)
The chromosome number of this Central Asian species was found to be n=24 in two populations from Kirgizia (LUKHTANOV & DANTCHENKO 2002a). It is one of only two species of *Agrodiaetus* known to have a stable haploid chromosome number of n=24 which is the modal chromosome number in Lycaenidae. (The other species is *turcicus* (Koçak, 1977). No chromosome fixations were available to us.

dagmara-group

dagmara (Grum-Grshimailo, 1888)
The karyotype of this Central Asian species is unknown. No chromosome fixations were available to us.

erschoffii-group

glaucias (Lederer, 1871)
The karyotype of this species which has been described from Hajiabad and Schakuh in Elburs Mts. of Iran remains unknown. We did not manage to find this species on our visit at the type localities.

erschoffii (Lederer, 1869)
DE LESSE (1963a) and LUKHTANOV & DANTCHENKO (2002a) recorded a chromosome number of n=13-15 from Kopetdag (Turkmenia) from where ssp. *tekkeanus* (Christoph, 1887) was described. We can confirm this chromosome number for nominotypical *erschoffii* from the type locality Hajiabad (East Elburs Mts., Iran).

unknown group
The following taxa have been described after 1997 and are not apparently closely related to any of the taxa listed by ECKWEILER & HÄUSER (1997):

klausschuriani ten Hagen, 1999
The chromosome number of this newly discovered species was not known until now. We checked six specimens from the type locality Veresk in eastern Elburs Mts. and found a chromosome number of n=56 in three of them.

tenhageni Schurian & Eckweiler, 1999
Two chromosome preparations of this newly discovered taxon from Khorasan (Iran) did not reveal typical divisions and therefore the karyotype remains unknown. SCHURIAN & ECKWEILER (1999) could not place it into any group.

arasbarani (Carbonell & Naderi, 2000)
The chromosome number of this new taxon from Arasbaran (Azarbaijan-e-Sharqi, Iran) remains unknown.

shahrami Skala, 2001
The chromosome number of this endemic from high altitudes of Zagros Mts. (Zarde-Kuh, 3000-3300m, Bakhtiari, Iran) was determined by V. Lukhtanov (SKALA 2002b) from one preparation with meiotic divisions as n=128-131, which constitutes the highest chromosome number so far known in *Agrodiaetus*.

achaemenes Skala, 2002
Only atypical divisions with a high number of chromosomes were found in two specimens of this taxon which was recently discovered by SKALA (2002b) at very high altitudes (3800-4000m) in the Iranian Zagros range (Kuh-e-Haft, Bakhtiari).

paulae Wiemers & De Prins, 2003
At Ahar Pass (Azarbayjan-e Sharqi, Iran) a new taxon of *Agrodiaetus* was found (WIEMERS & DE PRINS, in print) whose phenotype has similarities to *elbursicus* (wing colour of the upperside) and *altivagans* (reduced wing markings on the underside). Its chromosome number was determined as n=17 from six specimens. At Ahar Pass this taxon was flying together with *gorbunovi*, which is thought to be closely related to *altivagans* and has n=20 chromosomes.

Tab. 2 presents a synoptic alphabetical list of the above mentionned taxa with chromosome counts. It also includes further *Agrodiaetus* species of which chromosome numbers are known, with corresponding references.

Discussion

The correct establishment of the karyotype is a very difficult task, especially in the many *Agrodiaetus* species with high chromosome numbers and very small chromosomes. The only possibility to count them is in the Metaphase I of Meiosis when the bivalents are in a condensed form and well separated from each other. Even then, their size can be below 1µm which is at the absolut limit of resolution for light microscopy.Irregular (apyrene) spermatogenesis (FRIEDLÄNDER 1997) is the dominant form in adult *Agrodiaetus*, but correct chromosome counts can usually only be made from eupyrene spermatogonia which are much less common. Difficulties in finding “good” metaphase cells with non-overlapping bivalents can lead to erroneous counts. The presence of multivalents and macrochromosomes which can be confused with each other or possibly supernumerary chromosomes further complicates the task (LORKOVIĆ 1990). Not surprisingly, erroneous results have also been published, one unfortunate example being BROWN (1976b) and BROWN & COUTSIS (1978) with totally wrong chromosome counts (COUTSIS *et al.* (1999); DE PRINS, pers. comm.). Therefore caution should be applied if chromosome counts are ambiguous or cells are of poor quality. Nevertheless, a large part of the variation found in *Agrodiaetus* species is due to methodical difficulties, especially in the case of the squash techniques which often result in overlapping bivalents which can lead to an underestimate of chromosome numbers. Only recently, a new two-phase method of chromosome preparation was developed (LUKHTANOV & DANTCHENKO 2002a) which overcomes some of these problems, because the original position of chromosomes is less distorted. The disadvantage of this method is that no durable preparations can be made and photographs remain the only evidence. This method was applied in a part of the preparations (since 2002) and often yielded more precise chromosome counts. Despite the methodological difficulties there is some evidence that slight variation of bivalent chromosome numbers (not involving supernumerary chromosomes) within a population and even within individuals may exist. We observed such variation e.g. in *A. birunii* (n=10-11), *A. iphigenia* (n=12-14) and *A. poseidon* (n=19-21). More studies are needed to understand this phenomenon. More common is slight variation of chromosome numbers between populations and it is not known whether these differences are effective as genetic barriers to gene flow.

Tab. 2. Chromosome numbers in *Agrodiaetus*

Agrodiaetus-**Taxa**	**n** (new= bold)	**Own results** (haploid chromosome numbers) according to Provinces (E=Spain, I=Italy, TR=Turkey, IR=Iran) or **references**
achaemenes Skala, 2002	?	*see text*
actis (Herrich-Schäffer, [1851])	**17**	TR: Sivas (17)
admetus (Esper, [1783])	78-80	TR: Antalya (80), Adana (ca78-80)
ainsae (Forster, 1961)	108-110	E: Alava (ca108), Huesca (ca108)
alcestis (Zerny, 1932)	19-21	IR: Zanjan (19), TR: Hakkari (19), Van (19), Karaman (20), Adana (21)
altivagans (Forster, 1956)	18-23	TR: Van (ca21-23), Erzincan (ca21)
antidolus (Rebel, 1901)	40-42	TR: Hakkari (42)
arasbarani (Carbonell & Naderi, 2000)	?	*see text*
ardschira (Brandt, 1938)	113-115	De Lesse (1961b)
aroaniensis (Brown, 1976)	48	*see text*
artvinensis (Carbonell, 1997)	21-22	TR: Artvin (ca21-22)
aserbeidschanus (Forster, 1956)	22-23	Lukhtanov & Dantchenko (2002a)
baytopi (de Lesse, 1959)	27	TR: Van (ca27-28)
bilgini (Dantchenko & Lukhtanov, 2002)	25	Lukhtanov & Dantchenko (2002b)
birunii Eckweiler & ten Hagen, 1998	**10-11**	IR: Tehran (10-11), Mazandaran (10-11)
caeruleus (Staudinger, 1871)	**20**	IR: Golestan (20)
carmon (Herrich-Schäffer, [1851])	81-82	TR: Artvin (ca80)
carmonides Eckweiler, 1997	15-16	Lukhtanov (1989)
ciscaucasicus Forster, 1956	16	Lukhtanov & Dantchenko (2002a)
cyaneus (Staudinger, 1899)	16-20	TR: Kars (17), Van (18-19)
dagestanicus Forster, 1960	40	Lukhtanov & Dantchenko (2002a)
dagmara (Grum-Grshimailo, 1888)	?	*see text*
dama (Staudinger, 1892)	41	*see text*
damocles (Herrich-Schäffer, [1844])	23-26	*see text*
damon ([Denis & Schiffermüller], 1775)	45	*see text*
damone (Eversmann, 1841)	66-68	Lukhtanov *et al.* (1997)
dantchenkoi (Lukhtanov & Wiemers, 2003)	**40-42**	TR: Van (ca40-42)
darius Eckweiler & ten Hagen, 1998	?	*see text*
deebi (Larsen, 1974)	17	Larsen (1974b)
demavendi (Pfeiffer, 1938)	66-76	IR: Tehran (ca70), Azarbaijan (ca70-80); TR: Kars (ca66), Hakkari (ca60-70)
dizinensis (Schurian, 1982)	**17**	IR: Tehran (17)
dolus (Hübner, [1823])	123-125	De Lesse (1962b, 1966)
ectabanensis (De Lesse, 1963)	18	De Lesse (1964)
elbursicus (Forster, 1956)	16-18	IR: Tehran (17-18), Mazandaran (16-18), Zanjan (18)
eriwanensis (Forster, 1960)	32-35	Lukhtanov & Dantchenko (2002a)
ernesti Eckweiler, 1989	**18**	TR: Isparta (18)
erschoffii (Lederer, 1869)	13-15	IR: Golestan (ca13-14)
fabressei (Oberthür, 1910)	90	E: Soria (>75)
femininoides (Eckweiler, 1987)	**27**	IR: Zanjan (27), Ardabil (27)
firdussii (Forster, 1956)	24-32	IR: Zanjan (28-29); TR: Erzincan (ca30-32)
fulgens (de Sagarra, 1925)	103	E: Tarragona (ca98-103)
galloi (Baletto & Toso, 1979)	66	Troiano & Giribaldi (1979)
glaucias (Lederer, 1871)	?	*see text*
gorbunovi Dantchenko & Lukhtanov, 1994	**19-20**	IR: Azarbaijan (20), Ardabil (19)
guezelmavi Olivier, Puplesiene, van der Poorten, De Prins & Wiemers, 1999	42	*see text*
haigi (Lukhtanov & Dantchenko, 2002)	21-25	TR: Van (24-26), Hakkari (25-27)
hamadanensis (de Lesse, 1959)	21-22	IR: Tehran (21-22)
hopfferi (Herrich-Schäffer, [1851])	15	TR: Malatya (ca15-16), Van (15), Hakkari (15)
huberti (Carbonell, 1993)	33-37	TR: Artvin (36), Kars (ca33-34), Bayburt (ca33)
humedasae (Toso & Baletto, 1976)	38	I: Aosta (ca38)
interjectus (de Lesse, 1960)	29-32	TR: Erzincan (31)
iphicarmon Eckweiler & Rose, 1993	**29**	TR: Isparta (29)

***Agrodiaetus*-Taxa**	**n** (new= bold)	**Own results** (haploid chromosome numbers) according to Provinces (E=Spain, I=Italy, TR=Turkey, IR=Iran) or **references**
iphidamon (Staudinger, 1899)	14	IR: Mazandaran (14), Golestan (14)
iphigenia (Herrich-Schäffer, [1847])	12-16	TR: Kars (ca11-14), Erzincan (12), Fethiye (14), Isparta (15)
iphigenides (Staudinger, 1886)	65-67	LUKHTANOV & DANTCHENKO (2002a)
juldusus (Staudinger, 1886)	67	LUKHTANOV & DANTCHENKO (2002a)
kanduli (Lukhtanov & Dantchenko, 2002)	25	TR: Van (25)
karindus (Riley, 1921)	68	IR: Kordestan (68)
khorasanensis (Carbonell, 2001)	84	*see text*
klausschuriani ten Hagen, 1999	**56**	IR: Mazandaran (56)
kurdistanicus (Forster, 1961)	57-62	TR: Van (56-62)
lorestanus Eckweiler, 1997	69-74	*see text*
lycius (Carbonell, 1996)	**21-22**	TR: Antalya (21-22)
maraschi (Forster, 1956)	16	TR: Sivas (16)
menalcas (Freyer, [1837])	85	TR: Fethiye (85), Antalya (>75), Van (85)
merhaba De Prins, van der Poorten, Borie, Oorschot, Riemis & Coenen, 1991	16-17	TR: Artvin (ca17)
mithridates (Staudinger, 1878)	21-27	TR: Malatya (23)
mofidii (de Lesse, 1963)	34-35	*see text*
morgani (Le Cerf, 1909)	25-27	IR: Kordestan (27)
nephohiptamenos (Brown & Coutsis, 1978)	ca.90	*see text*
ninae (Forster, 1956)	33-37	TR: Ağrı (34)
paulae Wiemers & De Prins, 2003	**17**	IR: Azarbaijan (17)
peilei Bethune-Baker, 1921	**39**	IR: Kordestan (39)
pfeifferi (Brandt, 1938)	106-108	DE LESSE (1961b)
phyllides (Staudinger, 1886)	ca. 66	LUKHTANOV & DANTCHENKO (2002a)
phyllis (Christoph, 1877)	78-82	IR: Tehran (ca76-78), Golestan (ca82-86)
pierceae (Lukhtanov & Dantchenko, 2002)	21-22	TR: Van (21)
poseidon (Herrich-Schäffer, [1851])	19-22	TR: Nevşehir (21-22), Sivas (19)
poseidonides (Staudinger, 1886)	24	*see text*
posthumus (Christoph, 1877)	**ca. 85**	IR: Golestan (ca85)
pseudactis (Forster, 1960)	29	*see text*
pseudoxerxes (Forster, 1956)	15-16	IR: Golestan (15)
putnami (Lukhtanov & Dantchenko, 2002)	25-27	TR: Ağrı (25)
ripartii (Freyer, 1830)	90	E: Burgos (ca90); TR: Isparta (>80), Adana (ca90), Artvin (ca90), Erzincan (>85), Van (>71)
rovshani Dantchenko & Lukhtanov, 1994	?	*see text*
schamil (Dantchenko, 2000)	17	LUKHTANOV & DANTCHENKO (2002a)
schuriani (Rose, 1978)	81-82	TR: Kayseri (ca75-80)
sekercioglui (Lukhtanov & Dantchenko, 2002)	50	TR: Van (>45)
sennanensis (de Lesse, 1959)	28-30	*see text*
sertavulensis (Koçak, 1979)	**20**	TR: Karaman (20)
shahrami Skala, 2001	128-131	*see text*
sigberti Olivier, van der Poorten, Puplesiene & De Prins, 2000	25-29	TR: Kayseri (25,28)
sorkhensis Eckweiler, 2003	**ca.45**	IR: Khorasan (ca45)
surakovi Dantchenko & Lukhtanov, 1994	50	*see text*
tankeri (de Lesse, 1960)	20-21	*see text*
tenhageni Schurian & Eckweiler, 1999	?	*see text*
theresiae Schurian, van Oorschot & van den Brink, 1992	63	TR: Adana (59-63)
transcaspicus (Heyne, [1895])	52-53	*see text*
turcicola (Koçak, 1977)	19-22	TR: Van (19-22)
turcicus (Koçak, 1977)	24	TR: Iğdır (ca25), Erzincan (ca24)
valiabadi (Rose & Schurian, 1977)	**23**	IR: Mazandaran (23)
wagneri (Forster, 1956)	16-18	TR: Nevşehir (18, 19-21?)
zapvadi (Carbonell, 1993)	18-19	TR: Van (18-19)
zarathustra Eckweiler, 1997	**ca. 22**	IR: Lorestan (ca22)

Chapter 3: A molecular phylogeny of *Agrodiaetus*
inferred from mitochondrial and nuclear DNA sequences

Material and methods

Material

Material for this study was collected on trips to Turkey, Iran, Italy, France, Spain and Morocco during the years 1998-2002. While testes or abdomens were removed for karyological analysis and wings cut off for wing pattern analysis, the remaining body was placed in vials with 100% ethanol and later stored at -20°C. The parts of each specimen were coded "MW" and numbered individually.
Further material was received from the following collegues:

Code	Name	Countries	Storage of material
AD	Alexandre Dantchenko (Moscow)	Armenia	Ethanol
CN	Clas Naumann (Bonn)	Turkey, Iran	Ethanol
DS	Dmitriy Sobanin (Voronezh)	Central Asia	dried
JC	John Coutsis (Athens)	Greece	Ethanol; wings separated
JM	José Munguira (Madrid)	Spain	Ethanol; wings separated
OK	Otakar Kudrna (Schweinfurt)	Italy, Spain	frozen
WE	Wolfgang Eckweiler (Frankfurt)	mainly Iran	dried; abdomens & wings separated

A complete list of available material is found in Appendix 2.

Tab. 3. Material used for DNA extraction

		Specimens						***Populations (COI)***								***Specimens***		
Genus	***Spezies***	**DNA**	**COI**	**MO**	**E**	**F**	**I**	**GR**	**TR**	**AR**	**IR**	**UZ**	**TA**	**KI**	**Σ**	**ND1**	**Cytb**	**ITS2**
Agriades	*pyrenaicus*	1	1						1						1	0	0	1
Agrodiaetus	*achaemenes*	1	1								1				1	0	0	1
Agrodiaetus	*actinides*	2	0												0	0	0	1
Agrodiaetus	*actis*	3	1						1						1	0	0	1
Agrodiaetus	*admetus*	3	2					1	1						2	0	1	1
Agrodiaetus	*ainsae*	3	3		3										3	0	0	2
Agrodiaetus	*alcestis*	7	5						4		1				5	1	0	3
Agrodiaetus	*altivagans*	5	5						2	1					3	0	0	3
Agrodiaetus	*antidolus*	3	3						3						3	1	0	2
Agrodiaetus	*arasbarani*	1	1								1				1	0	0	1
Agrodiaetus	*aroaniensis*	1	1					1							1	0	0	1
Agrodiaetus	*artvinensis*	1	1						1						1	0	0	1
Agrodiaetus	*barmifiruze*	1 -	0												1	0	0	0
Agrodiaetus	*baytopi*	3	3						2						2	0	0	2
Agrodiaetus	*birunii*	7	7								6				6	1	0	5
Agrodiaetus	*caeruleus*	2	2								2				2	1	0	1
Agrodiaetus	*carmon*	3	2						2						2	0	0	1
Agrodiaetus	*cyaneus*	4	4						2		1				3	0	0	3
Agrodiaetus	*dagmara*	1	1										1		1	0	0	0
Agrodiaetus	*dama*	1	1						1						1	0	0	1

		Specimens		***Populations (COI)***												***Specimens***		
Genus	***Spezies***	**DNA**	**COI**	**MO**	**E**	**F**	**I**	**GR**	**TR**	**AR**	**IR**	**UZ**	**TA**	**KI**	**∑**	**ND1**	**Cytb**	**ITS2**
Agrodiaetus	*damalis*	1	1								1				1	0	0	0
Agrodiaetus	*damocles*	1 -	0												0	0	0	0
Agrodiaetus	*damon*	2	2			1			1						2	0	0	2
Agrodiaetus	*damone*	2 -	0												0	0	0	0
Agrodiaetus	*dantchenkoi*	4	4						2						2	0	0	3
Agrodiaetus	*darius*	1	1								1				1	0	0	1
Agrodiaetus	*demavendi*	12	12						2		3				5	2	0	6
Agrodiaetus	*dizinensis*	1	1								1				1	0	0	1
Agrodiaetus	*elbursicus*	7	7								6				6	1	0	5
Agrodiaetus	*ernesti*	1	1						1						1	0	0	1
Agrodiaetus	*erschoffii*	2	2								2				2	0	0	1
Agrodiaetus	*fabressei*	2	2		2										2	0	0	2
Agrodiaetus	*femininoides*	2	2								2				2	0	0	2
Agrodiaetus	*firdussii*	7	7						3		2				5	0	0	5
Agrodiaetus	*fulgens*	1	1		1										1	0	0	1
Agrodiaetus	*glaucias*	1	1								1				1	0	0	1
Agrodiaetus	*gorbunovi*	4	4								3				3	0	0	4
Agrodiaetus	*guezelmavi*	2	1						1						1	0	0	1
Agrodiaetus	*hamadanensis*	3	3								3				3	1	0	1
Agrodiaetus	*hopfferi*	5	2						2						2	0	0	2
Agrodiaetus	*huberti*	4	4						3	1					4	0	0	3
Agrodiaetus	*humedasae*	3	2				1								1	0	0	2
Agrodiaetus	*interjectus*	1	1						1						1	1	0	1
Agrodiaetus	*iphicarmon*	2	1						1						1	0	1	1
Agrodiaetus	*iphidamon*	3	3								3				3	1	0	2
Agrodiaetus	*iphigenia*	6	5						3	1					4	0	0	2
Agrodiaetus	*iphigenides*	2	2									1		1	2	0	0	1
Agrodiaetus	*kanduli*	1	1						1						1	0	0	1
Agrodiaetus	*karindus*	1	1								1				1	0	0	0
Agrodiaetus	*khorasanensis*	1	1								1				1	0	0	1
Agrodiaetus	*klausschuriani*	2	2								1				1	0	0	1
Agrodiaetus	*kurdistanicus*	2	2						2						2	0	0	1
Agrodiaetus	*lorestanus*	2	1								1				1	0	0	2
Agrodiaetus	*lycius*	3	2						2						2	0	0	1
Agrodiaetus	*menalcas*	5	3						3						3	1	0	1
Agrodiaetus	*merhaba*	2	2						1						1	0	0	1
Agrodiaetus	*mithridates*	2	1						1						1	0	0	1
Agrodiaetus	*mofidii*	2	1								1				1	0	0	1
Agrodiaetus	*morgani*	1	1								1				1	0	0	1
Agrodiaetus	*nephohiptamenos*	2	2					1							1	0	0	1
Agrodiaetus	*ninae*	2	2						1	1					2	0	0	2
Agrodiaetus	*paulae*	2	2								1				1	0	0	1
Agrodiaetus	*peilei*	1	1								1				1	0	0	1
Agrodiaetus	*phyllides*	3 -	0												0	0	0	0
Agrodiaetus	*phyllis*	7	6						2	1	3				6	0	0	4
Agrodiaetus	*pierceae*	3	2						2						2	0	0	2
Agrodiaetus	*poseidon*	6	4						2						2	1	0	3
Agrodiaetus	*poseidonides*	1	1										1		1	0	0	1
Agrodiaetus	*posthumus*	2	2								1				1	0	0	1
Agrodiaetus	*pseudactis*	1	1							1					1	0	0	1
Agrodiaetus	*pseudoxerxes*	2	2								2				2	0	0	1
Agrodiaetus	*putnami*	2	2						2						2	0	0	1

		Specimens							***Populations (COI)***								***Specimens***	
Genus	***Spezies***	**DNA**	**COI**	**MO**	**E**	**F**	**I**	**GR**	**TR**	**AR**	**IR**	**UZ**	**TA**	**KI**	**∑**	**ND1**	**Cytb**	**ITS2**
Agrodiaetus	*ripartii*	10	9		3			1	4						8	1	0	4
Agrodiaetus	*rovshani*	2	2								2				2	0	0	2
Agrodiaetus	*schuriani*	1	1						1						1	0	0	1
Agrodiaetus	*sekercioglui*	1	1						1						1	0	0	0
Agrodiaetus	*sennanensis*	1	1								1				1	0	0	1
Agrodiaetus	*sertavulensis*	2	1						1						1	0	0	1
Agrodiaetus	*shahrami*	1	1								1				1	0	0	1
Agrodiaetus	*sigberti*	3	2						1						1	0	0	1
Agrodiaetus	*surakovi*	1	1							1					1	0	0	1
Agrodiaetus	*tankeri*	2	2						1						1	0	0	2
Agrodiaetus	*tenhageni*	2	1								1				1	0	0	1
Agrodiaetus	*theresiae*	1	1						1						1	0	0	1
Agrodiaetus	*transcaspicus*	1 -	0												0	0	0	0
Agrodiaetus	*turcicola*	3	2						2						2	0	1	1
Agrodiaetus	*turcicus*	3	3						3						3	1	0	2
Agrodiaetus	*valiabadi*	2	2								2				2	0	0	2
Agrodiaetus	*wagneri*	4	3						2						2	0	0	3
Agrodiaetus	*zapvadi*	3	3						2						2	0	0	2
Agrodiaetus	*zarathustra*	1	1								1				1	0	0	1
Aricia	*agestis*	4	4		1			1	1		1				4	0	0	1
Aricia	*anteros*	1	1						1						1	0	0	1
Aricia	*artaxerxes*	3	3	1				1							2	1	0	2
Aricia	*cramera*	1	1		1				1						1	0	0	1
Aricia	*eumedon*	1	1						1						1	0	0	1
Aricia	*isauricus*	1	1						1						1	0	0	1
Aricia	*torulensis*	1	1						1						1	0	0	1
Cacyreus	*marshalli*	1	1			1									1	0	0	1
Celastrina	*argiolus*	2	2	1					1						2	0	0	1
Chilades	*trochylus*	1	1						1						1	0	0	0
Cupido	*osiris*	1	1						1						1	0	0	0
Cyaniris	*semiargus*	2	2	1							1				2	0	0	2
Favonius	*quercus*	1	1								1				1	1	0	1
Iphiclides	*feisthamelii*	2	2	1	1										2	0	0	0
Iphiclides	*podalirius*	1	1					1							1	0	0	1
Kretania	*eurypilus*	1	1						1						1	0	0	1
Lampides	*boeticus*	3	3	1	1				1						3	0	0	3
Leptotes	*pirithous*	1	1		1										1	0	0	0
Lycaena	*alciphron*	2	2	1							1				2	0	0	0
Lycaena	*asabinus*	1	1								1				1	0	0	0
Lycaena	*candens*	1	1								1				1	0	0	0
Lycaena	*phlaeas*	1	1	1											1	0	0	0
Lycaena	*thersamon*	3	1						1						1	0	1	0
Lycaena	*thetis*	1	1						1						1	0	0	0
Lycaena	*tityrus*	1	1						1						1	0	0	0
Lycaena	*virgaureae*	1	1						1						1	0	0	0
Lysandra	*albicans*	2	2		2										2	0	0	2
Lysandra	*bellargus*	6	5		1		1		2		1				5	0	0	4
Lysandra	*caelestissimus*	1	1		1										1	0	0	1
Lysandra	*coridon*	5	5		4		1								5	0	0	4
Lysandra	*corydonius*	5	4						4						4	0	0	2
Lysandra	*gennargenti*	1	1				1								1	0	0	0
Lysandra	*ossmar*	2	2						2						2	0	0	2

		Specimens						*Populations (COI)*									*Specimens*	
Genus	**Spezies**	**DNA**	**COI**	**MO**	**E**	**F**	**I**	**GR**	**TR**	**AR**	**IR**	**UZ**	**TA**	**KI**	**∑**	**ND1**	**Cytb**	**ITS2**
Lysandra	*syriaca*	1	1						1						1	1	0	1
Maculinea	*arion*	1	1						1						1	1	0	0
Meleageria	*daphnis*	6	3						2		1				3	1	0	2
Meleageria	*marcida*	2	2								2				2	0	0	1
Neolysandra	*coelestina*	1	1						1						1	0	0	1
Neolysandra	*corona*	1	1								1				1	0	0	1
Neolysandra	*diana*	1	1							1					1	0	0	0
Neolysandra	*fatima*	2	2						1						1	0	0	1
Plebeius	*argus*	1	1								1				1	0	0	1
Plebeius	*christophi*	1	1						1						1	0	0	0
Plebeius	*cyane*	1 -	0												0	0	0	0
Plebeius	*loewii*	3	1						1						1	0	0	1
Plebeius	*pylaon*	1	1						1						1	0	0	1
Polyommatus	*aedon*	1	1								1				1	0	0	1
Polyommatus	*amandus*	2	2	1					1						2	0	0	2
Polyommatus	*andronicus*	1	1					1							1	0	0	1
Polyommatus	*cornelia*	5	3						3						3	0	1	3
Polyommatus	*dorylas*	3	3		1				2						3	1	0	2
Polyommatus	*eroides*	2	2					1			1				2	1	0	2
Polyommatus	*eros*	2	1						1						1	0	0	0
Polyommatus	*escheri*	2	2		1			1							2	0	0	1
Polyommatus	*icarus*	7	5	1	1			1	1		1				5	1	0	4
Polyommatus	*menelaos*	2	2					2							2	0	0	2
Polyommatus	*myrrhinus*	3	3						2						2	1	0	2
Polyommatus	*thersites*	6	4		1				2		1				4	1	0	2
Pseudophilotes	*abencerragus*	1	1	1											1	0	0	0
Pseudophilotes	*vicrama*	1	1						1						1	0	0	0
Satyrium	*esculi*	1	1		1										1	0	0	0
Satyrium	*hyrcanicum*	1	1						1						1	0	0	1
Satyrium	*myrtale*	2	1						1						1	0	0	0
Tarucus	*theophrastus*	1	1	1											1	0	0	1
Turanana	*endymion*	2	1						1						1	0	0	0
Vacciniina	*alcedo*	2	2						1		1				2	0	0	1
Vacciniina	*morgianus*	1	1								1				1	0	0	1
Zizeeria	*knysna*	1	1	1											1	0	0	0
Sum	*∑*	370	312	12	27	2	4	13	126	8	81	1	2	1	277	24	5	209

- DNA = Number of specimens of which DNA was extracted (- = without result).
- COI, ND1, Cytb, ITS2 = Number of specimens sequenced for these genes.
- Populations (COI) = Number of populations sequenced for COI from Morocco (MO), Spain (E), France (F), Italy (I), Greece (GR), Turkey (TR), Armenia (AR), Iran (IR), Uzbekistan (UZ), Tajikistan (TA) and Kirgizia (KI)

Nomenclature according to HESSELBARTH *et al.* (1995), TOLMAN & LEWINGTON (1997) & KUDRNA (2002)

Selection of taxa

Material used for DNA extraction is listed in Tab. 3, sorted alphabetically according to genus and species names. Altogether 370 specimens from 158 butterfly taxa were used for DNA extraction. These include 90 ingroup taxa (subgenus *Agrodiaetus* of genus *Polyommatus*) covering 63 of the 83 species rank taxa listed by ECKWEILER & HÄUSER (1997) from all species groups, and an additional 17 species which have been described since. Of the outgroup taxa 27 are closely related taxa of the genus *Polyommatus* (subgenera *Cyaniris, Lysandra, Meleageria, Neolysandra & Polyommatus*), 16 are from the same subtribe Polyommatiti (e.g. the genera/subgenera *Agriades, Aricia, Chilades, Kretania, Plebeius,* *Vacciniina*), 11 from other subtribes within the tribe Polyommatini (Glaucopsychiti: *Maculinea, Turanana;* Scolitantiditi: *Pseudophilotes*; Celastriniti: *Celastrina*; Everiti: *Cupido*; Zizeeriti: *Zizeeria*; Taruciti: *Tarucus*; Leptotiti: *Leptotes*; Lampiditi: *Lampides*; *Cacyreus*), 12 from other tribes (Eumaeini: *Satyrium*; Theclini: *Favonius*; Lycaenini: *Lycaena*) of Lycaenidae and two taxa of another family of Papilionoidea (Papilionidae: *Iphiclides*). This selection covers all *Polyommatus* subgenera, all Polyommatini subtribes and all but one Lycaenidae tribus known to occur in Anatolia, the centre of *Agrodiaetus* radiation (nomenclature according to HESSELBARTH *et al.*, 1995).

DNA extraction

In most cases parts of the thorax were cut into slices and subsequently used for DNA extraction, but in a few cases only dried legs were available and thus used.
DNA was extracted with QIAGEN® DNeasy Tissue Kit according to the manufacturer's protocol for mouse tail tissue. This method turned out to give the most consistent results and was the most economical compared to other methods tried out in the beginning:

- phenol-chloroform extraction (time-consuming method using hazardous chemicals)
- CTAB buffer based chloroform-isoamylalcohol extraction (time-consuming method yielding a high proportion of degraded DNA)
- BIORAD® Quantum Prep® Aqua Pure™ Genomic DNA Tissue Kit (fast salt-precipitation method prone to contamination with butterfly scales)

Results of DNA extraction were checked with Agarose gel electrophoresis.

Selection of genes

Mitochondrial genes are especially well suited for phylogenetic studies of closely related species, because of the faster rate of evolution compared to nuclear genes (1-2 times faster in insects; HOY, 1994) and the shorter coalescence time due to their smaller effective population size (a quarter of an autosomal locus).

Cytochrome Oxidase I was chosen because this gene has been used successfully in phylogenetic studies of closely related Lepidoptera species, including butterflies (BELTRAN *et al.* (2002); BROWER (1994); CATERINO & SPERLING (1999); MONTEIRO & PIERCE (2001); RAND *et al.* (2000); WAHLBERG & ZIMMERMANN (2000)). Initially experiments were also carried out with cytochrome b which has only rarely been used in Lepidoptera (but recent papers on butterflies were published by AAGARD *et al.* (2002) and TORRES *et al.* (2001)). Cytochrome Oxidase I is known to evolve relatively slowly compared to other mitochondrial genes, e.g. of the ND family. Therefore part of the mitochondrial ND1 gene was also sequenced for a selection of taxa. In Lepidoptera this gene has been used in phylogenetic studies of Nymphalidae (AUBERT *et al.*, 1999; MARTIN *et al.*, 2000) and Geometridae (ABRAHAM *et al.*, 2001).

Because "gene trees and species trees are not the same" (NICHOLS, 2001), conclusions drawn from a single locus can be misleading. This is especially true for mitochondrial DNA which is maternally inherited. *Agrodiaetus* species are thought to have evolved only recently and gene flow might still exist due to incomplete speciation and hybridization events. Hybridization can be detected if gene trees based on mtDNA and nuclear DNA are compared to each other. Therefore the internal transcribed spacer (ITS-2), a non-coding region between the nuclear ribosomal genes 5.8s and 28s was chosen for a comparative study. ITS-2 is a very variable region, while the flanking genes are very conservative, so that universal primers can be employed. ITS-2 has not been used in published phylogenetic studies of Lepidoptera yet, but was used successfully for studying the phylogeny of closely related species in other insect orders like Diptera, Hymenoptera, Coleoptera, Odonata (WEEKERS *et al.* 2001) and Blattodea.

PCR and sequencing

Amplification of DNA was conducted using the polymerase chain reaction (PCR).
The reaction mixture (for a total reaction volume of 25µl) included:
ddH20 16,80 µl
10xPCR II buffer (without MgCl2) 2,50 µl
MgCl2 25mM 3,20 µl
dNTP-Mix 2mM 0,50 µl
Primer 1 20pm 0,375 µl
Primer 2 20pm 0,375 µl
Taq Polymerase 0,25 µl
DNA 1,00 µl

The primers used are shown in Tab. 4.

Tab. 4. Primers

Alias	Designation*	Sequence (5' to 3')	References
k698	TY-J-1460	TAC AAT TTA TCG CCT AAA CTT CAG CC	CATERINO & SPERLING (1999)
Nancy	C1-N-2192	(CCC) GGT AAA ATT AAA ATA TAA ACT TC	CATERINO & SPERLING (1999)
Faw ND1	N1-J-12314	TAG AAT TAG AAG ATC AAC CAG C	PASHLEY & KE (1992)
16sb	LR-N-12866	ACA TGA TCT GAG TTC AAA CCG G	VOGLER & DESALLE (1993)
cb11	CB-J-10612	CCA TCC AAC ATC TCA GCA TGA TGA AA	PALUMBI (1996)
cb2-h	CB-N-10920	CCC TCA GAA TGA TAT TTG TCC TCA	PALUMBI (1996)
ITS-3		GCA TCG ATG AAG AAC GCA GC	WHITE *et al.* (1990)
ITS-4		TCC TCC GCT TAT TGA TAT GC	WHITE *et al.* (1990)

* according to the positions in *Drosophila yakuba* (see CLARY & WOLSTENHOLME, 1985)

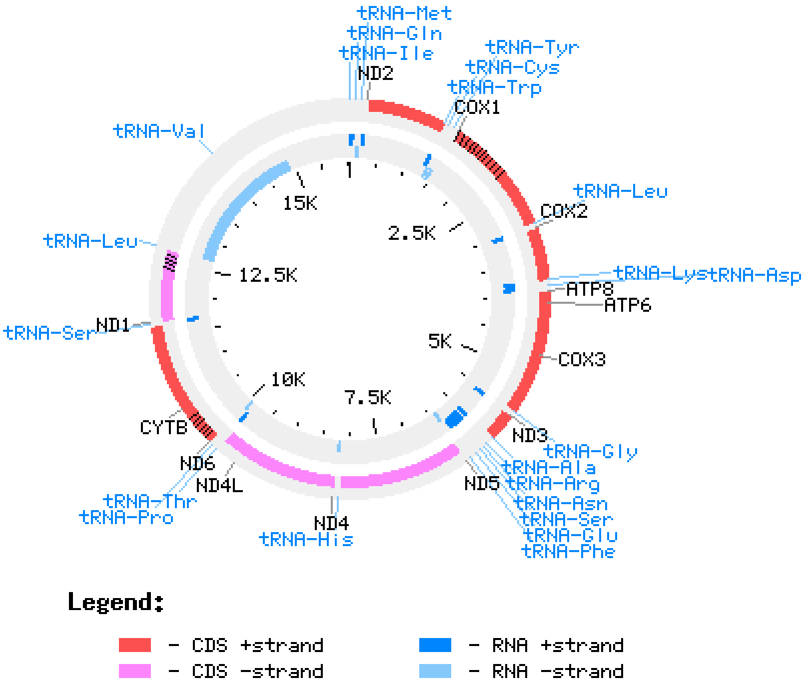


Fig. 28. The mitochondrial genome of *Drosophila yakuba* (copied from GenBank). Hatched sections of the genes Cytochrome Oxidase I (COX1), Cytochrome b (CYTB) and NADH dehydrogenase subunit 1 (ND1) were sequenced.

For the mitochondrial genome, primers k698 and Nancy were used to amplify a 700bp fragment of cytochrome oxidase subunit 1 (COI), primers Faw ND1 and 16sb were used to amplify a 530bp fragment of NADH dehydrogenase subunit 1 (ND1) and 16s rRNA and primers cb11 and cb2-h amplified a 284bp fragment of cytochrome b gene (Cyt b).

Primers ITS-3 and ITS-4 were used to amplify the complete internal transcribed spacer 2 (ITS-2) in the nuclear genome together with fractions of the flanking regions of the genes coding for the ribosomal subunits 5.8s and 28s.

COI was sequenced for 150 taxa and the number of specimens and populations for each country are shown in Tab. 3. ITS-2 was sequenced for 125 taxa only because distantly related outgroups turned out to be non-alignable. ND1 was only sequenced for 23 representative taxa and Cytb for a mere 5 taxa.

PCR was conducted on thermal cyclers from Biometra® (models Uno II or T-Gradient) or ABI Biosystems® (model GeneAmp® PCR-System 2700) using the following profiles:
COI & Cyt b: initial 4 minutes denaturation at 94°C and 35 cycles of 30 seconds denaturation at 94°C, 30 seconds annealing at 55°C and 1 minute extension at 72°C.
ND1: Touchdown PCR with initial 3 minutes denaturation at 94°C, 15 cycles of 30 seconds denaturation at 92°C, 45 seconds annealing at 60°C with a 1°C decrease each cycle down to 45°C and 45 seconds extension at 72°C, followed by 20 cycles of 30 seconds denaturation at 92°C, 30 seconds annealing at 50°C and 45 seconds extension at 72°C.
ITS-2: initial 3 minutes denaturation at 94°C and 36 cycles of 35 seconds denaturation at 94°C, 30 seconds annealing at 48°C and 1 minute extension at 72°C.

PCR products were purified using purification kits from Promega® or Sigma® and checked with agarose gel electrophoresis before and after purification.

Cycle sequencing was carried out on Biometra® T-Gradient or ABI Biosystems® GeneAmp® PCR-System 2700 thermal cyclers using sequencing kits of MWG Biotech® (for Li-cor® automated sequencer) or ABI Biosystems® (for ABI® 377 automated sequencer) according to the manufacturers' protocols and with the following cycling times: initial 2 minutes denaturation at 95°C and 35 cycles of 15 seconds denaturation at 95°C, 15 seconds annealing at 49°C and 15 seconds extension at 70°C. Primers used were the same as for the PCR reactions for the ABI (primer 1 was used for forward and primer 2 for independent reverse sequencing), but for Li-cor truncated and labelled primers were used with 3 bases cut off at the 5' end and labelled with IRD-800. For ABI sequencing the products were cleaned using an ethanol precipitation protocol.

Electrophoresis of sequencing reaction products was carried out on Li-cor® or ABI® 377 automated sequencers using the manufacturer's protocols.

Sequence alignment

Alignment of the mitochondrial gene sequences COI, ND1 and Cyt b was done by hand in comparison with sequences obtained from GenBank. Some of these were also included in the analysis as outgroups (Tab. 5):

Tab. 5. GeneBank sequences used as outgroups

Gene	Family	Species	GenBank accession number
COI	Lycaenidae	*Euphilotes bernardino*	AF170864
COI	Nymphalidae	*Coenonympha tullia*	AF170860
COI	Papilionidae	*Papilio machaon*	AF044006
COI	Papilionidae	*Iphiclides podalirius*	AF170873
COI	Pieridae	*Colias eurytheme*	AF044007
COI	Riodinidae	*Apodemia mormo*	AF170863
COI,ND1,Cytb	Drosophilidae	*Drosophila yakuba*	NC001322
Cytb	Pyralidae	*Ostrinia nubilalis*	AF442957
ND1	Libytheidae	*Libytheana bachmanii*	U32463
ND1	Lycaenidae	*Celastrina ladon*	U32455
ND1	Lycaenidae	*Incisalia* spec.	U32461
ND1	Nymphalidae	*Danaus plexippus*	U32457
ND1	Papilionidae	*Papilio machaon*	AJ224107
ND1	Pieridae	*Phoebis sennae*	U25875
ND1	Riodinidae	*Apodemia mormo*	U32452

Alignment was unambiguous and straightforward, due to the conserved amino acid coding triplet pattern, and apart from one insertion event (triplet) in one Cyt b sequence, no indels were found. The 16s rRNA sections of the ND1-16s sequences were discarded from the analysis due to poor quality and alignment ambiguities.

Alignment of ITS-2 sequences was done with the help of ClustalX (THOMPSON *et al.*, 1997), but manual re-editing was required to improve the alignment. Indel events are very common in ITS-2 regions which makes alignment difficult in distantly related taxa. Therefore ITS-2 has only been used in closely related species and genera, although the discovery of secondary structures for its transcripts might make it more versatile for phylogenic studies at deeper taxonomic levels in future (COLEMAN, 2003).

Alignment of ingroup sequences was mostly straightforward due to their similarity, but distant outgroups had so many indels that they had to be excluded from the analysis and (with one exception) only sequences of the subtribus Polyommatiti and one outgroup taxon (*Tarucus theophrastus*) were retained to avoid the exclusion of variable portions deemed to be important for phylogenetic reconstruction of *Polyommatus* and closely related genera. Only one section of ITS-2 had to be exluded from the analysis due to alignment problems (characters 566-588). Because of alignment problems no ITS2-sequences from GenBank were included in the analysis. (The only Lepidopteran ITS2-sequences in GenBank are from the butterfly family Papilionidae).

Choice of methods for phylogenetic inference

Phylogenies are usually presented in a tree and the choice of tree-building methods is a subject of heated debate between proponents of these methods. Even though different methods differ in their efficiency to reconstruct the true tree, their success depends on so many conditions that it is hardly possible to tell which method is appropriate in real data sets. Most often, the decision will have to be pragmatic and a comparison of different methods will

show that differences are confined to branches which have weak statistical support (PAGE & HOLMES 1998; NEI & KUMAR 2000).
Distance methods such as UPGMA or Neighbour Joining are very fast, but less robust than other methods if underlying assumptions are violated. They also discard a lot of information because they calculate trees from distances matrices. Therefore they are not shown here.

Maximum parsimony (MP) is one of the most widely used tree-building methods in phylogenetic systematics. It uses all available information from nucleotide data to infer the shortest tree. However, it is difficult to test the robustness of the tree. The most commonly used method is the bootstrap, which generates pseudoreplicates from sequence data, but bootstrap values are difficult to interprete and values are often unreasonably low in data sets of closely related species with low divergence. Despite of these drawbacks, MP-trees are presented here.

Maximum likelihood (ML) is a more general approach than MP and requires an explicit model of evolution. It is computationally very expensive, especially if bootstrap values need to be computed, and therefore currently unsuitable for large data sets.

The **Bayesian** approach has only recently been applied for phylogenetic reconstruction but already proved to be very efficient. It is related to ML but much faster to compute. Its beauty lies in the statistical properties which allow the calculation of the robustness of clades very well. Therefore this method was chosen for most discussions of phylogenetic relationships.

Tree-building methods are only effective in inferring hierarchical relationships but they produce unresolved trees if recombination occurs between taxa, e.g. due to hybridization events, or if ancestral haplotypes survive in extant taxa. Such events have to be expected in radiations of closely related species such as *Agrodiaetus*. **Network** approaches are more appropriate in these cases although they have only rarely been used so far in phylogenetic systematics (POSADA & CRANDALL 2001). Different methods exist to infer networks. The **Statistical parsimony** approach, which is chosen here, connects haplotypes in a stepwise fashion emphasizing the similarities between them.

Sequence comparisons and phylogenetic inference

Sequence statistics (base composition, number of variable and parsimony-informative sites) were calculated with MEGA Version 2.1 (KUMAR *et al.*, 2001).

A saturation analysis for the different positions of COI was conducted with the help of MEGA (KUMAR *et al.*, 1995) plotting transitions against transversions (with and without AT-transversions) and AT-transversions against CG-transversions.

COI and ITS-2 datasets were tested for incongruence with the incongruence length difference test (FARRIS *et al.*, 1995) implemented in PAUP 4.0 beta10 (SWOFFORD, 1998) as the "partition homogeneity test".

A Bayesian phylogeny reconstruction was done with the computer program MrBayes (HUELSENBECK & RONQUIST 2001). Codon positions of the COI and ND1 datasets were partitioned to allow them to have different rates of evolution and in the combined analyses genes were also partitioned to allow for different rates. The standard 4by4 nucleotide substitution model was applied, all substitution types were allowed to be different (General

Time Reversible model) and the rates of variable sites were drawn from a gamma distribution (INVGAMMA option) with the continuous gamma distribution broken into four categories of equal weight. The Metropolis-coupled Markov chain Monte Carlo simulation (MCMCMC or $(MC)^3$) was run under standard settings with 1,000,000 generations and every 100th tree was saved. Trees obtained before stationarity of the chain was achieved were discarded (burn in). The programme calculates branch lenghths which were multiplied with the factor 1,000,000 to enable input into the programme TreeExplorer (written by Koichiro Tamura, Tokyo). The posterior clade probabilities can be used to infer the confidence of each clade, and these values are placed at the nodes. The tree obtained from the COI data set was rooted with *Apodemia mormo* (C. & R. Felder, 1859) as outgroup. This species is a representative of the family Riodinidae which is appears to be the sister family of Lycaenidae according to molecular results (CAMPBELL *et al.* 2000) and traditional classification (ELIOT 1973). The trees from the ITS2- and the combined data sets were rooted with *Tarucus theophrastus* as outgroup. This species belongs to the subtribus Taruciti which turned out to be the subtribus most closely related to Polyommatiti in the COI analysis.

For a phylogenetic reconstruction under a maximum parsimony approach a heuristic search for the most parsimonious tree (HSEARCH) was carried out with PAUP after the exclusion of uninformative characters (PAUP command: EXCLUDE UNINF) under the following settings:

- Maximum number of trees per replicate restricted to 100 (SET MAXTREES=100)
- Random addition of sequences (ADDSEQ=RANDOM)
- Branch swapping method “Tree Bisection Reconnection” (SWAP=TBR)

Due to a bug in the current PAUP version, only one replicate is calculated if the number of trees found is higher than “MAXTREES”, even if the number of replicates is set to a higher value. Therefore the PAUP analysis was repeated 1000 times to receive 1000 replicates. The restriction on the maximum number of trees was necessary to prevent the calculation of millions of rearrangements in the tips of the tree. Experiments with higher limits than 100 were conducted but did not improve the results.

This analysis was repeated for each gene separately and with the different combinations of ITS-2, COI and ND1.

Consensus trees (strict, semistrict, majority rule & Adams consensus) were calculated from the shortest trees of each replicate and from the shortest trees of all replicates together.

Bootstrap analyses were done with PAUP with the heuristic search option employed, random addition of sequences, TBR branch swapping and 1000 replicates.

Gene genealogies of closely related species groups were estimated with statistical parsimony as described by TEMPLETON *et al.* (1992) and implemented in the computer program TCS (CLEMENT *et al.*, 2000). Because of the sensitivity of this approach to missing character information the analysis of the ITS-2 data set was repeated excluding 8 sequences with more than 10% missing characters (AD98001, AD98018, MW00110, MW00269, MW00316, MW01001, MW01025, MW99292). This data set was analyzed in two ways: counting gaps as missing character information and for the ingroup *Agrodiaetus* also counting gaps as 5th character.

Results

Sequences and alignment

The following mitochondrial gene sequences were obtained and aligned successfully: 690bp of Cytochrome Oxidase I (COI), 275bp of Cytochrome b (Cytb) and 230bp of NADH dehydrogenase subunit 1 (ND1), homologous to the following sites of *Drosophila yakuba* mitochondrial genome (CLARY & WOLSTENHOLME 1985): 1474-2163, 10650-10924 and 12391-12620, respectively.

Of the nuclear genome, a 120bp fraction of the 5.8s ribosomal subunit and the complete internal transcribed spacer 2 (ITS-2), an aligned 672bp, were aligned successfully. ITS-2 consists of several conservative sections with highly variable sections in between, including some sections with repetitive motifs similar to microsatellites. Indels are common and length variation in ITS-2 turned out to be considerable within Lycaenidae. The shortest sequence was found in *Tarucus theophrastus* Fabricius, 1793 (MW02025) with 369bp while *Lysandra corydonius* Herrich-Schäffer, [1852] (MW99514) had the longest with 521bp. The long sequences of many species of the subgenus *Lysandra* were mainly due to repetitive insertions at position 19 in the aligned sequences made up of the two motifs "GTC" (repeated up to 9 times) and "CACGGCG" (repeated up to 3 times). Within the other *Polyommatus* subgenera, length variation was much less pronounced, with sequences varying between 439bp in *Polyommatus cornelia* Freyer, [1850] and 484bp in *Polyommatus thersites* Cantener, [1835]. Variation within *Agrodiaetus* was similar. Most sequences were between 443bp (*Agrodiaetus maraschi* Forster, 1956) and 471bp (*Agrodiaetus gorbunovi* Dantchenko & Lukhtanov, 1994 & *A. wagneri* Forster, 1956). Only *Agrodiaetus dama* Staudinger, 1892 had a longer sequence of 482bp. In the distantly related outgroups (which were not included in the further analysis due to alignment problems) the longest ITS-2 sequence was found in *Iphiclides podalirius* L., 1758 (JC02001) from the family Papilionidae with 536bp. In this family an even more extreme length variation has been found in the genus *Luehdorfia*, (sequences taken from GenBank): 687bp in *Luehdorfia chinensis* Leech, 1893 (AB071925) compared to only 362bp in *Luehdorfia japonica* Leech, 1889 (AB071910).

Base composition and sequence divergence

Base composition in the insect mitochondrial genome is known to be heavily AT-biased, especially in 3rd codon positions, while the nuclear genome has a more homogenous base ratio. This also holds for the investigated gene sections in Lycaenidae (Tab. 6). In ITS-2 no base heterogeneity is found in *Iphiclides podalirius* L. (Papilionidae), but in Lycaenidae a slight deficiency in Adenin (A) is covered by a surplus in Guanin (G). This base composition is especially pronounced in the whole tribus Polyommatini and is remarkably constant in all taxa investigated. In the mitochondrial genes, the AT bias ranges from between 59% and 73% in 1st and 2nd codon positions (lowest in COI and highest in ND1) to 90% in 3rd codon positions of all three genes. Guanin (G) is especially rare in 3rd codon positions of genes on the (+)strand (COI, Cytb) while Cytosin (C) is rarest in ND1 which is on the (–)strand. The AT bias at 3rd codon positions of COI is less pronounced in the genus *Polyommatus* (90%) compared to other genera of the family Lycaenidae (94%). Thus the AT bias in *Polyommatus* is similar to other insect groups, but not as extreme as in the genus *Arhopala* (Lycaenidae) with average values over 95% (MEGENS 2002).

Tab. 6. Base composition (Nucleotide frequencies with *standard errors*)

Gene	T		C		A		G	
COI (*Polyommatus*)	**37.22**	***0.65***	**15.48**	***0.60***	**32.39**	***0.52***	**14.90**	***0.44***
1st Position	**28.70**	***0.87***	**13.91**	***0.83***	**32.27**	***0.59***	**25.13**	***0.66***
2nd Position	**42.50**	***0.40***	**25.10**	***0.37***	**15.92**	***0.45***	**16.49**	***0.33***
3rd Position	**40.49**	***1.58***	**7.42**	***1.25***	**49.03**	***1.34***	**3.07**	***1.06***
COI (other Lycaenidae)	**39.39**	***1.16***	**13.84**	***0.67***	**35.52**	***0.98***	**14.22**	***0.43***
1st Position	**29.78**	***1.09***	**12.72**	***0.92***	**32.88**	***0.84***	**24.62**	***0.77***
2nd Position	**42.65**	***0.56***	**24.67**	***0.44***	**16.20**	***0.51***	**16.48**	***0.39***
3rd Position	**45.78**	***2.83***	**4.11**	***1.52***	**48.54**	***2.77***	**1.56**	***0.90***
ND-1 (*Polyommatus*)	**45.31**	***0.53***	**9.40**	***0.51***	**32.98**	***0.79***	**12.30**	***0.70***
1st Position	**41.20**	***0.76***	**11.06**	***0.78***	**31.49**	***1.22***	**16.34**	***1.10***
2nd Position	**46.76**	***0.61***	**15.57**	***0.50***	**25.99**	***0.33***	**11.78**	***0.28***
3rd Position	**48.10**	***1.18***	**1.48**	***1.22***	**41.67**	***2.70***	**8.75**	***2.77***
Cytb (Lycaenidae)	**43.18**	***0.67***	**10.88**	***0.51***	**32.20**	***0.57***	**13.83**	***0.68***
1st Position	**37.55**	***0.19***	**7.68**	***0.78***	**32.90**	***0.42***	**21.93**	***0.30***
2nd Position	**45.33**	***0.62***	**16.88**	***0.64***	**21.00**	***0.20***	**16.88**	***0.35***
3rd Position	**46.68**	***2.32***	**8.05**	***1.59***	**42.78**	***2.01***	**2.50**	***2.13***
ITS-2 (Polyommatini)	**23.15**	***0.58***	**25.95**	***0.63***	**19.67**	***0.86***	**31.23**	***0.69***
(*Polyommatus*)	**23.19**	***0.58***	**25.95**	***0.63***	**19.64**	***0.82***	**31.22**	***0.69***
(other Polyommatini)	**22.60**	***0.37***	**26.02**	***0.64***	**20.10**	***1.19***	**31.27**	***0.70***
(other Lycaenidae)	**23.91**	***1.86***	**25.09**	***1.62***	**22.83**	***1.62***	**28.17**	***1.34***
(*Iphiclides podalirius*)	**26.8**		**24.7**		**22.2**		**26.3**	

Tab. 7. Variable and parsimony-informative sites in single gene studies

Gene	Taxa	Sequences	nucleotides				amino acids			
			variable sites		*parsimony-informative*		*variable sites*		*parsimony-informative*	
COI	**Papilionoidea**	***318***	**326**	***47.2%***	**274**	***39.7%***	**74**	***32.2%***	**38**	***16.5%***
	Lycaenidae	***310***	**311**	***45.1%***	**260**	***37.7%***	**68**	***29.6%***	**34**	***14.8%***
	Polyommatini	***297***	**300**	***43.5%***	**249**	***36.1%***	**63**	***27.4%***	**32**	***13.9%***
	Polyommatiti	***282***	**284**	***41.2%***	**237**	***34.3%***	**56**	***24.3%***	**32**	***13.9%***
	Polyommatus	***261***	**267**	***38.7%***	**219**	***31.7%***	**49**	***21.3%***	**29**	***12.6%***
	Agrodiaetus	***200***	**223**	***32.3%***	**172**	***24.9%***	**37**	***16.0%***	**17**	***7.4%***
ND1	**Lycaenidae**	***25***	**76**	***33.0%***	**45**	***19.6%***	**18**	***23.7%***	**8**	***10.5%***
	Polyommatus	***22***	**58**	***25.2%***	**33**	***14.3%***	**10**	***13.2%***	**6**	***7.9%***
	Agrodiaetus	***15***	**38**	***16.5%***	**23**	***10.0%***	**8**	***10.5%***	**2**	***2.6%***
Cytb	**Lycaenidae**	***6***	**53**	***19.2%***	**15**	***5.4%***	**8**	***8.7%***	**3**	***3.3%***
ITS2 (gaps= missing)	**Polyommatiti**	***199***	**257**	***39.6%***	**154**	***23.7%***				
	Polyommatus	***185***	**238**	***36.7%***	**132**	***20.3%***				
	Agrodiaetus	***138***	**159**	***24.5%***	**76**	***11.7%***				
5.8s	**Polyommatini**	***200***	**9**	***7.5%***	**4**	***3.3%***				

The number and percentage of variable and parsimony-informative sites for each gene is given in Tab. 7. Figures are for different taxonomic levels, from the superfamily (Papilionoidea) down to the ingroup (subgenus *Agrodiaetus*). The variation in amino acids of mitochondrial genes is much lower than the variation in nucleotide sites because most variation is found in synonymous sites (especially 3rd codon positions). The section of 5.8s rRNA turned out to be almost invariable in Lycaenidae and was therefore lumped with ITS-2 in the phylogenetic analysis. The comparison of sequence variation in the combined gene analyses (Tab. 8) reveals that Cytb and ND1 evolve faster than COI. This difference is almost entirely due to the higher number of nonsynonymous substitutions.

Tab. 8. Variable and parsimony-informative sites in combined gene studies

Gene	Taxa	Sequences	nucleotides				amino acids			
			variable sites		*parsimony-informative*		*variable sites*		*parsimony-informative*	
ND1	**Lycaenidae**	*25*	**76**	*33.0%*	**45**	*19.6%*	**18**	*23.7%*	**8**	*10.5%*
COI	**Lycaenidae**	*25*	**200**	*29.0%*	**116**	*16.8%*	**30**	*13.0%*	**9**	*3.9%*
Cytb	**Lycaenidae**	*6*	**53**	*19.2%*	**15**	*5.4%*	**8**	*8.7%*	**3**	*3.3%*
COI	**Lycaenidae**	*6*	**109**	*15.8%*	**24**	*3.5%*	**12**	*5.2%*	**1**	*0.4%*
COI	**Polyommatini**	*200*	**276**	*40.0%*	**218**	*31.6%*	**51**	*22.2%*	**27**	*11.7%*
ITS-2	**Polyommatini**	*200*	**277**	*42.7%*	**156**	*24.0%*				
5.8s	**Polyommatini**	*200*	**9**	*7.5%*	**4**	*3.3%*				

The saturation analysis showed no saturation in 1st and 2nd codon positions of COI within Lycaenidae, because the number of transitions is linearly increasing with the number of transversions (Fig. 29). In the 3rd codon positions transitions were saturated in ingroup-outgroup comparisons (Fig. 30) but there is still a high number of transversions. Due to the AT bias most of these are AT-transversions as can be seen from Fig. 31 in which AT-transversions were excluded. Fig. 32 displays the ratio of AT-transversions against CG-transversions. The steep linear increase indicates that AT-transversions are not saturated in ingroup-outgroup comparisons.

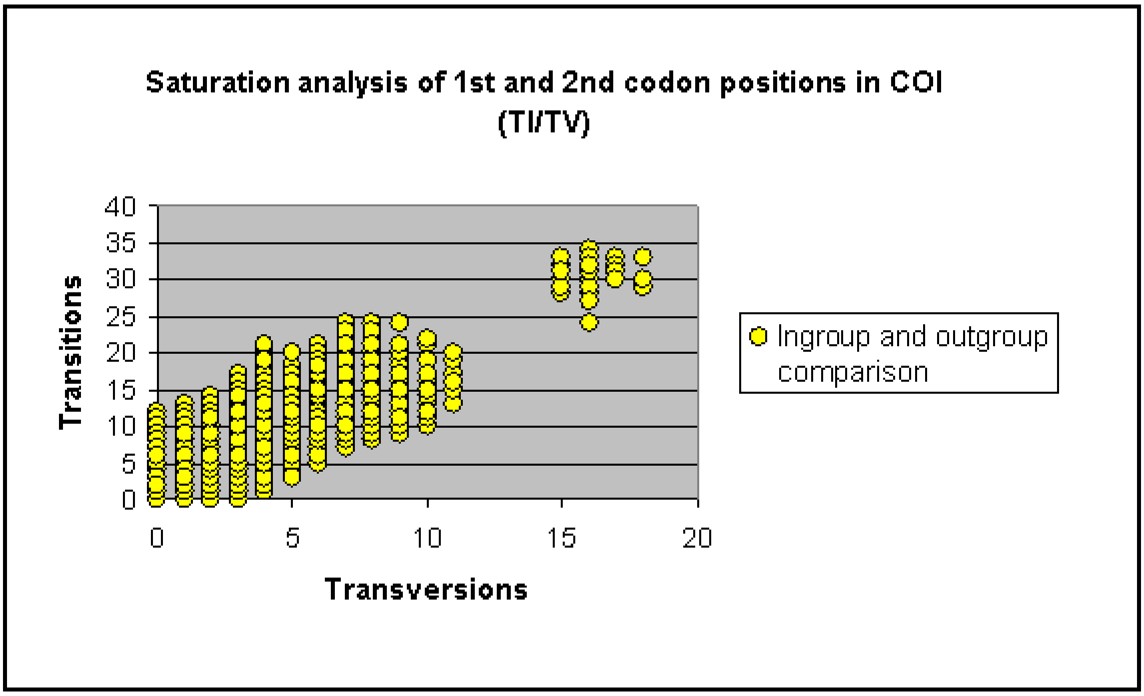


Fig. 29. Ratio of transitions (ti) and transversions (tv) in 1st and 2nd codon positions of COI in all investigated taxa

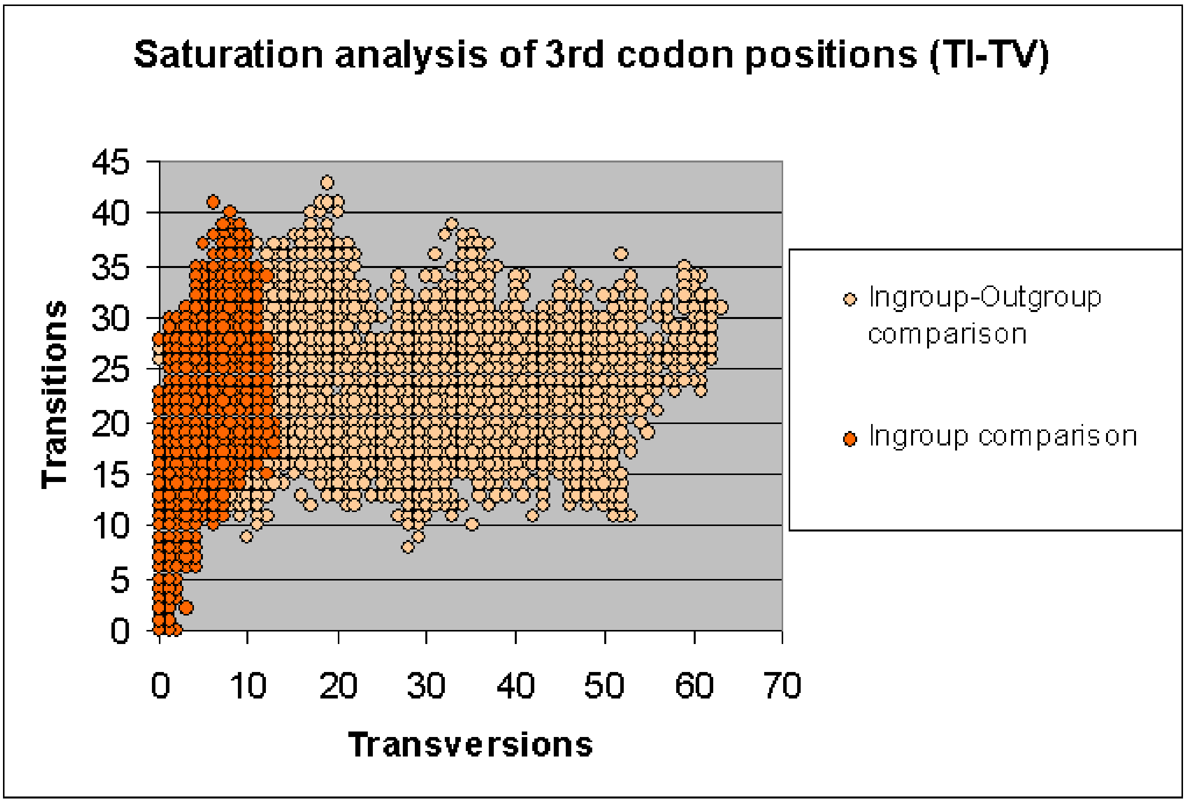


Fig. 30. Ratio of transitions (ti) and transversions (tv) in 3rd codon positions of COI within *Agrodiaetus* (ingroup) and compared to the outgroups (other taxa).

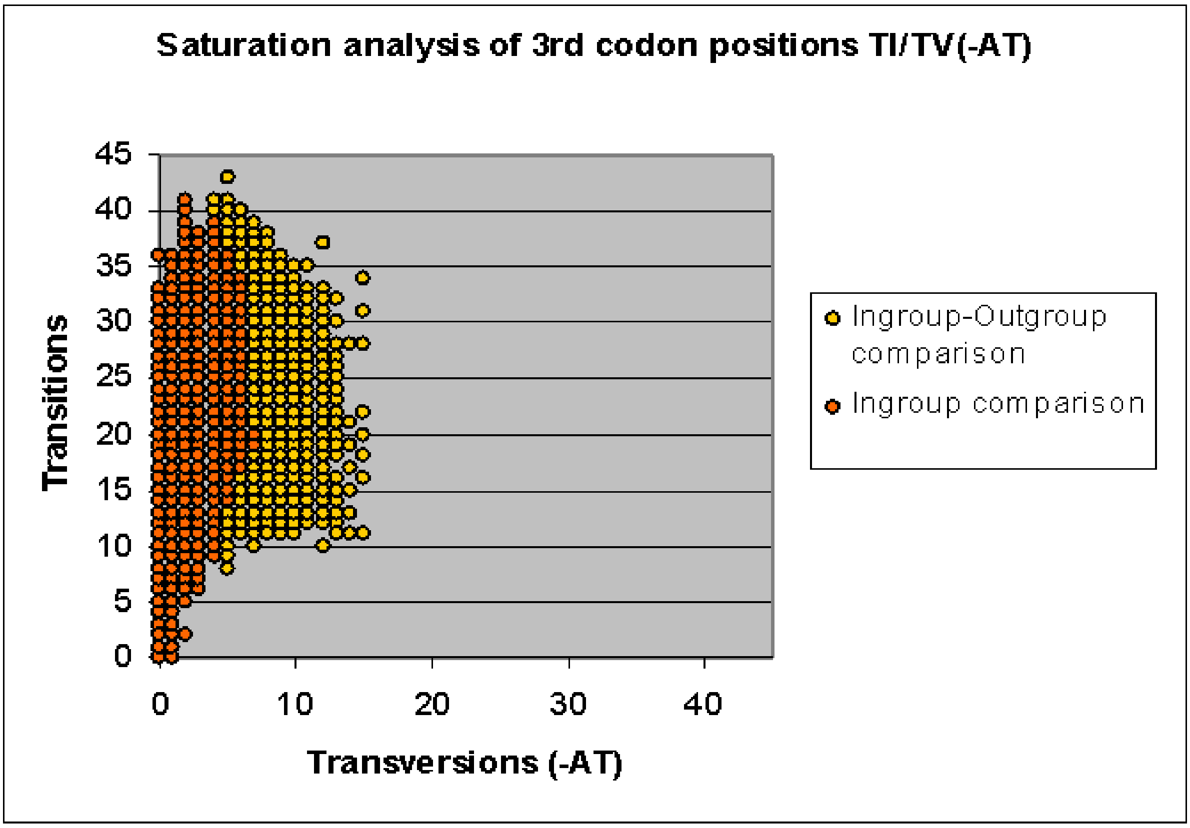


Fig. 31. Ratio of transitions and transversions excluding AT-transversions in 3rd codon positions of COI within *Agrodiaetus* (ingroup) and compared to the outgroups (other taxa).

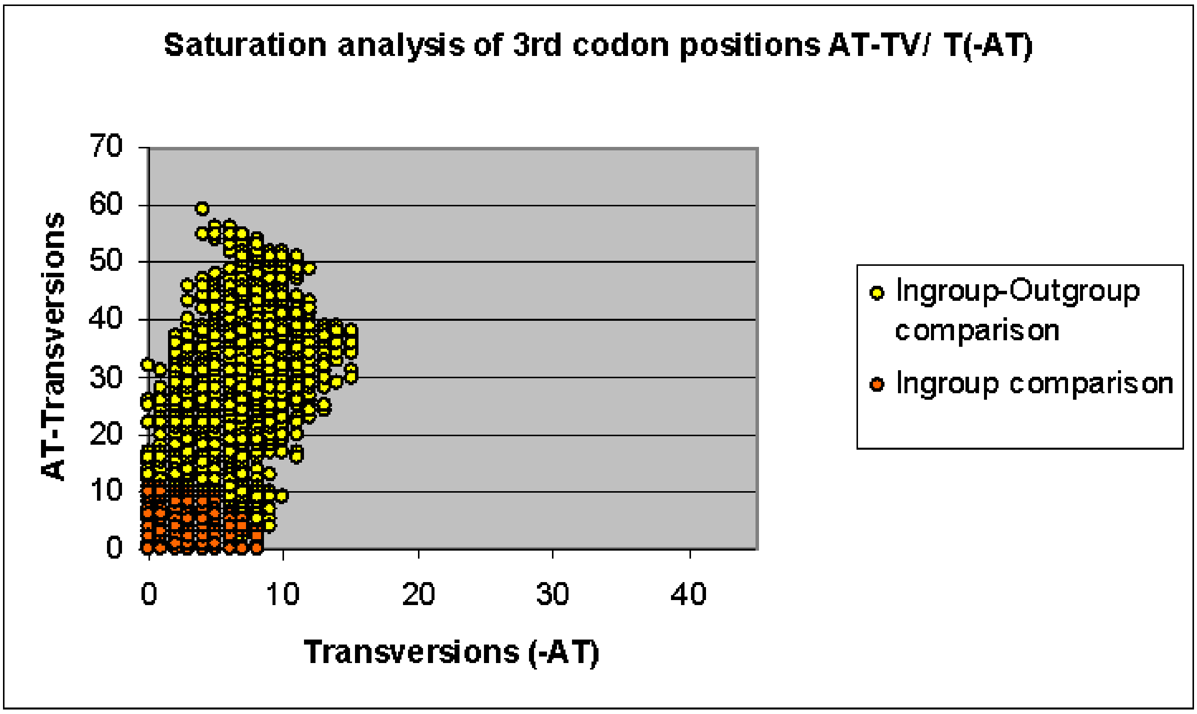


Fig. 32. Ratio of AT-transversions and other transversions in 3rd codon positions of COI within *Agrodiaetus* (ingroup) and compared to the outgroups (other taxa).

The partition homogeneity test revealed a significant incongruence between the COI and ITS-2 data sets ($p<0.001$). Despite this result, both data sets were combined for a total evidence approach, but they were also analyzed separately to figure out the incongruence in an effort to elucidate deviations of the gene trees from the true species tree.

Bayesian inference of phylogeny

The phylogenetic trees inferred from the Bayesian approach are represented in Fig. 33 - Fig. 46 for the COI data set, Fig. 47 & Fig. 48 for ITS-2 and Fig. 49 - Fig. 57 for the combined data set. Only the COI data set can be used to infer the phylogeny above the level of the subtribus (Polyommatiti).

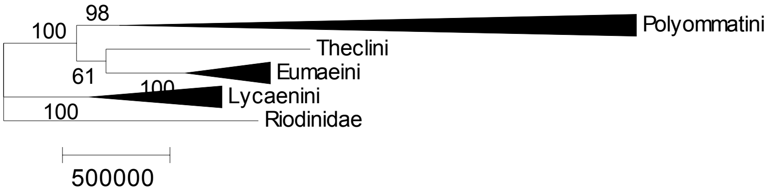


Fig. 33. MrBayes, COI, Lycaenidae (relationships of tribes)

The basal splits in the COI tree are on the tribus level (Fig. 33), separating the monophyletic *Lycaena* (Lycaenini), *Satyrium* (Eumaeini) and *Favonius* (Theclini) from the other taxa of tribus Polyommatini). Relationships within the genus *Lycaena* are highly resolved and shown in Fig. 34. The most basal taxa (*thetis, asabinus, thersamon*) belong to the *thersamon*-group (HESSELBARTH *et al.* 1995).

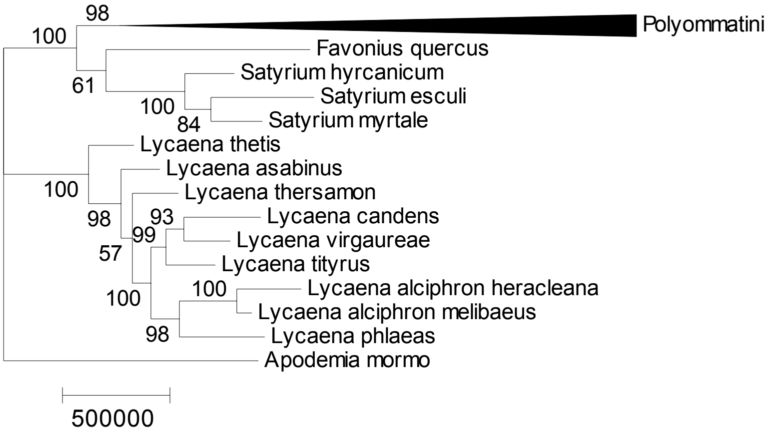


Fig. 34. MrBayes, COI, Lycaenidae (excl. Polyommatini)

Within Polyommatini the splits follow the level of morphologically defined subtribes but their relationships are not well resolved (Fig. 35).

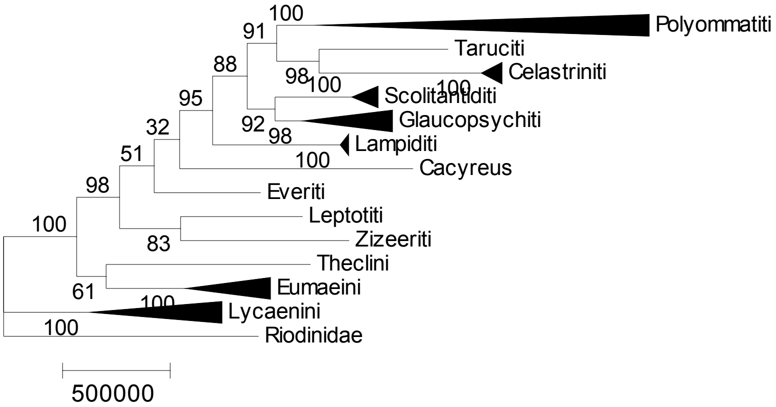


Fig. 35. MrBayes, COI, Lycaenidae (subtribes)

The subtribus most closely related to Polyommatiti are Taruciti, Celastriniti, Scolitantiditi, Glaucopsychiti and Lampiditi (Fig. 36, Fig. 37).

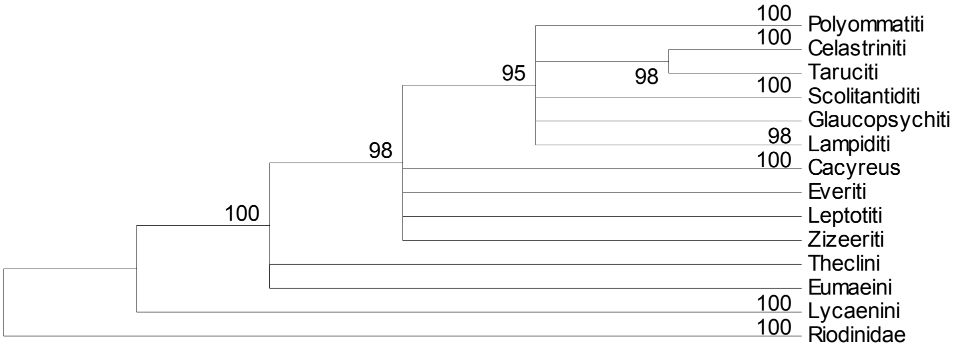


Fig. 36. MrBayes, COI, Lycaenidae (subtribes), condensed tree at 95% confidence limit

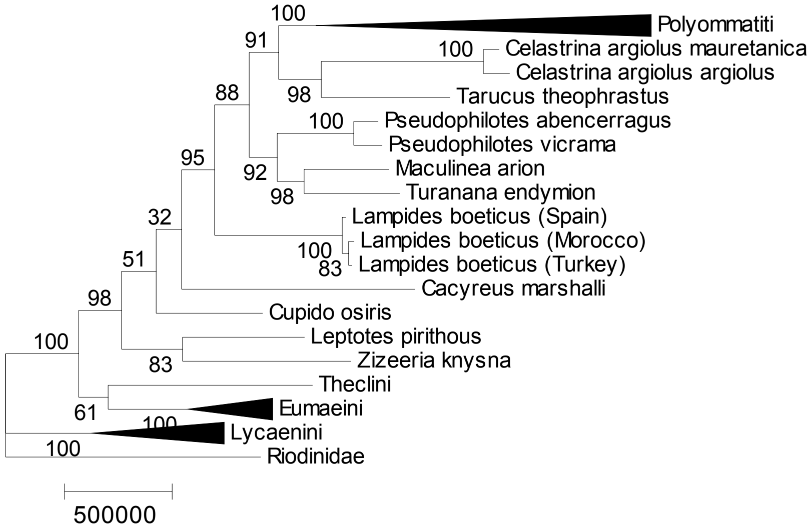


Fig. 37. MrBayes, COI, Polyommatini excl. Polyommatiti

Within Polyommatiti, the genus *Chilades* and the North American *Euphilotes* appear as the most basal taxa in the tree and the other taxa of the two genera *Polyommatus* and *Plebeius* together form a monophyletic unit (Fig. 38, Fig. 39).

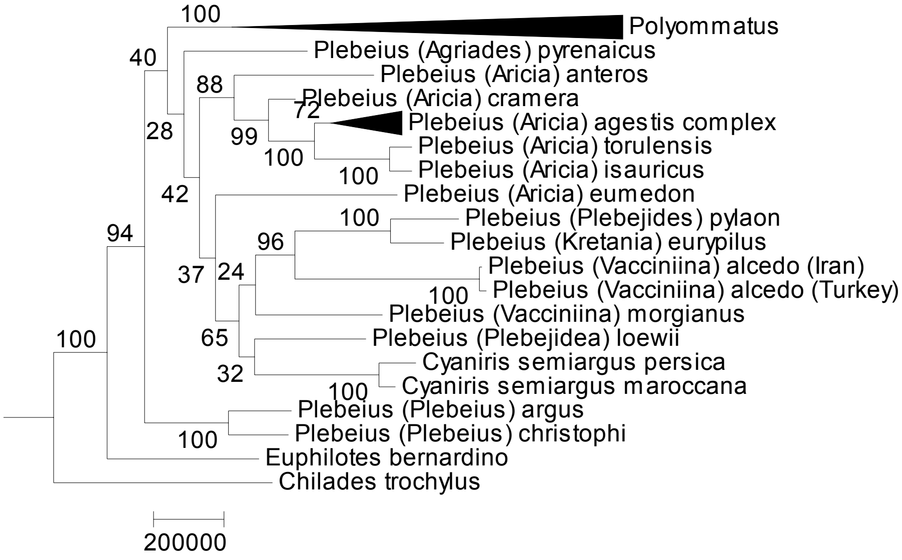


Fig. 38. MrBayes, COI, Polyommatiti

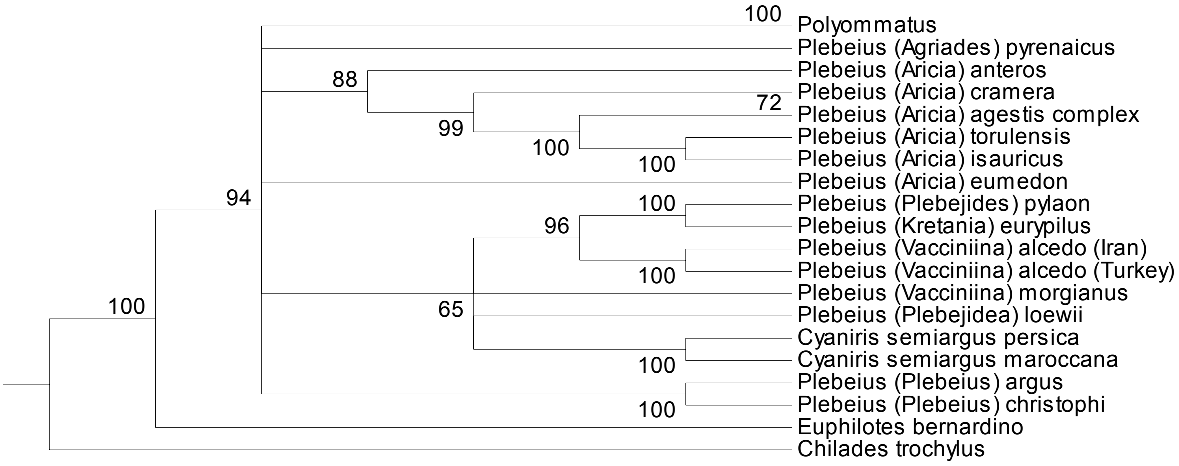


Fig. 39. MrBayes, COI, Polyommatiti, condensed (50% level)

While the genus *Polyommatus* (excluding the subgenus *Cyaniris*) also forms a monophyletic unit, the monophyly of the genus *Plebeius* is not supported and the relationships of most of its taxa are not well resolved. One exception is the subgenus *Aricia* (excluding *A. eumedon*) whose monophyly and taxa relationships appear quite well resolved. This genus includes the *Aricia agestis*-complex, a group of closely related taxa (*agestis, artaxerxes, montensis*, Fig. 40), but *Aricia cramera* (Eschscholtz, 1821) which is also thought to belong to this complex and phenotypically very similar, appears very distant genetically.

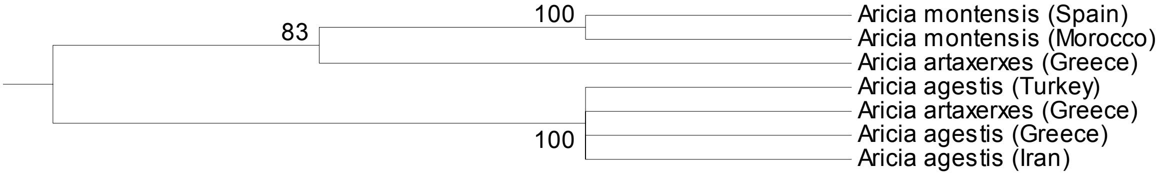


Fig. 40. MrBayes, COI, *Aricia agestis* complex, condensed (50% level)

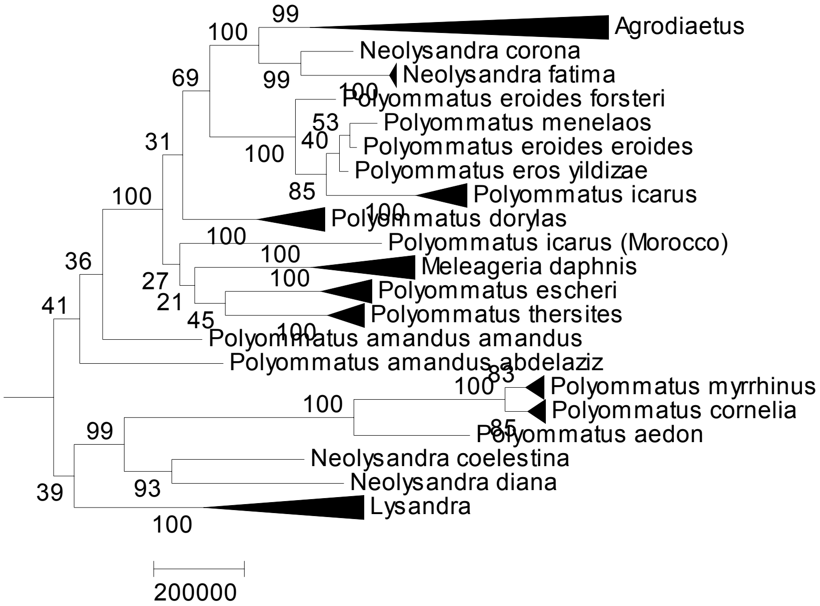


Fig. 41. MrBayes, COI, *Polyommatus*

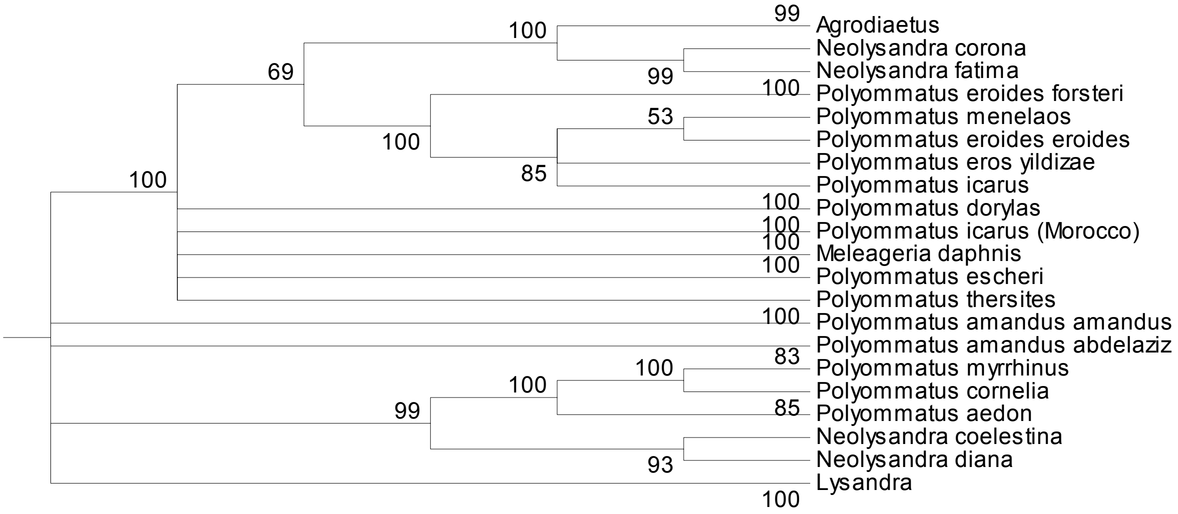


Fig. 42. MrBayes, COI, *Polyommatus*, condensed (50% level)

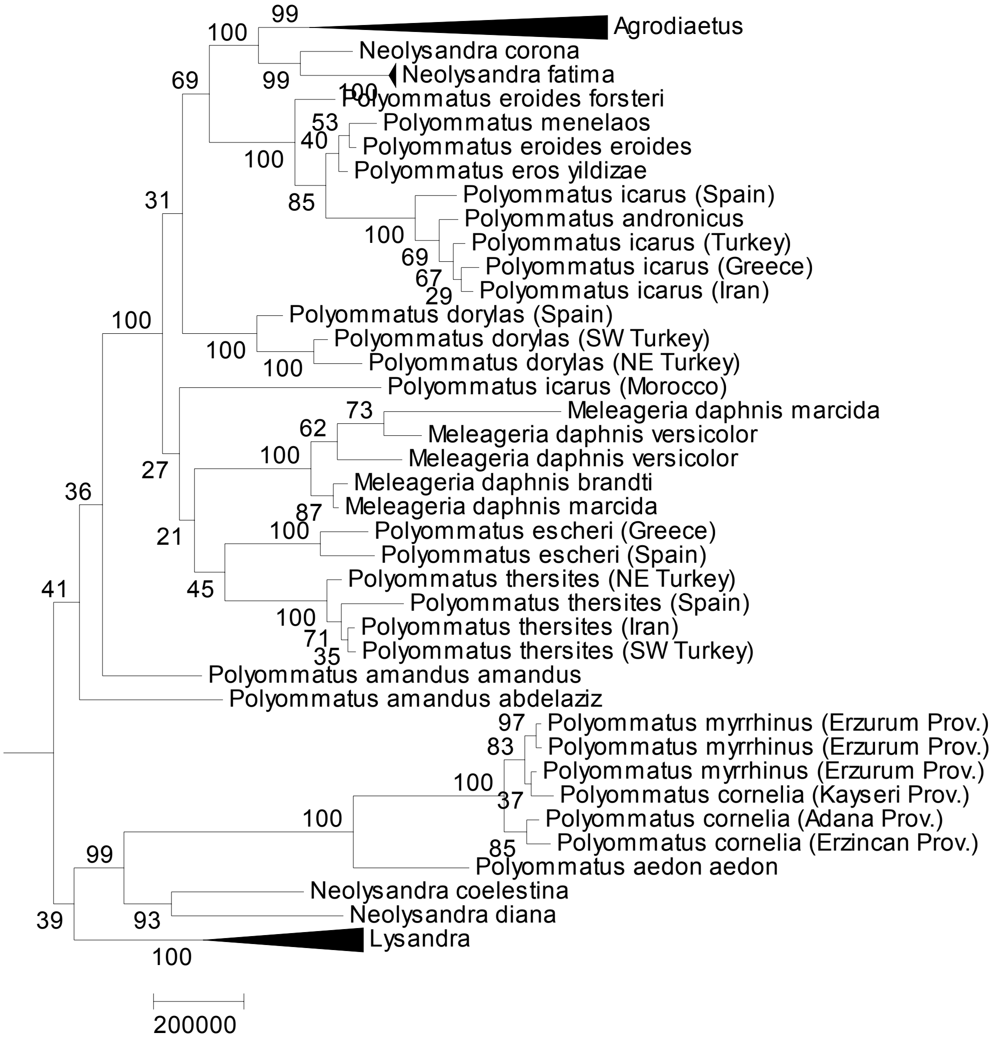


Fig. 43. MrBayes, COI, *Polyommatus*

Within the genus *Polyommatus* (Fig. 41, Fig. 42) the subgenera *Agrodiaetus* (sensu ECKWEILER & HÄUSER 1997) and *Lysandra* appear clearly as monophyletic units. The unification of *Meleageria* with *Lysandra* is not supported. The subgenus *Neolysandra* splits into two separate clusters. One of them, which consists of the species *N. corona* (Verity, 1936) and *N. fatima* (Eckweiler & Schurian, 1980)*,* forms the sister clade to *Agrodiaetus*, the other (with *N. coelestina* (Eversmann, 1843) and *N. diana* Miller, 1913) clusters with the *P.aedon/myrrhinus/cornelia*-group. This split is also supported by genital morphology (COUTSIS 2001) which also suggests a closer relationship of *N. corona* and *N. fatima* to *P. dorylas* ([Denis & Schiffermüller], 1775) than to *N. coelestina* and *N. diana*. Some species (*P. icarus, P. eroides, P. cornelia*) do not appear as monophyletic units in the COI gene tree (Fig. 43) and *P. myrrhinus,* which is considered a subspecies of *P. aedon* by HESSELBARTH *et al.* (1995), clusters with *P. cornelia.* The genus *Lysandra* constitutes a parallel case compared to *Agrodiaetus* with closely related taxa differing in (mostly high) chromosome numbers. *Lysandra syriaca* appears at the basis but the relationships of the other taxa of the *coridon* group remains unresolved or obscure and only the populations of *Lysandra bellargus* form a well supported monophyletic clade (Fig. 44, Fig. 45).

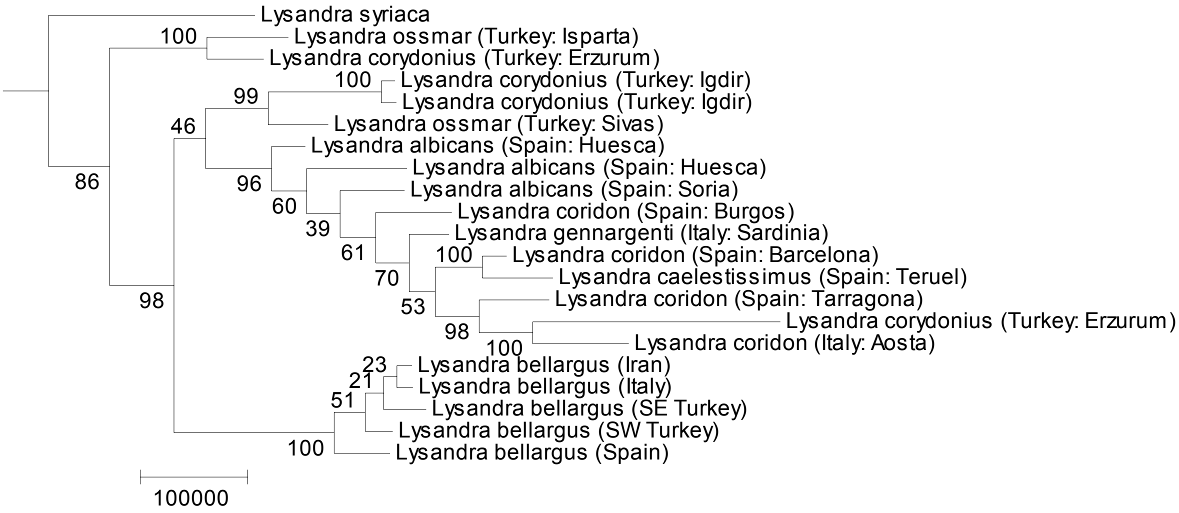


Fig. 44. MrBayes, COI, *Lysandra*

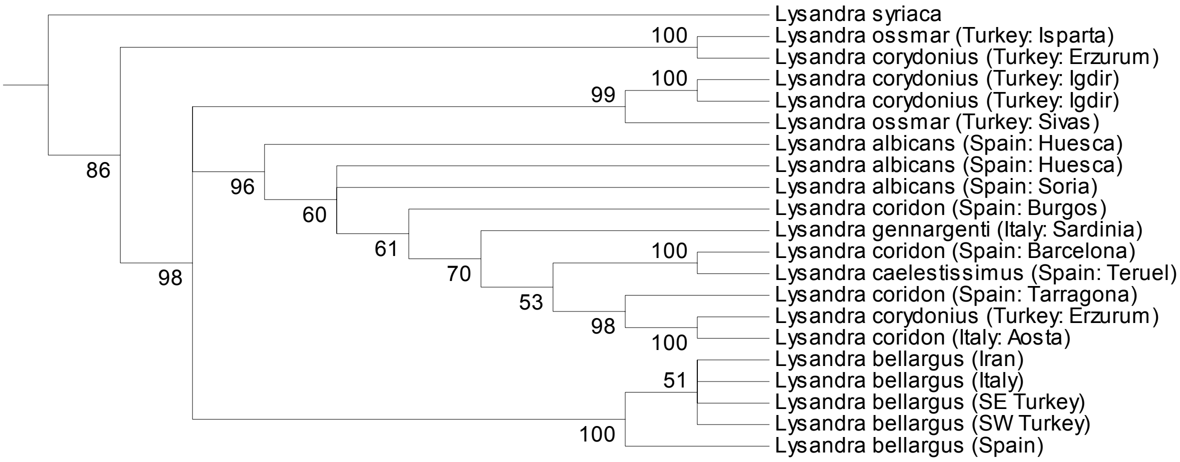


Fig. 45. MrBayes, COI, *Lysandra*, condensed (50% level)

The condensed tree for the *Agrodiaetus* clade (with 95% confidence limit) is presented in Fig. 46. The following clades are well supported:

- ***antidolus***-group (*antidolus, kurdistanicus, femininoides, morgani, peilei, karindus*)
- ***elbursicus***-group (*elbursicus, zarathustra, arasbarani, paulae*)

- ***carmon***-group (*carmon, surakovi, sekercioglui*)
- ***admetus***-group (*admetus, ripartii, nephohiptamenos, demavendi, lorestanus, khorasanensis*)
- ***iphidamon***-group (*iphidamon, dizinensis*)
- ***menalcas***-group (*menalcas, alcestis, interjectus, dantchenkoi, aroaniensis, humedasae, valiabadi, fabressei, ainsae, fulgens*)
- ***poseidonides***-group (*poseidonides, dagmara*)
- ***baytopi***-group (*baytopi, rovshani, tankeri, iphicarmon*)
- ***erschoffii***-group (*erschoffii, tenhageni, achaemenes, shahrami, glaucias, phyllis, klausschuriani, posthumus, darius, caeruleus, birunii*)
- ***poseidon***-group (*poseidon, putnami, hopfferi, lycius, actis, firdussii, sigberti, pseudactis, artvinensis, ernesti, damalis, merhaba, mithridates, wagneri, altivagans, sertavulensis, merhaba, mofidii, pseudoxerxes, gorbunovi, kanduli, sennanensis, cyaneus*)

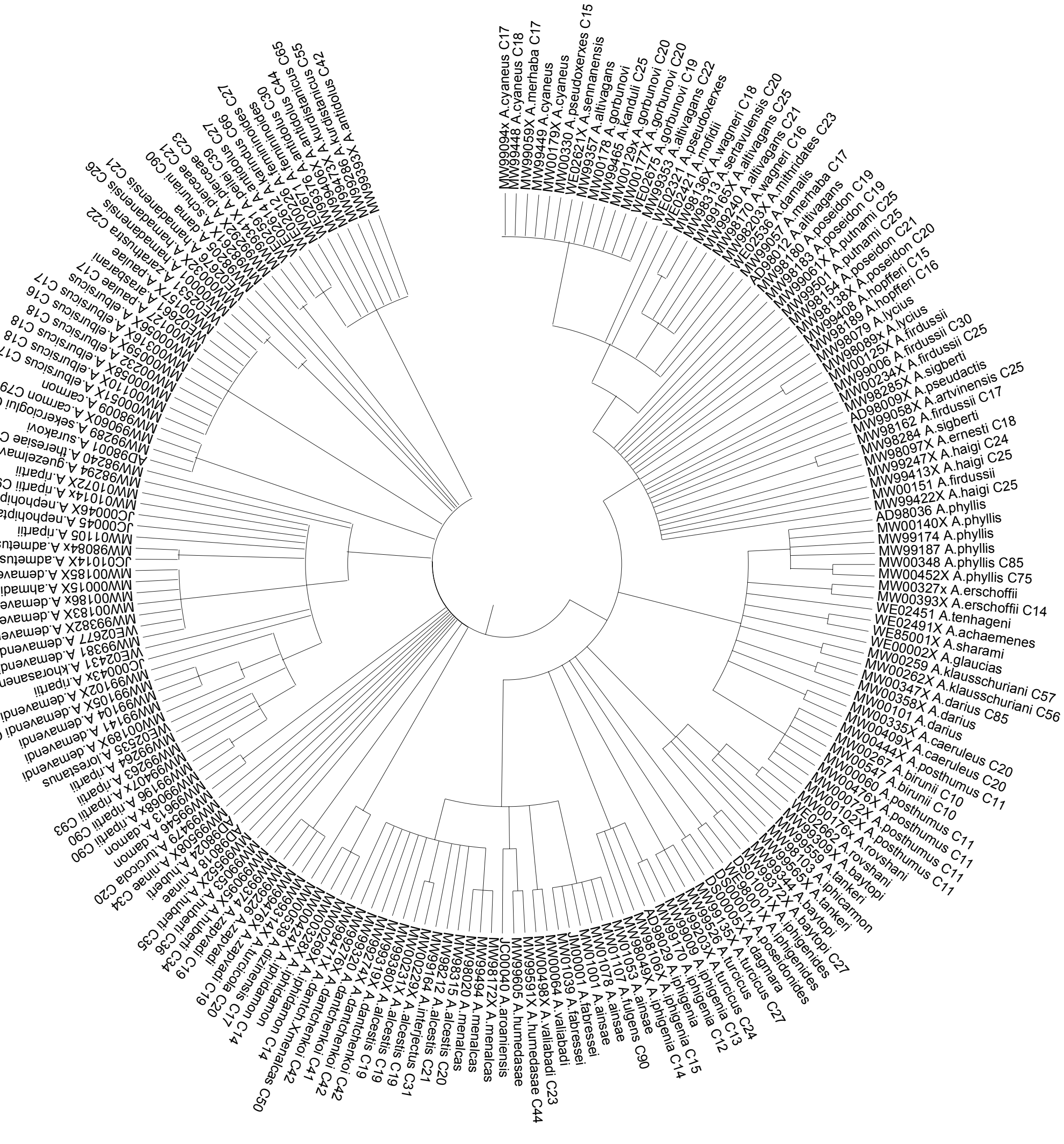


Fig. 46. MrBayes, COI, *Agrodiaetus*, condensed tree (95% confidence level)

On a lower level of confidence (83%), the first three clades form a joint clade together with the taxa *dama, schuriani* and *pierceae* and, with only 75% confidence, the taxa *ninae, turcicola, zapvadi, huberti* and *damon* cluster together. The relationships between the different clades remain largely unresolved on a low level of confidence.

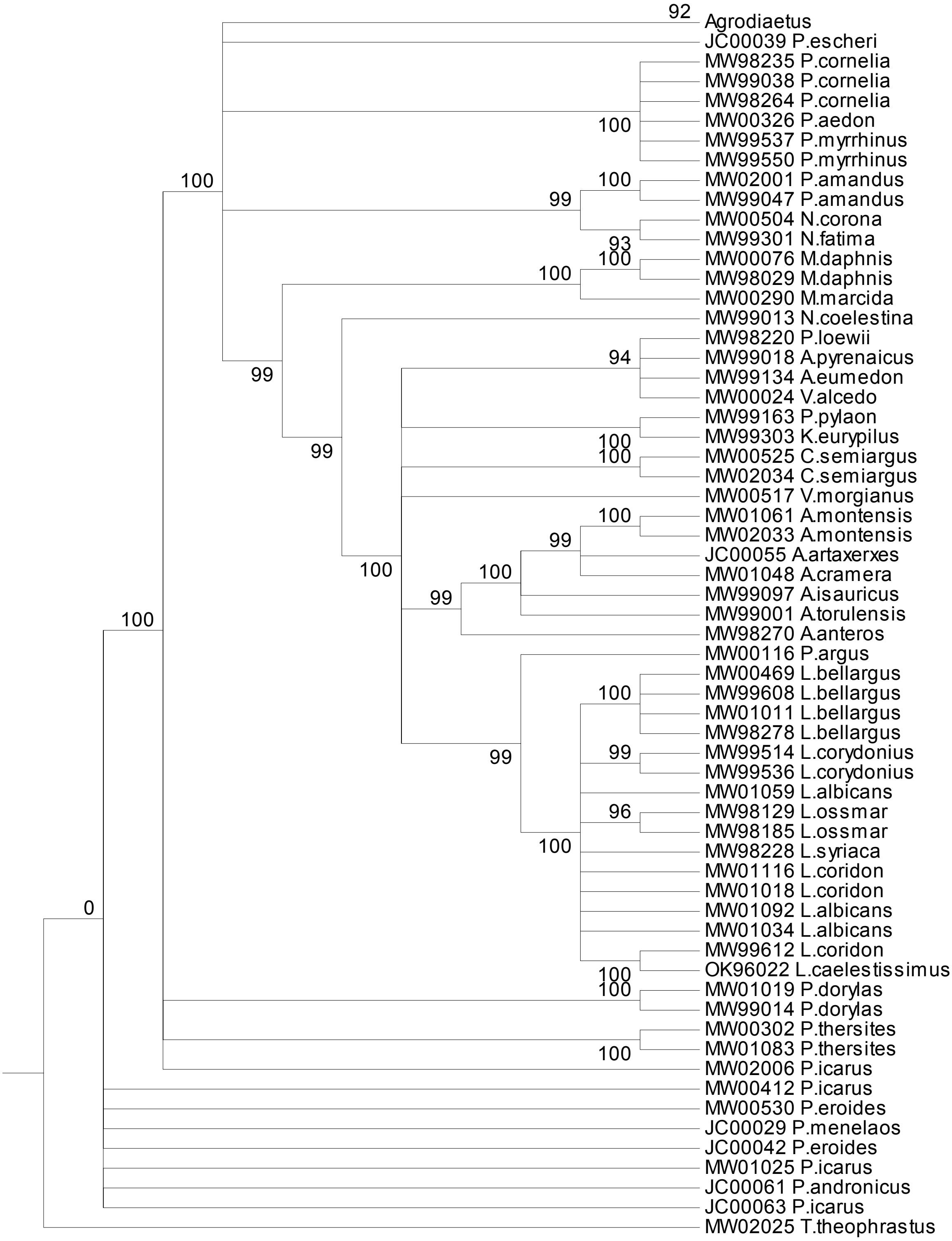


Fig. 47. MrBayes, ITS2, Polyommatiti, condensed (90% confidence level)

The Bayesian analysis of the ITS-2 dataset does not support the monophyly of *Polyommatus* (Fig. 47). Relationships of *Polyommatus* sensu strictu appear unresolved and the *Plebeius* subcluster which is found within *Polyommatus* includes not only *Cyaniris* but also *Lysandra*. The monophyly of *Aricia* (excl. *A. eumedon*) and *Lysandra* are very well supported and within the latter group the taxa *bellargus, corydonius* and *ossmar* appear as monophyletic units. The monophyly of *Agrodiaetus* is supported with a posterior probability of 92%, but the sister group is unresolved. Within *Agrodiaetus* (Fig. 48), *Agrodiaetus damon* appears as the sister taxon to all other *Agrodiaetus*, but the phylogeny of the remaining taxa is mainly unresolved.

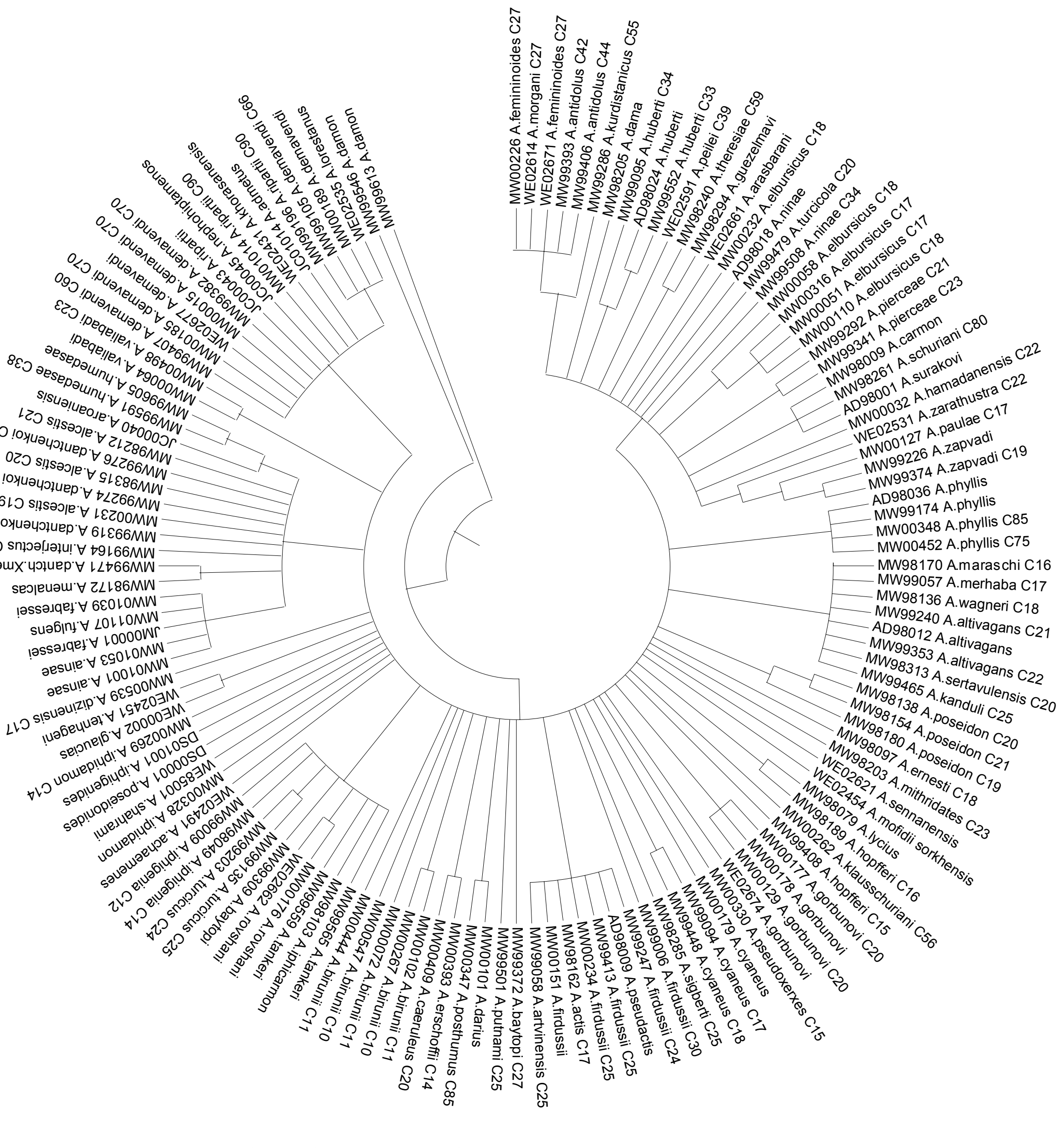


Fig. 48. MrBayes, ITS2, *Agrodiaetus*, 80%

Apart from several small clusters of closely related species only few larger clusters appear with a high level (>90%) of confidence:

- ***menalcas***-group (*menalcas, alcestis, interjectus, dantchenkoi, aroaniensis, humedasae, fabressei, ainsae, fulgens*)
- ***iphigenia***-group (*iphigenia, baytopi, rovshani, tankeri, iphicarmon, turcicus*)
- ***carmon***-group (*carmon, surakovi, sekercioglui*)
- ***antidolus***-group (*antidolus, kurdistanicus, femininoides, morgani*)

The last two groups form a cluster together with the taxa *dama, peilei, huberti, theresiae, guezelmavi, arasbarani, elbursicus, ninae, turcicola, pierceae, zarathustra, zapvadi* and the undescribed taxon from Ahar with a posterior probability of 81% and the ***admetus***-group (*admetus, ripartii, nephohiptamenos, demavendi, lorestanus, khorasanensis*) reappears with a confidence level of 84%. Relationships between these groups are unresolved.

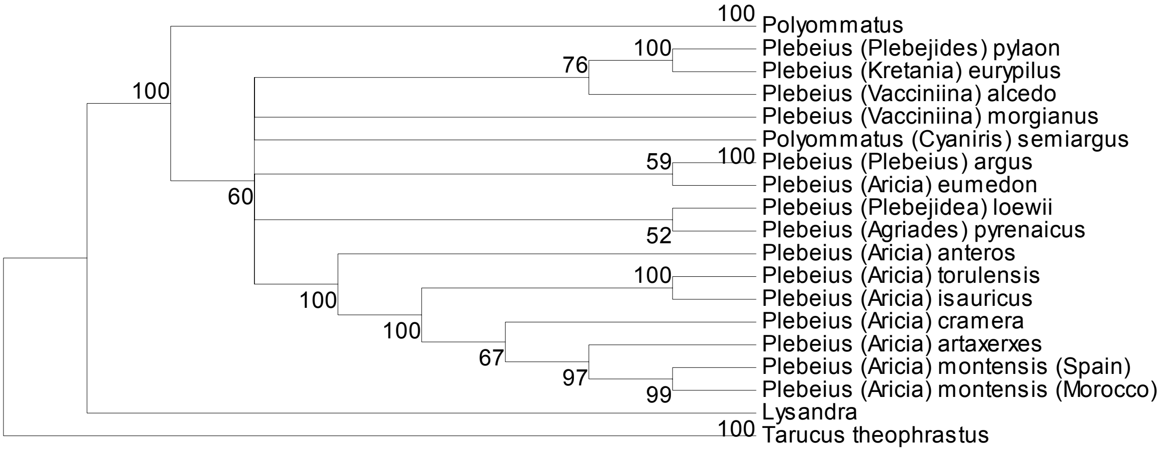


Fig. 49. MrBayes, ITS2&COI, Polyommatiti, condensed tree (50% confidence level)

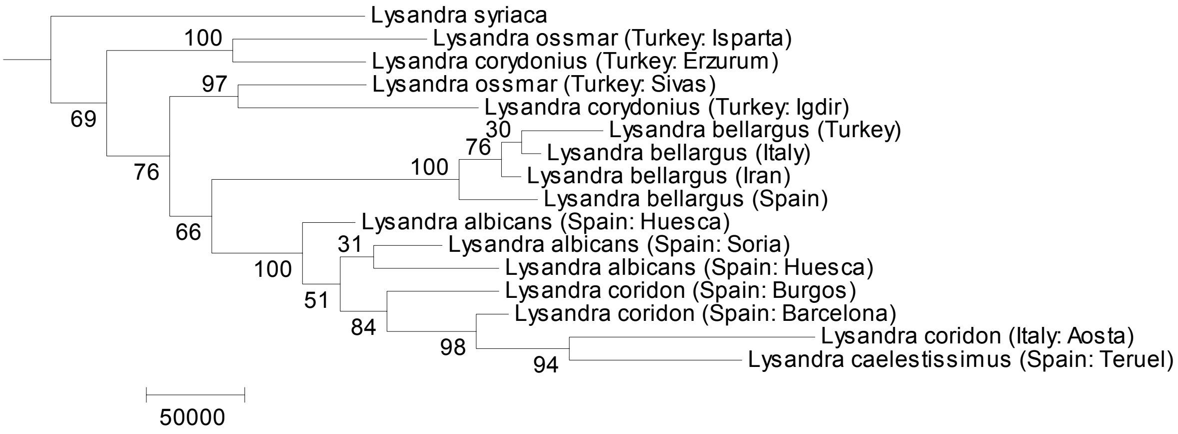


Fig. 50. MrBayes, ITS2&COI, *Lysandra*

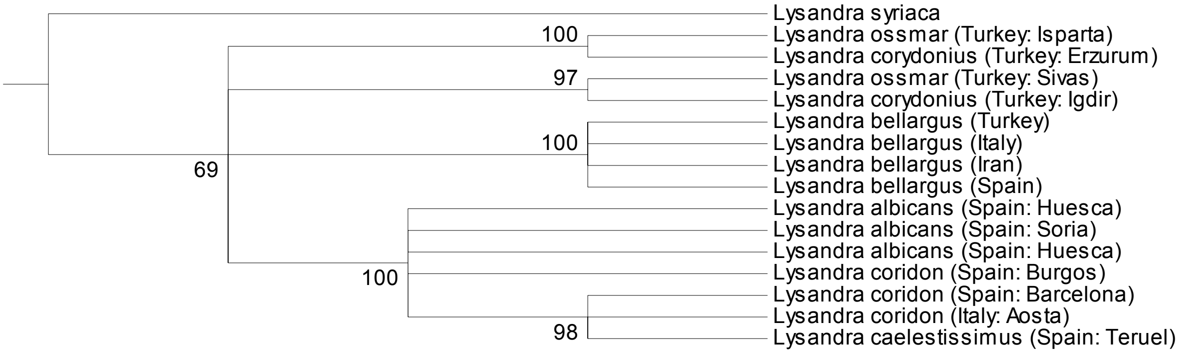


Fig. 51. MrBayes, ITS2&COI, *Lysandra*, condensed tree (95% confidence level)

In the combined data set of COI and ITS-2, the subgenus *Lysandra* forms a monophyletic clade at the base of the phylogram while the other *Polyommatus* (excluding *Cyaniris*) are found in a highly supported monophyletic clade at the tip of the tree (Fig. 49, Fig. 50, Fig.

51). The sister group to this clade is a weakly supported *Plebeius* monophylum which includes *Cyaniris*. Apart from the well supported and resolved *Aricia*-monophylum (excluding *A. eumedon*) the relationships within the genus *Plebeius* remain poorly resolved. *Lysandra syriaca* appears to be the sister species of all other *Lysandra* species which are divided into four well-supported clades, but it is conspicuous that *corydonius* and *ossmar* do not appear as monophyletic units. The other *Polyommatus* species split into seven groups (Fig. 52, Fig. 53) and *Neolysandra coelestina* (which is separated from the other two *Neolysandra* species) appears as sister taxon to the remaining *Polyommatus*. The relationships between the other main clades, which appear with a posterior probability of 100%, remain unresolved.

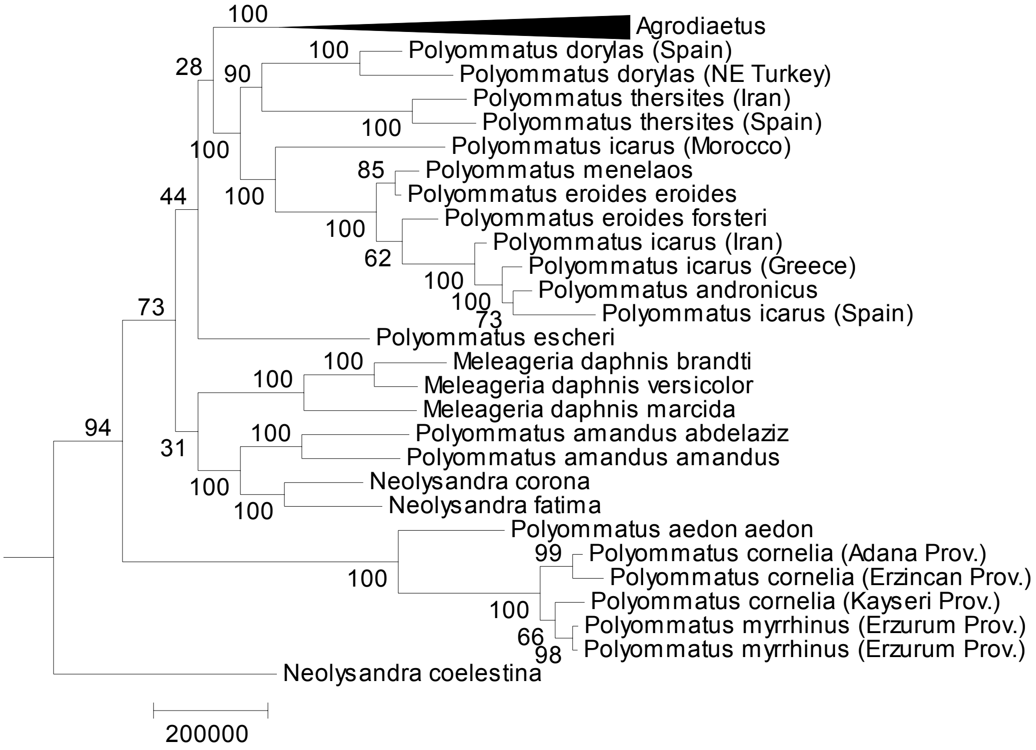


Fig. 52. MrBayes, ITS2&COI, *Polyommatus* (excl. *Lysandra*)

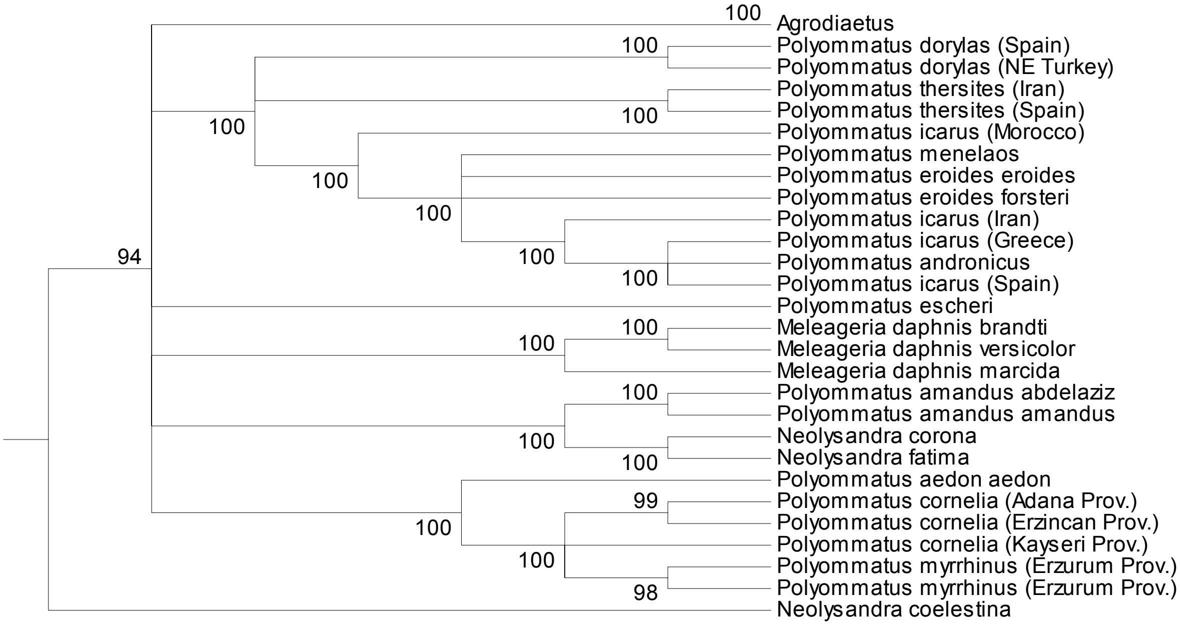


Fig. 53. MrBayes, ITS2&COI, *Polyommatus* (excl. *Lysandra*), condensed tree (95%)

Fig. 54. **MrBayes. ITS2&COI.** ***Agrodiaetus***

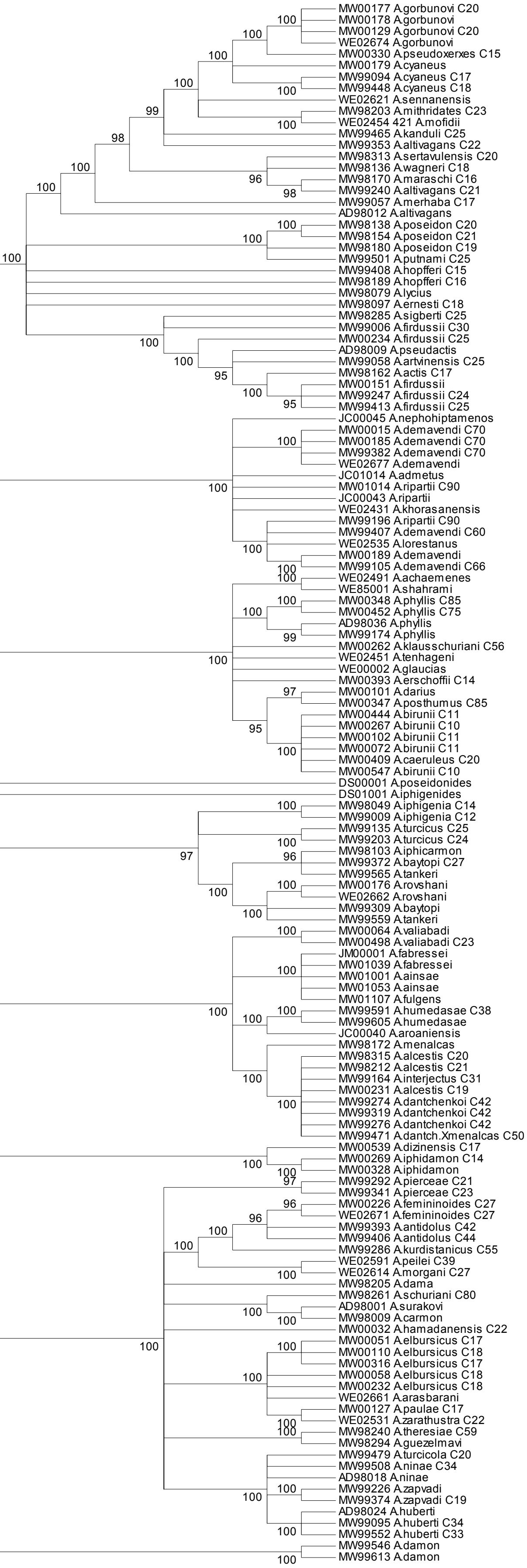


Fig. 55. **MrBayes. ITS2&COI.** ***Agrodiaetus*****, 95%**

The subgenus *Agrodiaetus* which represents one of these clades splits into 10 groups which can be named according to the taxonomically oldest species (Fig. 56, Fig. 57). One of them which includes only one species, *Agrodiaetus damon*, appears to be the sister group to all the others. The complete tree is presented in fig. Fig. 54 and the condensed topology (confidence limit of 95%) in Fig. 544.

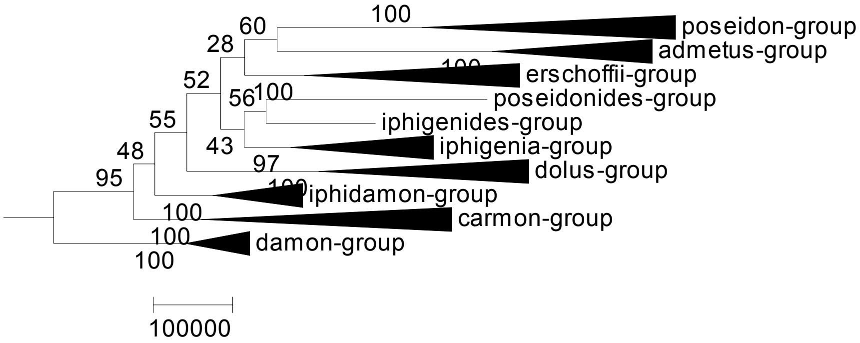


Fig. 56. MrBayes, ITS2&COI, *Agrodiaetus*

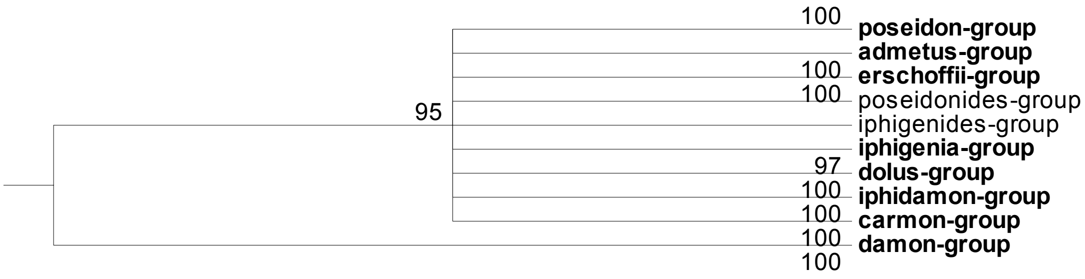


Fig. 57. MrBayes, ITS2&COI, *Agrodiaetus*, condensed tree (95% confidence limit)

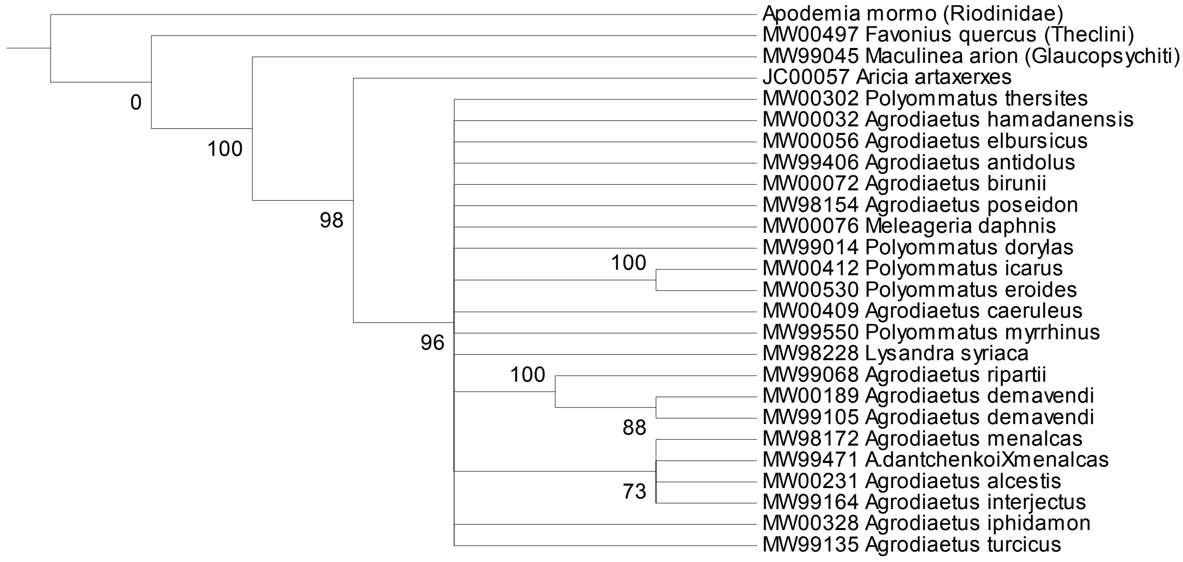


Fig. 58. MrBayes, ND1, Lycaenidae, condensed tree (70% confidence limit)

For the ND1 analysis most taxa were chosen to represent the main *Agrodiaetus* clades which were obtained from the combined COI- and ITS2-analyses in order to check if this gene gives a better resolution of clade relationships. The tree obtained from the ND1 analysis (Fig. 58) has little resolution but is compatible with those of the COI- and ITS2-analysis. A combination of the ND1 dataset with the COI- and ITS2-datasets also does not improve the resolution regarding the relationships of the different *Agrodiaetus* clades with each other. The tree obtained from the Cytb analysis (Fig. 59) is also compatible with the results from the other genes but due to the low number of taxa sequenced does not provide additional information.

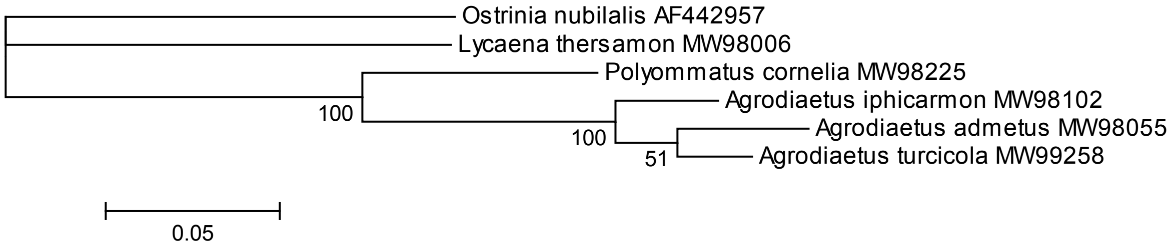


Fig. 59. MrBayes, Cytb

Maximum parsimony analysis

The Maximum parsimony analysis yielded 100000 trees in each of the COI-, ITS2- and the combined analysis because the maximum limit of 100 trees was reached in each replicate. The trees obtained from the COI analysis had scores between 2414 and 2433. The consensus tree calculated from the 300 shortest trees (score=2414) is shown in Fig. 60 for the outgroup & Fig. 61 for *Agrodiaetus* and that calculated from all trees in Fig. 62 (outgroup) & Fig. 63 (*Agrodiaetus*).

Scores of the ITS-2 analysis were between 1105 and 1107 (39800 of which had the lowest score of 1105). The consensus tree of all trees is shown in Fig. 64.

Scores of the combined analysis were between 2599 and 2606. A consensus tree of the 2700 shortest trees is presented in Fig. 65 and the consensus tree of all trees is shown in Fig. 66 & Fig. 67.

Bootstrap trees for the three analyses are shown in Fig. 68 (COI outgroups), Fig. 69 (COI *Agrodiaetus*), Fig. 70 (ITS-2), Fig. 71 (ITS-2 & COI combined, outgroups) and Fig. 72 (ITS-2 & COI combined, *Agrodiaetus*).

MP-trees calculated from the ND1-gene were poorly resolved and different combinations with the COI- and/or ITS-2 gene also did not provide new results and are therefore not presented here.

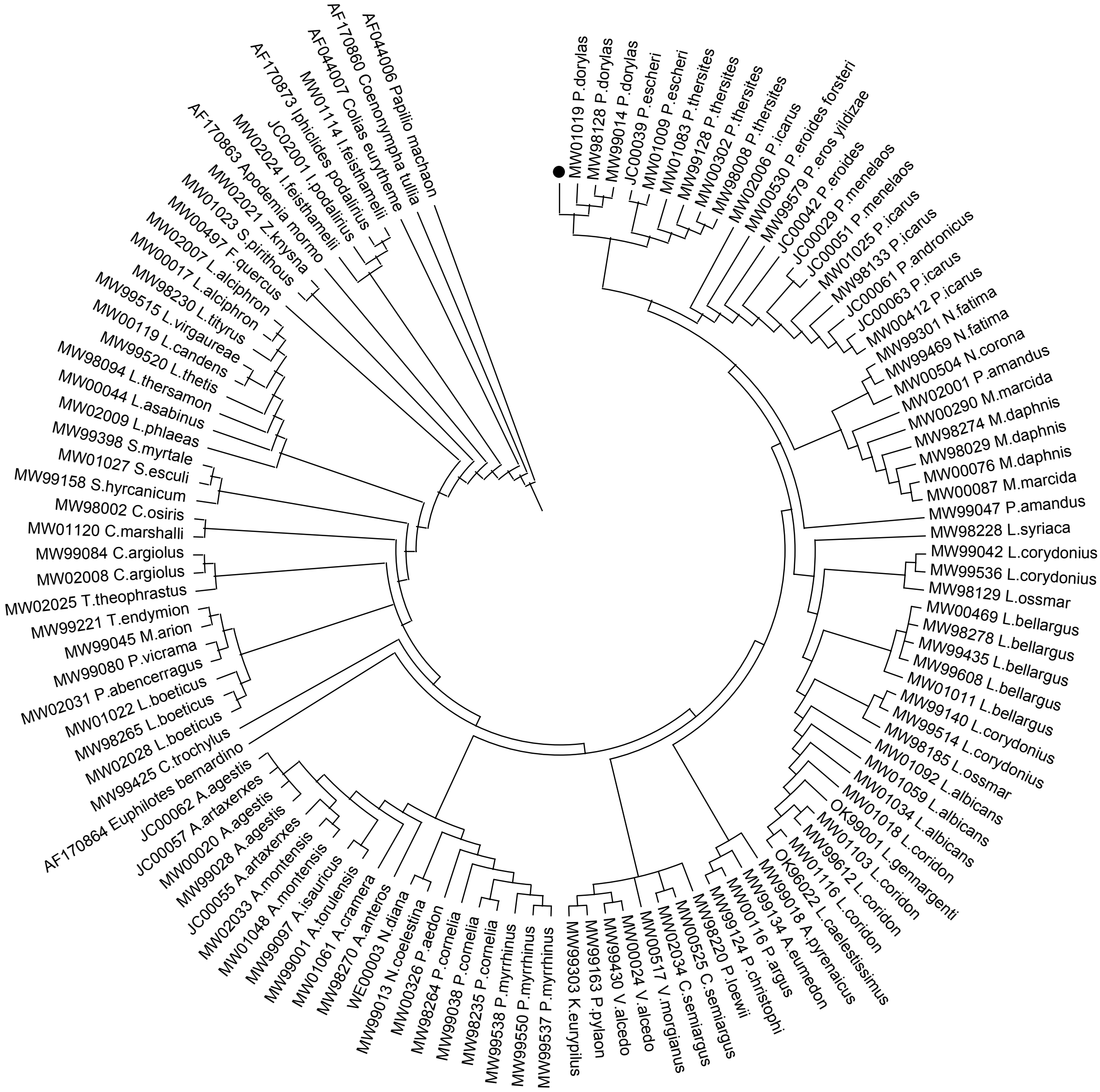


Fig. 60. MP Majority Rule Consensus Tree of the shortest trees (COI) excluding *Agrodiaetus*

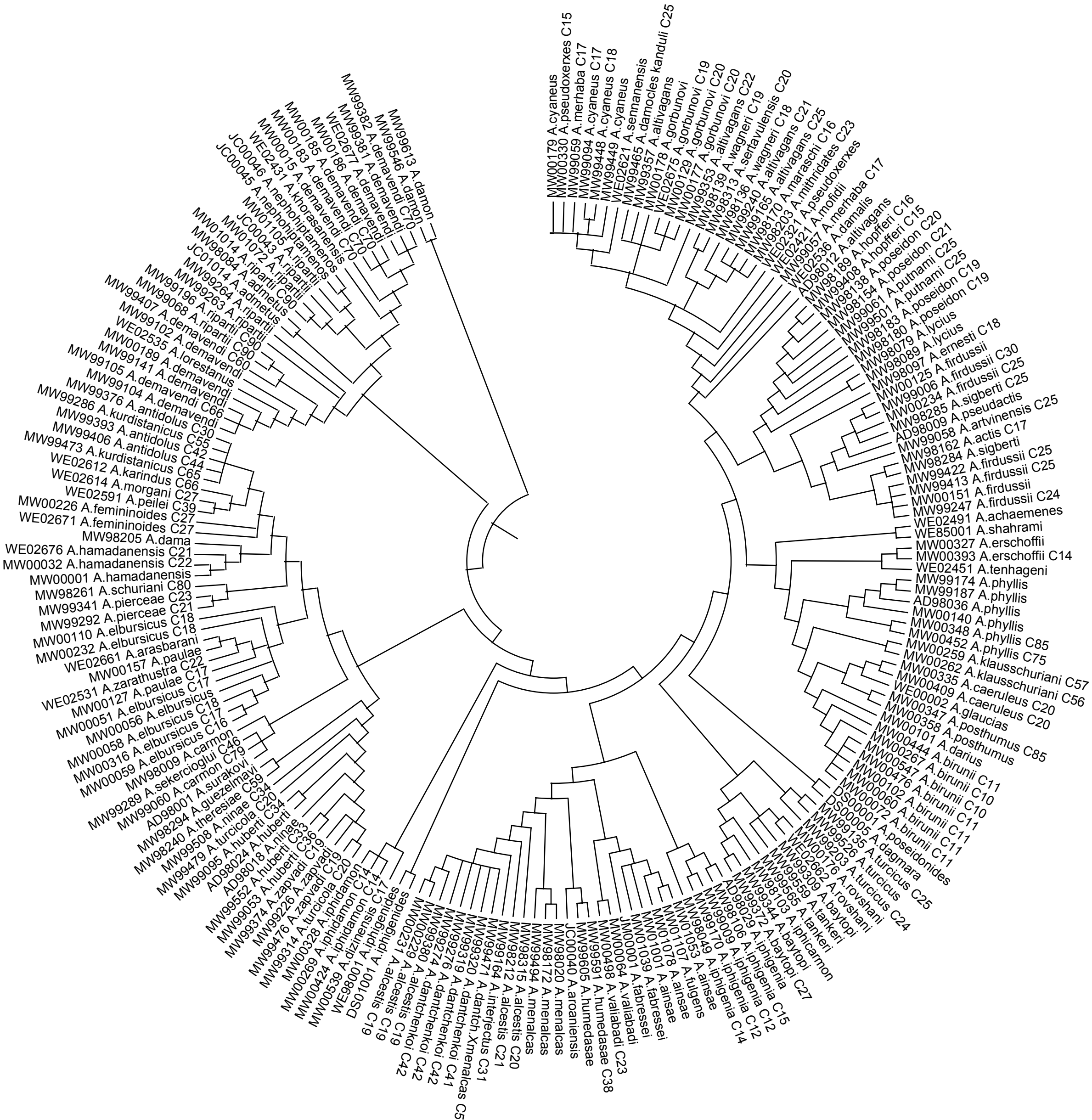


Fig. 61. MP Majority Rule Consensus Tree of the shortest trees (COI) of *Agrodiaetus*

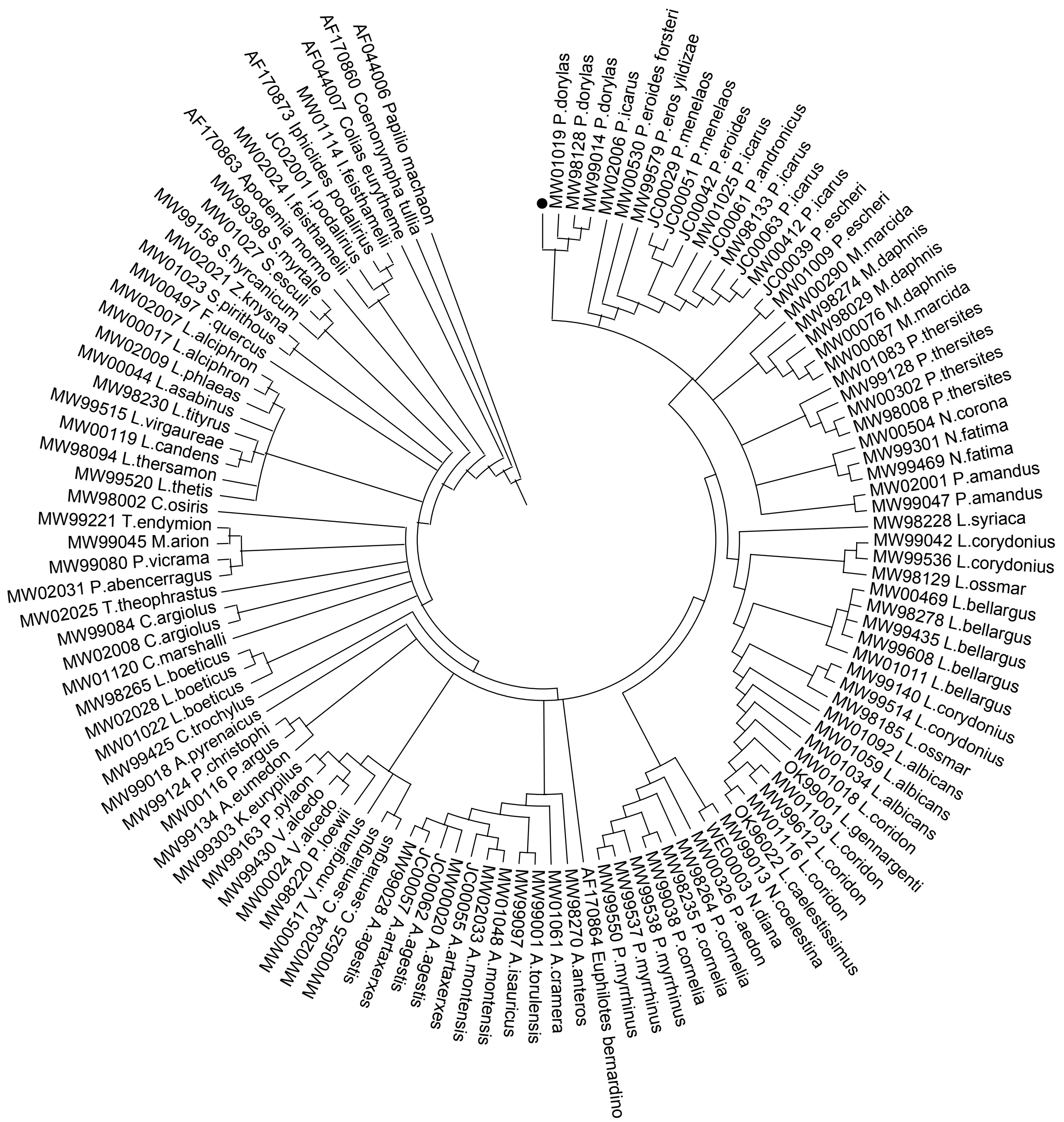


Fig. 62. MP Majority Rule Consensus Tree (COI) excl. *Agrodiaetus*

Fig. 63. MP Majority Rule Consensus Tree (COI) of *Agrodiaetus*

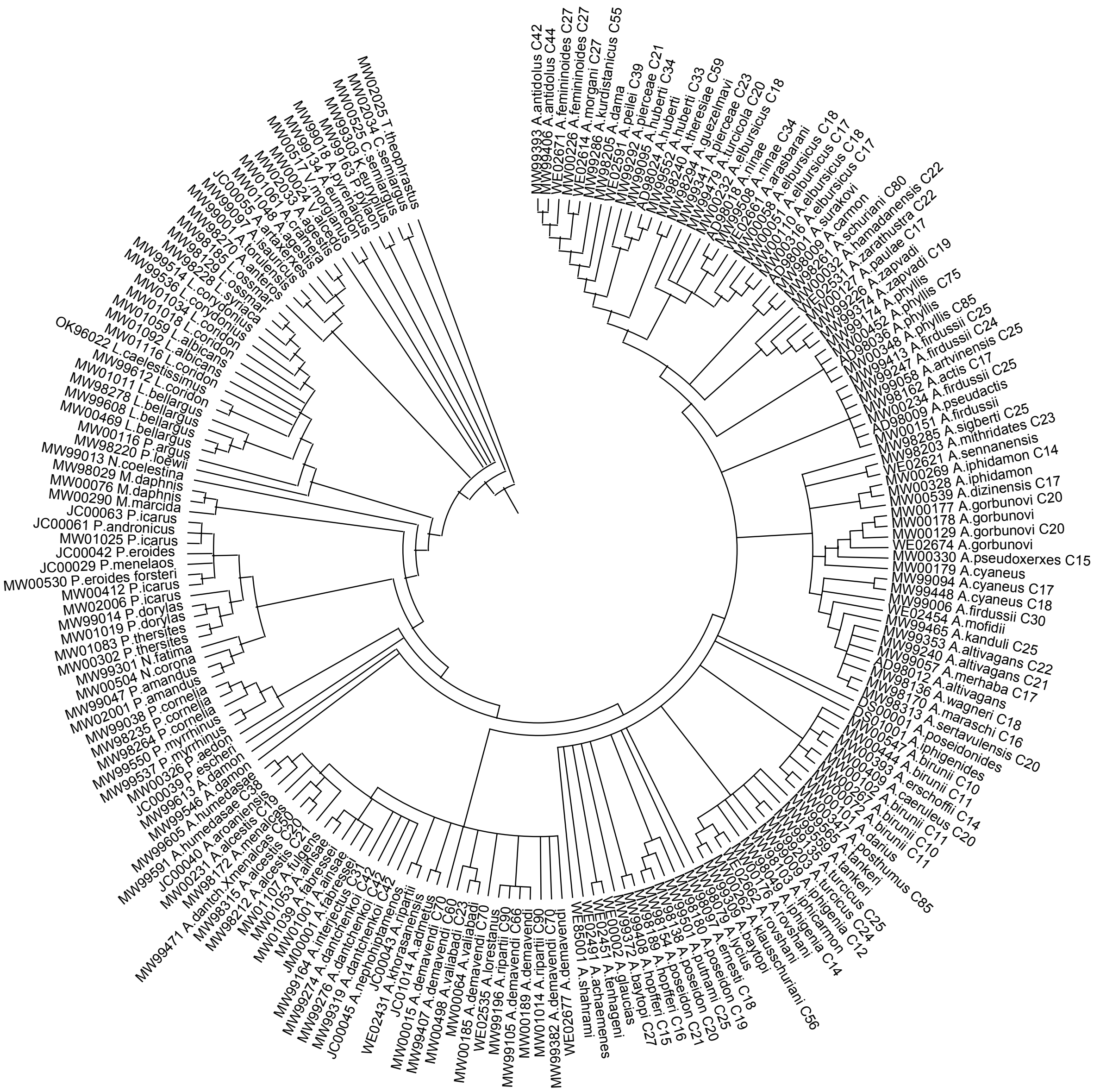


Fig. 64. Maximum Parsimony Majority Rule Consensus Tree (ITS-2)

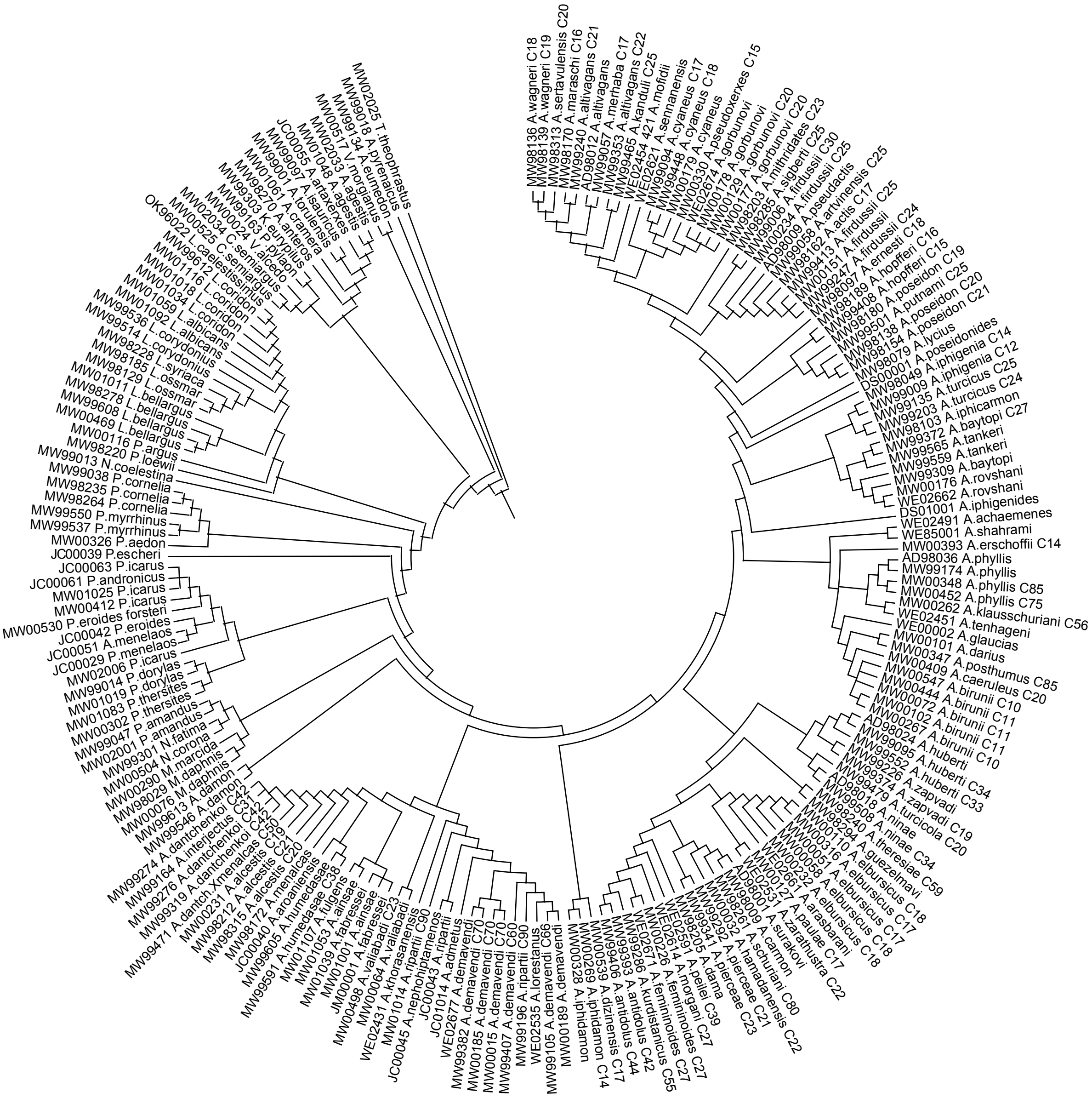


Fig. 65. MP Majority Rule Consensus Tree of the shortest trees (ITS-2 & COI)

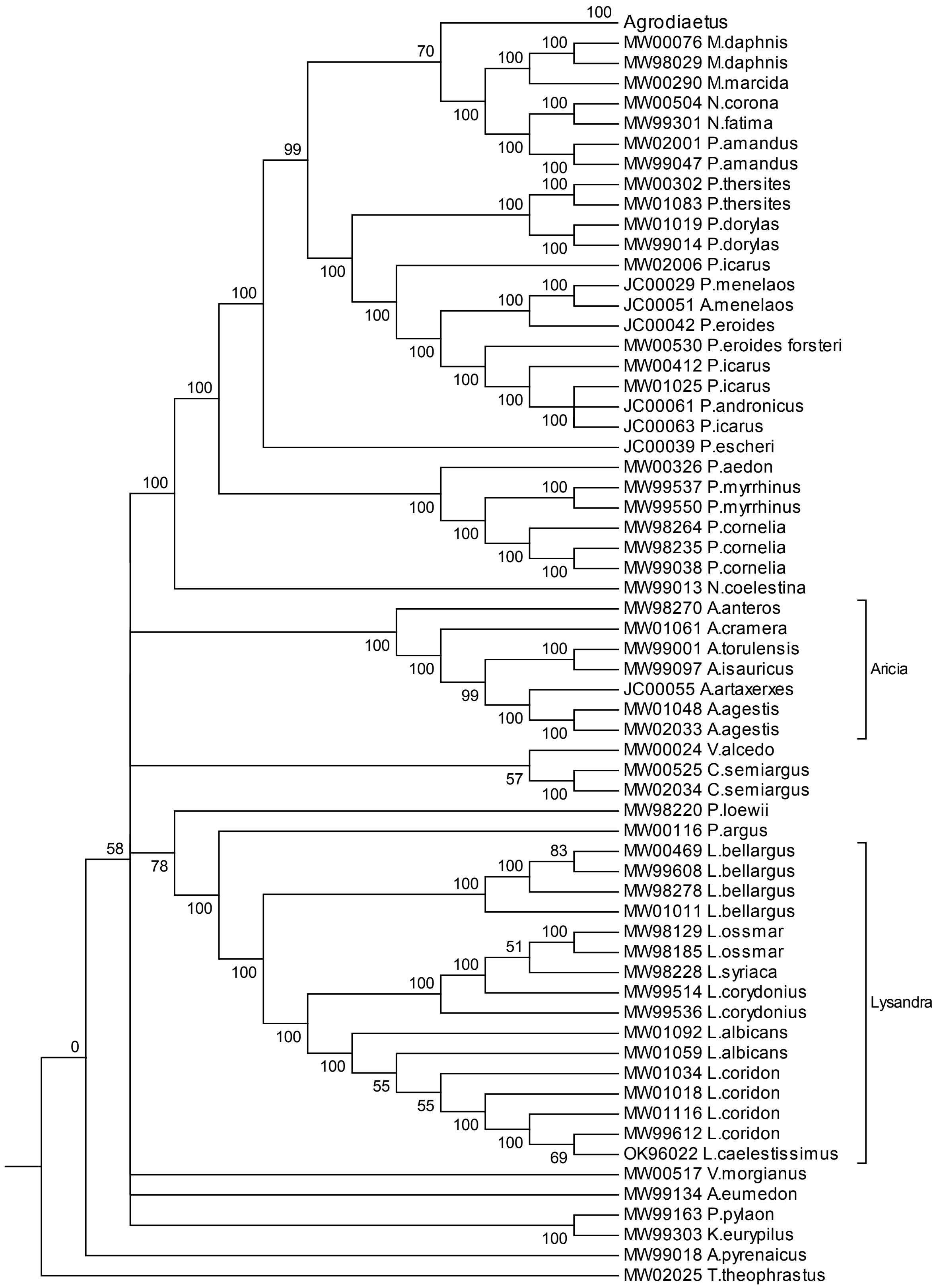


Fig. 66. MP Consensus Tree of the combined data set (ITS-2 & COI) excl. *Agrodiaetus*

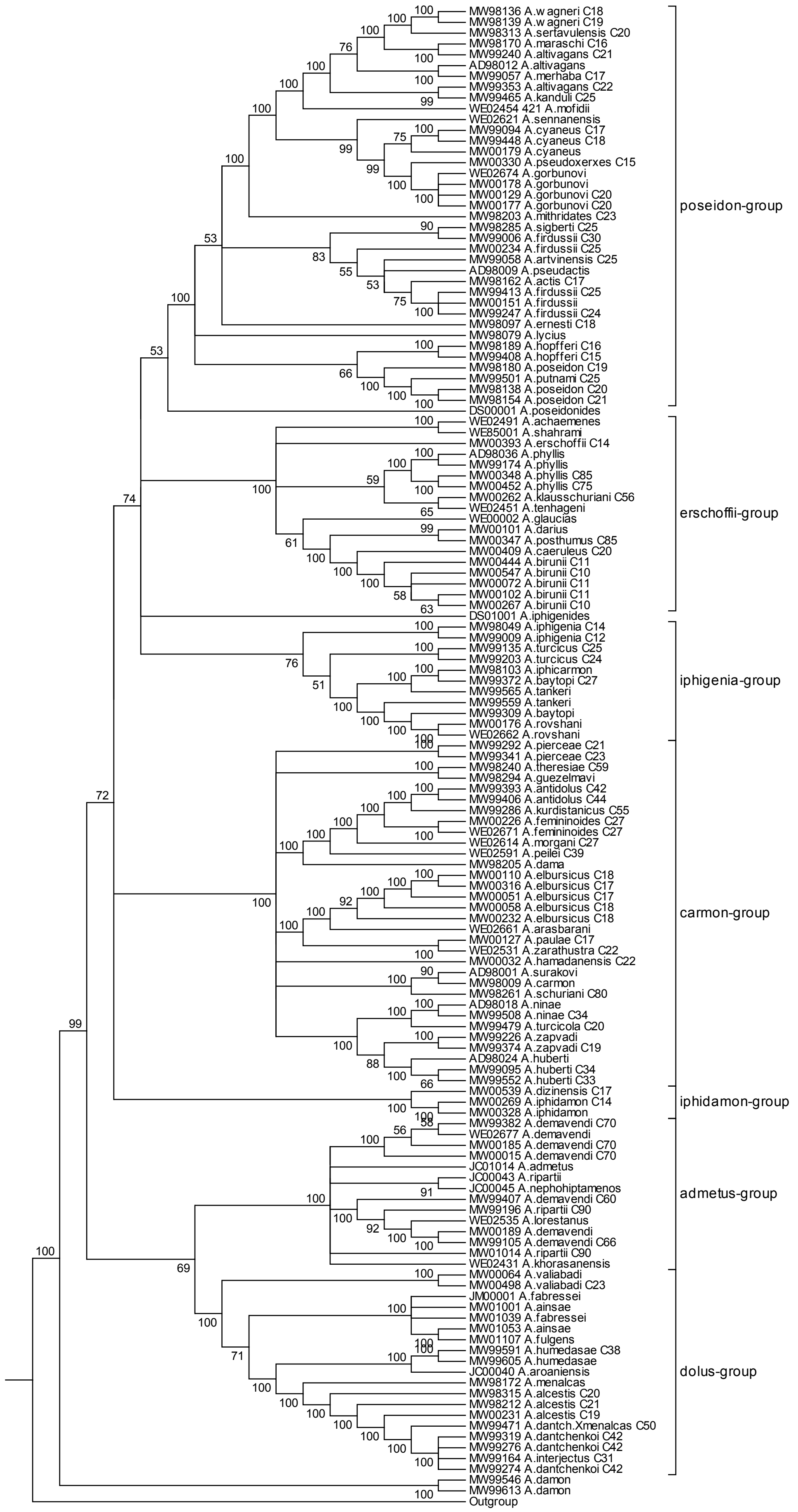


Fig. 67. MP Consensus Tree of the combined data set (ITS-2 & COI) of *Agrodiaetus*

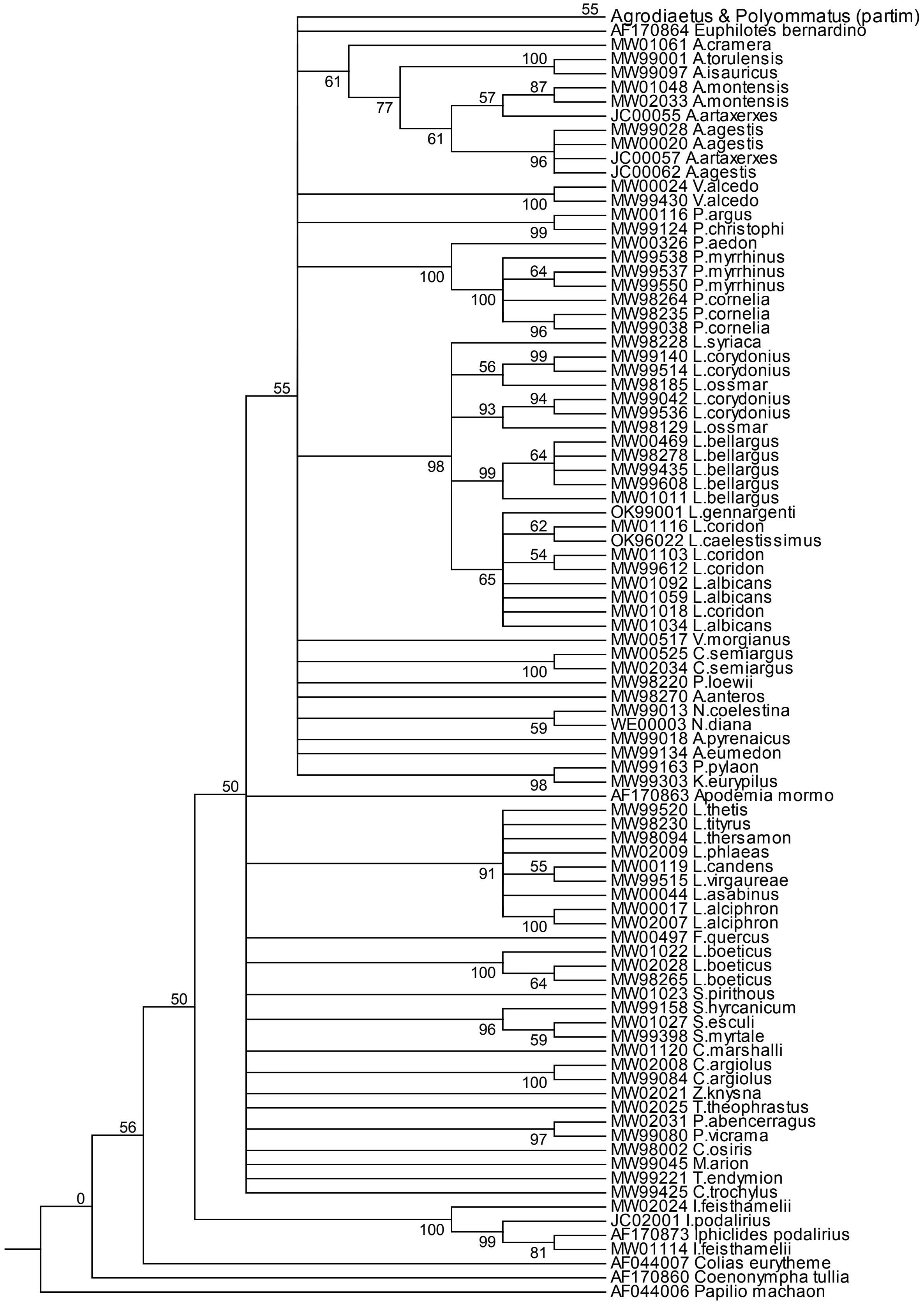


Fig. 68. Bootstrap Tree (COI) excl. *Agrodiaetus* and closely related *Polyommatus* species

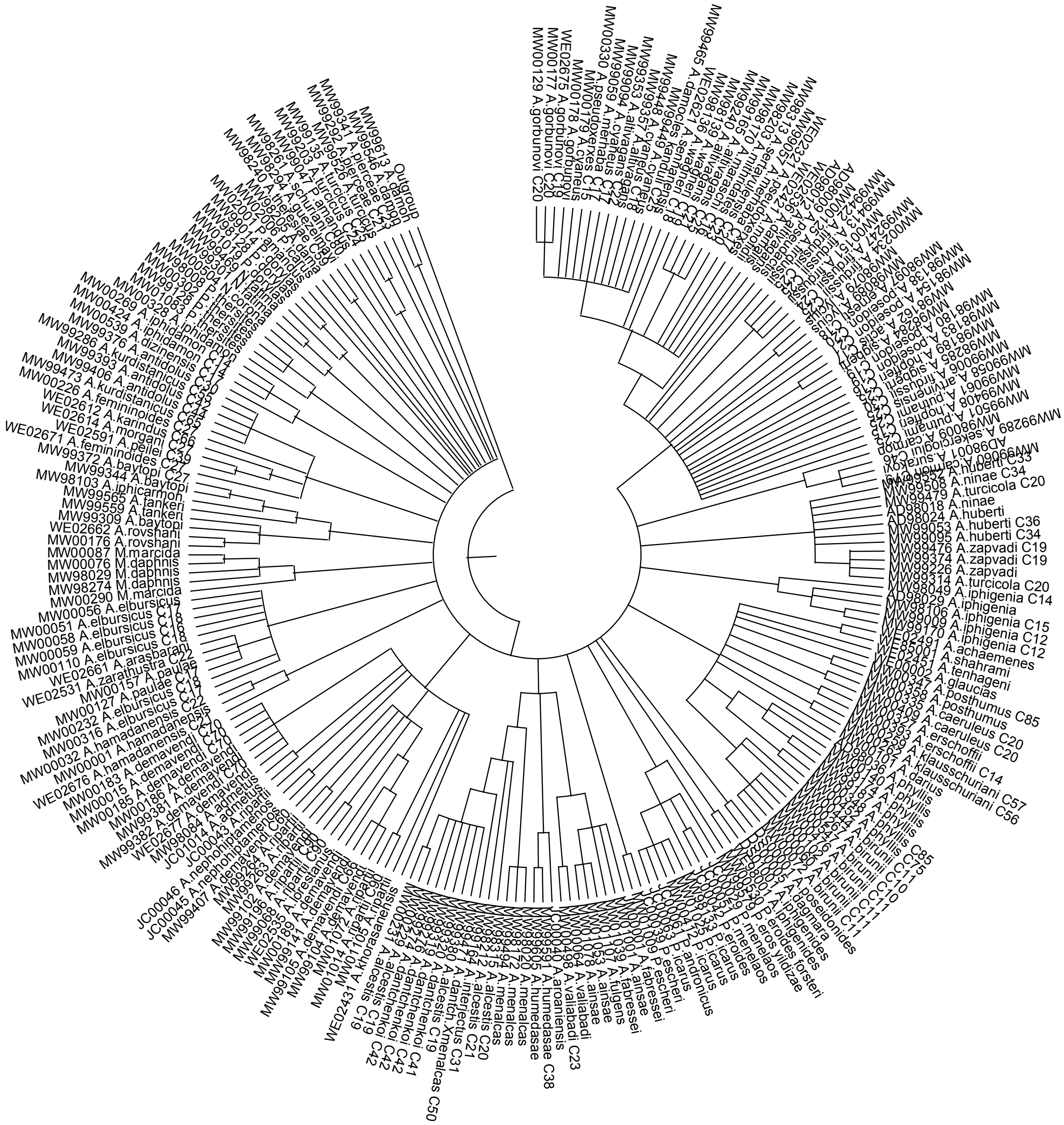


Fig. 69. Bootstrap Tree (COI) of *Agrodiaetus* and closely related *Polyommatus* species (50%)

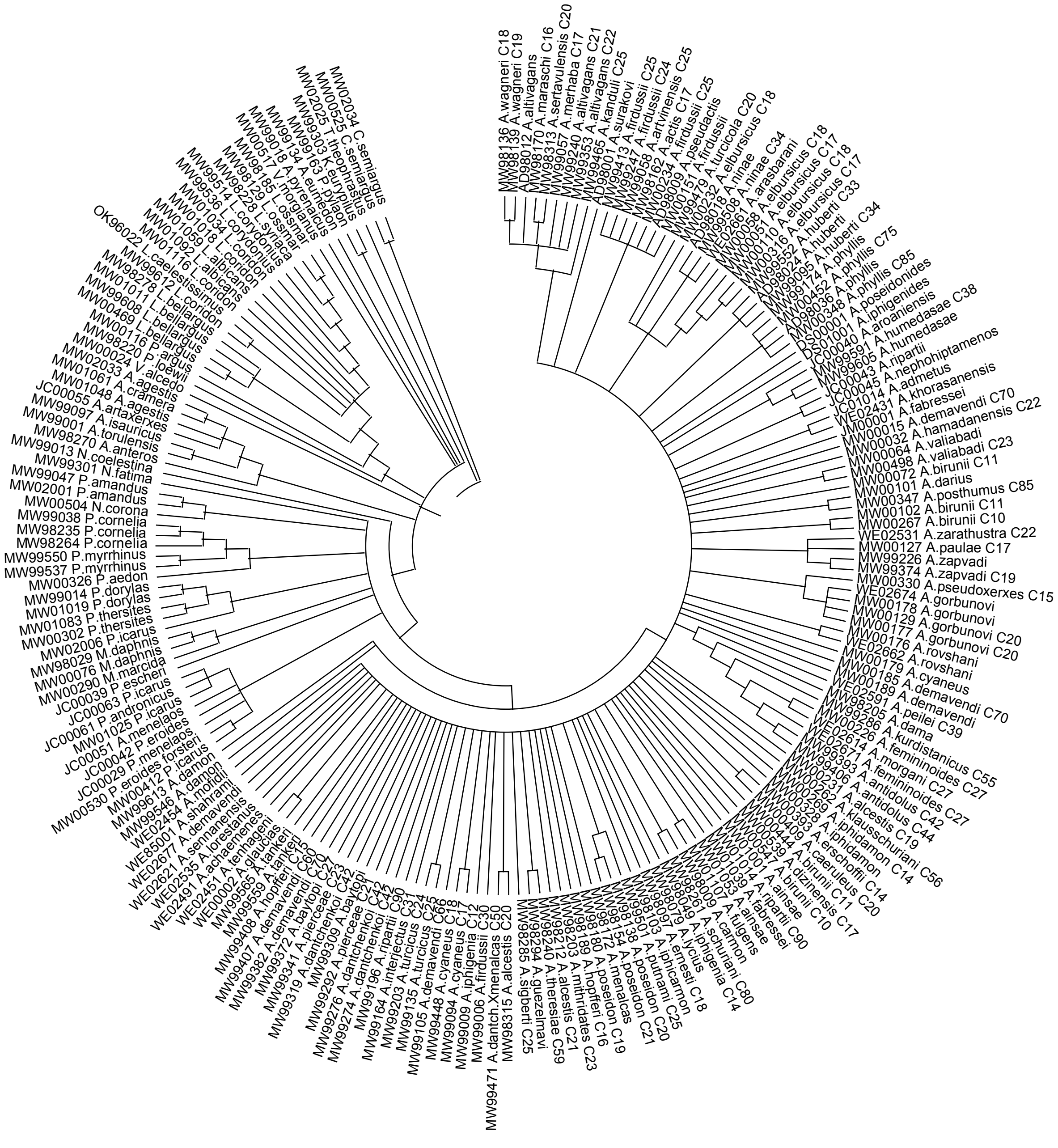


Fig. 70. Bootstrap tree (ITS-2), condensed at 50% confidence level

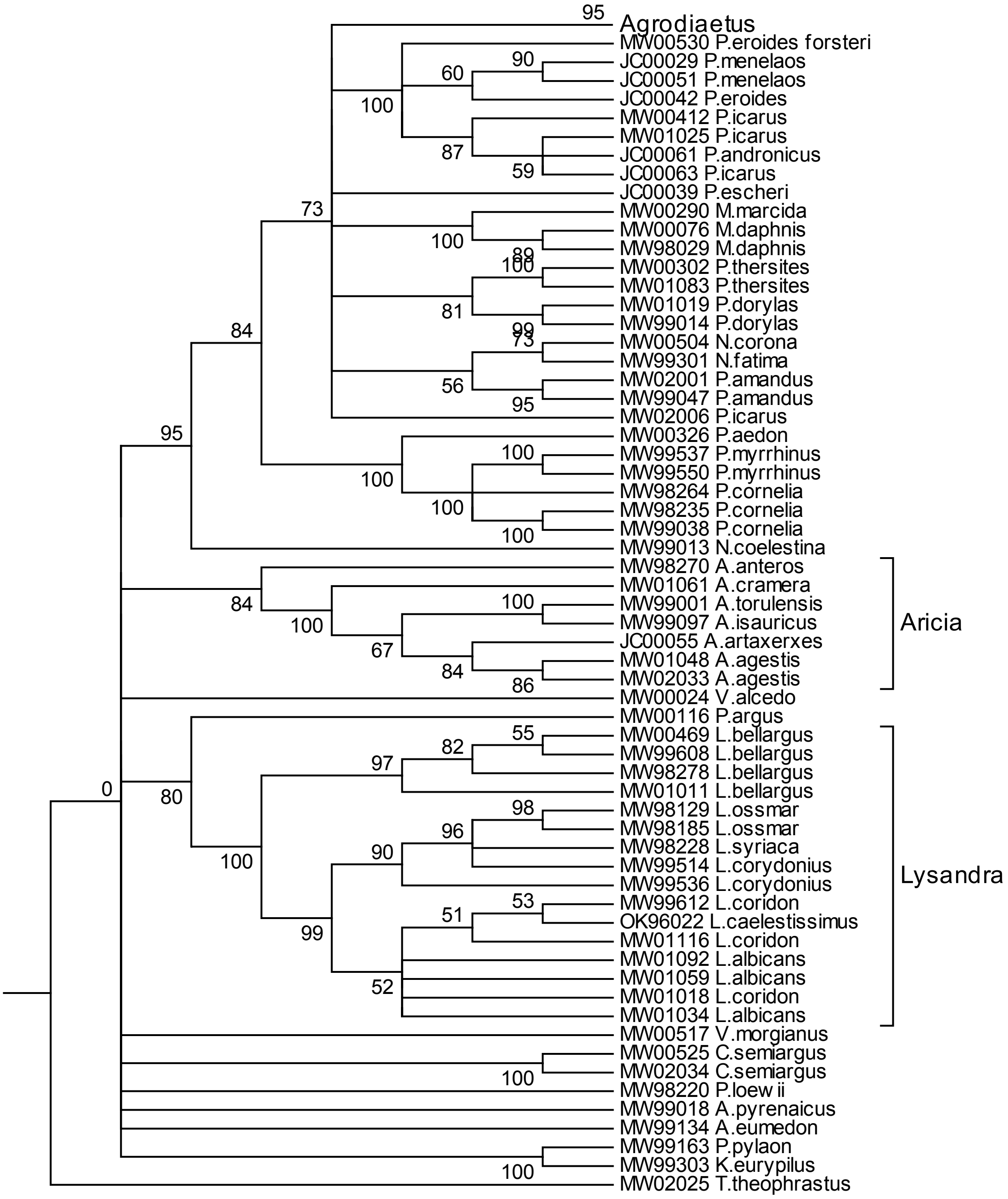


Fig. 71. Bootstrap Tree of the combined data set (ITS-2 & COI) excl. *Agrodiaetus*

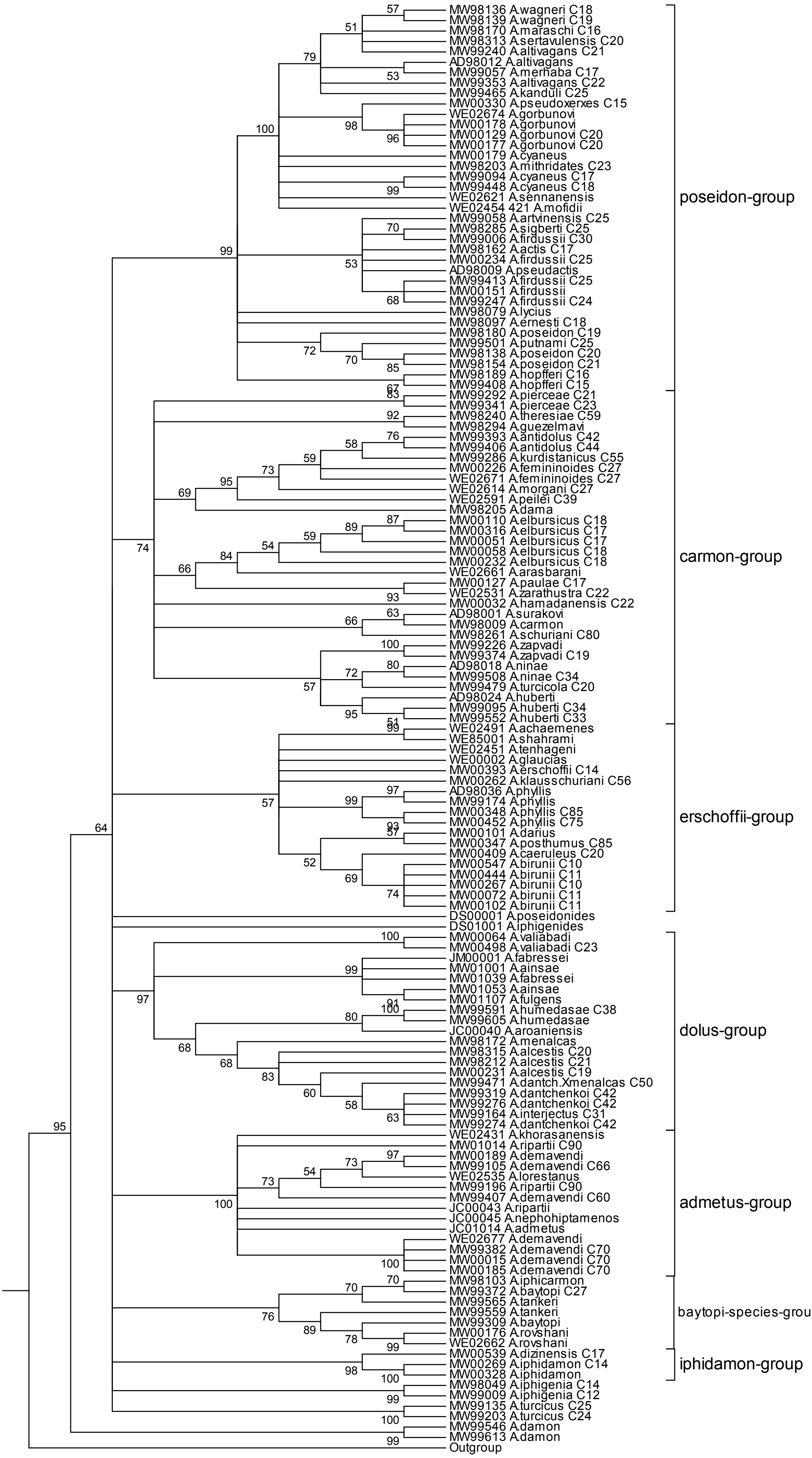


Fig. 72. Bootstrap Tree of the combined data set (ITS-2 & COI) of *Agrodiaetus*

Statistical parsimony networks

The following table gives an overview of the statistical parsimony networks calculated from the COI data set. The parsimony connection limit was 11 steps for a parsimony probability of 95%. Such a connection limit would only allow the calculation of networks for populations of the same species or very closely related species. In the case of *Agrodiaetus* 33 different networks were obtained with this connection limit. On the other hand, calculation time increases more than exponentially with an increasing connection limit which rendered the calculation of a complete network for *Agrodiaetus* unfeasible. Instead, networks were calculated for the main *Agrodiaetus* clades which were obtained from the combined COI- and ITS2-analysis (i.e. all clades with more than two sequences). The connection limit was increased until all haplotypes were connected, with the only exception of *A. klausschuriani* in the *erschoffii*-group, a taxon which was so distant that it seemed more reasonable to exclude it from the analysis. The number of steps required is stated in Tab. 9.

Tab. 9. Connection limits in the COI network analysis

Group	sequences	excluded taxa	haplo-types	steps	fig.
Iphiclides	4		3	14	Fig. 73
Polyommatus-aedon-group	7		6	31	Fig. 74
Aricia-agestis-group	12		11	13	Fig. 75
Lysandra	21		19	18	Fig. 76
Agrodiaetus-admetus-group	27		19	15	Fig. 77
Agrodiaetus-menalcas-group	25		17	16	Fig. 78
Agrodiaetus-carmon-group	44		34	20	Fig. 79
Agrodiaetus-erschoffii-group	24	*A. klausschuriani*	21	18	Fig. 80
Agrodiaetus-iphigenia-group	16		15	18	Fig. 81
Agrodiaetus-poseidon-group	49		39	13	Fig. 82

The number of haplotypes is always lower than the number of sequences, because some sequences turned out to have the same haplotype (or only differed in ambiguities). In these cases, the graph shows only one representative haplotype and the size of the bounding box is increased according to the frequency of this haplotype. Tab. 10 lists those representative haplotypes together with the codes of the collapsed haplotypes. Usually these collapsed haplotypes belong to the same taxon as the reference specimen, but in some cases they were designated to different taxa which is indicated with an asterisk (*). Identical COI haplotypes were found in the following different taxa.

- *Iphiclides feisthamelii* and *Iphiclides podalirius*
- *Agrodiaetus zapvadi* and *Agrodiaetus turcicola*
- *Agrodiaetus kurdistanicus* and *Agrodiaetus antidolus*
- *Agrodiaetus peilei* and *Agrodiaetus morgani*
- *Agrodiaetus fabressei* and *Agrodiaetus ainsae*
- *Agrodiaetus cyaneus* and *Agrodiaetus merhaba*
- *Agrodiaetus sertavulensis* and *Agrodiaetus wagneri*

This indicates that taxa could be identical genetically or that gene flow persists between them. If the bounding box is a rectangle, this haplotype was calculated to have the highest outgroup probability.

In several cases the networks provide information which could not be obtained from the phylogenetic trees. Extant ancestral haplotypes appear in the *Polyommatus-aedon*-group

(*Polyommatus myrrhinus*, Fig. 74), in the *Agrodiaetus-menalcas*-group (*Agrodiaetus dantchenkoi* and *Agrodiaetus fabressei*, Fig. 78), in the *Agrodiaetus-carmon*-group (*Agrodiaetus surakovi,* Fig. 79), and in the *Agrodiaetus-poseidon*-group (*Agrodiaetus putnami* and *A. pseudactis,* Fig. 82). Crosslinks between haplotypes of different taxa indicate that gene flow persists between them. This appears to be the case in the species pairs *Lysandra corydonius* and *Lysandra ossmar* (Fig. 73), *Lysandra coridon* and *Lysandra albicans* (Fig. 76), *Agrodiaetus demavendi* and *Agrodiaetus ripartii* (Fig. 77), and *Agrodiaetus huberti* and *Agrodiaetus ninae* (Fig. 79).

Tab. 10. Collapsed haplotypes in the COI network analysis

Group	**Reference specimen code**	**Taxon**	**specimen codes of collapsed haplotypes** * taxon different from the reference taxon			
Iphiclides	MW01114	*I. feisthamelii*	AF170873*			
Aricia	JC00062	*A. agestis*	MW00020			
Lysandra	MW00469	*L. bellargus*	MW99608			
	MW99140	*L. corydonius*	MW99514			
P. aedon	MW99537	*P. myrrhinus*	MW99550			
A. carmon	MW00051	*A. elbursicus*	MW00056	MW00058	MW00232	
	MW99226	*A. zapvadi*	MW99314*	MW99374		
	MW99286	*A. kurdistanicus*	MW99376*	MW99393	MW99473*	
	WE02591	*A. peilei*	WE02614*			
	MW00032	*A. hamadanensis*	MW00001			
A. dolus	JM00001	*A. fabressei*	MW01001*	MW01039		
	MW00064	*A. valiabadi*	MW01039			
	MW00229	*A. alcestis*	MW00231			
	MW99274	*A. dantchenkoi*	MW99276	MW99319	MW99320	MW99471
A. iphigenia	MW99009	*A. iphigenia*	MW99170			
A. erschoffii	MW0060	*A. birunii*	MW00060	MW00072	MW00102	MW00476
A. admetus	JC00045	*A. nephohiptamenos*	JC00046			
	MW00183	*A. demavendi*	MW00185	MW00186		
	MW99068	*A. ripartii*	MW99196			
	MW99104	*A. demavendi*	MW99141			
	MW99263	*A. ripartii*	MW99264			
	MW99382	*A. demavendi*	MW99381	WE02677		
A. poseidon	MW99006	*A. firdussii*	MW00125			
	MW00129	*A. gorbunovi*	MW00177	WE02675		
	MW99413	*A. firdussii*	MW00151	MW99422		
	MW99448	*A. cyaneus*	MW00179	MW99059*	MW99449	
	MW98313	*A. sertavulensis*	MW98139*			
	MW99061	*A. putnami*	MW99507			

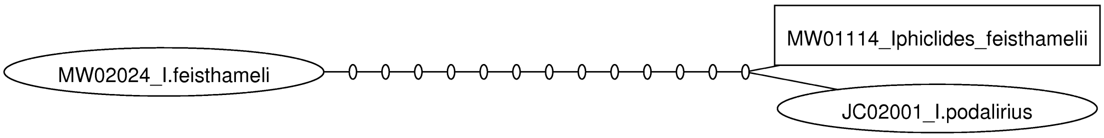
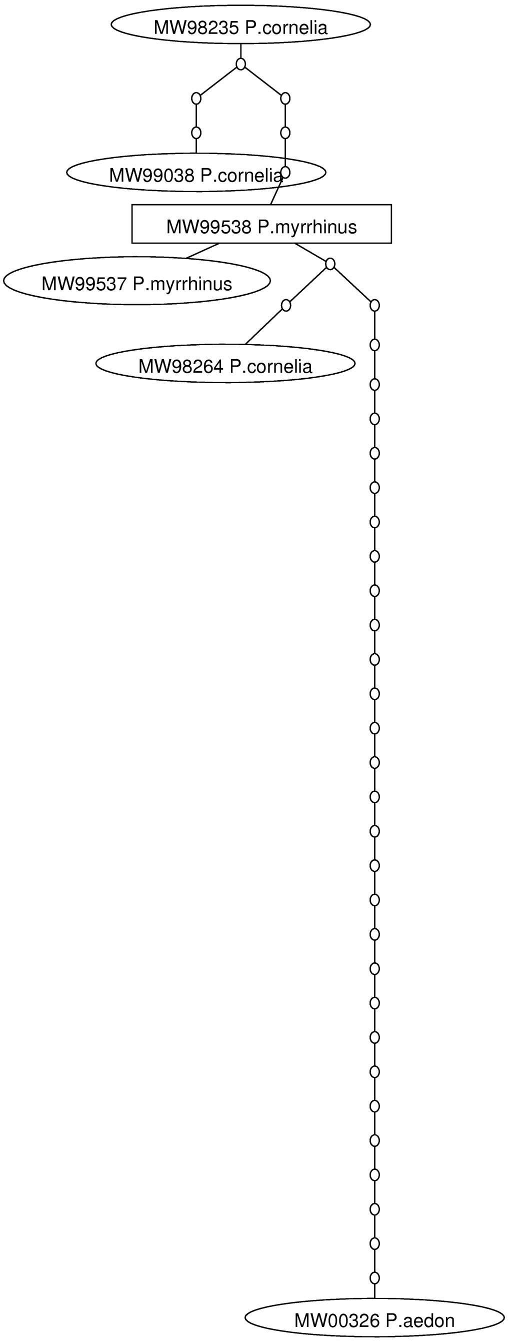


Fig. 73. COI-Parsimony-Network of *Iphiclides*



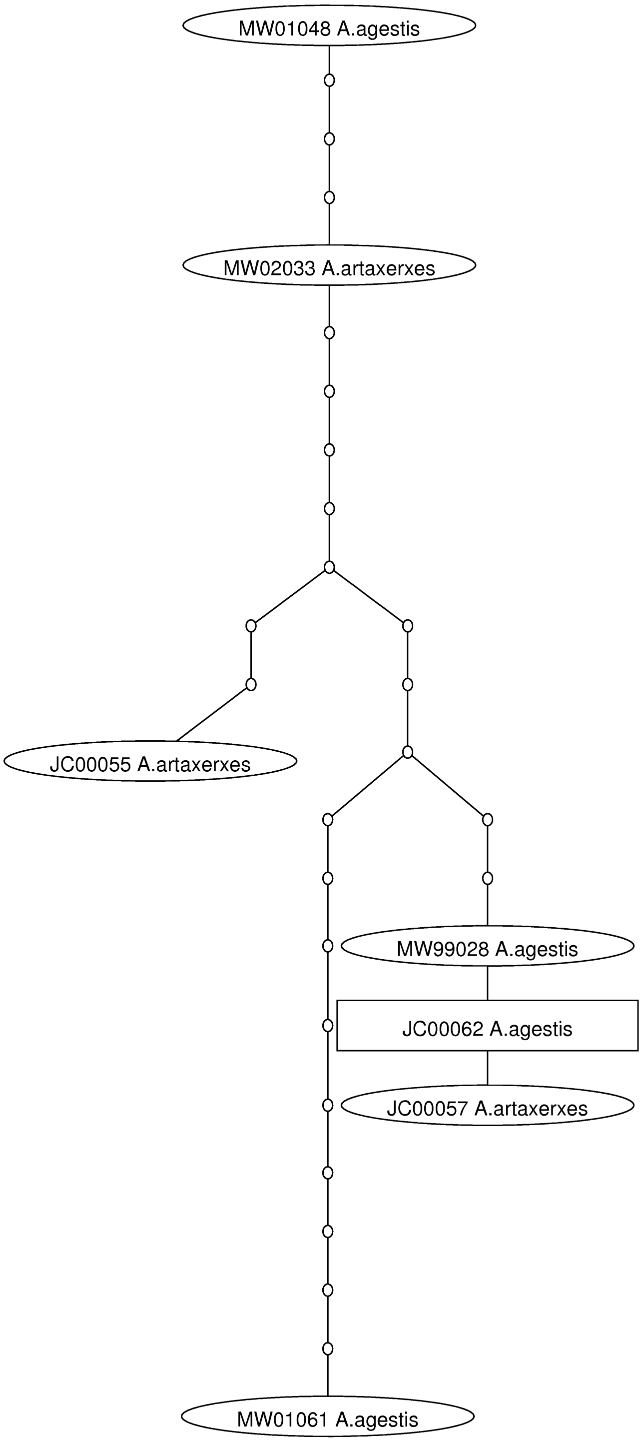


Fig. 74. COI-Parsimony-Network of the *P.aedon*-group

Fig. 75. COI-Parsimony-Network of the *Aricia agestis*-group

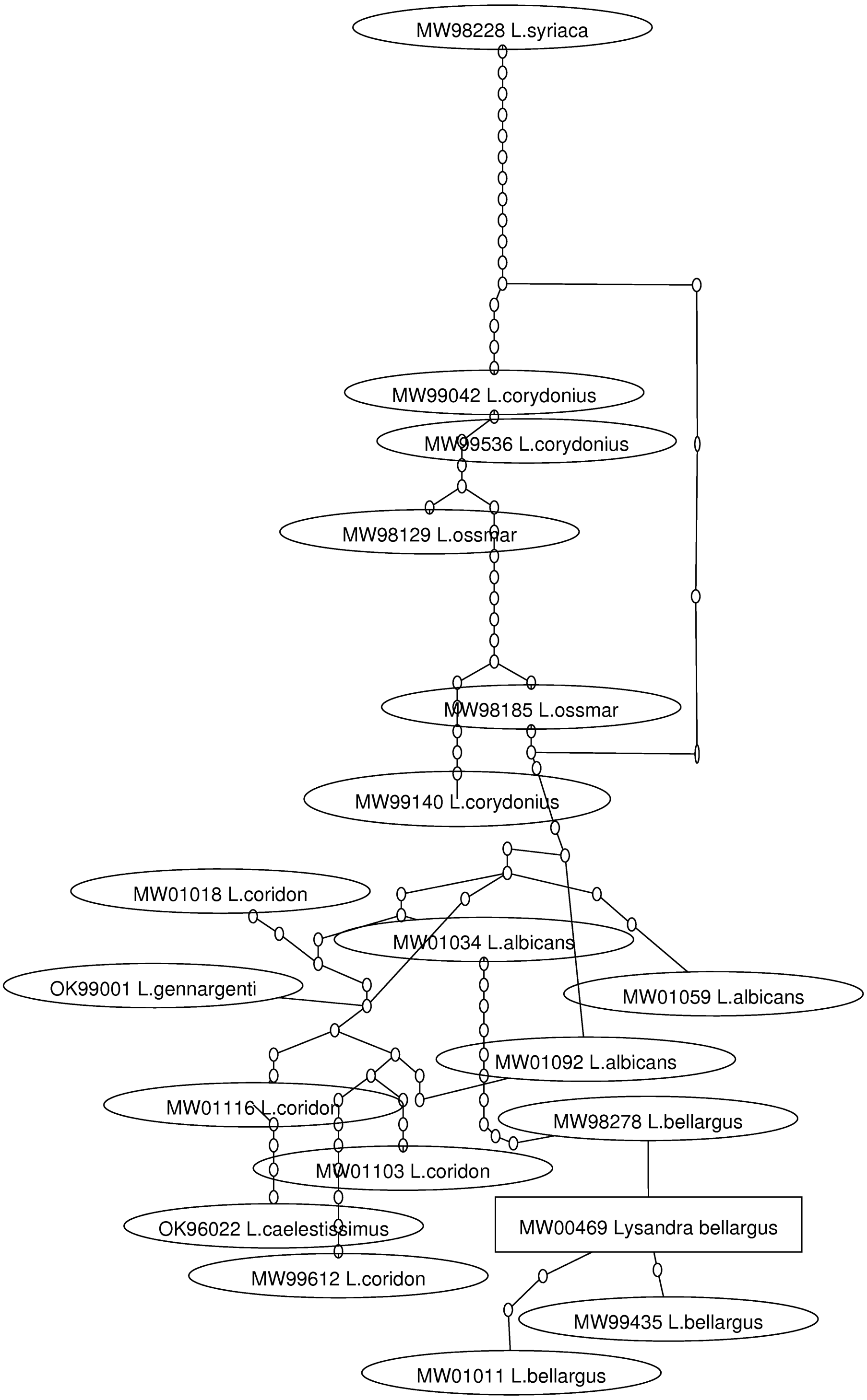


Fig. 76. COI-Parsimony-Network of *Lysandra*

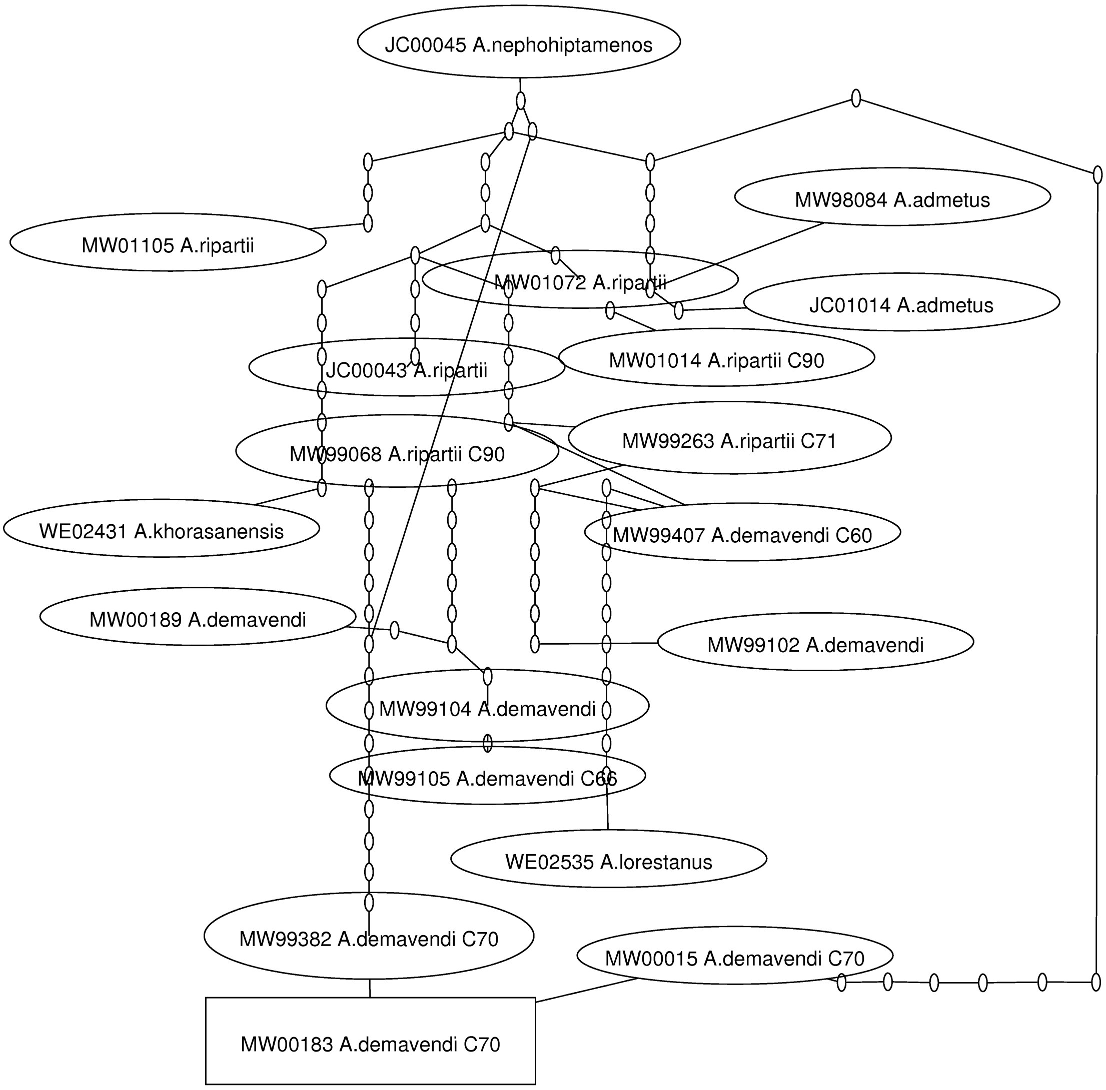


Fig. 77. COI-Parsimony-Network of the *Agrodiaetus admetus*-group

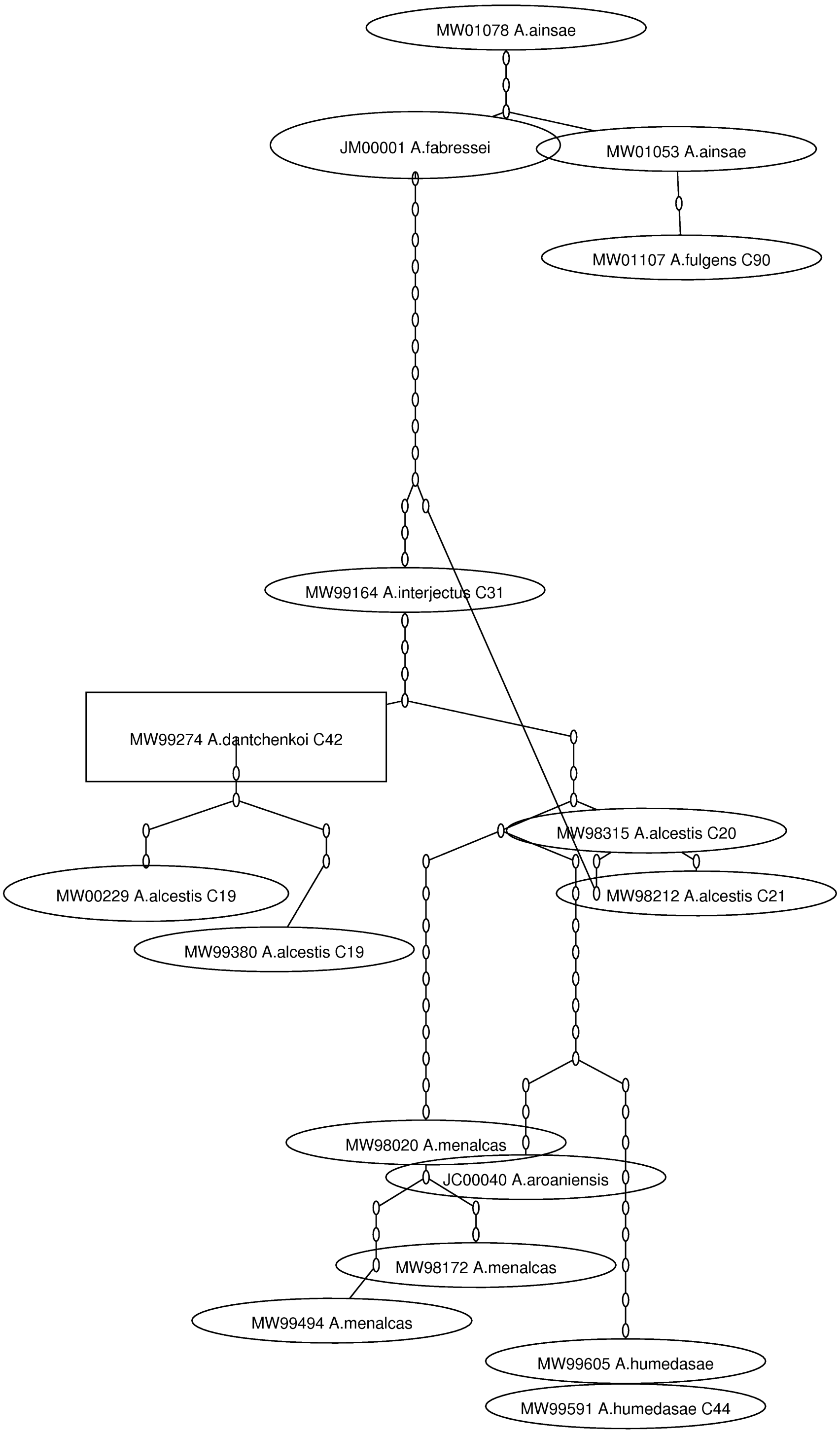


Fig. 78. COI-Parsimony-Network of the *Agrodiaetus-menalcas*-group

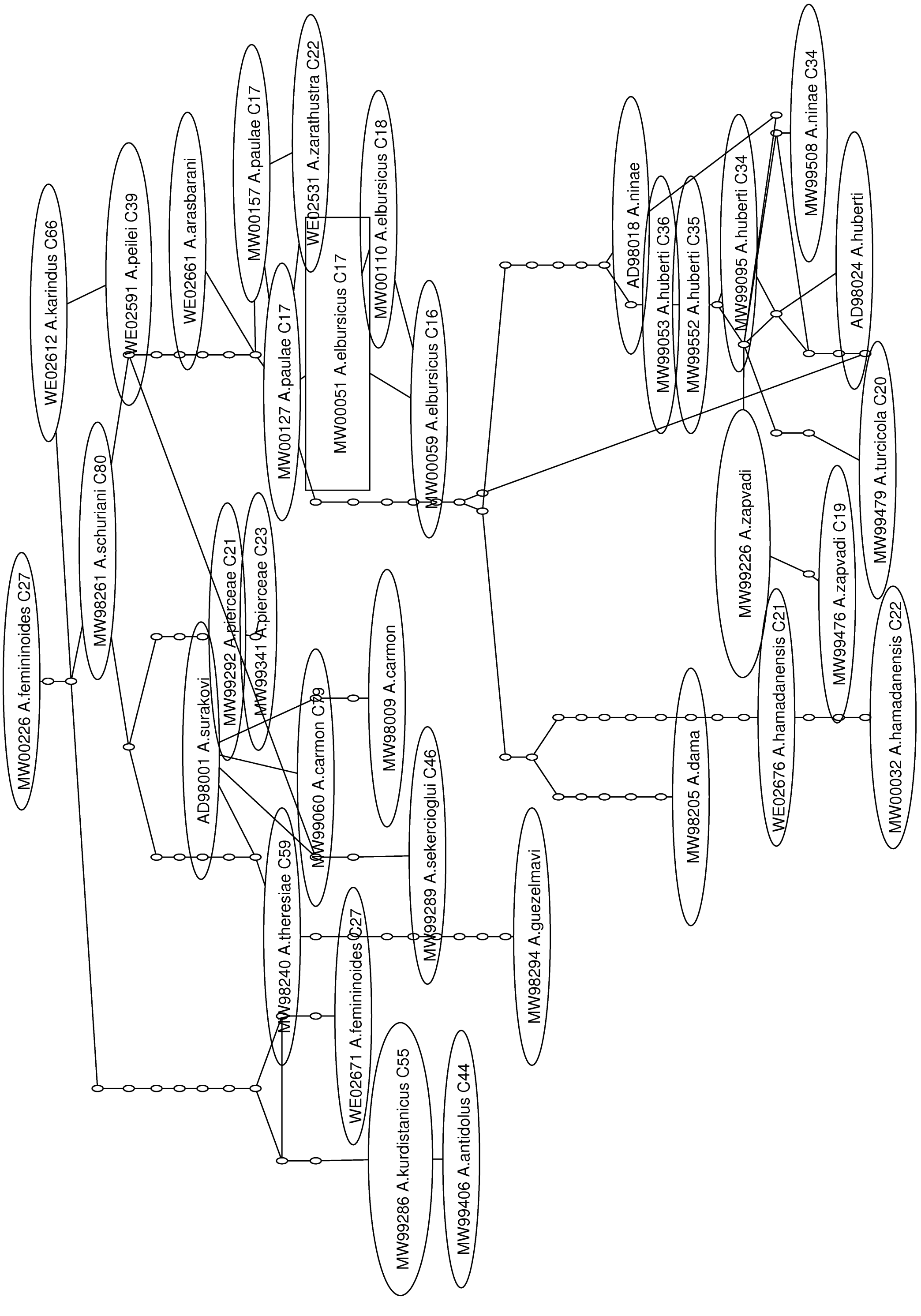


Fig. 79. COI-Parsimony-Network of the *Agrodiaetus carmon*-group

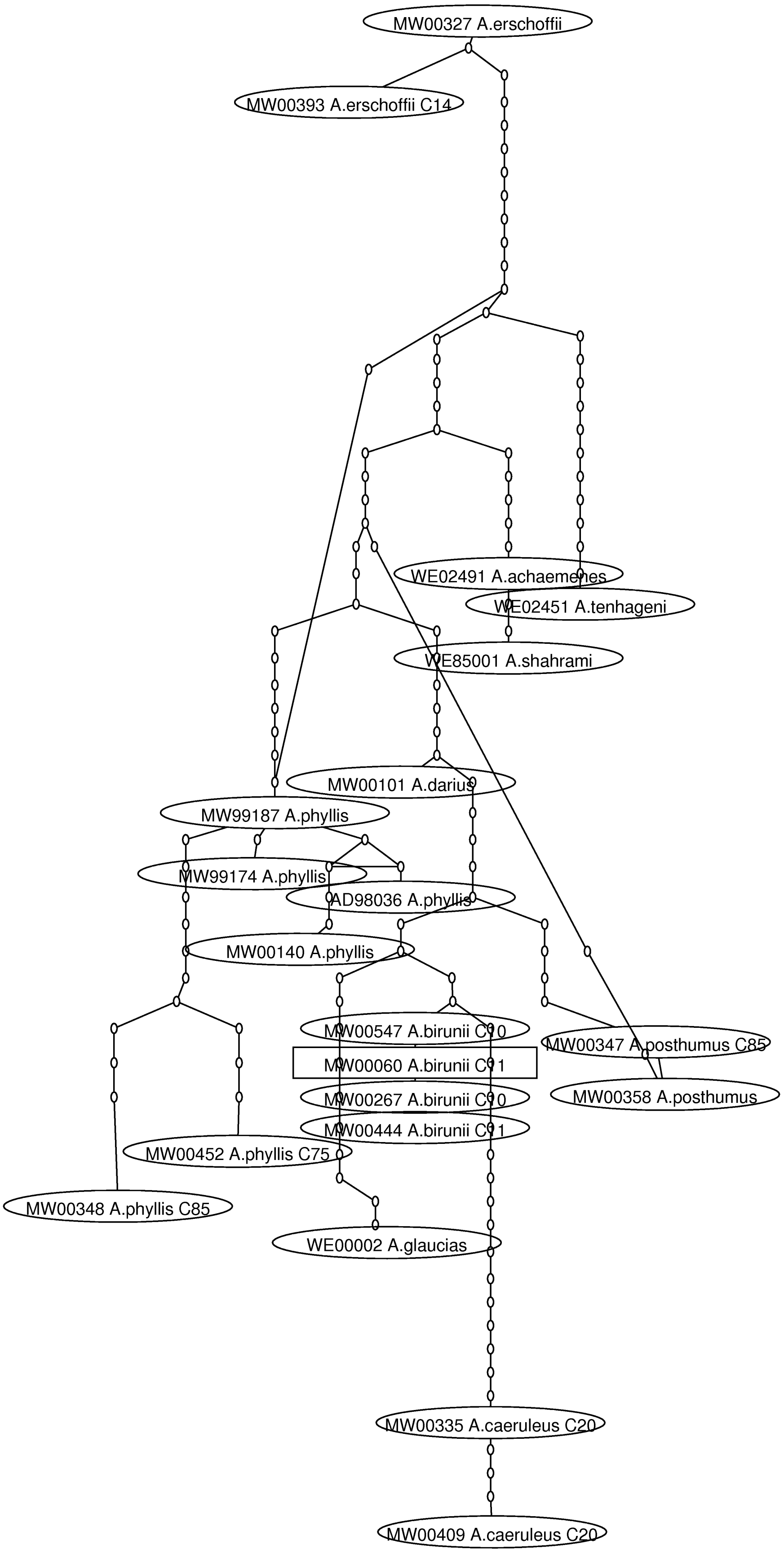


Fig. 80. COI-Parsimony-Network of the *Agrodiaetus erschoffii*-group

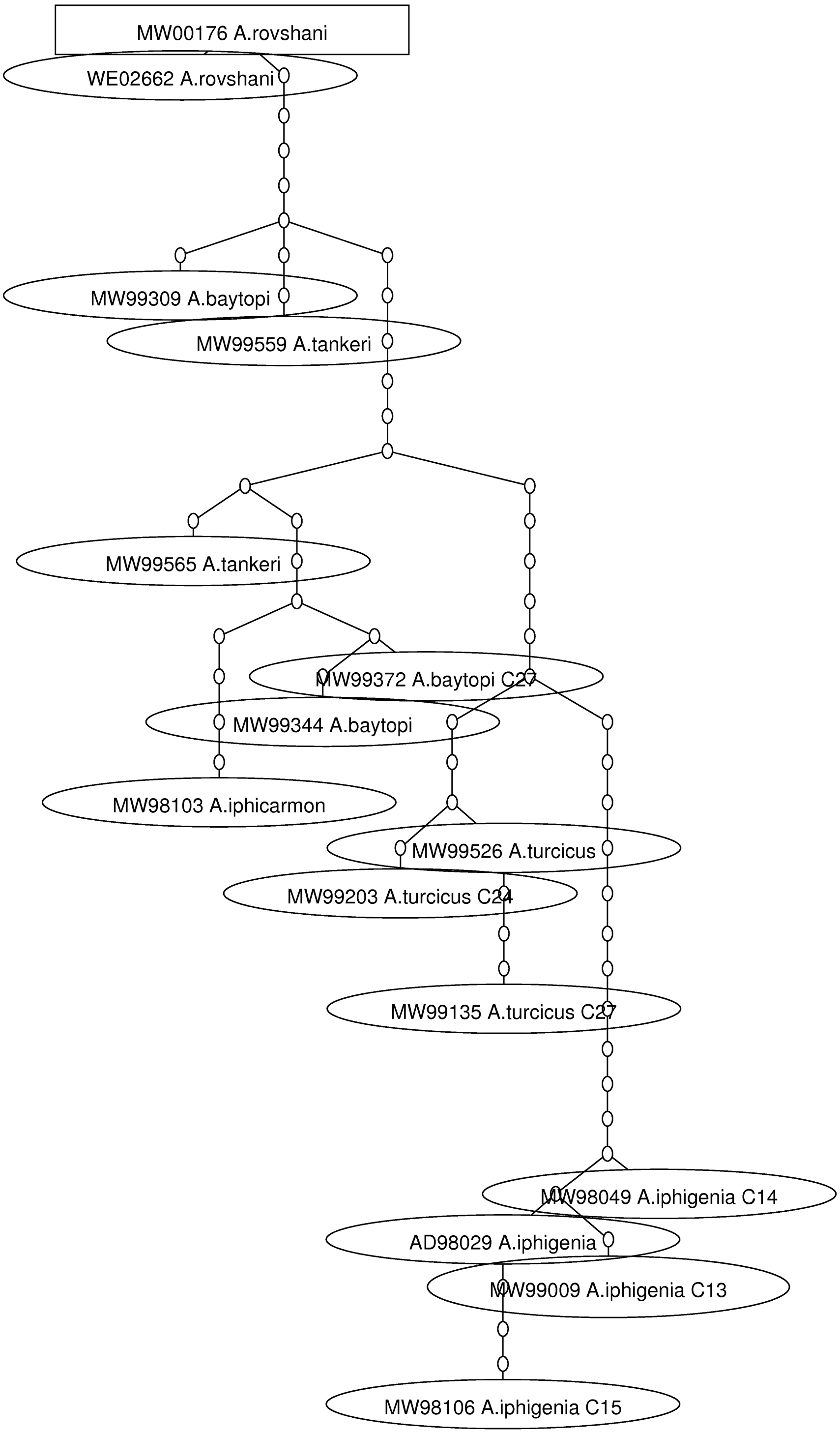


Fig. 81. COI-Parsimony-Network of the *Agrodiaetus iphigenia*-group

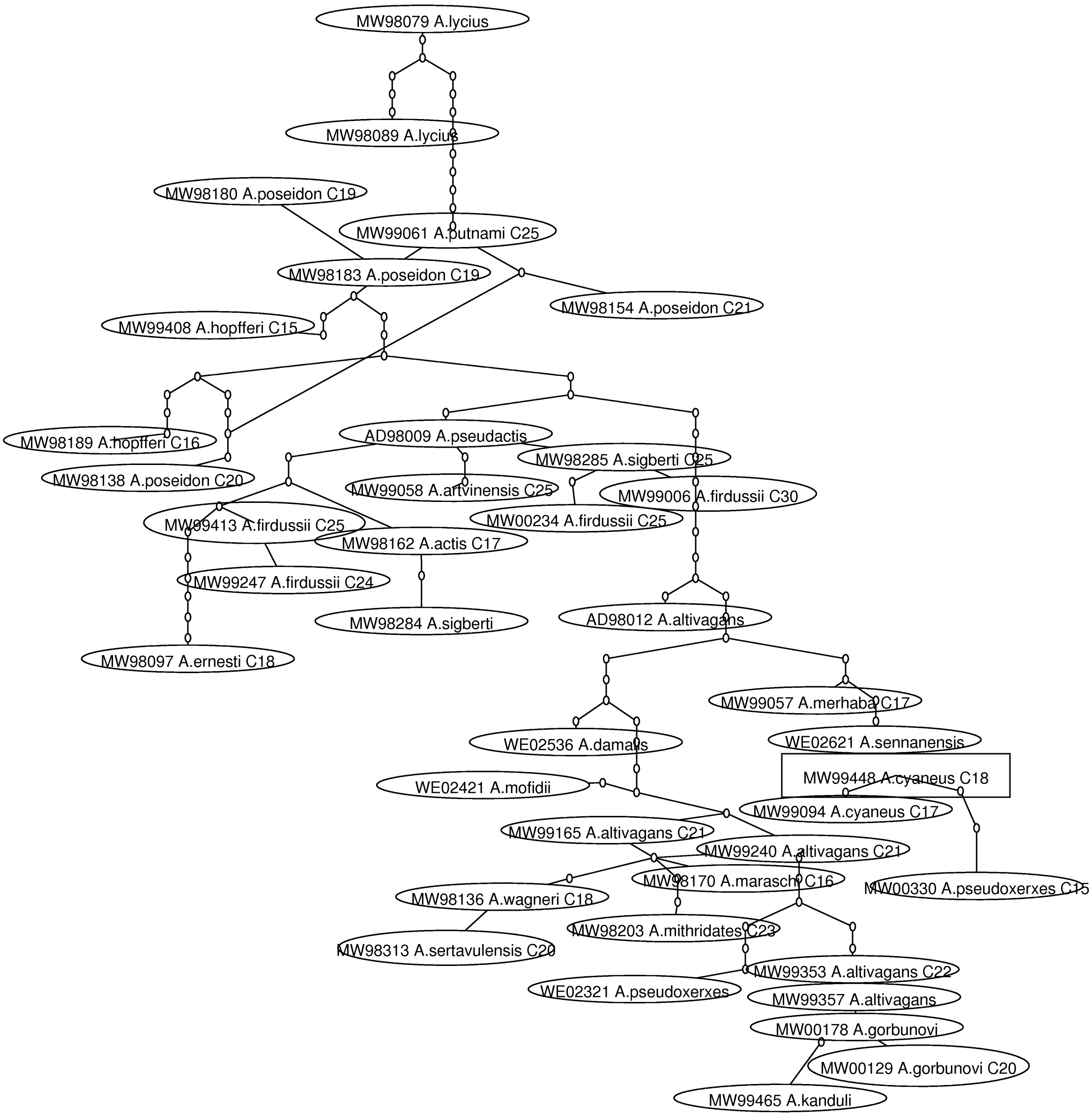


Fig. 82. COI-Parsimony-Network of the *Agrodiaetus-poseidon*-group

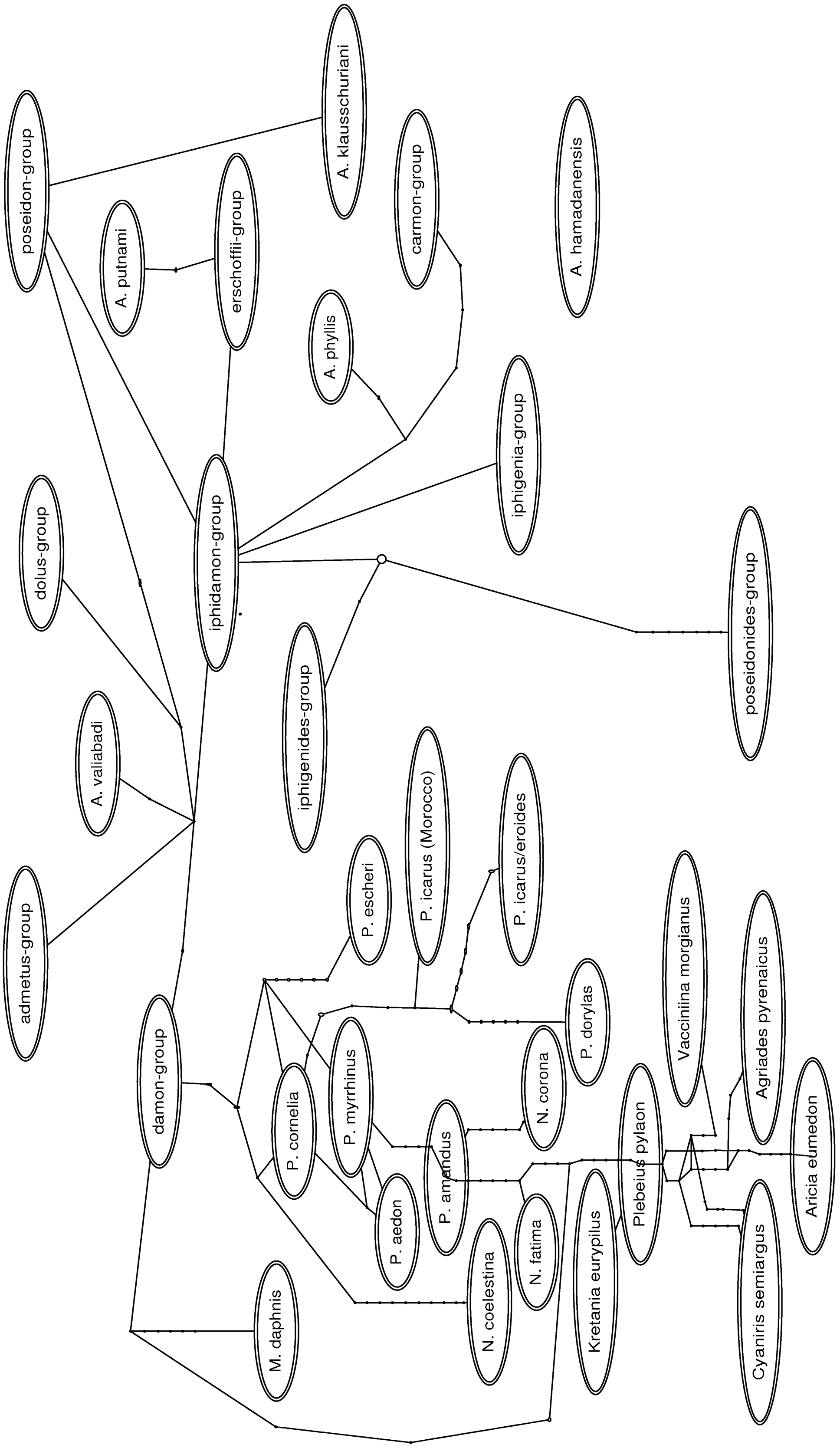


Fig. 83. ITS2-Parsimony-Network of *Agrodiaetus* (grouped) incl. connected outgroups

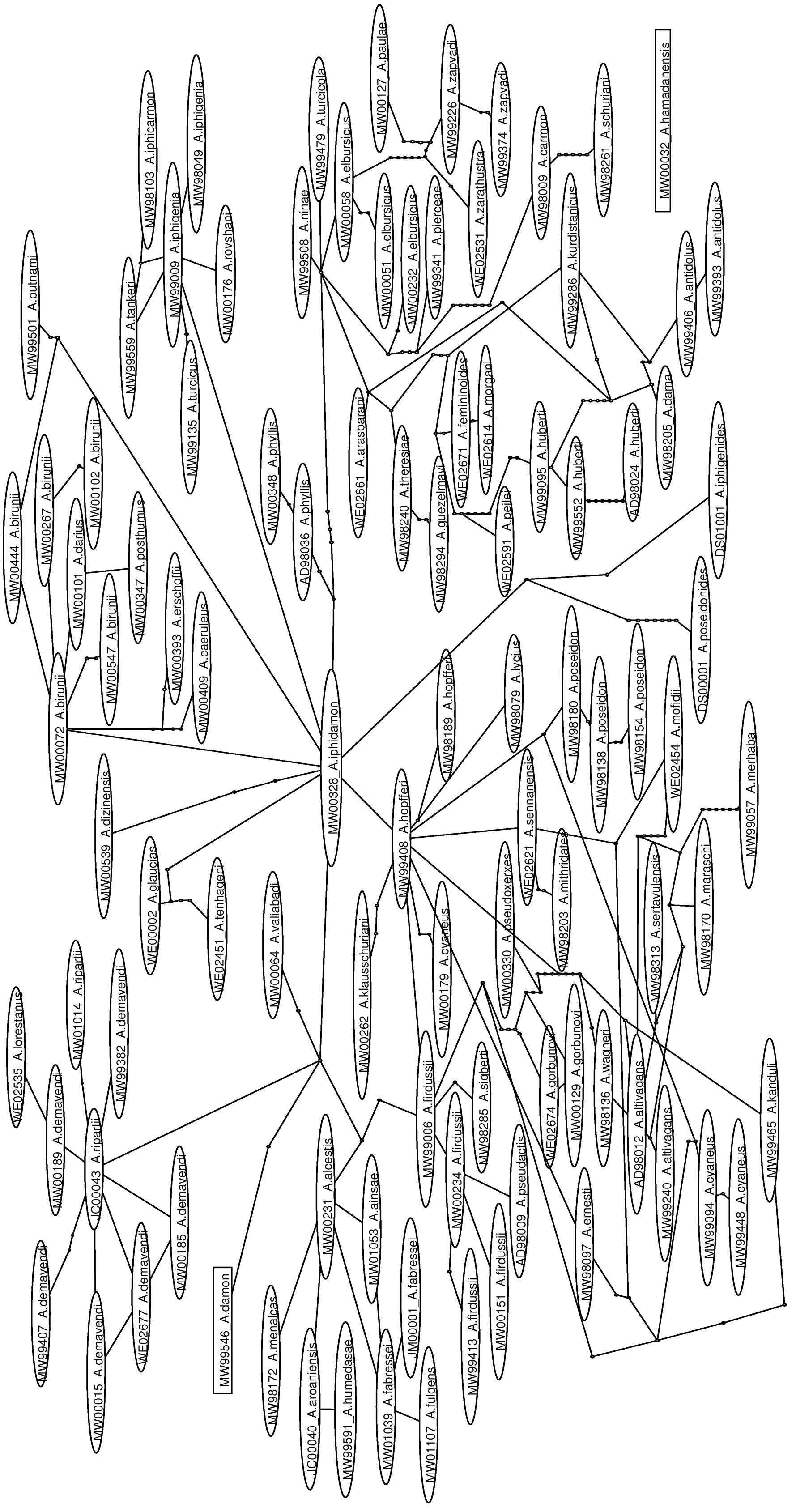


Fig. 84. ITS2-Parsimony-network of *Agrodiaetus* (excluding outgroups)

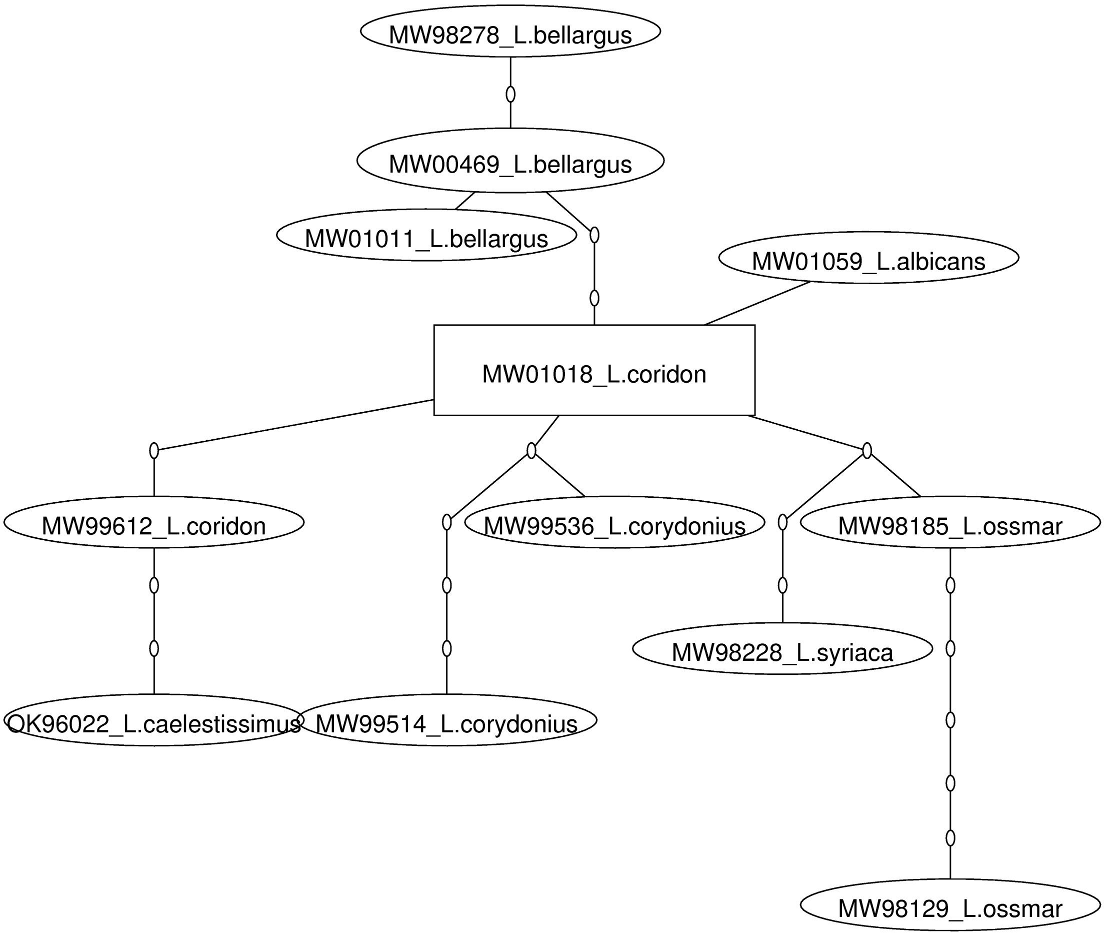


Fig. 85. ITS2-Parsimony-Network of *Lysandra*

For the ITS-2 dataset the connection limit was 12 steps for a parsimony probability of 95%. The parsimony analysis of all Polyommatiti ITS-2 sequences with this connection limit produces 8 different networks, if gaps are counted as missing characters. Most taxa, including all taxa of subgenus *Agrodiaetus* are found in one network. If *A. surakovi* is excluded from the analysis (due to more than 10% missing character information), *A. hamadanensis* is disconnected from the *carmon*-group (Fig. 83). This network includes also most other taxa of the genus *Polyommatus*. Exceptions are the genus *Lysandra* (Fig. 85) and *Polyommatus thersites* which form two separate networks. The genus *Agrodiaetus* is only connected via *Agrodiaetus damon* to the outgroup, and the shortest distance is to *Polyommatus cornelia* (4 steps). *A. damon* is further connected (with a maximum of 4 steps) to the *admetus*-group (3 steps), to *A. valiabadi* (4 steps), the other members of the *dolus*-group (4 steps) and to A. *iphidamon* (3 steps). *A. iphidamon* is the stem species of all other groups which closely resemble the groups found in the combined Bayesian analysis with the following exceptions: *A. klausschuriani* connects to *A. hopfferi* in the *poseidon*-group and *A. putnami* is not connected to the *poseidon*-group but to *A. iphidamon* and to *A. birunii* in the *erschoffii*-group. *A. glaucias* forms a group together with *A. tenhageni* which is directly connected to *A. iphidamon* and not to the other members of the *erschoffii*-group. *A. phyllis* is also split from the *erschoffii*-group. The complete network of ITS-2 haplotypes is presented in Fig. 84. A list of collapsed haplotypes can be found in Tab. 11.

Tab. 11. Collapsed haplotypes in the ITS-2 network analysis

Network	**Reference specimen code**	**Taxon**	**specimen codes of collapsed haplotypes** * taxon different from the reference taxon **#** reference specimen for further collapsed haplotypes **bold:** also collapsed if gaps are coded as 5th character			
1	AD98012	*Agrodiaetus altivagans*	MW99353			
1	AD98036	*Agrodiaetus phyllis*	**MW00452**	MW99174		
1	JC00043	*Agrodiaetus ripartii*	**JC00045***	JC01014*	WE02431*	
1	MW00051	*Agrodiaetus elbursicus*	MW00110			
1	MW00064	*Agrodiaetus valiabadi*	**MW00498**			
1	MW00129	*Agrodiaetus gorbunovi*	**MW00177**	MW00178		
1	MW00176	*Agrodiaetus rovshani*	**WE02662**			
1	MW00189	*Agrodiaetus demavendi*	MW99105	MW99196*		
1	MW00226	*Agrodiaetus femininoides*	**WE02614***			
1	MW00231	*Agrodiaetus alcestis*	**MW98212**	MW98315	MW99164*	MW99274#
1	MW00234	*Agrodiaetus firdussii*	**MW98162***	**MW99058***	**MW99247**	
1	MW00328	*Agrodiaetus iphidamon*	MW99372#			
1	MW01001	*Agrodiaetus ainsae*	MW01039*	MW01053		
1	MW98136	*Agrodiaetus wagneri*	MW98139			
1	MW98172	*Agrodiaetus menalcas*	MW99471			
1	MW99009	*Agrodiaetus iphigenia*	MW99309	MW99565		
1	MW99135	*Agrodiaetus turcicus*	**MW99203**			
1	MW99274	*Agrodiaetus dantchenkoi*	**MW99276**	**MW99319**		
1	MW99372	*Agrodiaetus baytopi*	**WE02491***	**WE85001***		
1	MW99546	*Agrodiaetus damon*	**MW99613**			
1	MW99591	*Agrodiaetus humedasae*	MW99605			
1	JC00029	*Polyommatus menelaos*	**JC00042***	JC00051		
1	JC00061	*Polyommatus andronicus*	**JC00063***			
1	MW00412	*Polyommatus icarus*	MW00530*			
1	MW99537	*Polyommatus myrrhinus*	MW99550			
7	MW00469	*Lysandra bellargus*	MW99608			
7	MW01018	*Lysandra coridon*	MW01034*	MW01092#		
7	MW01092	*Lysandra coridon*	**MW01116**			
8	JC00055	*Aricia artaxerxes*	**MW01048***			

In the case of gaps counted as 5th character most *Agrodiaetus* were also connected in one network, only *A. antidolus, A. kurdistanicus* and *A. femininoides* together formed a separate network and three other taxa (*A. hamadanensis, A. maraschi* and *A. paulae*) remained unconnected.

Discussion

Comparisons with traditional systematics

The basal splits in the COI gene tree correspond to the traditional classification of Lycaenidae (as far as these are represented in the Palaearctic region) into three subfamilies (Theclinae, Lycaeninae, Polyommatinae) according to ELIOT (1973) or tribes (Theclini, Lycaenini, Polyommatini) according to HESSELBARTH *et al.* (1995) and support modern views of SCOTT & WRIGHT (1990) and FIEDLER (1991b) that Lycaenini represent the most ancient subdivision of those three taxa. The clades within the tribus Polyommatini also largely follow current subdivisions into subtribes according to HESSELBARTH *et al.* (1995) and the monophyly of Polyommatiti is supported. Although taxon sampling of outgroups was necessarily coarse, the resolution achieved with the available molecular data was surprisingly good. The only exception appears to be *Euphilotes bernardino* (Barnes & McDunnough, 1917) which is sometimes treated as a subspecies of *Euphilotes battoides* (Behr, 1906). The trees surprisingly indicate that this species should be included in the Polyommatiti (*Polyommatus* section sensu ELIOT 1973). However, in his original description of the genus *Euphilotes*, MATTONI (1977) treated this taxon (together with *Philotiella*) as a relative of *Philotes*. Species currently assigned to *Euphilotes* and *Philotiella*, respectively, had previously been treated under the genus name *Philotes*, and ever since MATTONI's split all these taxa have been regarded, on the grounds of similarities in male genitalia and wing morphology, as belonging to the *Glaucopsyche* section sensu ELIOT (1972) (which was later split into two subtribes, Glaucopsychiti and Scolitantiditi, by HESSELBARTH *et al.* 1995). On the other hand, MATTONI (1977) noted that *Euphilotes* do differ in a number of points from "true" *Philotes*, and therefore there is a possibility that traditional morphology-based classification of *Euphilotes* as members of Scolitantiditi needs to be revised. However, the taxonomic identity of the specimen from which the GenBank sequence AF170864 is derived has not been ascertained so far (F. Sperling pers. comm.), and there remains a slight possibility that a misidentification with the phenotypically very similar *Plebeius (= Icaricia) acmon* (Westwood & Hewitson, [1852]) has occurred. Thus, unless the identity of this voucher specimen has been cross-checked (which is still in existence, F. Sperling pers. comm.) and in the absence of further supportive data (e.g. presence of an eversible female gonoporus, the best morphological autapomorphy of the true Polyommatiti: HÄUSER 1993), the affiliation of *Euphilotes bernardino* with the Polyommatiti remains uncertain.

Within Polyommatiti the COI and ITS2 gene trees correspond with each other in the exclusion of *Cyaniris* from a monophyletic genus *Polyommatus* but not in the position of *Lysandra*. While the COI gene tree which places *Lysandra* within *Polyommatus* confirms current morphology-based systematics, its basal placement within Polyommatiti in the ITS2 gene tree might be caused by alignment problems in the most distant groups and the high divergence of *Lysandra* sequences due to an apparent faster evolutionary rate, which might be caused by microsatellites. Disagreement in the COI and ITS2 data sets occur mostly in the less well resolved parts of the tree. The combined tree provides the best resolution within *Agrodiaetus* which proves that both data sets complement each other. The resulting clades obtained from the MP and Bayesian phylogenetic analysis are largely concordant with each other, but do not correspond very well with current groupings (HESSELBARTH *et al.* 1995; BÁLINT & JOHNSON 1997; ECKWEILER & HÄUSER 1997). However, these traditional, morphology-based approaches are also far from being congruent. In Tab. 12 the new subdivisions based on molecular phylogenetic data are contrasted with the three most recent conventional classification schemes.

Tab. 12. *Agrodiaetus*-clades on the basis of molecular data in comparison to previous morphology-based grouping concepts

***Agrodiaetus*-clades** **on the basis of molecular data**	**n**	**Hesselbarth et al. (1995)**	**Bálint & Johnson (1997)**	**Eckweiler & Häuser (1997)**
***damon*-group**				
damon ([Denis & Schiffermüller], 1775)	**45**	***damon***	***damon***	***damon***
***admetus*-group**				
admetus (Esper, [1783])	**78-80**	***admetus***	***admetus***	***admetus***
ripartii (Freyer, 1830)	**90**	***admetus***	***admetus***	***admetus***
nephohiptamenos (Brown & Coutsis, 1978)	**ca.90**	***admetus***	***admetus***	***admetus***
demavendi (Pfeiffer, 1938)	**66-76**	***admetus***	***admetus***	***admetus***
khorasanensis (Carbonell, 2001)	**84**	***admetus***		
lorestanus Eckweiler, 1997	**69-74**			***admetus***

***Agrodiaetus*-clades** **on the basis of molecular data**	**n**	**Hesselbarth et al. (1995)**	**Bálint & Johnson (1997)**	**Eckweiler & Häuser (1997)**
***dolus*-group**				
ainsae (Forster, 1961)	**108-110**	***dolus***	***dolus***	***dolus***
fulgens (de Sagarra, 1925)	**103**			***dolus***
fabressei (Oberthür, 1910)	**90**	***admetus***	***admetus***	***admetus***
humedasae (Toso & Baletto, 1976)	**38**	***admetus***	***admetus***	***admetus***
aroaniensis (Brown, 1976)	**48**	***admetus***	***admetus***	***admetus***
menalcas (Freyer, [1837])	**85**	***dolus***	***dolus***	***dolus***
alcestis (Zerny, 1932)	**19-21**	***admetus***	***admetus***	***admetus***
interjectus (de Lesse, 1960)	**29-32**	***admetus***	***admetus***	***admetus***
dantchenkoi (Lukhtanov & Wiemers, 2003)	**40-42**			
valiabadi (Rose & Schurian, 1977)	**23**		***admetus***	***admetus***
***iphidamon*-group**				
iphidamon (Staudinger, 1899)	**14**		***damon***	***damon***
dizinensis (Schurian, 1982)	**17**	***carmon***	***carmon***	***damon***
***carmon*-group**				
ninae (Forster, 1956)	**33-37**	***transcaspicus***	***transcaspicus***	***damon***
turcicola (Koçak, 1977)	**19-20**	***transcaspicus***		***damon***
huberti (Carbonell, 1993)	**33-37**	***carmon***		***damon***
zapvadi (Carbonell, 1993)	**18-19**	***transcaspicus***		***damon***
elbursicus (Forster, 1956)	**16-18**	***transcaspicus***	***transcaspicus***	***damon***
paulae (Wiemers & De Prins, 2003)	**17**			
arasbarani (Carbonell & Naderi, 2000)				
zarathustra Eckweiler, 1997	**ca. 22**			***damon***
pierceae (Lukhtanov & Dantchenko, 2002)	**22**			
carmon (Herrich-Schäffer, [1851])	**81-82**	***carmon***	***carmon***	***damon***
schuriani (Rose, 1978)	**81-82**			***damon***
surakovi Dantchenko & Lukhtanov, 1994	**50**			***damon***
sekercioglui (Lukhtanov & Dantchenko, 2002)	**50**			
hamadanensis (de Lesse, 1959)	**21-22**	***carmon***	***dama***	***dama***
theresiae Schurian, van Oorschot & van den Brink, 1992	**63**	***transcaspicus***	***dama***	***dama***
guezelmavi Olivier, Puplesiene, van der Poorten, De Prins & Wiemers, 1999	**42**			
dama (Staudinger, 1892)	**41**	***poseidon***	***dama***	***dama***
karindus (Riley, 1921)	**66-68**			***dama***
peilei Bethune-Baker, 1921	**39**		***dolus***	***dolus***
femininoides (Eckweiler, 1987)	**27**		***dolus***	***dolus***
morgani (Le Cerf, 1909)	**25-27**	***dolus***	***dolus***	***dolus***
kurdistanicus (Forster, 1961)	**57-62**	***dolus***	***dolus***	***dolus***
antidolus (Rebel, 1901)	**40-41**	***dolus***	***dolus***	***dolus***
***erschoffii*-group**				
erschoffii (Lederer, 1869)	**13-15**		***erschoffii***	***erschoffii***
achaemenes Skala, 2002				
shahrami Skala, 2001	**128-131**			
klausschuriani Ten Hagen, 1999	**56**			
tenhageni Schurian & Eckweiler, 1999				
phyllis (Christoph, 1877)	**78-82**	***damon***	***dolus***	***damon***
glaucias (Lederer, 1871)			***glaucias***	***erschoffii***
darius Eckweiler & Ten Hagen, 1998				
caeruleus (Staudinger, 1871)	**20**	***poseidon***	***transcaspicus***	***damon***
posthumus (Christoph, 1877)	**ca. 85**	***damon***	***damon***	***damon***
birunii Eckweiler & Ten Hagen, 1998	**10-11**			
***iphigenides*-group**				
iphigenides (Staudinger, 1886)	**65-67**		***poseidonides***	***iphigenides***
***poseidonides*-group**				
dagmara (Grum-Grshimailo, 1888)			***erschoffii***	***dagmara***
poseidonides (Staudinger, 1886)	**24**		***poseidonides***	***iphigenides***

***Agrodiaetus*-clades** **on the basis of molecular data**	**n**	**Hesselbarth et al. (1995)**	**Bálint & Johnson (1997)**	**Eckweiler & Häuser (1997)**
***iphigenia*-group**				
iphigenia (Herrich-Schäffer, [1847])	**12-16**	***damon***	***damon***	***damon***
turcicus (Koçak, 1977)	**24**	***carmon***	***carmon***	***damon***
baytopi (de Lesse, 1959)	**27**	***damon***	***damon***	***damon***
rovshani Dantchenko & Lukhtanov, 1994			***damon***	***damon***
tankeri (de Lesse, 1960)	**20-21**	***damon***	***damon***	***damon***
iphicarmon Eckweiler & Rose, 1993	**29**	***damon***	***damon***	***damon***
***poseidon*-group**				
poseidon (Herrich-Schäffer, [1851])	**19-22**	***poseidon***	***poseidon***	***damon***
putnami (Lukhtanov & Dantchenko, 2002)	**25-27**	***poseidon***		
hopfferi (Herrich-Schäffer, [1851])	**15**	***poseidon***	***poseidon***	***damon***
lycius (Carbonell, 1996)	**21-22**		***poseidon***	***damon***
ernesti Eckweiler, 1989	**18**			***damon***
pseudactis (Forster, 1960)	**29**			***damon***
firdussii (Forster, 1956)	**24-32**	***actis***	***actis***	***damon***
actis (Herrich-Schäffer, [1851])	**17**	***actis***	***actis***	***damon***
artvinensis (Carbonell, 1997)	**21-22**	***actis***	***actis***	***damon***
sigberti Olivier, van der Poorten, Puplesiene & De Prins, 2000	**25-29**			
haigi (Lukhtanov & Dantchenko, 2002)	**21-25**			
mithridates (Staudinger, 1878)	**21-27**	***dolus***	***admetus***	***dolus***
mofidii (de Lesse, 1963)	**34-35**	***damon***	***dolus***	***damon***
altivagans (Forster, 1956)	**18-23**	***actis***	***actis***	***damon***
kanduli (Lukhtanov & Dantchenko, 2002)	**25**			
merhaba De Prins, van der Poorten, Borie, Oorschot, Riemis & Coenen, 1991	**16-17**	***carmon***	***carmon***	***damon***
wagneri (Forster, 1956)	**16-18**	***actis***	***actis***	***damon***
maraschi (Forster, 1956)	**16**	***actis***		***damon***
sertavulensis (Koçak, 1979)	**20**	***actis***		***damon***
pseudoxerxes (Forster, 1956)	**15-16**	***carmon***	***carmon***	***damon***
sennanensis (de Lesse, 1959)	**28-30**	***dolus***	***dolus***	***dolus***
gorbunovi Dantchenko & Lukhtanov, 1994	**19-20**		***actis***	***damon***
cyaneus (Staudinger, 1899)	**16-20**	***carmon***	***carmon***	***damon***

The ITS-2 network analysis supports the larger clades found in the COI and combined cladograms but also provides evidence that the bad resolution in some closely related species groups and the peripheral position of certain taxa like *A. iphidamon* and *A. iphigenides* in the cladograms is due to the survival of stem species. *A. damon* appears to be directly derived from the ancestor of all *Agrodiaetus* and *A. iphidamon* the stem species for the *iphigenides-, iphigenia-, erschoffii-, poseidon-, carmon-* and *poseidonides*-clades. The short distances between the stem species and the subnetworks provide evidence for the fast radiation of *Agrodiaetus*. Phylogenetic relationships within the genus *Agrodiaetus* are discussed in more detail in Chapter 4.

Congruence between gene trees and species trees in outgroups

If relationships between closely related species are discussed the question of congruence between gene trees and species trees arises. If both are identical, species (if defined as reproductively isolated units) should form monophyletic groups in the cladograms. Apparently some exceptions can be found, one of the most striking examples being *Polyommatus icarus* (Rottemburg, 1775). While populations from Spain to Iran appear as a monophyletic group (including the Greek *Polyommatus andronicus* Coutsis & Ghavalas, 1995 which has been separated only recently from *P. icarus* based on disputable evidence), the Moroccan specimen of *P. icarus* is placed outside this clade. This result came as a surprise because Northwest African populations of *P. icarus* are thought to represent the same subspecies as in Europe (TENNENT 1996). The COI and ITS-2 p-distances between the Moroccan and Eurasian populations of *P. icarus* differ to a much higher degree than in other species (Tab. 13), including those with well differentiated subspecies in Northwest Africa (like *Polyommatus amandus*), and are on the level of well differentiated species. The Moroccan specimen also differs in phenotype from the other *icarus* (f. *celina* Austaut), but *P. icarus* is an extremely variable species throughout its vast, trans-Palaearctic distributional range. Without further material it cannot be decided if Northwest African populations of *P. icarus* are so divergent from Eurasian ones that they should better be seen as representing a distinct *Polyommatus* species.

Tab. 13. P-distances between Moroccan and Eurasian populations

Species	**Country comparison**	**p-distance COI**	**p-distance ITS-2**
Aricia montensis	Morocco-Spain	0.006	0.005
Celastrina argiolus	Morocco-Turkey	0.013	
Cyaniris semiargus	Morocco-Iran	0.012	0.011
Iphiclides feisthamelii	Morocco-Spain	0.021	
Iphiclides feisthamelii - podalirius	Spain - Greece	0.003	
Lampides boeticus	Morocco-Spain	0.003	0.001
Lampides boeticus	Morocco-Turkey	0.002	
Lycaena alciphron	Morocco-Iran	0.027	
Polyommatus amandus	Morocco-Turkey	0.037	0.007
Polyommatus icarus	Morocco-Spain	0.068	0.025
Polyommatus icarus	Morocco-Greece	0.063	0.017
Polyommatus icarus	Morocco-Turkey	0.059	
Polyommatus icarus	Morocco-Iran	0.060	0.015
Polyommatus icarus	Spain-Iran	0.012	0.017
Polyommatus andronicus - icarus	Greece	0.007	0.000

Another surprise involving a Moroccan taxon was found in the species pair *Iphiclides podalirius – feisthamelii* (Papilionidae). The latter replaces the former in Northwest Africa and the Iberian Peninsular. Opinions differ whether these two taxa represent different species or just subspecies and no detailed studies are known from the contact zone in the French Pyrenees. The COI haplotype of *I. feisthamelii* (Duponchel, 1832) from Spain is identical to the *I. podalirius* (Linnaeus, 1758) sequence AF170873 in GenBank and very similar to Greek *I. podalirius*, but Moroccan and Spanish *I. feisthamelii* sequences are very different from each other (Tab. 13, Fig. 73). Although it cannot be ruled out that the GenBank sequence represents *I. feisthamelii,* because the specimen is from "France" where both taxa occur and the voucher specimen is unavailable (Sperling, pers. comm.), the COI data indicate a high level of differentiation between Northwest African and European populations but not between the two taxa *feisthamelii* and *podalirius*.

Further cases where the gene trees do not seem to correspond with taxonomical species catagories are found outside *Agrodiaetus* in the following species groups: *Aricia agestis-artaxerxes, Polyommatus eros-eroides-menelaos, Meleageria daphnis-marcida, Polyommatus aedon-myrrhinus-cornelia,* and the genus *Lysandra*.

Aricia agestis (Denis & Schiffermüller, 1775) and *A. artaxerxes* (Fabricius, 1793) are very closely related species which are known to interbreed (AAGARD *et al.* 2002; HOEGH-GULDBERG 1979, 1982). The two Greek specimens of *Aricia artaxerxes* had a very different

COI haplotype, one of them (JC00057) almost identical to *Aricia agestis*. This might be due to mtDNA introgression because these specimens were found sympatrical with *A. agestis* on Mt. Taiyetos.

The *Polyommatus eros-eroides* complex consists of mostly allopatric populations whose relationships are unclear. *P. menelaos* Brown, 1996 from Peleponnesos is thought to be closely related to *P. eros* Ochsenheimer, 1808 by most authors and not to *P. eroides* Frivaldszky, 1835 which is found in mainland Greece, but the status of *P. eroides* and *P. eros* as distinct species is only founded on very slight differences in coloration and in habitat, with *P. eros* inhabiting mainly higher altitudes above 1800 m. Although the total ranges of both taxa overlap they are not known to occur in sympatry. *P. eroides forsteri* Pfeiffer, 1938 from Elburs Mts. in Iran is treated as a distinct species by BÁLINT (1993) and CARBONELL (1994b). The taxon *yildizae* Kocak, 1977 from Kop Dağı Mts. in Turkey was described as a subspecies of *P. eroides* and treated as such by CARBONELL (1994b) but transferred to *P. forsteri* by BÁLINT (1993) and to *P. eros* by HESSELBARTH *et al.* (1995) even though they noticed that the distribution of this taxon between two subspecies of *P. eroides* is hard to explain on zoogeographic grounds. Different species boundaries are again suggested by TUZOV *et al.* (2000a) who combine high altitude populations from Azerbaijan, Iran and Turkey (ssp. *moletti* Carbonell, 1994) under the name *Polyommatus erotulus* Nekrutenko, 1985, whereas GORBUNOV (2001) recognizes even five units in this species complex. Available genetic data only support a division between Iranian *forsteri* on one side and Greek/Turkish *eroides/menelaos/yildizae* on the other side which agrees best with CARBONELL (1994b). Nominotypical *P. eros* (from the Alps) have not been investigated though.

Meleageria marcida (Lederer, 1872) is a discoloured variety of *Meleageria daphnis* (Denis & Schiffermüller, 1775) confined to the Northern slopes of Elburs Mts. in Iran which was raised to species rank by BÁLINT & JOHNSON (1997) although hybrids with intermediate phenotype are known (SCHURIAN 1989b). The discoloration is probably an adaption to the specific climatic conditions (low solar radiation) on the north side of Elburs Mts. (BIRO *et al.* 2003). The COI sequence of *M. marcida* from Veresk is very different from the other *daphnis* populations, but another specimen from Kendevan Pass has a haplotype similar to *daphnis*. This suggests that *M. marcida* is well differentiated genetically, but gene flow exists in contact zones (one of which is near Kendevan Pass).

Polyommatus myrrhinus (Staudinger, 1901) from Eastern Anatolia was described as a subspecies of *Polyommatus myrrha* (Herrich-Schäffer, [1851]) which is found in other parts of Anatolia. HESSELBARTH *et al.* (1995) ranked it as a subspecies of *Polyommatus aedon* (Christoph, 1887) from Elburs Mts. (Iran) whereas BÁLINT & JOHNSON (1997) treated it as a distinct species. The large genetic distance in the COI data supports the specific distinctness of *myrrhinus* and *aedon* but does not exclude the possibility that *P. myrrhinus* is conspecific with true *P. myrrha* which was not analyzed. The COI and ITS2 haplotypes of *Polyommatus cornelia* (Gerhard, [1850]) are extremely similar to *P. myrrhinus*. Although both taxa are sometimes united in the subgenus *Sublysandra* (e.g. BÁLINT & JOHNSON 1997) they are quite different in wing pattern and definitely constitute different species which occur sympatrically in Anatolia without hybridization. The molecular data set implies that these taxa are very young and therefore not well differentiated genetically. It does not agree well with the conclusions of FIEDLER *et al.* (1994) drawn from the study of life history parameters which suggest a closer relationship of *P. cornelia* (= *P. candalus* (Herrich-Schäffer, [1851]) to *P. icarus* than to the *P. myrrha*-complex. It should be noted that *P. cornelia* is a very variable butterfly (HESSELBARTH *et al.* 1995) and karyological data (DE LESSE 1960a) indicate that it might comprise different species.

The subgenus *Lysandra* is a group of closely related taxa some of which are known to interbreed with each other (SCHURIAN 1989b & 1989c). Many taxa and allopatric populations differ in chromosome numbers (DE LESSE 1960a, 1969) which range between n=24 in *Lysandra syriaca* (Tutt, [1910]) and n=92 in populations of *Lysandra coridon* (Poda, 1761) from the Balkan Peninsula. Because of its plesiomorphic chromosome number, *L. syriaca* (from Lebanon and South Turkey) is thought (SCHURIAN 1989b) to represent the most basal *Lysandra* (together with *L. punctifera* (Oberthür, 1876) from Morocco). The COI data confirm this hypothesis. *L. bellargus* (Rottemburg, 1775) (n=45) which has an extensive distribution from Spain to Iran is found sympatrically with most other *Lysandra* taxa. Hybrids with *L. coridon* have sometimes been found in nature (*polonus* Zeller, 1847), but F1 hybrids are probably sterile and extensive hybridization experiments with *L. coridon, L. hispana* and *L. ossmar* have failed (SCHURIAN, 1989b). The COI and ITS2 data confirm the monophyly of *L. bellargus* populations from Spain, Italy, Turkey and Iran without indications of gene flow with other *Lysandra* species. *L. ossmar* (Gerhard, 1851) and *L. corydonius* (Herrich-Schäffer, 1852) are thought to be sister species differing in the upperside wing colour (grey vs. blue) which are parapatrically distributed in West and Central Anatolia (*L. ossmar*) and Eastern Anatolia to Caucasus and Transcaucasus (*L. corydonius*). Their chromosome numbers are identical (n=84), but *L. ossmar* has two large chromosomes compared to three in *L. corydonius* (DE LESSE 1969). Natural hybrids are known from the contact zone in Sivas, Erzincan and Erzurum Province. SCHURIAN (1989b) managed to breed such hybrids until the F3-generation. The ITS2 gene tree conforms to the supposed species tree, but the sequences are very similar and only two positions are parsimony-informative. In the COI gene two different groups of haplotypes can be identified which differ in five positions, but the specimens from Sivas and Erzurum (near/in the contact zone) possess the haplotypes of the opposite species which causes the difference of the COI gene tree from the species tree. Although more material would be needed to clarify this situation, the data indicate extensive mtDNA introgression across the contact zone. (The two specimens from Erzurum have the same haplotype apart from two positions, one of which is identical to *L. coridon* from Italy in MW99042. This specimen also has missing character information at 16% of all COI nucleotides which causes the odd placement with *L. coridon* in the Bayesian analysis. The MP analysis seems to be less sensitive to missing character information and correctly places the two *corydonius* from Erzurum together.) The remaining *Lysandra* taxa belong to the *Lysandra coridon* species complex which has been the main focus of LELIEVRE's (1992) study of allozymes in this group. *Lysandra coridon* (Poda, 1761) is the most widespread species which is found from Northern Spain (ssp. *asturiensis* De Sagarra, 1924) through Central Europe (type locality: Graz in Austria) to Greece. Allozyme variation indicates a division between a western and eastern group of populations (SCHMITT & SEITZ 2001). The chromosome numbers increase gradually from n=87 in Southwest Europe (Spain and Italy) to n=92 in Southeast Europe (Macedonia) (DE LESSE 1969). The allopatric taxa *caelestissimus* Verity, 1921 from Montes Universales (Central Spain) and *gennargenti* Leigheb, 1987 from Sardinia are thought to be subspecies of *L. coridon* by most authors but treated as distinct species by KUDRNA (2002). LEIGHEB (1987) suggested a close relationship between *gennargenti* and *caelestissimus* due to similarities in wing coloration. Allozyme variation however indicates that *gennargenti* populations originated from the Italian mainland and differentiation is due to gene drift and inbreeding (MARCHI *et al.* 1995). *Lysandra albicans* (Gerhard, 1851) with a chromosome number of n=82 replaces *L. coridon* in Central and Southern Spain. Hybrids with *L. caelestissimus* have often been found and even named (*caerulescens* Tutt) and supposed hybrids with *L. coridon asturiensis* are known from the contact zone (e.g. near Peñahorada/Burgos; LELIEVRE, 1992). Specimen MW01018 is from the same locality and looks like the specimen figured as possible hybrid in LELIEVRE (1992:

photo 2, fig. 16). The picture is further complicated by the fact that another species, *Lysandra hispana* (Herrich-Schäffer, 1852) with n=84 chromosomes, occurs in coastal regions from Catalonia to Tuscany. The 2nd generation of this bivolitine species can occur together with the only generation of *L. albicans* and *L. coridon* and can not be reliably separated at these locations (SCHURIAN, 1989b). *L. coridon* and *L. hispana* have been crossed very successfully until the F3 generation (BEURET 1956-1959). It is possible that the specimens from Sta. Coloma de Queralt (Tarragona) represent this taxon. The ITS2- and COI-sequences from the taxa analyzed in the *Lysandra coridon*-complex form one monophyletic clade which confirms that they are not well differentiated genetically. Populations of *L. albicans* are placed at basal positions in the tree and in the network which might indicate that *L. albicans* is the ancestral taxon, but the material is not sufficient for far-reaching conclusions.

Comparison with allozyme results

The only study of allozymes in *Agrodiaetus* was published by MENSI *et al*. (1994) who investigated some monomorphic *Agrodiaetus* species together with *Agrodiaetus damon* ([Denis & Schiffermüller], 1775). Unfortunately the chromosome number of the specimens used was not determined and therefore the identification of several taxa is doubtful, especially those from Anatolia (*A. ripartii, A. demavendi* and *A. interjectus*). *A. interjectus* is not known from Van Province, but four other similar karyospecies occur there: *A. dantchenkoi, A. alcestis, A. demavendi* and *A. ripartii*. Despite these flaws, some interesting comparisons with the DNA results are possible. Allozyme and DNA results correspond in the following points:

- *A. damon* forms a distinct clade from the other investigated *Agrodiaetus* species.
- The monomorphic *Agrodiaetus* species (*A. fabressei, A. humedasae, A. admetus, A. ripartii*) are closely related and form one clade together with the dimorphic taxa *A. menalcas, A. dolus* and *A. fulgens*.
- *A. admetus* and *A. ripartii* are very closely related (possibly sister species).

The only differences are in the position of *A. fabressei* and *A. humedasae* which cluster within the *dolus*-group in the DNA analysis but occupy an ancestral position in the allozyme studies. Of interest is also the position of two taxa which were not included in the DNA study:

- *A. dolus* (Hübner, 1823) from South France appears closely related to *A. fulgens* and *A. menalcas*, with *A. dolus vittatus* (Oberthür, 1892) from Aveyron more closely related to *A. fulgens* than to *A. dolus dolus* (Bouches du Rhône). This result would question the status of *A. fulgens* as a distinct species.
- *A. exuberans* (Verity, 1926), a very local endemic from Oulx (Torino, Italy) appears to be an ancestral taxon, closely related to *A. fabressei* and *A. humedasae*.

Hybridization in *Agrodiaetus*

Despite the presumed close relationships between many *Agrodiaetus* species, not much is known about hybridization in this subgenus of *Polyommatus*. In contrast to the related subgenus *Lysandra*, where extensive hybridization experiments have been conducted (SCHURIAN 1989b), the only available evidence for hybrids in *Agrodiaetus* so far stems from a few collected specimens which are thought to represent hybrids due to their intermediate phenotype. The following natural hybrids (all of them males) have been recorded:

- within *Agrodiaetus:*
  - *A. ripartii* (Freyer, 1830) x *damon* ([Denis & Schiffermüller], 1775) (SCHURIAN & HOFMANN 1975)
  - *A. ripartii* x *menalcas* (Freyer, [1837]) (SCHURIAN & HOFMANN 1980)
  - *A. antidolus aereus* Eckweiler, 1998 x (?) *cyaneus* (Staudinger, 1899) (TEN HAGEN 2003)

- of *Agrodiaetus* with other *Polyommatus* subgenera:
    - *A. damon* x *Meleageria daphnis* ([Denis & Schiffermüller], 1775) (REBEL 1920)
    - *A. damon* x *Lysandra coridon* (Poda, 1761) (REBEL 1930a)
    - *A. damon* x *Polyommatus icarus* (Rottemburg, 1775) (REBEL 1930b)
    - *A. ectabanensis* x *Meleageria daphnis elamita* (Le Cerf, 1913) (TEN HAGEN 2003)
    - *A. turcicus* (Koçak, 1977) x *Polyommatus icarus* (TEN HAGEN 2003)

The problem with such records is that the conclusions about the parental species of those natural hybrids (which might also be just aberrations) are very uncertain. In the case of the presumed hybrid *ripartii* x *menalcas*, at least one other karyospecies similar to *A. ripartii, A. alcestis* (Zerny, 1932), probably occurs at the site at Zelve (Nevşehir Prov., Turkey).
Obviously, hybrids between phenotypically similar species would usually be overlooked (the same is true for any female hybrid within *Agrodiaetus*) or recorded as a variation of one of the parental species, and only hybrids between very different phenotypes are likely to be discovered.

During the expeditions to Turkey, Iran, Italy and Spain, only one specimen was found which appeared to be a hybrid because of its intermediate phenotype. This male specimen (MW99471) from Erek Dağı (Van Prov., Turkey) has brown wings with traces of silvery scales which would be expected in a hybrid between a species of the "brown" *Agrodiaetus* complex and one with silvery males. Possible parental species were two species with silvery males, *A. menalcas* (Freyer, [1837]) and *A. kurdistanicus* (Forster, 1961), which were both found at the site, and four karyospecies with brown males which are known to occur in Van Province, *A. alcestis*, *A. dantchenkoi* (Lukhtanov & Wiemers, 2003), *A. demavendi* (Pfeiffer, 1938) and *A. ripartii*. Mitochondrial DNA is maternally inherited and would therefore indicate the mother species of the presumed hybrid. In this case, the mtDNA COI sequence turned out to be identical to those of two specimens of *A. dantchenkoi* from nearby Kurubaş Geçidi. In nuclear genes there is a 50% chance that either the paternal or maternal copy is inherited. The ITS-2 sequence was identical to the sequence of *A. menalcas* including the 'A' in ITS-2 position 613 in the aligned data set which was not found in any other Polyommatiti sequence. Thus it can be concluded that specimen MW99471 is a hybrid between a female of *A. dantchenkoi* which has a chromosome number of n=40-42 and a male of *A. menalcas* which has the double chromosome number of n=85. The chromosome number of the hybrid specimen is approximately the same as in *A. dantchenkoi* and this would be expected in an F1 hybrid if a complete pairing between each *dantchenkoi* chromosome with two *menalcas* chromosomes is achieved by trivalent formation in meiosis whereas intermediate chromosome numbers usually occur in F_n and backcrosses. Chromosome numbers in hybrids can also be higher than those of their parents if no complete pairing is achieved. *A. dantchenkoi* and *A. menalcas* appear to be very closely related and might even be sister species and the occurrence of a hybrid between them is therefore hardly surprising.

Meiotic behaviour of chromosomes in hybrids of two closely related Lepidoptera species with a different karyotype, *Antheraea roylei* (n=31) and *A. pernyi* (n=49), was studied by NAGARAJU & JOLLY (1986) who observed the formation of 18 trivalents + 13 bivalents (n=31) in F_1 hybrids and two different karyotypes with either 49 bivalents or 9 trivalents + 31 bivalents (n=40) in backcrosses.

A comparison of mtDNA and nuclear sequences did not reveal any other hybrid in *Agrodiaetus*. Although hybrids between very closely related species (such as those with identical nuclear or mtDNA sequences) can not safely be detected in this way, the existence of hybrids between distantly related species, especially those from different species groups within the studied material can firmly be excluded.

Radiation of *Agrodiaetus* and the colonization of Europe

Genetic data confirm current opinions (e.g. HESSELBARTH *et al.* 1995) that *Agrodiaetus* is a very young radiation originating in the Pliocene, with most intense speciation during the Pleistocene. The biogeographical origin of the subgenus *Agrodiaetus* remains unsolved, because the sister group within *Polyommatus* could not be exactly determined and *A. damon,* a close relative of the ancestor species of *Agrodiaetus,* has an extremely extensive distribution from the Pyrenees to Mongolia, where it is confined to isolated mountain ranges like most other *Agrodiaetus* species. The lower altitudinal limits of most *Agrodiaetus* increase from the West (Spain: 500 m) to the East (Iran: 1500 m), but are usually around 1000 m. Only few species are found in the lowlands or even near sea level (e.g. *A. admetus*) and some are even confined to very high altitudes (e.g. *A. faramarzii* Skala, 2001 at 4000 m in the Zagros range of Iran). It can be assumed that *A. damon* had an almost continuous distribution at the end of the Pleistocene (Dryas 10000 years ago) but populations retreated into the mountains when the climate warmed up and became isolated from each other. Obviously the centre of *Agrodiaetus* radiation is Eastern Anatolia, Transcaucasia and Iran. Not only do these regions have the highest species diversity, but species of these regions are present in almost all species groups (with the only exception of some Central Asian ones) and their stem species are also found in these areas, most notably *A. iphidamon* from Elburs Mts. in northern Iran. The orogeny enabled them to evade even severe climate changes by moving up and down the mountains without the need of long range dispersal. Many species are now confined to isolated mountain tops with subalpine or alpine *Onobrychis* steppe and have a discontinuous distribution, but during at least ten arctic periods of the Pleistocene these populations were able to extend their distribution and to intermix, but were separated again during the interstadials, thus producing complicated speciation patterns.

Europe was only reached by few *Agrodiaetus* species which belong to the *dolus-, admetus-* and *iphigenia*-clade. European endemic (karyo-)species are only found in the *dolus*-clade and therefore this clade probably represents the first European radiation. The ancestor species is a close relative of the three Anatolian species *A. dantchenkoi, A. interjectus* and *A. alcestis*. Relicts of this first colonization are the monomorphic species *A. fabressei* (Central Spain), *A. humedasae* (Aosta, Italy), and *A. aroaniensis* (Greece) which appear to have survived the last glaciation in close proximity to their current occurrence. The Southwest Mediterranean *A. dolus, A. ainsae* and *A. fulgens* appear very close genetically to *A. fabressei* (nuclear and mtDNA) but also to the phenotypically more similar Anatolian *A. menalcas* (allozymes, v. MENSI et al. 1994), thus their origin remains unclear. The *admetus*-clade represents a distinct colonization including *A. ripartii* which is widely distributed in the Mediterranean region (Northern Spain, Southern France, Balkans) through Anatolia and Russia to Altai and the closely related Anatolian *A. admetus* which adapted especially well to low altitudes and occurs throughout the Balkan peninsula. The only species with blue-coloured males (apart from *A. damon*) that got a foothold in Europe is the Anatolian *A. iphigenia* which marginally extended its distribution to Southern Greece during the Pleistocene and is now restricted in Europe to Mt. Chelmos in the Peleponnesos.

Chapter 4: Systematics of *Agrodiaetus* based on molecular evidence

– a new perspective

The following systematic list attempts to summarize the molecular results to infer the relationships between species of the subgenus *Agrodiaetus* taking into account the available evidence from karyological, morphological and biogeographic studies. It includes only those taxa which were included in the molecular study.

damon-group

This group contains only one species with a most extensive distribution from Spain to Mongolia. It represents the sister of all other *Agrodiaetus* according to the nuclear DNA data set.

damon ([Denis & Schiffermüller], 1775)

> Despite its vast distribution the genetic variation appears small. Samples from the French Alps and from NE Turkey are genetically very similar. The sister taxon of *A. damon* remains unclear.

iphidamon-group

This ancestral group consists of two closely related species confined to the Iranian Elburs Mountains.

iphidamon (Staudinger, 1899)

> This species represents a genotype that is close to the presumed ancestor of all species groups with blue males (*iphigenides-, iphigenia-, erschoffii-, carmon-, actis-* and *poseidonides*-group). The nuclear ITS-2 sequences are identical with possible stem species in the *iphigenia*-group (*A. baytopi*) and *erschoffii*-group (*A. shahrami* & *A. achaemenes*).

dizinensis (Schurian, 1982)

> This local endemic which is only known from the type locality Dizin (Central Elburs Mts.) appears to be most closely related to *A. iphidamon*. ECKWEILER & HÄUSER (1997) suggest a close relationship to *A. kendevani* (Forster, 1956), a taxon which could not be included in this study.

iphigenides-group

A Central Asian species group of which only one species was sampled.

iphigenides (Staudinger, 1886)

poseidonides-group

This Central Asian group appears very distant from the other groups. Study of more Central Asian taxa is necessary to decide if e.g. it can be united with the *iphigenides*-group.

poseidonides (Staudinger, 1886)

> In the ITS-2 network analysis this taxon seems to be most closely related to *A. iphigenides.*

dagmara (Grum-Grshimailo, 1888)

> Genetically this taxon is closely related to *A. poseidonides*.

iphigenia-group

Small Anatolian species group. Possible ancestor species: *A. iphidamon.*
The following four taxa with mostly allopatric distribution appear to be very closely related genetically.

baytopi (de Lesse, 1959)

The ITS-2 sequence of this East Anatolian species is identical to the suggested ancestor species *iphidamon* and therefore it could be the stem species of the *iphigenia*-group.

tankeri (de Lesse, 1960)

This taxon differs from the previous species in phenotype and karyotype and is distributed parapatrically in NE Turkey while *A. baytopi* is found in SE Turkey. A sympatric occurrence is known from Tahir Geçidi (Ağrı Prov., Turkey; HESSELBARTH *et al.* 1995). ITS-2 sequences of both taxa are identical and their mtDNA haplotypes overlap which raises the question if speciation is complete or if gene flow persists.

rovshani Dantchenko & Lukhtanov, 1994

This taxon whose karyotype remains unknown occurs in Azarbaijan and Iranian Azarbaijan and is genetically close to *A. baytopi* and *A. tankeri*.

iphicarmon Eckweiler & Rose, 1993

Genetic data confirm the karyological results that this taxon is not a subspecies of *A. iphigenia* but instead closely related to *A. baytopi*.

turcicus (Koçak, 1977)

This Eastern Anatolian species is also closely related to *A. baytopi* and *A. tankeri* but occurs sympatrically with them.

iphigenia (Herrich-Schäffer, [1847])

This is the only representative of this group whose range extends to Europe (Peleponnesos, Greece). Populations from different parts of Anatolia and Armenia are genetically very similar and well differentiated from the other members of the *iphigenia*-group, which are often found sympatrically.

admetus-group

This group has an extensive distribution from Northern Spain to Kazakhstan and includes only monomorphic brown species with an elevated number of chromosomes (n=65-90). The ancestor species of this group seems to be a close relative of *A. damon*.

The following three taxa are karyospecies with an allopatric distribution, but indistinguishable on morphological grounds.

ripartii (Freyer, 1830)

Despite of their similarities in phenotype and karyotype populations of this widespread taxon from Spain, Greece and Turkey do not form a monophyletic group which could be taken as an indication that *A. ripartii* represents the stem species for the remaining taxa in this group. Alternatively it is possible that speciation is incomplete and gene flow between the karyospecies *A. ripartii* and *A. demavendi* persists.

khorasanensis (Carbonell, 2001)

This taxon from Kopet Dagh (Iran) with a chromosome number intermediate between the previous and the following taxon is genetically close to *A. ripartii.*

demavendi (Pfeiffer, 1938)

Genetic and karyological data indicate that this karyospecies might consist of several species with only slightly different chromosome numbers but further investigations which include the precise determination of chromosome numbers are necessary. Dugijan (Azarbaijan-e Sharqi, Iran) turned out to be one interesting location where two different mtDNA haplotypes were found which might indicate the coexistence of two different species. These haplotypes were both found from Eastern Turkey to Northwest Iran. Slight differences in phenotype have led to recent descriptions of new species like *A. ahmadi* (Carbonell, 2001) and *A. urmiaensis*

(Schurian & ten Hagen, 2003), unfortunately without karyological data, and it is uncertain whether the recorded differences can be used to delimit species.

lorestanus Eckweiler, 1997

This taxon was described as a subspecies of *A. demavendi* and its karyotype is probably identical (Carbonell, 2001). Genetic data confirm the close relationship to *A. demavendi*.

nephohiptamenos (Brown & Coutsis, 1978)

This taxon from Macedonia might constitute a synonym of *A. ripartii* unless it can be confirmed that is has a different karyotype. Genetically and phenotypically it appears to be very close to *A. ripartii.*

admetus (Esper, [1783])

This species has an extensive distribution from the Balkans to Western Siberia and occurs sympatrically with most of the former taxa. Genetically it is closely related to *A. ripartii* and *A. demavendi*.

dolus-group

This is a group of taxa with brown or whitish males which is distributed from Southern Spain to Elburs Mts. (Iran) and Lebanon. It corresponds to the *menalcas*-group which resulted from the Bayesian analysis of COI and ITS-2. The ancestor species of this group seems to be a close relative of *A. damon*.

valiabadi (Rose & Schurian, 1977)

This species appears to be the most ancestral in the *dolus*-group.

dolus (Hübner, [1823])

Material of this taxon from Southern France with whitish males could not be included in this study, but the following two taxa are apparently very closely related.

ainsae (Forster, 1961)

This is the Spanish representative of *A. dolus* which differs only slightly in chromosome numbers.

fulgens (de Sagarra, 1925)

DNA sequences of this taxon are identical to *A. ainsae* which further questions its status as a distinct allopatric species (see Chapter 2).

fabressei (Oberthür, 1910)

Despite the similar phenotype and karyotype this taxon does not seem to be closely related to *ripartii*. Instead it appears to be very closely related to *A. ainsae* to which it is allopatric in distribution (MUNGUIRA *et al.* 1995).

interjectus (de Lesse, 1960)

The comparison of nuclear and mtDNA confirms DE LESSE's opinion (1960b) that this taxon is not a hybrid species between *A. alcestis* and *A. demavendi* or *A. ripartii* despite of its intermediate chromosome number but instead it is genetically very close to *A. alcestis*. It occurs sympatrically with *A. alcestis* and *A. demavendi*.

dantchenkoi (Lukhtanov & Wiemers, 2003)

This karyospecies is closely related to *A. interjectus* to which it is allopatric in distribution.

alcestis (Zerny, 1932)

The two subspecies with slightly different karyotypes, the nominate one from Lebanon and Anatolia and ssp. *karacetinae* Lukhtanov & Dantchenko, 2002 from Kordestan have similar ITS-2 sequences but different and independently evolved COI haplotypes indicating possible specific distinctness of these two taxa.

menalcas (Freyer, [1837])

Although this Anatolian taxon has whitish males like *A. dolus/ainsae/fulgens* it appears to be more closely related to *A. alcestis*.

aroaniensis (Brown, 1976)

This Greek taxon also appears most closely related to *A. alcestis*.

humedasae (Toso & Baletto, 1976)

This Italian endemic from Aosta valley is very closely related to *A. aroaniensis*.

erschoffii-group

This is a predominantly Iranian group with one species reaching Central Anatolia. Most members of this group appear closely related to their ancestor species *A. iphidamon*.

shahrami Skala, 2001

This high mountain endemic from the Zagros range appears to be one of the most ancestral because its ITS-2 sequence is identical to *A. iphidamon*.

achaemenes Skala, 2002

A very close relative of *A. shahrami* with almost identical sequences. It is an allopatric endemic of another high mountain in the Zagros range.

phyllis (Christoph, 1877)

This species which ranges from Elburs Mts. to Central Anatolia represents a monophyletic group of populations which are well differentiated genetically from all other members of this group.

glaucias (Lederer, 1871)

The closest relative of this taxon which was described from Elburs Mts. (Iran) appears to be *A. birunii*.

tenhageni Schurian & Eckweiler, 1999

This taxon from Khorasan (Iran) appears to be closely related to the ancestor species *A. iphidamon*.

klausschuriani ten Hagen, 1999

The origin of this species remains unclear. In the ITS-2 network analysis it connects with the *actis*-group.

posthumus (Christoph, 1877)

This taxon appears to be restricted to the eastern Elburs Mts. The genetic analysis confirms the specific distictness from *A. phyllis* which occurs sympatrically at the type locality and has a similar chromosome number but a different karyotype with two very large chromosomes.

darius Eckweiler & ten Hagen, 1998

Genetically this taxon from Central Elburs Mts. is most closely related to the allopatric *A. posthumus* from eastern Elburs.

birunii Eckweiler & ten Hagen, 1998

This taxon was described as a subspecies of *A. posthumus* from central Elburs Mts. (Iran) but according to the genetic analysis, which agrees with the karyological results, this taxon must be considered specifically distinct from *A. posthumus*.

caeruleus (Staudinger, 1871)

This is the only *Agrodiaetus* species in this study which has blue-coloured females. It is distributed from Transcaucasus to Transcaspia and similar taxa also occur in Central Asia. In Elburs Mts. it occurs sympatrically with several taxa in this group (e.g. *A. phyllis, A. posthumus, A. erschoffii* and *A. glaucias*) which appear as the closest relatives in this study.

erschoffii (Lederer, 1869)

This species from Northeast Iran appears to be genetically most distinct from the other species in this group and its closest relatives remain unclear.

carmon-group

The ancestor species of this heterogenous group which is distributed from Anatolia to Iran appears to be *A. iphidamon.*

carmon (Herrich-Schäffer, [1851])

This Anatolian taxon is the first in a group of four closely related and apparently allopatric taxa, some of which have a different karyotype. Specimens from very distant locations (Antalya Prov. in SW Turkey and Kars Prov. in NE Turkey) appear to be very similar genetically.

schuriani (Rose, 1978)

Although the sampled specimen of this taxon from Cappadokia is from a location which is between the two sampled localities of *carmon*, the sequences are quite distinct. This result indicates that the taxon *schuriani* is not a synonym of *carmon*, but further investigations are necessary to verify its status and distribution. A close relation to *A. surakovi* as indicated by ROSE (2002) seems possible on the basis of the molecular results.

surakovi Dantchenko & Lukhtanov, 1994

This taxon represents *A. carmon* in Armenia and Azarbaijan but has a different karyotype. Genetically it is very similar to *A. carmon*.

sekercioglui (Lukhtanov & Dantchenko, 2002)

The COI data confirm that this taxon from SE Turkey is closely related to *A. surakovi* and was correctly placed as a subspecies of the latter.

pierceae (Lukhtanov & Dantchenko, 2002)

This taxon is very similar in phenotype to *A. huberti* (Carbonell, 1993) but has a different karyotype and seems to replace it in Southeast Turkey (Van and Hakkari Prov.). According to LUKHTANOV & DANTCHENKO (2002b) it is genetically (mtDNA) close to *A. kendevani* (Forster, 1956) and *A. zarathustra neglecta* (Dantchenko, 2000)[2] and not to *A. huberti* despite the very similar appearance. The author can confirm the genetic distance to *A. huberti*. According to the COI data set *A. pierceae* is very close to *A. schuriani* but according to the ITS2 data set its relationships within the *carmon*-group are less clear because it appears to be quite distinct to any other members of this group. *A. pierceae* occurs sympatrically with *A. surakovi sekercioglui* at Çatak.

The following 8 taxa represent a group of closely related taxa, some of which are allopatric to each other and may differ only karyologically. Their relationships are not well understood. Most of its members were included in the *transcaspicus*-group sensu HESSELBARTH *et al.* (1995).

ninae (Forster, 1956)

The first member of this group, which was described as a subspecies of *A. transcaspicus* but differs from it in karyotype, is distributed from Armenia to Eastern Anatolia

turcicola (Koçak, 1977)

This taxon which appears to replace *A. ninae* in Van Province (Turkey) can only be distinguished from the latter by its karyotype and the genetic data confirm that this taxon is very closely related to it.

huberti (Carbonell, 1993)

Prior to CARBONELL (1993) this taxon which is widely distributed in Northeastern Anatolia and occurs sympatrically with *A. ninae* was confused with the latter due to its similar appearance and identical karyotype. The nuclear and mitochondrial DNA data sets differ in the position of this taxon. *A. huberti* shares very similar COI haplotypes with *A. ninae*, but the ITS-2 sequences are distinct, confirming its specific status.

elbursicus (Forster, 1956)

Nominotypical material of this taxon from Elburs Mts. (Iran) appears to be very close to *A. ninae* according to the nuclear DNA data set, but quite distinct from it according to the mtDNA data set. The number of chromosomes is half the number found in *A. ninae*.

zapvadi (Carbonell, 1993)

The phenotype and karyotype of this taxon from Van Province (Turkey) is very similar to *elbursicus*, but genetically it is distinct. According to the mtDNA data set it is most closely related to *A. huberti*.

zarathustra Eckweiler, 1997

This Iranian taxon from Lorestan has a peculiar phenotype and its karyotype is also different from the other members of the *ninae*-species group. Genetically it is very close to *A. elbursicus* (mtDNA) and *A. zapvadi* (ITS-2).

---

[2] This taxon was described from Armenia but the name *A. zarathustra neglecta* Dantchenko, 2002 appears to be a nomen nudum because it was published without description and without stating any differentiating characters.

arasbarani (Carbonell & Naderi, 2000)

This taxon from Azarbaijan-e Sharqi (Iran) is similar to *A. zarathustra* in phenotype. Genetically it is closely related to *A. elbursicus*.

paulae Wiemers & De Prins, 2003

The phenotype of this new species from Ahar Pass (Iran) is very distinct from any other member of this group and it has previously been confused with *A. altivagans* (ECKWEILER, pers. comm.). According to the genetic data it is most closely related to *A. zarathustra, A. arasbarani, A. elbursicus* and *A. zapvadi* and its karyotype is like those of the latter two taxa.

dama (Staudinger, 1892)

This very rare Anatolian species is genetically very distant from the other taxa in this group. It appears basal in the ITS-2 network and therefore might represent an ancestral taxon.

hamadanensis (de Lesse, 1959)

This Iranian species with a peculiar phenotype (males with violett wing upperside) is genetically very distant from other *Agrodiaetus* but seems to be most closely related to *A. dama* according to the mtDNA data set.

theresiae Schurian, van Oorschot & van den Brink, 1992

The relationships of this local Anatolian endemic remain unclear although the mtDNA data set indicates *A. surakovi* as closest relative. Possibly this is another ancestral relict species comparable to *A. dama*.

guezelmavi Olivier, Puplesiene, van der Poorten, De Prins & Wiemers, 1999

The genetic data confirm that this local Anatolian endemic is closely related to its sister species *A. theresiae* from which it differs only by its karyotype.

antidolus (Rebel, 1901)

This Eastern Anatolian species is the first in a group of 6 genetically closely related taxa. The first four taxa have males with a silvery-brown upperside and are allopatric in distribution.

kurdistanicus (Forster, 1961)

This taxon which is very similar to *antidolus* in phenotype but differs in chromosome number is only known from Van Province (Turkey). Genetically these karyotypically different specimens from Van Province do not differ from specimens with the *antidolus*-karyotype found in Hakkari Province.

femininoides (Eckweiler, 1987)

The darkest member of this group from Zanjan (NW Iran) again has a different chromosome number but genetically it is close to the former two taxa from Turkey.

morgani (Le Cerf, 1909)

The phenotype of this taxon from Iranian Kordestan and Lorestan is similar to *A. antidolus* but its chromosome number is the same as in *A. femininoides*. Its mtDNA is also similar to the latter.

peilei Bethune-Baker, 1921

This rare species whose males have a unique golden brown wing colour occurs sympatrically with the former and the following species. It differs from them in karyotype and has a chromosome number intermediate between these two species. Genetically it is closely related to both of them and its COI haplotype is even identical with *A. morgani*.

karindus (Riley, 1921)

This Iranian taxon which occurs sympatrically with the former two species and differs from them in phenotype and karyotype appears to be misplaced in this group at first glance. Unlike the other members of the *antidolus*-species group its males display a bright blue upperside wing colour, similar to *A. dama* and therefore it was described as a subspecies of the latter. However the analysis of its mtDNA reveals that its haplotype is almost identical to *A. peilei*. Striking similarities to this species can also be found in the form of the wings and in the underside wing pattern.

poseidon-group

This group comprises mainly Anatolian, Caucasian, and few Iranian elements. Its ancestor species is probably *A. iphidamon*.

hopfferi (Herrich-Schäffer, [1851])

This Anatolian species with conspicuous male phenotype (greyish blue upperside) appears to be the stem species of this group.

poseidon (Herrich-Schäffer, [1851])

The genetic data confirm that this Anatolian species is closely related to *A. hopfferi*. It has a similar phenotype but blue-coloured males and a different karyotype. Its distribution closely resembles that of *A. hopfferi* but it is absent from Southeast Turkey. In Northeast Turkey it seems to be replaced by the following karyospecies:

putnami (Lukhtanov & Dantchenko, 2002)

Genetically this taxon from NE Turkey which was separated from *A. poseidon* because of its higher number of chromosomes seems to be very close to *A. poseidon* and its COI haplotype is almost identical. In the ITS-2 network however it clusters with the *erschoffii*-group, but this is due to only two plesiomorphic nucleotide character states shared with *A. birunii* but which are also found in *A. iphidamon*. Possibly this taxon is ancestral to *A. poseidon*.

lycius (Carbonell, 1996)

The genetic data confirm the view of ECKWEILER & HÄUSER (1997) that this local taxon which occurs near Antalya just off the Southwestern distributional limit of *A. poseidon* and *A. hopfferi* and which shares the karyotype of the former is closely related to both species.

The following 8 taxa belong to a group of genetically very closely related taxa and most of them share very similar phenotypes. The reason why the MP- and Bayesian analysis produced unresolved trees is the fact that several populations appear as stem populations of others which can be seen in the network analysis (Fig. 82). This is usually the case in populations of the same species. Although karyological results indicate that several species are involved, there is no indication of genetic differentiation of such karyospecies.

actis (Herrich-Schäffer, [1851])

This taxon from Central Anatolia is the first named of the *actis*-species group and apparently has a low chromosome number (n=17) although topotypical material has not been investigated yet. Genetically however it is not differentiated from the following taxa.

firdussii (Forster, 1956)

This taxon was described from Elburs Mts. and with n=31-34 its chromosome number seems to be about double the number in *actis*. Populations from Northwest Iran and Eastern Anatolia which were included in this study have a slightly lower and variable number (see chapter 2) but there is no indication of genetic differentiation between populations or specimens with lower (n=ca.25) and higher (n=28-30) number of chromosomes.

pseudactis (Forster, 1960)

With n=29 the chromosome number of this taxon from Azarbaijan appears to be the same as in many populations from Iranian Azarbaijan and eastern Anatolia. If populations of *A. firdussii* from Elburs Mts. should turn out to be specifically distinct, the name *pseudactis* might apply to populations from Northwest Iran and eastern Anatolia, otherwise the name might be sunk into synonymy with *firdusii* (as done by HESSELBARTH *et al.* 1995). A specimen from Armenia which was included in this study appears to represent the stem populations for all the others. This would indicate that the *actis*-species group originated in Armenia.

ernesti Eckweiler, 1989

This local taxon which was described as a subspecies of *A. firdussii* from mountains near Antalya at the southwestern range limit of this species group is genetically more differentiated than any other taxon in this group. It also differs in phenotype (e.g. lighter blue upperside of the males). The chromosome number (n=18) is very similar to *A. actis*. HESSELBARTH *et al.* (1995) synonymized this taxon under *A. sertavulensis*, although both taxa have a different phenotype. This action is not supported by genetic and karyological data.

artvinensis (Carbonell, 1997)

Some populations from Northeast Turkey differ slightly in phenotype and chromosome number (n=21-22). Genetically however, these populations appear almost identical to those from Armenia (*pseudactis*).

sigberti Olivier, van der Poorten, Puplesiene & De Prins, 2000

Some populations from the Taurus Mts. and the Pontic chain with dark phenotype are covered under this name. However, the phenotype of this taxon is very variable and many specimens cannot be separated from typical *actis/firdussii/pseudactis*. The karyotype is the same as in *pseudactis*. Genetically these populations do not seem to be differentiated either. Two specimens from the same population appear at slightly different places in the network. Although these specimens exhibit the extremes in phenotype variation found in this taxon, the genetic analysis also does not indicate that two different species are involved.

haigi (Lukhtanov & Dantchenko, 2002)

Populations from Southeast Turkey appear to have a slightly lower chromosome number (n=21-25) than surrounding populations from Northwest Iran and Northeast Turkey and such specimens were also included in the genetic analysis but they do not appear to be well differentiated genetically. The same probably applies to *A. bilgini* (Dantchenko & Lukhtanov, 2002) which was described from Torul (Prov. Gümüşhane) and has the same chromosome number as *A. haigi*.

The remaining taxa form the crown group in *Agrodiaetus* and appear very closely related genetically. Due to the very similar phenotypes and karyotypes their systematics remains poorly understood. It appears that they are very young evolutionary units in the process of speciation.

altivagans (Forster, 1956)

The genetic analysis reveals that the material referred to this taxon in this study is heterogenous and might constitute several species, despite similar chromosome numbers (n=21-23). Alternatively it is one genetic unit with a variable phenotype and comprising several different haplotypes. In this case the following four taxa might represent karyologically diverged populations at the periphery of its range which are in the process of speciation and therefore not well differentiated genetically. The specimen from Armenia, where the type locality of *A. altivagans* is located, seems to occupy an ancestral position in the COI network analysis (Fig. 82) and it appears to be genetically distinct from the Turkish specimens: MW99165 from Erzincan (Erzurum Prov.) and MW99240 from Güzeldere Geçidi (Van Prov.) appear closely related to *A. wagneri* and *A. maraschi* whereas MW99353 and MW99357 from Güzeldere Geçidi (Van Prov.) are genetically similar to *A. gorbunovi*. The phenotype of the latter two specimens differs from typical *altivagans* and appears more similar to *A. wagneri* sensu HESSELBARTH *et al.* (1995) but this taxon has a different karyotype.

wagneri (Forster, 1956)

This taxon was treated as a subspecies of *A. altivagans* by DE LESSE (1962a) but elevated to species rank by HESSELBARTH *et al.* (1995) who claim that both taxa occur sympatrically in eastern Turkey. Their delimitation of this taxon however remains far from clear and the only karyological data available are from DE LESSE (1962a) who checked one specimen from the type locality which had n=16 chromosomes. The specimen included in this study is from Nevşehir which is 300 km east of the type locality in the centre of distribution of *wagneri* and 400 km west of the closest population of *A. altivagans* in Erzincan (according to HESSELBARTH *et al.* 1995). The phenotype of this specimen is typical for *A. wagneri* and several similar specimens from the same population are figured in HESSELBARTH *et al.* (1995: Plate 122, fig. 14-17). Its chromosome number is n=18 which is the same as recorded by De Lesse (1962a) from *A. altivagans* of Erzincan Prov. Genetically this specimen is also very similar to *A. altivagans* from Erzincan (MW99165). Two further specimens which are similar to *A. wagneri* sensu HESSELBARTH *et al.* (1995) from Van Province (MW99353 and MW99357) turned out to have the same chromosome number as *A. altivagans* (n=21-23) and are therefore placed under this taxon. Genetically these two specimens do not appear closely related to *A. wagneri*.

maraschi (Forster, 1956)

HESSELBARTH *et al.* (1995) synonymized this taxon from Maraş under *A. wagneri*, partly because of its identical chromosome number (n=16) which DE LESSE (1962a) reported from Kayseri, 170 km west of its type locality. The genetic analysis includes a specimen from Gürün (Sivas Prov.), 130 km north of the type locality whose phenotype appears to be very similar to the holotype of *A. maraschi*. Its chromosome number also turned out to be n=16. Genetically it is almost identical to *A. altivagans* from Erzincan and Van Prov. (specimen MW99240, n=21).

sertavulensis (Koçak, 1979)

HESSELBARTH *et al.* (1995) raised this taxon from the Taurus Mts. in Turkey to species level and synonymized *A. ernesti* with it, one reason for this action being the alleged sympatry of *A. sertavulensis* with *A. wagneri* at the type locality. Genetically however this taxon appears to be almost identical to *A. wagneri* and *A. maraschi* but distinct from *A. ernesti*. *A. sertavulensis* (n=20) seems to represent an allopatric population of the *altivagans*-complex and the "sympatric" *wagneri* might be just an intrapopulational variation.

gorbunovi Dantchenko & Lukhtanov, 1994

This is another allopatric taxon of the *altivagans*-complex from Azarbaijan. Genetically specimens from three different populations in Northwest Iran are almost identical with each other and with two *A. altivagans* from Van Province (Turkey).

damocles (Herrich-Schäffer, [1844])

This Russian taxon with a chromosome number of n=24-27 has only recently been recorded from Turkey (Erzincan Prov.) and described as ssp. *kanduli* (LUKHTANOV & DANTCHENKO, 2002). The holotype is phenotypically very similar to *A. wagneri* sensu HESSELBARTH *et al.* (1995). According to the mtDNA data set of LUKHTANOV & DANTCHENKO (2002) this taxon is closely related to *A. damocles damocles, A. damocles rossicus, A. damocles krymaeus* and *A. altivagans*. In this study a specimen from Çatak (Van Province) is included which resembles *A. damocles kanduli* in phenotype and which has the same chromosome number (n=25). Genetically it turned out to be very similar to *A. gorbunovi* and to *A. altivagans* from Güzeldere Geçidi (Van Province) with n=22. It seems that karyological results do not coincide well with phenotypic or genetic variation in this complex and further karyological investigations are necessary to clarify species boundaries. At present, the genetic data only indicate the existence of one species (*A. damocles*) with a variable phenotype and karyotype which comprises the taxa *damocles, altivagans, wagneri, maraschi, sertavulensis & gorbunovi.*

mofidii (de Lesse, 1963)

This Northeast Iranian taxon from Kopet Dagh (ssp. *mofidii*, n=34-35) and Kuh-e-Sorkh (ssp. *sorkhensis* Eckweiler, 2003, n=45) is genetically very close to *A. altivagans* to which it is allopatric in distribution.

mithridates (Staudinger, 1878)

The systematic position of this monomorph Anatolian species with a variable chromosome number of n=21-27 has been uncertain. It was placed into the *admetus*-group (with monomorph males) by BÁLINT & JOHNSON (1997), but into the *dolus*-group (with silvery males) by HESSELBARTH *et al.* (1995) and ECKWEILER & HÄUSER (1997). Genetically it is closely related to *A. sennanensis* and *A. hopfferi* according to the nuclear DNA data set, but to *A. altivagans* and *A. maraschi* according to the mtDNA data set. The range of *A. mithridates* appears to be the intersection of the range of *A. hopfferi* with the range of the *A. altivagans*-complex.

sennanensis (de Lesse, 1959)

This northwest Iranian taxon appears to be closely related to the allopatric *A. hopfferi* (ITS-2) and to the sympatric *A. cyaneus* (COI).

pseudoxerxes (Forster, 1956)

The closest relative of this Iranian taxon from Elburs Mts. seems to be *A. gorbunovi* and *A. cyaneus*. ECKWEILER & HÄUSER (1997) list it as a subspecies of *A. kendevani* although De Lesse (1962a) found both taxa sympatrically at Kendevan Pass and treats *A. pseudoxerxes* as a subspecies of *A. altivagans* and the close relationship with this species can now be confirmed genetically. According to the mtDNA data set of Lukhtanov & Dantchenko (2002) *A. kendevani* is genetically closely related to *A. pierceae* and *A. zarathustra* both of which belong to the *carmon*-group. This result also rules out conspecifity of *A. pseudoxerxes* with *A. kendevani*.

cyaneus (Staudinger, 1899)

This taxon was described from Georgia and is distributed from the Caucasus and Kordestan to Iran. Genetically it appears distinct but closely related to the *altivagans*-complex. Specimens from Van Province (Turkey) and Marand (Iranian Azarbaijan) which belong to the nominate subspecies are very similar genetically, but the specimen of ssp. *damalis* (Riley, 1921) from Lorestan in Iran appears to be genetically distinct.

merhaba De Prins, van der Poorten, Borie, Oorschot, Riemis & Coenen, 1991

This taxon is similar to *A. cyaneus* in phenotype and karyotype and only known from northeastern Anatolia (Artvin and Erzurum Prov.). The genetic data confirm its close relationship with *A. cyaneus* to which it is allopatric in distribution and it might be more appropriate to treat it as a subspecies of *A. cyaneus*.

Chapter 5: Evolution of morphological traits in *Agrodiaetus*

Introduction

Although differences in wing pattern and coloration between many *Agrodiaetus* species are very subtle to anyone who is not familiar with this group of butterflies, they often represent the only means of identification and classification. Yet even experts are often unable to determine single specimens because of considerable infraspecific variation (within and between populations). On the other hand, the subgenus *Agrodiaetus* includes also very different colour morphs. Even though the majority of species has males with an iridescent blue upperside, like the majority of Lycaenidae, the subgenus *Agrodiaetus* also includes many species with different upperside coloration, most of them brown, some silvery, whitish or even golden brown. Together with the extent of androconial patches, these colour morphs have even been the main characters to delimit species groups within *Agrodiaetus*.

The iridescent coloration is confined to the males, whereas females of most *Agrodiaetus* species are dull brown. It therefore appears that the male coloration has evolved through sexual selection. Females of the closely related *Polyommatus icarus* only mate once and exhibit mate choice (KNÜTTEL & FIEDLER 2001), and it should be noted that butterflies discern colour very differently from the human eye, because they also have colour receptors for the ultraviolet light spectrum. Unfortunately no studies have been conducted to infer the coloration of *Agrodiaetus* males as it would appear to the eye of the butterfly, and not even the visible colour has been measured and analysed quantitatively. A quantitative analysis of wing pattern characters by means of multivariate techniques is also beyond the scope of this thesis (but hopefully can be conducted in the future). This chapter aims to pinpoint four important morphological characters which have been used for the systematics of *Agrodiaetus* and evaluate them in a qualitative approach:

1. Presence of a distinct white streak on the hindwing underside
2. Presence of orange submarginal lunules on the hindwing underside
3. Presence of well developed androconial patches on the forewing upperside of males
4. Ground colour of the male upperside

The first character is the main character used to delimit the subgenus *Agrodiaetus* although some species or individuals with the white streak missing are still regarded as members of this subgenus due to other distinctive characters. The remaining characters have been used in combination to characterize species groups within *Agrodiaetus*.

Material and methods

The presence of the first three characters (white streak, orange submarginal lunules and androconial patches) was checked from the wing vouchers. 1211 wing vouchers of *Agrodiaetus* and 521 wing vouchers of outgroup species which are kept in glass slide mounts were available for the analysis (Appendix 2). Wings were also scanned with a Microtek Scanmaker E6 at 600 dpi resolution in RGB Modus (16.7 million colours) and will be made available online through MorphBank (http://www.morphbank.net/). The ground colour of the forewing upperside was copied from a representative spot in the area of the cell using Adobe Photoshop and pasted onto the nodes of the ITS2-network for visualization.

Results

A distinct white streak was found in most *Agrodiaetus* but not in any outgroup species. Within *Agrodiaetus* the white streak was found missing in the following species or specimens:

Clade	**Species**	**Specimens with missing streak**
admetus-clade	*Agrodiaetus admetus*	all males, females streak reduced
admetus-clade	*Agrodiaetus lorestanus*	WE02535 (=1/2)
dolus-clade	*Agrodiaetus fabressei*	all
dolus-clade	*Agrodiaetus humedasae*	all
dolus-clade	*Agrodiaetus aroaniensis*	JC00040, 041, 047 (=3/4)
carmon-clade	*Agrodiaetus hamadanensis*	all
carmon-clade	*Agrodiaetus dama*	all
carmon-clade	*Agrodiaetus karindus*	all
carmon-clade	*Agrodiaetus peilei*	all
carmon-clade	*Agrodiaetus femininoides*	all
carmon-clade	*Agrodiaetus morgani*	all
carmon-clade	*Agrodiaetus antidolus*	MW99376-379, 393, 404 (=7/11)
erschoffii-clade	*Agrodiaetus tenhageni*	all
poseidon-clade	*Agrodiaetus sennanensis*	all
poseidon-clade	*Agrodiaetus mithridates*	very weak (1)

Orange submarginal lunules were present in the following species:

Clade	Species
iphigenides-clade	*Agrodiaetus iphigenides*
poseidonides-clade	*Agrodiaetus poseidonides*
poseidonides-clade	*Agrodiaetus dagmara*

Androconia are present in all *Agrodiaetus* but in some species they are organized in hairy androconial patches on the forewing upperside. The extension of these patches however is subject to considerable variation and is difficult to measure. The following list includes only species with extensive androconial patches which are not restricted to the wing venation:

Clade	**Species**	**Specimens**
admetus-clade	all	
dolus-clade	all	
carmon-clade	*Agrodiaetus peilei*	all
carmon-clade	*Agrodiaetus femininoides*	partial
carmon-clade	*Agrodiaetus morgani*	all
carmon-clade	*Agrodiaetus kurdistanicus*	all
carmon-clade	*Agrodiaetus antidolus*	all
poseidon-clade	*Agrodiaetus hopfferi*	partial
poseidon-clade	*Agrodiaetus sennanensis*	all
poseidon-clade	*Agrodiaetus mithridates*	all

The ground colour of the reference specimens in the ITS2-network (see Fig. 84) is presented in Fig. 86 and the presence of well-developed androconial patches is indicated with an ‘A’. The species names of the reference specimens can be found in Fig. 84 and Tab. 11.

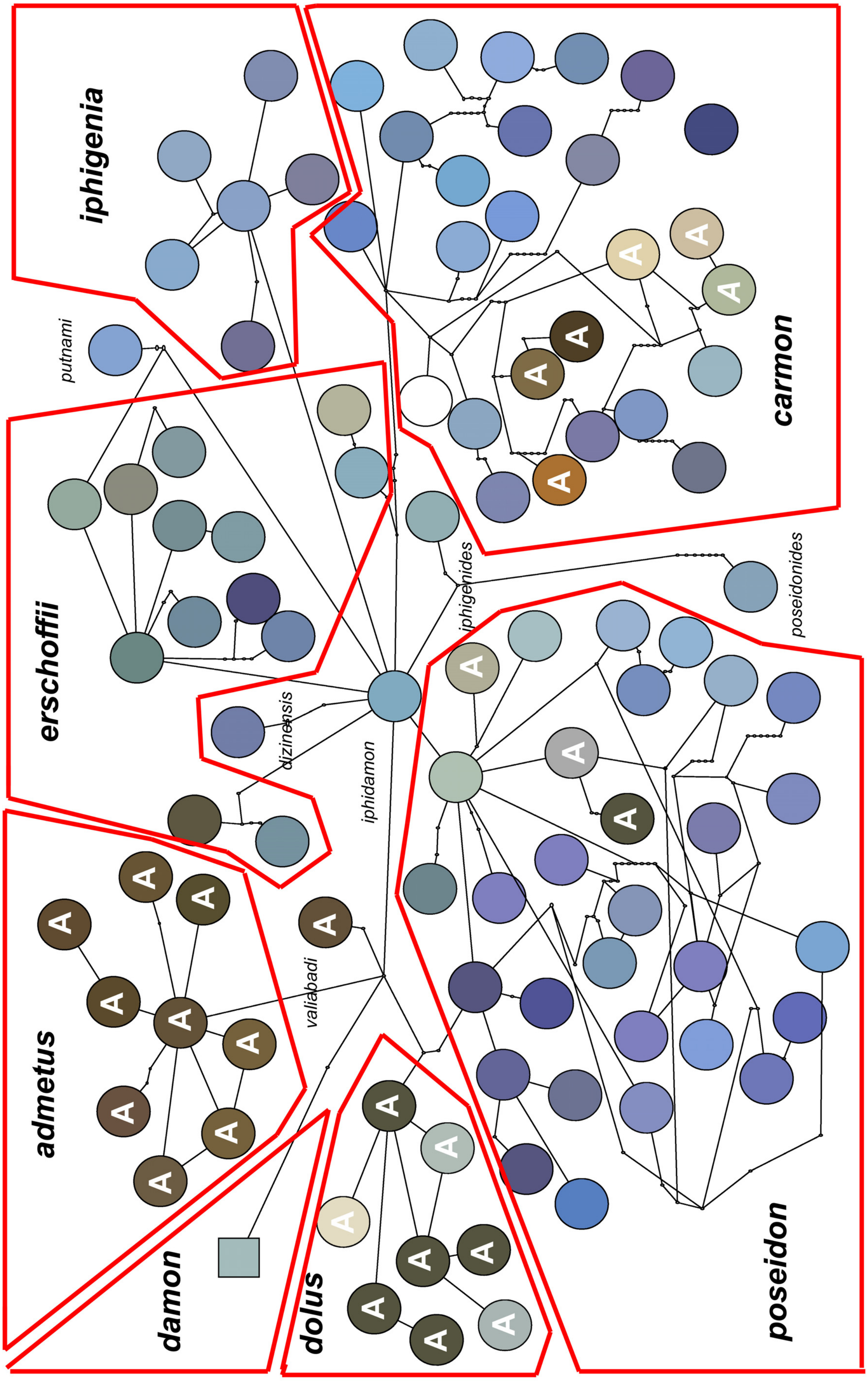


Fig. 86. Ground colour and presence of androconia (A) mapped on ITS2-MP-network

Discussion

HÄUSER & ECKWEILER (1997) state the presence of a distinct white streak on the hindwing underside which is „sometimes entirely absent but never partly present (as in other groups of *Polyommatus*)" as the only morphological diagnostic feature for the delimitation of the subgenus *Agrodiaetus.* (The second diagnostic feature stated is the oligophagy on *Onobrychis* and *Hedysarum*.) The molecular results have confirmed the delimitation of *Agrodiaetus* sensu HÄUSER & ECKWEILER (1997) as a monophyletic group within *Polyommatus* and also the exclusion of *Polyommatus thersites* which has a vestigial white streak (like many *Polyommatus* species) and whose larva also feeds on *Onobrychis*. (*P. thersites* is included within *Agrodiaetus* e.g. by BÁLINT & JOHNSON (1997) and TOLMAN & LEWINGTON (1997).) It can also be confirmed that the loss of the white streak in several *Agrodiaetus* species occurred independently in different clades and that there is individual variation of this character in some species. According to HESSELBARTH *et al.* (1995) the streak is mostly absent in *A. admetus* but can sometimes be present and in females it is often only partly present (contrary to the statement in HÄUSER & ECKWEILER 1997). In *A. mithridates* the variation of this character is considerable with the white streak present, hardly visible or totally absent. *A. demavendi lorestanus* Eckweiler, 1997 was described because of the absence of the white streak in 90% of the individuals. HESSELBARTH *et al.* (1995) discuss the possibility that the white streak represents a diagnostic character to separate the two karyospecies *A. antidolus* and *A. kurdistanicus*. In the material used for this thesis all specimens of the karyospecies *A. kurdistanicus* (from Van Province) had a white streak. In *A. antidolus* (from Hakkari Province) the white streak was absent in all specimens from Yüksekova and Dilezi Geçidi but present in a part of the specimens from Haruna Geçidi and Dez valley. Specimens of *A. antidolus* with and without white streak were included in the molecular study which did not reveal any genetic differentiation between these two forms. In summary, there is good evidence to accept the white streak as an autapomorphic character state of *Agrodiaetus*, which has subsequently been lost multiple times, most notably in the *antidolus* subclade.

Orange submarginal lunules were only present in the three Central Asian species. (This character can be found in many further Central Asian *Agrodiaetus* species which could not be included in this study.) The presence of such lunules is a plesiomorphic character which is found in most other species of the genus *Polyommatus* (but not in *Meleageria* s.str. and *Neolysandra*). Therefore these Central Asian species might be thought to represent ancestral taxa but this does not appear to be true from the molecular analysis. However, this possibility can not be entirely ruled out, because *Polyommatus* species confined to Central Asia were not sampled and the sister group to *Agrodiaetus* might be found there.

According to ECKWEILER & HÄUSER (1997) the upperside coloration and presence of well-developed androconial patches are the main characters to delimit species groups within *Agrodiaetus*. Apart from the Central Asian taxa which were separated due to their biogeographical origin (*iphigenides*- and *dagmara*-group), despite of differences in upperside coloration and androconial patches, all other blue-coloured *Agrodiaetus* with sparsely developed androconial patches were grouped together (*damon*-group) and the taxa with well developed androconial patches were split into three groups, one with only brown-coloured males (*admetus*-group), one with only blue-coloured males (*dama*-group) and one with differently (including white-) coloured males (*dolus*-group). From Fig. 86 it appears that well-developed androconial patches were only found in non-blue-coloured males, a discrepancy to ECKWEILER & HÄUSER (1997) which needs explanation. Some taxa of their *dama*-group (like *A. theresiae*) have slightly better developed androconia than other blue *Agrodiaetus* but these are not comparable to those found in the *admetus*- and *dolus*-group. In *A. hamadanensis* the androconial patches are hardly developed at all. Individual variation can also explain some differences in judgement between authors. The most extreme variation was observed in *A. hopfferi,* a species with variable bluish-silvery coloured males which was placed in the *damon*-group by ECKWEILER & HÄUSER (1997). Some specimens have well-developed androconial patches whereas these are hardly visible in others and absent in the more bluish males from Hakkari Province. On the other hand, two specimens with brown males appear in Fig. 86 which do not have well-developed androconial patches. One of them is *A. glaucias*, a member of the *erschoffii*-group, which still has blue basal suffusion on the wing upperside. The same is true for specimen WE02671 of *A. femininoides* from Ardabil Province whereas *A. femininoides* specimens from Zanjan Province, which have only slight traces of basal suffusion, all have well-developed androconial patches. To conclude, it appears that androconial patches are especially well developed in species with non-blue-coloured males. This makes sense because a well-developed scent-based mate recognition system is needed in monomorph *Agrodiaetus* to replace the visual mate recognition system.

A second question concerns the systematic value of these characters. Fig. 86 reveals that the *admetus*-clade only consists of monomorphic brown species and the *dolus*-clade only contains species with brown- or white-coloured males, but *A. sennanensis* and *A. mithridates* are found within the *poseidon*- and several other brown *Agrodiaetus* in the *carmon*-clade. In the case of *A. mithridates* it was noted already by HESSELBARTH *et al.* (1995) that this species can not be closely related to the monomorphic *Agrodiaetus* of the *admetus*-group, e.g. because of the different structure of the androconial patches. Differences can also be found in other taxa, e.g. in the *antidolus*-species group where the androconial patch is limited to the area below the central cell whereas it extends along the costal vein in the *admetus*- and *dolus*-clade. A most interesting case consists of the three taxa *A. peilei* (brown males), *A. morgani* (silvery males) and *A. karindus* (blue males) which seem to be very closely related (with almost identical nuclear and mtDNA haplotypes) and occur sympatrically in Lorestan (Iran), but have different karyotypes. Although the underside wing pattern is extremely similar in these three taxa they were even placed into different groups due to the striking differences in upperside wing colour. This case might be an interesting example of a sexually selected character displacement reinforcing premating isolation.

Current data suggest that in *Agrodiaetus* the loss of the blue iridescent wing colour coupled with the expansion of the androconial patches requires few genetic changes and happened independently several times in the course of the radiation of *Agrodiaetus*. Therefore the value of these characters to infer the systematics and evolutionary history of *Agrodiaetus* is limited, and the group of "brown" *Agrodiaetus* apparently is no monophyletic unit. Discoloration, the loss of the iridescent blue colour is also found in many other genera of Lycaenidae, see BÁLINT & JOHNSON (1997) for an overview, but most species are found within *Agrodiaetus* and *Aricia*. The reasons for it are unknown in most cases, but in *Meleageria (daphnis) marcida* discoloration appears to be an adaptation to local climatic conditions of the northern Elburs with reduced solar radiation (BIRÓ *et al.* 2003). This could also explain the brown colour of *Agrodiaetus valiabadi* which occurs in the same area, but it is less plausible for most other brown *Agrodiaetus* species. Instead, sexual selection might be the driving force in these cases. Further studies coupled with experiments and wing colour measurements which must include the hidden wing pattern in the UV spectrum (like KNÜTTEL & FIEDLER 2001 in *Polyommatus icarus*) could reveal exciting insights into the evolution of mate recognition systems in *Agrodiaetus*.

Summary

A qualitative analysis of major wing pattern characters in *Agrodiaetus* revealed that the distinct white streak appears to be an autapomorphy of *Agrodiaetus* but secondarily can get lost again as an individual variation.

The presence of a plesiomorphic wing character in Central Asian *Agrodiaetus* would suggest an ancestral position but this is not corroborated by the molecular analysis.

An obvious strong correlation exists between the loss of blue iridescent coloration of males and an enlargement of their andronconial patches which indicates a switch from a visual sexual recognition system to an olfactorial one. Both character states evolved independently several times in *Agrodiaetus* and can not be used to define species groups within *Agrodiaetus*.

Chapter 6: The role of chromosome evolution in the radiation of *Agrodiaetus*

Introduction

Although the incredible variation in chromosome numbers among *Agrodiaetus* is well-known since the pioneering work of DE LESSE (1960a), the reasons for this pattern are not understood. HESSELBARTH *et al.* (1995) hypothesize that fission of chromosomes should increase the ability of species to adapt to new environmental conditions, because exchange of chromosomal material during meiosis would be facilitated. Correspondingly, chromosome fusions should lower the recombination potential leading to a more stable genome which would be beneficial for species already adapted to specific, more stable environmental conditions. However, these predictions have never been empirically tested. If these predictions are true, a positive correlation between the number of chromosomes and range size should be expected, because species with very restricted ranges are usually specifically adapted to local conditions, whereas widely distributed species accept broader amplitudes of habitat conditions. This hypothesis will be tested in this chapter.

Another question concerns the role of karyotype evolution in the radiation of *Agrodiaetus*. Is it the cause for the high number of species in this subgenus? Did it even cause sympatric speciation? In Metazoa sympatric speciation has hardly been proven, but convincing cases are found among recent radiations of freshwater fishes (e.g. MCCUNE & LOVEJOY 1998; RUNDLE *et al.* 2000; SCHLIEWEN *et al.* 2001) and it is common in plants where polyploidy often leads to speciation. Putting karyological results into a phylogenetic framework should help to elucidate these questions.

Other interesting aspects of karyotype evolution include biogeographical patterns and phylogenetic signal in chromosome numbers. Do species with high or low chromosome numbers occur in certain biogeographical areas? Is there a direction of change in chromosome numbers? Do numbers change gradually or by stepwise multiplication or division? This chapter aims to find answers to these questions.

Material and methods

Chromosome numbers (or their mean in case of a range of numbers) were plotted against the range size of all currently known karyospecies (N=88). A rough score of the range size (RS) was assigned in analogy to KUDRNA (1986), but adapted for the Palaearctic region:

1. Species widespread over the whole (or nearly all of) the Palaearctic region;
2. Species widespread over large parts of the Palaearctic region;
3. Species distributed over one or more smaller parts of the Palaearctic region;
4. Species restricted to one or more territories smaller than the above;
5. Species confined to a small area, such as one mountain range, or a single (known) site.

The Spearman rank-difference correlation coefficient was calculated to test for any (positive or negative) correlation between both variables and a Kruskal-Wallis-ANOVA was also conducted to check correlations between range size and chromosome numbers. These tests appear justified because no indication exists that range size is depending on the phylogenetic position.

Two methods were applied to investigate the karyological data in a phylogenetic framework. Firstly, statistical parameters were calculated for each clade obtained from the combined COI- and ITS-2 phylogenetic analysis in order to see if patterns of chromosome evolution differ between clades. All clades with only one or two taxa were lumped together. The chromosome numbers used were the mean values for each recognized taxon listed in chapter 2 taking into account own as well as literature data.

In a second approach, chromosome numbers were mapped onto the ITS-2 phylogenetic network to look for evidence of any direction in karyotype evolution. In this case actual chromosome numbers of the specimens used to construct the network were applied. Only if such data were not available, chromosome numbers were inferred from other sources (including literature data) and marked as such. If chromosome numbers change gradually and a direction of chromosome evolution exists, taxa which are distant from the supposed ancestral haplotype of *A. damon* should have a more derived karyotype (i.e. highly fissioned or highly fused) than those near the origin of the network.

Results

A list of all recognized karyospecies in alphabetical order together with their (mean) haploid chromosome number (n) and range size (RS) is found in Tab. 14 and the number of taxa attributed to each range size category are shown in the following table:

RS	**1**	**2**	**3**	**4**	**5**
Taxa	0	2	14	39	33

The correlation between both variables is shown in Fig. 87.

Tab. 14. List of species with (mean) haploid chromosome number and range size

Taxon	**n**	**RS**	***Taxon***	**n**	**RS**	***Taxon***	**n**	**RS**	***Taxon***	**n**	**RS**
actis	17	4	*dantchenkoi*	41	5	*iphicarmon*	29	5	*poseidon*	21	4
admetus	79	3	*deebi*	67	5	*iphidamon*	14	4	*poseidonides*	24	4
ainsae	109	5	*demavendi*	71	3	*iphigenia*	14	3	*posthumus*	85	5
alcestis	20	3	*dizinensis*	17	5	*iphigenides*	66	3	*pseudactis*	29	4
altivagans	21	4	*dolus*	124	5	*juldusus*	67	4	*pseudoxerxes*	16	4
antidolus	41	4	*ectabanensis*	18	4	*karindus*	67	4	*putnami*	26	5
ardschira	114	4	*elbursicus*	17	4	*khorasanensis*	84	4	*ripartii*	90	2
aroaniensis	48	5	*eriwanensis*	32	4	*klausschuriani*	56	5	*sennanensis*	29	4
artvinensis	22	5	*ernesti*	18	5	*kurdistanicus*	60	5	*sertavulensis*	20	5
aserbeidschanus	23	4	*erschoffii*	14	3	*lycius*	22	5	*shahrami*	130	5
baytopi	27	4	*fabressei*	90	4	*maraschi*	16	5	*shamil*	17	4
birunii	11	5	*femininoides*	27	4	*menalcas*	85	3	*sigberti*	27	4
caeruleus	20	4	*firdussii*	28	3	*merhaba*	17	5	*surakovi*	50	4
carmon	82	3	*fulgens*	103	5	*mithridates*	24	3	*tankeri*	21	5
carmonides	16	4	*galloi*	66	5	*mofidii*	35	4	*theresiae*	63	5
ciscaucasicus	16	4	*gorbunovi*	20	4	*morgani*	26	4	*transcaspicus*	53	4
cyaneus	18	4	*guezelmavi*	42	5	*ninae*	35	4	*turcicola*	20	5
dagestanicus	40	4	*hamadanensis*	22	4	*paulae*	17	5	*turcicus*	24	4
dama	41	5	*hopfferi*	15	3	*peilei*	39	5	*valiabadi*	23	5
damocles	25	3	*huberti*	35	4	*pfeifferi*	107	4	*wagneri*	17	4
damon	45	2	*humedasae*	38	5	*phyllis*	80	3	*zapvadi*	19	5
damone	67	3	*interjectus*	31	5	*pierceae*	22	5	*zarathustra*	22	4

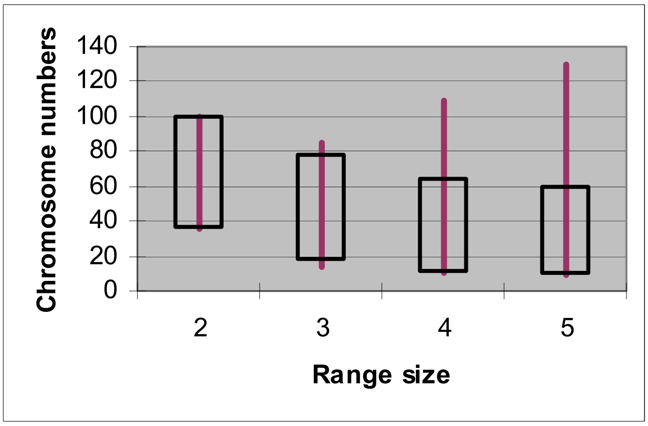


Fig. 87. Correlation between chromosome numbers and range

Neither the Spearman Rank Correlation Coefficient (R = 0.053, p>= 0.621, Z = 0.494) nor the Kruskal-Wallis-ANOVA (H=3.74, p=0.2914) returned a significant result for a correlation between both variables.

Fig. 88 displays the variation of chromosome numbers and Tab. 15 lists statistical parameters for each clade, apart from the few species of the ancestral *damon-, iphidamon-, iphigenides-* and *poseidonides*-clade which were lumped together ("others").

Tab. 15. Statistical parameters of chromosome number variation in *Agrodiaetus* clades

	admetus	***dolus***	***iphigenia***	***erschoffii***	***carmon***	***poseidon***	**others**	**Total**
Number of taxa	6	11	5	7	20	23	5	**77**
Minimum	66	19	12	10	16	15	14	**10**
Maximum	90	125	29	131	82	45	67	**131**
Mean	80.9	64.8	22.9	56.4	38.9	21.8	33.2	**40.9**
Median	81.5	48.0	24.0	56.0	37.0	20.5	24.0	**27.0**
Standard deviation	8.5	38.2	5.9	44.6	18.3	5.2	22.0	**29.0**

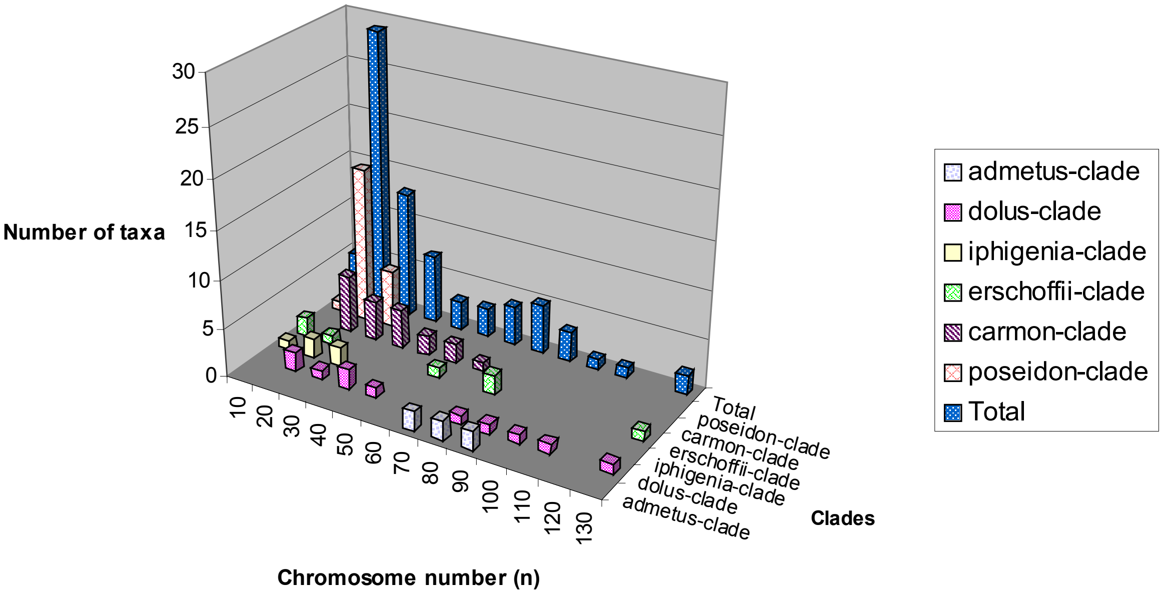


Fig. 88. Variation of chromosome numbers in different *Agrodiaetus* clades

Different clades have significantly different chromosome numbers (Tab. 16).

Tab. 16. Kruskal-Wallis-ANOVA: Chromosome number differences between clades.

Chromosome no. by Clade	n	Rank sum	Mean rank
admetus-group	4	256.5	64.13
dolus-group	10	520.5	52.05
iphigenia-group	5	136.0	27.20
erschoffii-group	7	281.5	40.21
carmon-group	20	794.5	39.73
poseidon-group	21	481.0	22.90
others	5	158.0	31.60

Kruskal-Wallis statistic	23.33	
p	0.0007	(chisqr approximation, corrected for ties)

The ITS-2 MP-network with chromosome numbers mapped onto it is shown in Fig. 89. The taxa names can be looked up in Fig. 84. If chromosome numbers were inferred from other specimens than those used to construct the network, these are shown in brackets {}.

Subnetworks which resemble the clades obtained in the phylogenetic trees are named and marked with a polygon, and exceptions are also labelled. All taxa in the *admetus*-group and most taxa in the *dolus*-group have high chromosome numbers whereas low chromosome numbers prevail in the remaining groups. Exceptions are *A. posthumus* (n=85) in the *erschoffii*- and *A. carmon* in the *carmon*-group (n=81-82). Low chromosome numbers are often found in stem species (e.g. *A. birunii* (n=10-11) in the *erschoffii*-group, *A. iphigenia* (n=13-14) in the *iphigenia*-clade, *A. hopfferi* (n=15-16) in the *poseidon*-group and *A. alcestis* (n=19-21) in the *dolus*-group whereas a higher chromosome number appears to be a derived condition. Numbers between n=30 and n=60 are common in the *dolus*- and especially the *carmon*-group but hardly found in most other groups. Exceptions are *A. damon* (n=45) and two taxa in the *poseidon*-group, *A. mofidii sorkhensis*, n=45 and *A. klausschuriani* (n=56), but the phylogenetic position of the latter taxon is uncertain.

Discussion

No significant correlation was found between chromosome numbers and range size which questions the assumption that the number of chromosomes influences the ability of a species to adapt to environmental conditions. Circumstantial evidence for differing habitat requirements between taxa with low and taxa with high chromosome numbers is not apparent either. Closely related karyospecies inhabit similar habitats, e.g. *A. alcestis* (n=19-21) and *A. menalcas* (n=85) in Anatolia, *A. birunii* (n=10-11) and *A. posthumus* (n=85) in central and eastern Elburs Mts. or *A. morgani* (n=27) and *A. karindus* (n=66-68) in Lorestan, Iran. Currently it seems more reasonable to assume that karyological differences are not adaptive, but occur more or less accidentally in *Agrodiaetus*.

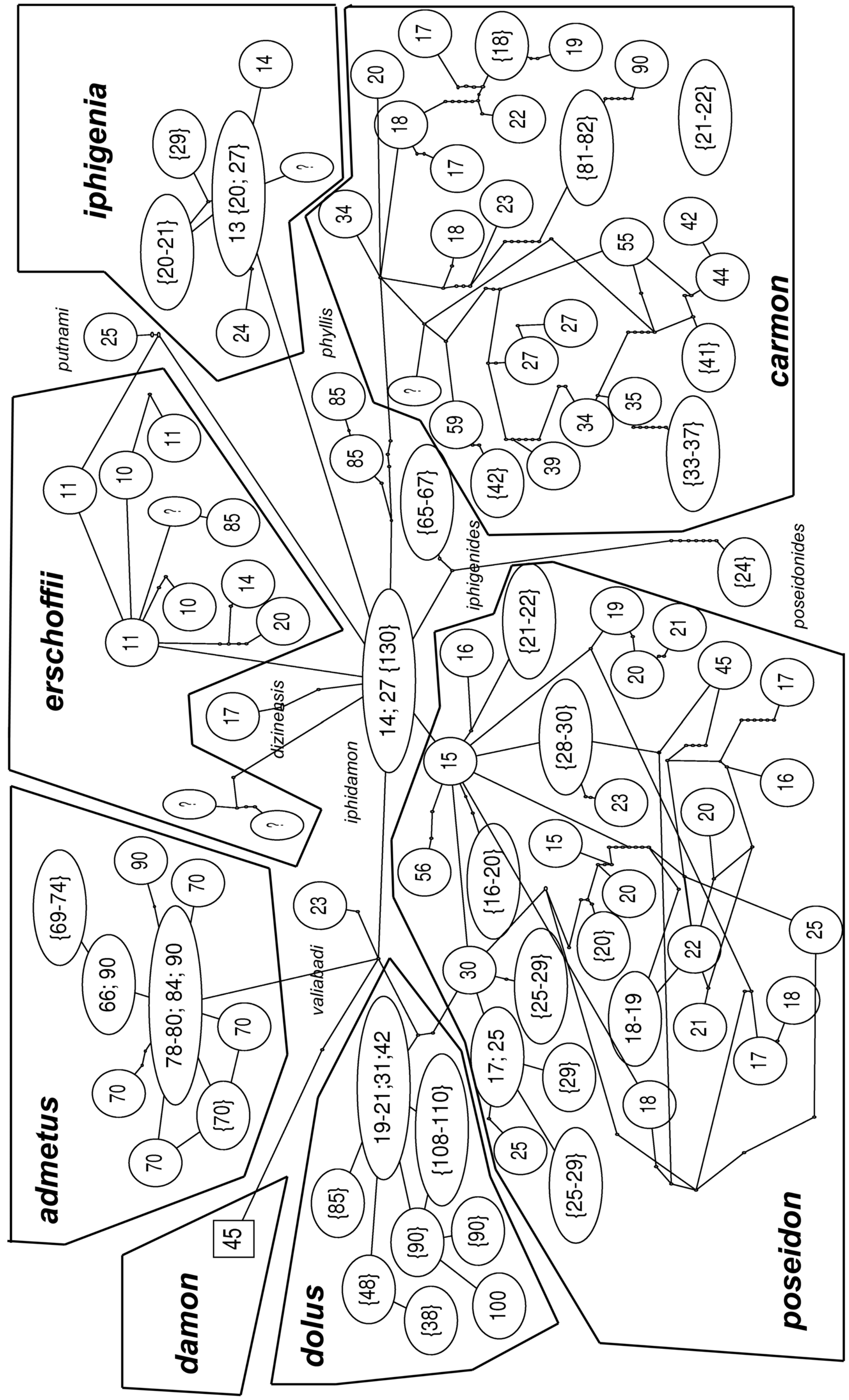


Fig. 89. Chromosome numbers mapped onto the ITS2-MP-network

In order to see if there is a directional change of chromosome numbers in the radiation of *Agrodiaetus*, we shall have a first look at possible sister species of the ancestral *A. damon*, which has a chromosome number of n=45. Such a number is not found in any close relative of *Agrodiaetus* (apart from *Lysandra bellargus*) and appears to be caused by fission of the modal and probably ancestral number of n=22-24 which is found in most *Polyommatus* species. Species with higher numbers are only found in the derived subgenus *Lysandra* (reaching from n=24 in the ancestral *L. syriaca* to n=87-92 in *L. coridon*) and even higher in a group of closely related species sometimes united into the subgenus *Plebicula* (LORKOVIĆ 1990): *P. dorylas* (n=147-151), *P. nivescens* from Spain (n=190-191) and *P. atlanticus* from Morocco (n=221-223). Of interest is also the variation found within *P. cornelia* (n=26-38) which appears closely related to *A. damon* in the ITS-2 network. The closest relatives of *A. damon* among *Agrodiaetus* according to the ITS-2 network have chromosome numbers which are multiples or fractions of n=45: almost triple in *A. shahrami* (n=130), double in *A. ripartii* (n=90), half in *A. valiabadi* (n=23) and a third in *A. iphidamon* (n=14). Thus it appears that considerable variations in chromosome numbers have appeared early in the radiation of *Agrodiaetus*. Accordingly, chromosome numbers also vary in each *Agrodiaetus* clade, although differences can be seen between clades. The *admetus*-clade has the highest mean number and variation is low. The highest variation is found in the (mainly Iranian) *erschoffii*-clade which also has the taxa with the lowest (*A. birunii*, n=10) and highest (*A. shahrami*, n=130) chromosome number found in *Agrodiaetus*. The *poseidon*-clade which includes mainly Anatolian faunal elements has the lowest variation and also the lowest mean in chromosome numbers, most of which vary between n=15 and n=35. Most chromosome number changes in this group (and part of the *carmon*-group) are due to slight variations of the modal value 24. On the other hand, high chromosome numbers seem to appear suddenly, probably by simultaneous fission of the whole chromosome set which leads to multiple numbers. Phylogenetically they appear to be in a deadlock position. Fig. 89 does not show any clear case where highly fissioned chromosomes were fused again to low numbers.

Interestingly, the most extreme values are not found in the most derived taxa but they appear mainly in ancestral clades. Chromosome numbers in the *poseidon*-group, which turned out to be the crown group of *Agrodiaetus* in the molecular phylogenetic analysis and which includes many taxa in the process of speciation, has the lowest variation in chromosome numbers most of which are still around the modal value. This also indicates that most of the drastic changes of chromosome numbers happened early in the radiation of *Agrodiaetus* and therefore corroborates the taxonomic practice to attribute species status to karyospecies with highly divergent chromosome numbers.

Most closely related karyospecies are allopatric or parapatric in distribution. If karyologically well-differentiated sister species occur in sympatry, they also differ considerably in phenotype: *A. alcestis* (brown males, n=19-21) and *A. menalcas* (white males, n=85) in Anatolia, *A. hopfferi* (silvery males, n=15) and *A. poseidon* (blue males, n=19-22) in Anatolia, or *A. morgani* (silvery males, n=27), *A. peilei* (brown males, n=39) and *A. karindus* (blue males, n=66-68) in Lorestan, Iran. Apparently the coexistence is only possible if females can differentiate the males of closely related species by their phenotype. Otherwise extensive hybridization between different “karyospecies” would occur and difficulties in the pairing of chromosomes during meiosis would lead to a very low fitness of the offspring. Therefore it can be concluded that there is little evidence for sympatric speciation caused by changes in karyotype. Instead, changes in chromosome number seem to be a common by-product of allopatric speciation and phenotypic differentiation is necessary for sister species to occur in sympatry. However, it is probable that chromosomal changes have been important for the radiation of *Agrodiaetus* during the Pleistocene. Due to periodically changing climate conditions, altitudinal range shifts of populations may have lead to their isolation from each other during the interstadia. Chromosomal changes which occured in allopatric populations confined to isolated mountain tops did not allow remixing of gene pools when their ranges met again during recurrent periods of cooler climate. These processes could explain the high species diversity in *Agrodiaetus*, in particular in areas with complex topographic relief such as Anatolia, Transcaucasia or Iran.

Summary

A correlation analysis of chromosome numbers and range size did not support the hypothesis that the number of chromosomes has an adaptive value. A comparison of chromosome numbers between evolutionary units revealed different patterns. High numbers dominate in the two clades with exclusively brown or silvery-white males. Fission events have happened early in the radiation of *Agrodiaetus* and independently within different clades. A high degree of fragmentation appeared to represent an irreversible condition when chromosome numbers were mapped onto a phylogenetic network. No evidence was found that changes of chromosome numbers lead to sympatric speciation, rather karyotype evolution in allopatry could have prevented introgression between genotypes if allopatrically evolved taxa came secondarily into sympatry. In this regard, karyotype differentiation may have played a major role in the radiation of *Agrodiaetus* during the Pleistocene.

Summary

The subgenus *Agrodiaetus* which is distributed extensively in the Palaearctic region and especially in Southwest Asia is a species-rich group of blues which are often very similar morphologically but show a large variation in their chromosome numbers (n=10-125). The karyology of 64 taxa was successfully studied and the previously unknown chromosome numbers of 17 taxa were revealed. By means of molecular techniques it was possible to clarify the phylogeny of this group for the first time. *A. damon*, a species which is extremely widespread in the Palearctic region and has a constant chromosome number of n=45, is the sister-species of all other species of *Agrodiaetus* that have been tested. Presumably the colonization of Europe took place before the main radiations in the Anatolian-Caucasian-Iranian region. The greatest differences in the number of chromosomes were found in allopatrically distributed sister-species. It was surprising that morphologically extremely similar sympatric species with different numbers of chromosomes were not closely related, but often belonged to totally different clades, whereas some closely related sympatric species differed greatly in wing colours. This leads to the conclusion that changes in the number of chromosomes do not lead to sympatric speciation, but instead appear as a by-product of allopatric speciation and that such young species can only occur in sympatry after a sufficient differentiation in their phenotype to exclude erroneous matings. The comparison of mitochondrial with nuclear DNA sequences has also shown that hybridizations in *Agrodiaetus* are rare events. Supposedly they do not occur more frequently in *Agrodiaetus* than in other Lycaenidae. Only one of the specimen tested, which already drew our attention by its intermediate wing coloration, after molecular testing proved to be a hybrid of two nearly related but quite differently coloured species.

Zusammenfassung

Die in der Paläarktis und besonders in Vorderasien weit verbreitete Untergattung *Agrodiaetus* ist eine sehr artenreiche Gruppe von Bläulingen, welche sich morphologisch oft sehr ähnlich sehen, sich aber durch eine extrem starke Variation ihrer Chromosomenzahlen (n=10-125) auszeichnen. 64 Taxa konnten karyologisch erfolgreich untersucht und die bisher unbekannte Chromosomenzahl von 17 Taxa aufgedeckt werden. Mit Hilfe molekularer Techniken ist es nun erstmals gelungen, die Phylogenie dieser Gruppe weitgehend aufzuklären. Demnach ist *A. damon*, eine Art mit extrem weiter Verbreitung in der Paläarktis und konstanter Chromosomenzahl (n=45), die Schwesterart aller übrigen untersuchten *Agrodiaetus*-Arten. Die Besiedlung Europas erfolgte vermutlich schon vor den Hauptradiationen im anatolisch-kaukasich-iranischen Raum. Die größten Unterschiede in den Chromosomenzahlen finden sich bei allopatrisch verbreiteten Schwesterarten. Überraschend war, dass morphologisch extrem ähnliche sympatrisch vorkommende Arten mit unterschiedlichen Chromosomenzahlen nicht näher miteinander verwandt sind, sondern oft sogar zu ganz verschiedenen Verwandtschaftsgruppen gehören, wohingegen sich einige sehr nahe verwandte sympatrisch vorkommende Arten stark in der Flügelfärbung unterscheiden. Daraus lässt sich der Schluss ziehen, dass Veränderungen der Chromosomenzahlen nicht zu sympatrischer Artbildung führen, sondern stattdessen ein Nebenprodukt allopatrischer Artbildung darstellen und dass solche jungen Arten erst dann wieder in Sympatrie auftreten können, wenn sie sich auch phänotypisch ausreichend differenziert haben, um Fehlpaarungen zu vermeiden. Der Vergleich von mitochondrialen mit Kern-DNA-Sequenzen hat auch gezeigt, dass Hybridisationen bei *Agrodiaetus* seltene Ereignisse darstellen. Sie treten vermutlich nicht viel

häufiger auf als bei anderen Lepidopteren-Gattungen. Nur einer der untersuchten Falter, der bereits durch eine intermediäre Färbung aufgefallen war, erwies sich nach molekularer Untersuchung als Hybrid zwischen zwei nahe verwandten, aber recht unterschiedlich gefärbten Arten.

Acknowledgements

This work would not have been successfully accomplished without the help of many collegues whose support and contributions I gratefully acknowledge:

To my mentor **Prof. Dr. Clas M. Naumann** (Bonn) I am especially indebted. He initiated this work and I have to thank him for his continuous and generous support at the Zoologisches Forschungsinstitut und Museum Alexander Koenig and his sympathy in difficult situations of life. I was especially pleased to be able to accompagny him on an excursion to the core area of *Agrodiaetus*, where he also helped with the tedious work of preparations. Without his aid and his outstanding expertise this work would not have been accomplished.

Prof. Dr. Konrad Fiedler (Bayreuth) brought in his excellent knowledge on Lycaenidae and thus was instrumental in initiating this project as well as bringing it to a satisfactory end. I am looking forward to future cooperation.

Dr. habil. Bernhard Misof (Bonn) I have to thank for taking the task of Korreferat. His excellent supervision of laboratory work was indispensable for sequencing such a great amount of material.

Dr. Jurate De Prins (Antwerpen) instructed me in her excellent method of karyological preparations and helped in preparing and analyzing numerous karyological slides. The hospitality of herself and her husband, **Willy De Prins**, during the many visits to Antwerp was extraordinary, and I am grateful for their friendship and two extremely successful joint expeditions to Anatolia.

Dr. Vladimir Lukhtanov (St. Petersburg), the leading expert on *Agrodiaetus* karyology, demonstrated his new method of two-phase chromosome preparation as a visiting scientist to the Museum Koenig. He supported me with the preparation and analysis of a great number of preparations. I am greatful for his cordial cooperation.

Karen Meusemann (Bonn) did a major proportion of chromosome preparations in the course of her diploma thesis on the karyology of *Agrodiaetus*. Thanks to her unusual efforts it was possible to analyze such a lot of preparations, and our discussions were helpful for both of us.

I thank my other student assistents, **Esther Meyer, Ruth Rottscheidt, Meike Thomas** and **Manuela Brenk** for their dedicated support with molecular lab work. Manuela also helped in the production of several diagrams. Without this help the work would not have been completed yet.

Most helpful was the cooperation of the other members of the **Museum's lab crew**. Above all I have to thank **Dr. Axel Hille**, the first head of lab, for his introduction, **Rainer Sonnenberg** and **Anja Schunke** for further tutoring and numerous helps during the whole project and **Oliver Niehuis** for excellent cooperation in sequencing and the organization of the joint excursion to Morocco.

Claudia Etzbauer, the soul of our lab, secured excellent working conditions, and with her sense of humour helped in frustrating periods of work.

I thank the lepidopterists of the Museum Koenig, **Dr. Dieter Stüning**, **Dr. Wolfgang Speidel** and **Dr. Harald Fänger** for friendly support and numerous hints.

Dirk van der Poorten & **Alain Olivier** (Antwerpen) helped to identify most of the Anatolian material and organized the two most successful joint expeditions to Central and Eastern Turkey.

Dr. Wolfgang Eckweiler (Frankfurt), the leading expert of Iranian *Agrodiaetus*, contributed valuable material, and I am grateful for his help in identifying Iranian material and many inspiring discussions.

Dr. Klaus G. Schurian (Sulzbach/Taunus) also helped in the identification of *Agrodiaetus* from Iran. Thank you for your friendship and interesting discussions.

Dr. Sigbert Wagener (Oberhausen) magnanimously lent me his representative *Agrodiaetus* collection from Anatolia and explained his ideas on the evolution of *Agrodiaetus*.

Dr. Alexandre Dantchenko (Moskow) supported me with material from Armenia. I thank him for interesting discussions during his time as visiting scholar to the Museum Koenig.

John Coutsis (Athens) provided important *Agrodiaetus*-material from Greece and I also thank him for most interesting information on the genital morphology of *Agrodiaetus*. He also did preparations and excellent genitalia drawings from my material. An evaluation of this material was not possible for this thesis but will be done in a forthcoming publication of John and further joint work.

Dr. José Munguira (Madrid) not only provided material from Spain but also helped with information on Spanish localities of *Agrodiaetus.*

With **Dr. Otakar Kudrna** (Schweinfurt) I had interesting discussions and I thank him for providing two important *Lysandra* taxa for this project.

Dr. Emilio Balletto (Torino) was very helpful when my car broke down during a visit to Torino on the excursion to Italy and I am greatful for his hospitality.

Dr. Hendrik-Jan Megens (Leiden) supplied information on PCR-primers and a copy of his excellent thesis.

Sven Erlacher (Jena) also helped with information on PCR primers for ND1. Thank you!

My loving wife **Paula** not only helped in looking after our child and the household while I worked long hours in the lab. She also contributed to this thesis considerably by scanning *Agrodiaetus* wings and typing a part of the reference list. Thank you very much for your support, even though my scientific work caused time and financial constraints to our family.

Dear little **Pascal** (sorry, you have grown already and tomorrow you will start school) has encouraged me with his cheerfulness, even in difficult periods.

Finally, I am especially grateful to my parents, **Wolfgang & Helga Wiemers** (Münster) for their continuous support throughout my postgraduate studies. Without their help and encouragement this work could not have been carried out.

References

AAGARD, K., K. HINDAR, A.S., PULLIN, C.H., JAMES, O., HAMMARSTEDT, T., BALSTAD & O. HANSSEN, 2002. Phylogenetic relationships in brown argus butterflies (Lepidoptera: Lycaenidae: *Aricia*) from north-western Europe. – *Biol. J. Linn. Soc.* 75(1): 27-37.

ABRAHAM, D., N. RYRHOLM, H. WITTZELL, J. D. HOLLOWAY, M. J. SCOBLE & C. LÖFSTEDT., 2001. Molecular Phylogeny of the subfamilies in Geometridae (Geometroidea: Lepidoptera). – *Molecular Phylogenetics and Evolution,* 20(1): 65-77.

AGENJO, R., 1973. Nuevas subespecies de ropalóceros ibéricos. – *Graellsia* 26 : 25-36.

ANIKIN, V.V., S.A. SACHKOV & V.V. ZOLOTUHIN, 1993. “Fauna lepidopterologica Volgo-Uraliensis” 150 years later : changes and additions. Part 1. Rhopalocera (Insecta, Lepidoptera). Atalanta 24 (1/2): 89-120.

AUBERT, J., B. BARASCUD, H. DESCIMON & F. MICHEL, 1996. Molecular systematics of the Argynninae (Lepidoptera: Nymphalidae). - *Comptes Rendus de L'Academie des Sciences Serie III Sciences de la Vie* 319 (7): 647-651.

AUBERT, J., B. BARASCUD, H. DESCIMON & F. MICHEL, 1997. Ecology and genetics of interspecific hybridization in the swallowtails, *Papilio hospiton* Géné and *P. machaon* L., in Corsica (Lepidoptera: Papilionidae). – *Biol. J. Linn. Soc.* 60: 467-492, 6 figures.

AUBERT, J, L. LEGAL, H. DESCIMON & F. MICHEL., 1999. Molecular Phylogeny of Swallowtail Butterflies of the Tribe Papilionini (Papilionidae, Lepidoptera). – *Molecular Phylogenetics and Evolution* 12 (2): 156-167.

AVCI, Ü. & H. ÖZBEK., 1996. Erzurum ve Bazı Çevre İ llerin Lycaenidae (Lepidoptera) Türleri Üzerinde Faunistik Çalışmalar. – *Tr. J. Zoology* 20: 73: 87.

BACHMETJEW, P., 1902. The Lepidoptera of Bulgaria. – *Trudy russk. ent. Obshch.* 35: 382-463. (In Russian).

BALLETTO, E. & G. G. TOSO., 1979. On a new species of *Agrodiaetus* (Lycaenidae) from Southern Italy. – *Nota lepid.* 2 (1/2): 13-25.

BALLETTO, E., 1993. *Polyommatus humedasae* (TOSO & BALLETTO). – In: New, T.R. (Ed.): Conservation Biology of Lycaenidae (Butterflies). Occasional Paper of t*he IUCN Species Survival Commission* (8): 88-89.

BARRACLOUGH, T.G. & S. NEE, 2001. Phylogenetics and speciation. – *Trends in Ecology & Evolution 16 (7): 391-399.*

BÁLINT, Z., 1992 [1993]. New taxa of the *Polyommatus* section *(sensu* ELLIOT, 1973) from Central Asia. Studies on Central Palaearctic Lycaenids II. (Lepidoptera, Lycaenidae). – *Linn. belg.* 13 (8): 423-446.

BÁLINT, Z., & K. JOHNSON, 1997. Reformation of the *Polymmatus* Section with a Taxonomic and Biogeographic Overwiew (Lepidoptera, Lycaenidae, Polyommatini). – *Neue ent. Nachr.* 40: 1-68, 4 col.pls., 23 text figs.

BÁLINT, Z., 1999. Annotated list of type specimens of *Polymmatus* sensu ELIOT of the Natural History Museum, London (Lepidoptera, Lycaenidae). – *Neue ent. Nachr.* 46: 1-89, 2 tab., 4 col.pls. (with 71 figs).

BÁLINT, Z., 2001. Questions and answers concerning *Polyommatus (Agrodiaetus) iphigenia* HERRICH-SCHÄFFER, [1847], (Lepidoptera, Lycaenidae). – *Linn. belg.* 18 (2): 73-74.

BELTRAN, M., C.D. JIGGINS, V. BULL, M. LINARES, J. MALLET, W.O. MCMILLAN, E. BERMINGHAM, 2002. Phylogenetic discordance at the species boundary: comparative gene genealogies among rapidly radiating Heliconius butterflies. – *Mol. Biol. Evol*. 19(12): 2176-2190.

BEURET, H. (1956): Studien über den Formenkreis *Lysandra coridon-hispana-albicans*. Ein Beitrag zum Problem der Artbildung. 1. Studie – *Mitt. ent. Ges. Basel,* N.F. 6(3): 17-32, (6): 49-64, (7): 65-71, (8): 73-80.

BEURET, H. (1957): Studien über den Formenkreis *Lysandra coridon-hispana-albicans*. Ein Beitrag zum Problem der Artbildung. 2. Studie – *Mitt. ent. Ges. Basel,* N.F. 7(2): 17-36, (3): 37-59.

BEURET, H. (1959): Studien über den Formenkreis *Lysandra coridon-hispana-albicans*. Ein Beitrag zum Problem der Artbildung. 3. Studie – *Mitt. ent. Ges. Basel,* N.F. 9(2): 25-40, (3): 41-59.

BIENERT, T., [1869]. Lepidopterologische Ergebnisse einer Reise in Persien in den Jahren 1858 und 1859. – *C. W. Vollrath, Leipzig,* 56 S.

BIGGER, T. R. L., 1975. Karyotypes of some *Lepidoptera* Chromosomes and changes in their Holokinetic organisation as revealed by New Cytological techniques. – *Cytologia* 40: 713-726.

BIRÓ, L.P., ZS. BÁLINT, K. KERTÉSZ, Z. VÉRTESY, G.I. MÁRK, Z.E. HORVÁTH, J. BALÁZS, D. MÉHN, I. KIRICSI, V. LOUSSE & J.-P. VIGNERON, 2003. Role of photonic-crystal type structures in the thermal regulation of a Lycaenid butterfly sister species pair. – *Physical review E* 67, Article 021907. 7 pages.

BOLOGNESI, A., 2000. Rearing the *Agrodiaetus* of Italy (Lycaenidae). 35 pp., 18 col. pls. Milano (self published).

BRAMSON, K. L., 1890. Die Tagfalter (Rhopalocera) Europas und des Caucasus. – *K. L. Bramson,* Kiew, 150 S., 1 Taf.

BROWER, A.V.Z., 1994. Phylogeny of *Heliconius* Butterflies Inferred from Mitochondrial DNA Sequences (Lepidoptera: Nymphalidae). – *Molecular Phylogenetics and Evolution* 3 (2): 159-174.

BROWER, A.V.Z., 1996. Parallel race formation and the evolution of mimicry in *Heliconius* butterflies: A phylogenetic hypothesis from mitochondrial DNA sequences. - *Evolution* 50: 195-221.

BROWER, A.V.Z., 1997. The evolution of ecologically important characters in *Heliconius* butterflies (Lepidoptera: Nymphalidae): A cladistic review. - *Zool. J. Linn. Soc.* 119: 457-472.

BROWN, J., 1976a. On two previously undescribed subspecies of Lycaenidae (Lepidoptera) from Greece. – *Ent. Ber., Amst.* 36: 46-47.

BROWN, J., 1976b. Notes regarding previously undescribed European taxa of the genera *Agrodiaetus* HÜBNER, 1822 and *Polyommatus* KLUK, 1801 (Lep., Lycaenidae). - *Entomologist's Gaz.* 27 (2): 77-84. 10 text figs, 2 tabs.

BROWN, J., 1977. On the status of a recently discovered Grecian *Agrodiaetus* HÜBNER (Lep., Lycaenidae). - *Entomologist's Gaz.* 28 (1): 3-8.

BROWN, J. & J.G. COUTSIS, 1978. Two newly discovered lycaenid butterflies (Lepidoptera: Lycaenidae) from Greece, with notes on allied species. - *Entomologist's Gaz.* 29: 201-213.

BROWN, K.S. JR, T.C. EMMEL, P.J. ELIAZAR & E. SUOMALAINEN, 1992. Evolutionary patterns in chromosome numbers in neotropical Lepidoptera I. Chromosomes of the Heliconiini family Nymphalidae Subfamily Nymphalinae. - *Hereditas* 117: 109-125.

BROWN, J.M., O. PELLMYR, J.N. THOMPSON & R.G. HARRISON, 1994a. Phylogeny of *Greya* (Lepidoptera: Prodoxidae), based on nucleotide sequence variation in mitochondrial cytochrome oxidase I and II: Congruence with morphological data. - *Mol. Biol. Evol.* 11: 128-141.

BROWN, J.M., O. PELLMYR, J.N. THOMPSON & R.G. HARRISON, 1994b. Mitochondrial DNA phylogeny of the Prodoxidae (Lepidoptera: Incurvarioidea) indicates rapid ecological diversification of Yucca moths. - *Annals of the Entomological Society of America* 87: 795-802.

BROWN, J.M., J.H. LEEBENS MACK, J.N. THOMPSON, O. PELLMYR & R.G. HARRISON, 1997. Phylogeography and host association in a pollinating seed parasite *Greya politella* (Lepidoptera: Prodoxidae). - *Molecular Ecology* 6: 215-224.

BRUNTON, C.F.A., RUSSELL, P.J.C. & MAJERUS, E.N., 1996. Variation in ultraviolet wing patterns of brimstone butterflies *(Gonepteryx:* Pieridae) from Madeira and the Canary Islands. – *The Entomologist* – 115 (1), 30-39.

BRUNTON, C.F.A., 1997. The evolution of ultraviolet patterns in European *Colias* butterflies (Lepidoptera, Pieridae): a phylogeny using mitochondrial DNA. - *Heredity* 80: 611-616.

BRUNTON, C.F.A. & G.D.D. HURST, 1998. Mitochondrial DNA phylogeny of Brimstone butterflies (genus *Gonepteryx*) from the Canary Islands and Madeira. - *Biol. J. Linn Soc.* 63: 69-79.

BUDASHKIN, J. I. & V. A. LUKHTANOV, 1993. Eine neue Art der Untergattung *Agrodiaetus* von der Krim (Lepidoptera, Lycaenidae). – *Atalanta* 24 (1-4): 85-87.

CAMPBELL, D. L. & A. V. Z. BROWER & N. E. PIERCE., 2000. Molecular evolution of the *Wingless* Gene and its implications for the phylogenetic placement of the butterfly family Riodinidae (Lepidoptera: Papilionoidea). – *Mol. Biol. Evol.* 17(5): 684-696.

CARBONELL, F., 1991. Une espèce jumelle méconnue du genre *Polyommatus (Neolysandra)* KOÇAK, 1977 (Lepidoptera, Lycaenidae). – *Linn. belg.* 13 (1): 35-45.

CARBONELL, F., 1991a [1992]. Contribution à la connaissance du genre *Polyommatus* en Turquie orientale (Lepidoptera: Lycaenidae). – *Linn. belg.* 13(4) (1991): 221-235, 2 col. pls., 3 figs, 1 map.

CARBONELL, F., 1993a. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822): le complexe ultraspécifique d'A.*transcaspica* STAUDINGER (1899) (Lepidoptera : Lycaenidae). – *Linn. belg.* 14 (2) : 89-116.

CARBONELL, F., 1993b. Contribution á la connaissance du genre *Polyommatus* LAREILLE (1804) : le complexe ultraspécifique de *Polyommatus eros-eroides* au Moyen-Orient et en Transcaucasie (Lepidoptera, Lycaenidae) (1re partie : descriptions de nouveaux taxa). – *Linn. belg.* 14 (4): 227-234.

CARBONELL, F., 1994a. Le complexe d'*Agrodiaetus poseidon* HERRICH-SCHÄFFER (1851) en Turquie et au Liban. Description d'une nouvelle sous-espéce d'*A.theresiae* (Lepidoptera : Lycaenidae). – *Linn. belg.* 14 (6) : 291-302.

CARBONELL, F., 1994b. Contribution á la connaissance du genre *Polyommatus* LATREILLE, 1804 : le complexe ultraspécifique de *Polyommatus eros-eroides* au Moyen-Orient et en Transcaucasie (Lepidoptera, Lycaenidae) (2^{éme} partie : diagnose et discussion). – *Linn. belg.* 14 (8): 439-454.

CARBONELL, F., 1996. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822) *Agrodiaetus lycius* n. sp. en Turquie méridionale (Lepidoptera : Lycaenidae). – *Linn. belg.* 15 (7) : 281-285.

CARBONELL, F., 1997. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822), *Agrodiaetus actis artvinensis* n. ssp. en Turquie orientale, (Lepidoptera : Lycaenidae). – *Linn. belg.* 16(4): 139-142, 1 pl. coul. (9 figs).

CARBONELL, F., 1998a. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822), position taxinomique d'*Agrodiaetus anticarmon* KOÇAK 1983 (Lepidoptera: Lycaenidae). - *Linn. belg.* 16(7): 263-265.

CARBONELL, F., 1998b. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER 1822. *Agrodiaetus cilicius* n. sp. en Turquie méridionale (Lepidoptera: Lycaenidae). - *Linn. belg.* 16(8): 343-349, 5 cartes, 1 diagr., 1 pl. coul. (19 figs).

CARBONELL, F., 2000. Contribution á la connaissance du genre *Agrodiaetus* HÜBNER (1822), *A. barmifiruze* n. sp. et *A. musa esfahensis* n. ssp. en Iran méridional (Lepidoptera, Lycaenidae). – *Linn. Belg.* 17(5): 211-217.

CARBONELL, F. & A. R. NADERI, 2000. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822), *A. arasbarani* nouvelle espèce dans le nord-ouest de l'Iran (Lepidoptera : Lycaenidae). – *Linn. belg.* 17(5): 218-220, 1 col. pl. (20 figs).

CARBONELL, F., 2001. Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822), *A. ahmadi et A. khorasanensis* nouvelles espèces dans le Nord de l'Iran *(Lepidoptera : Lycaenidae). Linn. Belg.* 18(2): 105-110.

CATERINO, M. S. & F. A. H. SPERLING., 1999. *Papilio* Phylogeny Based on Mitochondrial Cytochrome Oxidase I and II Genes. – *Molecular Phylogenetics and Evolution* 11 (1): 122-137.

CATERINO, M. S., S. CHO & F. A. H. SPERLING., 2000. The current state of insect molecular systematics: A thriving tower of babel. – *Annu. Rev. Entomol.* 45: 1-54.

CHRISTOPH, H., 1873. Weiterer Beitrag zum Verzeichnis der in Nord-Persien einheimischen Schmetterlinge. – *Horae Soc. ent. ross.* 10: 3-55, Taf. I-II (mit 33 Abb.).

CHRISTOPH, H., 1876-1877. Sammelergebnisse aus Nordpersien, Krasnowodsk in Turkmenien und dem Daghestan. – Horae Soc. ent. ross. 12: 181-299; Tafeln 5-8.

CLARKE, C., 1977. Linkage and cytogenetic studies in the swallowtail butterflies *Papilio machaon* L. and their hybrids. – *Proc. R. Soc. Lond. B* 198: 385-399.

CLARY, D.O. & D.R. WOLSTENHOLME, 1985. The mitochondrial DNA molecular of *Drosophila yakuba*: nucleotide sequence, gene organization, and genetic code. – *J. Mol. Evol.* 22: 252-271.

CLEMENT, M., D. POSADA & K.A. CRANDALL, 2000. TCS: a computer program to estimate gene genealogies. – *Molecular Ecology* 9(10): 1657-1660.

COLEMAN, A.W., 2003. ITS2 is a double-edged tool for eukaryote evolutionary comparisons. – *Trends Genet.* 19 (7): 370-375.

COHEN, M.B., M.A. SCHULER & M.R. BERENBAUM, 1992. A host-inducible Cytochrome P-450 from a host-specific caterpillar. Molecular cloning and evolution. - *Proceedings of the National Academy of Sciences of the United States of America* 89: 10920-10924.

CONTRAFATTO, G., J.A. MEESTER, K. WILLAN, P.J. TAYLOR, M.A. ROBERTS & C.M. BAKER, 1992. Genetic variation in the African rodent subfamily Otomyinae (Muridae) II. Chromosomal changes in some populations of *Otomys irroratus*. - *Cytogenetics & Cell Genetics* 59: 293-299.

COURVOISIER, L. G., 1914-1921. Zur Synonymie des Genus *Lycaena.* – Dt. ent. Z. Iris 28(2): 143-229 (1914) ; 34(3-4): 230-262 (1920); 35: 54-110 (1921).

COUTSIS, J., 1985. Notes concerning the taxonomic status of *Agrodiaetus tankeri* DE LESSE (Lepidoptera: Lycaenidae). – *Nota lepid.* 8 (1): 8-14.

COUTSIS, J., 1986. The blue butterflies of the genus *Agrodiaetus* HÜBNER (Lep., Lycaenidae): Symptoms of taxonomic confusion. - *Nota lepid.* 9 (3/4): 159-169.

COUTSIS, J. G. & N. GHAVALAS., 1995. Notes on *Polyommatus icarus* (Rottemburg, 1775) in Greece and the description of a new *Polyommatus* Latreille, 1804 from northern Greece (Lepidoptera, Lycaenidae). – *Phegea* 23 (3): 145-156.

COUTSIS, J. G. & N. GHAVALAS., 1996. Ultra-violet reflection pattern in *Polyommatus andronicus* COUTSIS & GHAVALAS, 1995 and *Polyommatus icarus* (Rottemburg, 1775) (Lepidoptera, Lycaenidae). – *Phegea* 24 (4): 167-169.

COUTSIS, J. G., J. PUPLESIENE & W. DE PRINS., 1999. The chromosome number and karyotype of *Polyommatus (Agrodiaetus) ripartii* and *Polyommatus (Agrodiaetus) aroaniensis* from Greece (Lepidoptera, Lycaenidae). – *Phegea* 27 (3): 81-84.

COUTSIS, J. G., 2001. The male genitalia of the butterflies placed in the subgenus *Neolysandra* of the genus *Polyommatus* (Lycaenidae). – *Nota lepid.* 24 (1/2): 65-72.

DANTCHENKO, A.V., 1994. New taxa of the genus *Polymmatus* *LATREILLE,* 1804 from Tadzhikistan (Lepidoptera: Lycaenidae). – *Atalanta* 25 (1/2): 203-206.

DANTCHENKO, A. 1995. Notes on the biology of *Polyommatus (Agrodiaetus) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993 (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 16 (2/3): 141-146.

DANTCHENKO, A.V., 2000. Genus *Agrodiaetus.* – In: TUZOV, V.K., P.V. BOGDANOV, S.V. CHURKIN, A.V. DANTCHENKO, A.L. DEVYATKIN, V.S. MURZIN, G.D. SAMODUROV & A.B. ZHDANKO. Guide to the Butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera). Vol. 2: 196-214.

DANTCHENKO, A. V., 1997. Notes on the biology and distribution of the *damone* and *damocles* species-complexes of the subgenus *Polyommatus (Agrodiaetus)* (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo*, Frankfurt, Suppl. 16: 23-42.

DANTCHENKO, A. V. & S. CHURKIN., 2003. A new species of the genus *Polyommatus* LATREILLE, 1804 from Mongolia (Lepidoptera, Lycaenidae). – *Neue entomol. Nachr.* 54: 5-13.

DANTCHENKO, A. V. & V. LUKHTANOV, 1993. Zur Systematik und Verbreitung der Arten der *Polyommatus (Agrodiaetus) damone*-Gruppe Südosteuropas und Südwestsibiriens (Lepidoptera: Lycaenidae). – *Atalanta* 24 (1/2): 75-83.

DANTCHENKO, A. V. & V. A. LUKHTANOV., 1994. New taxa of the subgenus *Agrodiaetus* HÜBNER, 1822 from Caucasus (Lepidoptera, Lycaenidae). – *Atalanta* 25 (1/2): 207-213, col. pl. VIII.

DENIS, M. & I. SCHIFFERMÜLLER., 1775. Ankündung [sic] eines systematischen Werkes von den Schmetterlingen der Wienergegend, Wien. 323 S.

DE JONG, R. & R. I. VANE-WRIGHT & P. R. ACKERY., 1996. The higher classification of butterflies (Lepidoptera): problems and prospects. – *Ent. Scand.* 27(1): 65-101.

DE PRINS, W. & D. VAN DER POORTEN, 1993. Grypocera and Rhopalocera of Turkey 11. Description of the females of two little known lycaenid butterflies from southeast Turkey: *Polyommatus (Lysandra) dezinus* (De Freina & Witt, 1993) and *Polymmatus buzulmavi* Carbonell, 1992 (Lepidoptera: Lycaenidae). – *Phegea* 21 (1): 11-16, 2 col. pls.

DE PRINS, W. & D. VAN DER POORTEN, 1996. Additions and corrections to “Die Tagfalter der Türkei”. 2. Interesting observations of butterflies in Turkey during the 38th expedition of the “Werkgroep Grieks-Turkse dagvlinders” (Lepidoptera: Lycaenidae). - *Phegea* 24: 25-32.

DE PRINS, W. & F. IVERSEN., 1996. Family Lycaenidae. *In:* KARSHOLT, O. & J. RAZOWSKI (eds.): The Lepidoptera of Europe. – *Stenstrup (Apollo books),* pp. 205-209.

DE PRINS, W., D. VAN DER POORTEN, J.-P. BORIE, H. VAN OORSCHOT, A. RIEMIS & F. COENEN., 1991. Rhopalocera of Turkey. 7. On a new species of *Polyommatus* LATREILLE, 1804 subgenus *Agrodiaetus* HÜBNER, [1822] from north-eastern Turkey (Lepidoptera, Lycaenidae). – *Phegea* 19 (4): 141-148.

DOVE, G., T. STRACHAN & S. D. M. BROWN., 1981. The evolution of genomes in closely-related species. – *Evolution today, Proceedings of the Second International Congress of Systematic and Evolutionary Biology, pp.* 337-349.

DUMONT, D., 1998. Une nouvelle espéce de *Lycaenidae* du sud de la Turquie : *Polyommatus bollandi* n. sp.. – *Linn. belg.* 16 (8): 335-338.

ECKWEILER, W. & K. SCHURIAN., 1980. Verbreitung und subspezifische Gliederung von *Neolysandra coelestina* (EVERSMANN, 1843) (Lepidoptera, Lycaenidae). – *Atalanta* 11 (1): 69-78.

ECKWEILER, W. & P. HOFMANN., 1980. Verzeichnis iranischer Tagfalter. Checklist of Iranian butterflies. – *Nachr.ent.Ver.Apollo (Suppl.)* 1: 1-28.

ECKWEILER, W. & E. GÖRGNER., 1981. Rhopaloceren-Fauna des Palandöken-Gebirges in Ostandatolien. – *Nachr.ent.Ver.Apollo,* N.F. 2 (3): 80-96 & (4): 97-116.

ECKWEILER, W., 1984. Eine neue Unterart von *Turanana cytis* (CHRISTOPH, 1877) aus Türkisch-Kurdistan (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 5 (2/3): 63-70.

ECKWEILER, W., 1987. Ergebnisse der Tschechoslowakisch-Iranischen entomologischen Expedition nach dem Iran 1970, 1973 und 1977 (Lepidoptera, Lycaenidae). – Acta entomol. Mus. natn. Pragae 42: 39-55.

ECKWEILER, W., 1989. Drei neue Lycaeniden aus der Türkei (Lepidoptera, Lycaenidae). – *Nachr. entomol. Ver. Apoll, Frankfurt,* N.F. 10 (2): 81-102, 1 Farbtaf., 50 Abb.

ECKWEILER, W., 1997. Neue Taxa von *Polyommatus (Agrodiaetus)* (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo, Frankfurt,* Suppl. 16: 7-22.

ECKWEILER, W., 1997b. Netzreport. OMC Online Map Creation – der persönliche Landkartenzeichner. - *Nachr. ent. Ver. Apollo*, N.F. 18 (4): 411-415.

ECKWEILER, W., 1998. Neue Taxa der Gattungen *Polyommatus* LATREILLE, 1804 und Plebeius KLUK, 1780 aus dem Iran (Lepidoptera: Lycaenidae). – Nachr. ent. Ver. Apollo, N.F. 19 (3/4): 219-238.

ECKWEILER, W., 2002. Zwei neue Unterarten des Subgenus *Agrodiaetus* HÜBNER, 1822 aus Nordwest-Iran (Lepidoptera: Lycaenidae, Gattung *Polyommatus*). – *Nachr. ent. Ver. Apollo,* N.F.23 (1/2): 77-79.

ECKWEILER, W., 2003. Zwei neue Unterarten des Subgenus *Agrodiaetus* HÜBNER, 1822 aus Ostiran (Lepidoptera: Lycaenidae, Gattung *Polyommatus*). – *Nachr. ent. Ver. Apollo,* N.F. 24 (1/2): 51-54.

ECKWEILER, W. & C.L. HÄUSER, 1997. An illustrated checklist of *Agrodiaetus* HÜBNER, 1822, a subgenus of *Polyommatus* LATREILLE, 1804 (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo*, Frankfurt, Suppl. 16: 113-166. 11 col. pls.

ECKWEILER, W. & K. ROSE., 1993. Zwei neue Lycaeniden aus der Südwesttürkei (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 13 (3a): 355-364.

ECKWEILER, W. & W. TEN HAGEN, 1998. Zur Taxonomie von *Polyommatus (Agrodiaetus) phyllis* (CHRISTOPH, 1877), *P. posthumus* (CHRISTOPH, 1877) und *P. darius* spec. nov. (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo* 19(2): 109-118.

EITSCHBERGER, U., 1993. Zur Artverschiedenheit der europäischen *Iphiclides*-Arten (Lepidoptera, Lycaenidae). – *Atalanta* 24 (1/2): 9-13.

ELIOT, J. N., 1973. The higher classification of the Lycaenidae (Lepidoptera): A tentative arrangement. – *Bulletin of the British Museum (Natural History) Entomology* 28 (6): 374-505, 6 pls.

ELWES, H., 1899. On the Lepidoptera of the Altai Mountains. – *Trans. entomol. Soc. Lond.* 47: 295-367.

EMELYANOV, A. F. & V.I. KIRILLOVA, 1991.Trends and Modes of the Karyotype Evolution in Cicadina II. Peculiarities and Evolutionary Changes of Karyotypes in the Superfamilies Cercopoidea, Fulgoroidea and in the Cicadina as a Whole (Homoptera). - *Ent. Obozr.* 70 (4): 796-817.

ESPER, E. J. C., 1780-1786. Die Schmetterlinge in Abbildungen nach der Natur mit Beschreibungen. – Theil 1 (2): 1-190, Taf. 51-93.

EVERSMANN, E., 1841. Nachricht ueber einige noch unbeschriebene Schmetterlinge des oestlichen Russlands. – *Bull. Soc. Nat. Moscou* 14 (1): 18-33.

FEDERLEY, H., 1953. Kreuzungsversuche mit Lepidoptera. – *Z. Lepid.* 3: 1-32.

FEDTSCHENKO, B. 1901. Generis *Hedysari* revisio. – *St. Petersburg,* pp. 1-168 + 1-56 [in Russian].

FIEDLER, K., 1990. Untersuchungen zur Funktion, Ökologie und Evolution der Myrmekophilie der Bläulinge (Lepidoptera: Lycaenidae). – PhD thesis, Univ. Frankfurt, iv + 219 pp.

FIEDLER, K., 1991a. European and North West African Lycaenidae and their associations with ants. – *J. Res. Lepid.* 28 (4): 239-257.

FIEDLER, K., 1991b. Systematic, evolutionary, and ecological implications of myrmecophily within the Lycaenidae (Insecta: Lepidoptera: Papilionoidea). – *Bonner zool. Monogr.* 31: 1-210.

FIEDLER, K., 1994. Lycaenid butterflies and plants: is myrmecophily associated with amplified hostplant diversity? – *Ecol. Entomol.* 19: 79-82.

FIEDLER, K., 1995a. Lycaenid butterflies and plants: is myrmecophily associated with particular hostplant preferences? – *Ethol. Ecol. Evol.* 7 (2): 107-132.

FIEDLER, K., 1995b. Lycaenid butterflies and plants: Hostplant relationships, tropical versus temperate. – *Ecotropica* 1 (1): 51-58.

FIEDLER, K., 1995c. Associations of lycaenid butterflies with ants in Turkey. – Pp. 437-450 in: Hesselbarth, G., van Oorschot, H., & Wagener, S.: Die Tagfalter der Türkei unter Berücksichtigung der angrenzenden Länder, vol. I. S. Wagener Verlag, Bocholt.

FIEDLER, K., 1996e. Host-plant relationships of lycaenid butterflies: large-scale patterns, interactions with plant chemistry, and mutualism with ants. – *Entomol. exp. appl.* 80: 259-267.

FIEDLER, K., 1996f. Interactions between lycaenid butterflies and ants in Peninsular Malaysia. – Pp. 291-296 in: Edwards, E. D., Booth, W., & Choy, S. C. (eds.): Tropical rainforest research – current issues. Kluwer Acad. Publ., Dordrecht.

FIEDLER, K., 1998a. Lycaenid-ant interactions of the Maculinea type: tracing their historical roots in a comparative framework. – *J. Insect Conserv.* 2: 3-14.

FIEDLER, K., 1998b. Geographical patterns in life-history traits of lycaenid butterflies – ecological and evolutionary implications. – Zoology (Analysis of Complex Systems) 100: 336-347.

FIEDLER, K., 1998c. Diet breadth and host plant diversity of tropical- versus temperate-zone herbivores: South East Asian and West Palaearctic butterflies as a case study. – *Ecol. Entomol.* 23 (*in print*)

FIEDLER, K., & HAGEMANN, D., 1995. The influence of larval age and ant number on myrmecophilous interactions of the African Grass Blue butterfly, *Zizeeria knysna. – J. Res. Lepid.* 31 (3/4): 213-232.

FIEDLER, K., & HÖLLDOBLER, B., 1992. Ants and *Polyommatus icarus* immatures (Lycaenidae) – sex-related developmental benefits and costs of ant-attendance. – *Oecologia* 91: 468-473.

FIEDLER, K., & HUMMEL, V.,1996. Myrmecophily in the brown argus butterfly, *Aricia agestis* (Lepidoptera: Lycaenidae): effects of larval age, ant number and persistence of contacts with ants. – *Zoology (Analysis of Complex Systems)* 99: 128-137.

FIEDLER, K. & MASCHWITZ, U., 1987 [1988]. Functional analysis of the myrmecophilous relationships between ants (Hymenoptera: Formicidae) and lycaenids (Lepidoptera: Lycaenidae). III. New aspects of the function of the retractile tentacular organs of lycaenid larvae. – *Zool. Beitr. Berlin, N. F.* 31 (3): 409-416.

FIEDLER, K. & MASCHWITZ, U. ,1988. Functional analysis of the myrmecophilous relationships between ants (Hymenoptera: Formicidae) and lycaenids (Lepidoptera: Lycaenidae). II. Lycaenid larvae as trophobiotic partners of ants – a quantitative approach. – *Oecologia* 75: 204-206.

FIEDLER, K. & MASCHWITZ, U. ,1989a. Functional analysis of the myrmecophilous relationships between ants (Hymenoptera: Formicidae) and lycaenids (Lepidoptera: Lycaenidae). I. Release of food recruitment in ants by lycaenid larvae and pupae. – *Ethology* 80: 71-80.

FIEDLER, K. & SAAM, C., 1994. Does ant-attendance influence development in 5 European Lycaenidae species? – *Nota lepid.* 17 (1/2): 5-24.

FIEDLER, K. & SAAM, C., 1995a. A "microbial cost" of butterfly-ant mutualisms (Lycaenidae). – *J. Lepid. Soc.* 49 (1): 80-84.

FIEDLER, K. & SAAM, C., 1995b. Ants benefit from attending facultatively myrmecophilous Lycaenidae caterpillars: evidence from a survival study. – *Oecologia* 104: 316-322.

FIEDLER, K., SCHURIAN, K. G., & SEUFERT, P., 1992. Neue Beobachtungen zu Ameisenassoziationen europäischer Bläulingsraupen (Lepidoptera: Lycaenidae). – *Mitt. intern. entomol. Ver. Frankfurt* 17 (3): 121-130.

FIEDLER, K., KRUG, E., & PROKSCH, P., 1993. Complete elimination of host-plant quinolizidine alkaloids by larvae of a polyphagous lycaenid butterfly, *Callophrys rubi. – Oecologia* 94: 441-445.

FIEDLER, K., SCHURIAN, K. G., & HAHN, M., 1994. The life-history and myrmecophily of *Polyommatus candalus* (HERRICH-SCHÄFFER) from Turkey (Lep., Lycaenidae). – *Linneana Belg.* 14: 315-332.

FIEDLER, K., HÖLLDOBLER, B., & SEUFERT, P., 1996. Butterflies and ants: the communicative domain. – *Experientia* 52: 14-24.

FORSTER, W., 1936. Beitrag zur Systematik des Tribus Lycaenini unter besonderer Berücksichtigung der *argyrognomon-* und der *argus*-Gruppe. – *Mitt. münch. ent. Ges.* 26(2): 41-150, 7 Texttab., Taf. III-XV.

FORSTER, W., 1938. Das System der paläarktischen Polyommatini. (Lepidoptera, Lycaenidae). – *Mitt. münch. ent. Ges.* 28(2): 97-118, 395, Taf. I-III.

FORSTER, W., 1956. Bausteine zur Kenntnis der Gattung *Agrodiaetus* SCUDD. (Lep. Lycaen.) I. - *Z. wien. entomol. Ges.* 41: 42-61, 70-89, 118-127.Tafel 8-13.

FORSTER, W., 1960. Einige neue Formen der Gattung *Agrodiaetus* SCUDD. (Lepidoptera, Lycaenidae). – *Entomol. Z.* 70 (3): 17-22.

FORSTER, W., 1960-1961. Bausteine zur Kenntnis der Gattung *Agrodiaetus* SCUDD. (Lep. Lycaen.) II. - *Z. wien. entomol. Ges.* 45: 105-142, Taf. 10-14; 46: 8-13, 38-47, 74-79, 88-94, 110-116.Taf. 10-15.

FREYER, C. F., 1830. Beiträge zur Geschichte europäischer Schmetterlinge mit Abbildungen nach der Natur. – 3. Band. 168 S., 48 Tafeln.

FREYER, C. F., ([1836]-1839). Neuere Beträge zur Schmetterlingeskunde. – 3. Band, 134 S., 96 Tafeln.

FRIEDLÄNDER, M., 1997. Control of the Eupyrene-Apyrene Sperm Dimorphism in Lepidoptera. – *J. Insect Physiol.* 43 (12): 1085-1092.

MARTIN, J., A. GILLES & H. DESCIMON, 2000. Molecular phylogeny and evolutionary patterns of the European satyrids (Lepidoptera: Satyridae) as revealed by mitochondrial gene sequences. – *Mol. Phylogenet. Evol.* 15(1):70-82.

GOKHMAN, V.E. & D.L.J. QUICKE, 1995. The Last Twenty Years of Parasitic Hymenoptera Karyology: An Update and Phylogenetic Implications. - *J. Hym. Res.* 4: 41-63.

GOKHMAN, V.E., 1997. Chromosome number and other karyotypic features of parasitic wasps as a source of taxonomic information. – *Boln. Asoc.esp.Ent.,* Supl. 21: 53-60.

GOOSSENS, E., 1979. Deuxiéme voyage entomologique en Turquie (1978). Tweede entomologische reis in Turkije (1978). – *Bull. Cercle Lepid. Belg.* 8: 108-115.

GOOSSENS, E. & M. CROMPHOUT., 1978. Voyage lépidoptérologique en Turquie. Lepidopterologische reis in Turkije. - *Bull. Cercle Lepid. Belg.* 7: 100-108, 11 figs.

GORBUNOV, P.Y., 2001. The butterflies of Russia: classification, genitalia, keys for identification. Thesis Publishers, Ekaterinburg, 320 pp., 41 b/w pls., 13 col. pls.

GROETERS, F.R. & D.D. SHAW, 1992. Association between latitudinal variation for embryonic development time and chromosome structure in the grasshopper *Caledia captiva* (Orthoptera: Acridadae). - *Evolution* 46: 245-257.

GROETERS, F.R. & D.D. SHAW, 1996. Evidence for association of chromosomal form and development time from complex clines and geographic races in the grasshopper *Caledia captiva* (Orthoptera: Acridadae). - *Biol. J. Linn. Soc.* 59: 243-259.

GRUM-GRSHIMAILO, GR., 1890. Le Pamir et sa faune lépidoptérologique. – *In :* Romanoff, N. M. (ed.), Mémoires sur les Lépidoptéres, St Pétersbourg 4: I-XVII, 1-575, [1]- [2], 21 pls. col., 1 pl. lith., 1 carte.

GRUM-GRSHIMAILO, G., 1888. Novae species et varietates Rhopalocorum [sic] e Pamir. – *Horae Soc. ent. ross.* 22: 303-307.

HAAG, K.L., A. MELLENDER DE ARAUJO & A. ZAHA, 1993. Genetic structure of natural populations of *Dryas iulia* (Lepidoptera: Nymphalidae) revealed by enzyme polymorphism and mitochondrial DNA (mtDNA) restriction fragment length polymorphism (RFLP). - *Biochemical Genetics* 31: 449-460.

HAMMOND, J.B.W., G. SPANSWICK & J.A. MAWN, 1996. Extraction of DNA from Preserved Animal Specimens for Use in Randomly Amplified Polymorphic DNA Analysis. - *Analytical Biochemistry* 240: 298-300.

HANUS, J. & D. HOAREAU., 1998. *Polymmatus (Agrodiaetus) dama* (Staudinger, 1892) on the Nemrut daği in Turkey (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 18(4): 416.

HARPER, G. L., S. PIYAPATTANAKORN, D. GOULSON & N. MACLEAN., 2000. Isolation of microsatellite markers from the Adonis blue butterfly (*Lysandra bellargus)*. - *Molecular Ecology* 9: 1948-1949.

HARVEY, P.H. & M.D. PAGEL, 1991. The Comparative Method in Evolutionary Biology. Oxford Univ. Press, Oxford. 248pp.

HÄUSER, C. (1990). Vergleichende Untersuchungen zur Morphologie, systematischen Bedeutung und Phylogenese der weiblichen Genitalorgane der Lepidoptera (Insecta). – PhD Dissertation. Albert-Ludwigs-Universität, Freiburg im Breisgau.

HÄUSER, C. (1993). Die inneren weiblichen Organe der Tagfalter (Rhopalocera): Vergleichende Morphologie und phylogenetische Interpretation (Insecta, Lepidoptera). – *Zool. Jb. Syst.* 120, 389–439.

HÄUSER, C.L. & W. ECKWEILER, 1997. A catalogue of the species-group taxa in *Agrodiaetus* HÜBNER, 1822, a subgenus of *Polyommatus* LATREILLE, 1804 (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo*, Frankfurt, Suppl. 16: 53-112.

HECKEL, D.G., L.J. GAHAN, B.E. TABASHNIK & M.W. JOHNSON, 1995. Randomly Amplified Polymorphic DNA Differences Between Strains of Diamondback Moth (Lepidoptera: Plutellidae) Susceptible or Resistant to Bacillus thuringiensis. - *Annals of the Entomological Society of America* 88: 531-537.

HEMMING, F., 1937. Herrich-Schäffer (G. A. W.), Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu J. Hübner's Sammlung europäischer Schmetterlinge, 1843-1856. *In:* Hemming, F., Hübner. A bibliographical and systematic account of the entomological works of Jacob Hübner and of the supplements thereto by Carl Geyer, Gottfried Franz von Frölich and Gottlieb August Wilhelm Herrich-Schäffer. Vol. 1, pp. 579-589. – *Royal Entomological Society of London,* London, XXXIV + 605 p.

HERRICH-SCHÄFFER, G. A. W., 1843-1856. Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu Jakob HÜBNER'S Sammlung europäischer Schmetterlinge. Regensburg, Manz. Tagfalter: 1: 164 Seiten; 6: Nachtrag zum ersten Bande.

HESSELBARTH. G. & W. SIEPE., 1993. *Polyommatus (Aricia) torulensis* – eine bisher nicht bekannte Lycaenidae aus Anatolien (Lepidoptera, Lycaenidae). – *Phegea* 21 (2): 47-53.

HESSELBARTH, G., H. VAN OORSCHOT & S. WAGENER, 1995. Die Tagfalter der Türkei unter Berücksichtigung der angrenzenden Länder. - Bocholt (Selbstverlag S. Wagener) 1-2: 1-1354, 3: 1-843. 3 Bde., 1354 S., 21 Tab., 75 Abb., 2 Farbkarten, 36 Farbtaf. (mit 306 Abb.) (Bd. 1 & 2) + 847 S., 128 Farbtaf., 13 Taf., IV +342 Verbreitungskarten (Bd. 3).

HEYDENREICH, [G. H.] 1851. Lepidopterorum Europæorum Catalogus methodicus. Systematisches Verzeichnis der europaeischen Schmetterlinge. – 3. Aufl., Julius Klinkhardt, Leipzig, 130 S. + 1 S. Nachtrag [1854].

HIGGINS, L. G., 1966. Check-List of Turkish Butterflies. – *Entomologist* 99: 209-222, 1 Map.

HIGGINS, L.G., 1975. The classification of European butterflies. - 320 pp. Collins. London.

HIGGINS, L.G. & N.D. RILEY, 1983. A field guide to the Butterflies of Britain and Europe. 5th Edition. – *London (Collins),* 384 pp.

HILLIS, D. M. & M. T. DIXION, 1991. Ribosomal DNA: Molecular evolution and phylogenetic inference. – *The quarterly review of biology, Vol.* 66, No. 4, 411-453.

HILLIS, D.M., C. MORITZ & B.K. MABLE, 1996. Molecular Systematics. 2nd edition. Sunderland, Mass. (Sinauer), 655pp.

HIROYOSHI, S., 1999. Eupyrene and Apyrene Spermatogenesis in the Asian Comma Butterfly, *Polygonia c-aureum* (Lepidoptera: Nymphalidae). – *Entomol. Science* 2(3): 297-305.

HOEGH-GULDBERG, O., 1979. The relationship of *Aricia agestis* (Lycaenidae) and its closest relatives in Europe. – *Nota lepid.* 2 (1/2): 35-39.

HOEGH-GULDBERG, O., 1981. A cooling experiment with an F_1 generation of *Polyommatus icarus* f. *melanotoxa* (Lepidoptera: Lycaeniden). – *Entomol. Scand. Suppl.* 15: 286-292.

HOEGH-GULDBERG, O., 1982. Southern Palaearctic *Aricia* from Portugal to Afghanistan (*Aricia* studies No.19). – *Proceedings of the 3rd Congress of European Lepidopterology Cambridge 1982,* 87-104.

HOFMANN, P., 1974. Entomologische Ausbeute Nord-Persien (Elbursgebirge). – *Nachr. ent. Ver. Apollo* 1 (1): 6-15.

HOFMANN, P., 1975. Entomologische Ausbeute Nord-Persien (Elbursgebirge). Teil II. – *Nachr. ent. Ver. Apollo* 1 (2): 33-36.

HOFMANN, P., 1976. Sammeltage in Süd-Iran. - *Nachr. ent. Ver. Apollo* 3 (1): 1-9.

HOLTZ, M., 1897. Die Macrolepidopteren-Fauna Ciliciens. Ein Beitrag zur Insektenfauna Kleinasiens. – *Illte Wochenschr. Ent.* 2: 42-47, 60-63, 77-79, 88-93.

HOLZINGER, F. & M. WINK, 1996. Mediation of cardiac glycoside insensitivity in the Monarch butterfly (*Danaus plexippus*): Role of an amino acid substitution in the ouabain binding site of Na+, K+ -ATPase. - *Journal of Chemical Ecology* 22: 1921-1937.

HOY, M.A., 1994. Insect Molecular Genetics. An Introduction to Principles and Applications. San Diego (Academic Press), 546pp.

HÜBNER, J., (1796-[1838]). Sammlung europäischer Schmetterlinge. Ausgburg. Band 1.

HUELSENBECK, J.P. & F. RONQUIST, 2001. MrBayes: Bayesian inference of phylogeny. – *Bioinformatics* 17: 754-755.

ICZN – *International Code of Zoological Nomenclature,* 1999. Fourth edition, adopted by the International Union of Biological Sciences. – *International Trust for Zoological Nomenclature, c/o The Natural History Museum, London,* XXX + 306 pp.

JIGGINS, C.D., W.O. MCMILLAN, P. KING & J. MALLET, 1997. The maintenance of species differences across a *Heliconius* hybrid zone. - *Heredity* 79: 495-505.

KANDUL, N.P, 1997. The karyology and the taxonomy of the blue butterflies of the genus *Agrodiaetus* HÜBNER [1822] from the Crimea (Lepidoptera: Lycaenidae). – *Atalanta (Würzburg)* 28 (1/2): 111-119, tab., 11 figs.

KANDUL, N.P. & V.A. LUKHTANOV, 1997. Karyotype variability and systematics of the blue butterflies of the species groups *Polyommatus (Agrodiaetus) poseidon* and *P. (A.) dama* (Lepidoptera, Lycaenidae). - *Zool. Zhurn.* 76: 63-69, 2 figs. [in Russian] *(Ent. Rev.* 77:256-262, 2 figs [English translation]

KEFERSTEIN, [W. G. A.] 1851. Versuch einer kritisch-systematischen Aufstellung der europ. Lepidopteren mit Berücksichtigung der Synonymie. – *Ent. Ztg. Stettin* 12 (7): 220-224, (8): 242-256, (9): 272-283, (10): 304-319, (11): 323-328.

KERZHNER, I., 1972. On the history of studying the entomofauna of Mongolian People's Republic, pp. 57-112; here cited: pp. 67-68. – *In:* Biological resources and natural conditions of Mongolian People's Republic. 1 (1). – 991 pp., *Nauka, Leningrad.*

KIRBY, W. F., 1871. A Synonymic Catalogue of Diurnal Lepidoptera. – *John van Voorst,* London, 8, 5 + 690 p.

KLEPPE, K., E. OHTSUKA, R. KLEPPE, I. MOLINEUX & H.G. KHORANA, 1971. Studies on polynucleotides XCVI. Repair replication of short synthetic DNA's as catalyzed by DNA polymerases. - *J. Mol. Biol.* 56: 341-361.

KNÜTTEL, H. & K. FIEDLER, 2001. Host-plant-derived variation in ultraviolet wing patterns influences mate selection by male butterflies. – *J. Exp. Biol.* 204: 2447-2459.

KOÇAK, A. Ö., 1977. Studies on the family Lycaenidae (Lepidoptera). – *Atalanta* 8 (1): 41-62.

KOÇAK, A. Ö., 1979. Studies on the family Lycaenidae II. New taxa and records from Turkey. Lycaeniden-Studie II. Neue Taxa und Meldungen aus der Türkei (Lepidoptera, Lycaenidae). – *Atalanta* 10(4a): 309-325.

KOÇAK, A. Ö., 1980. Studies of the family Lycaenide III. A Review of the subspecies of *Agrodiaetus (Sublysandra) myrrhus* (HERRICH-SCHAEFFER, 1852) (Lepidoptera, Lycaenidae). – *Atalanta* 11 (4): 262-272.

KOÇAK, A. Ö., 1980. Some notes on the Nomenclature of Lepidoptera. – Comm. Fac. sci. Univ. Ankara, Sér.C3 (Zoologie) 24: 7-25. Ser. CIII 24: 7-25.

KOÇAK, A. Ö., 1981-1983. Critical check-list of European Papilionoidea (Lepidoptera). – *Priamus* 1 (2): 46-90, (4): 155-167, (1981); 2 (2): 69-92, (1982); 3 (1): 11-37 (1983).

KOÇAK, A. Ö., 1988. Orta Anadolu'da Yeni bir *Agrodiaetus* Hbn. Türünün Tanımı (Lepidoptera, Lycaenidae). – *Cent. ent. Stud., Misc. Pap.* 59: 3-7, 4 figs., *with English translation.*

KOÇAK, A. Ö., 1996. Güney bati asta *Polyommatinae* taksonlarinin listesi ve bazi nomenklatür (*Lepidoptera, Lycaenidae)*. – *Misc. Pap.* 30/33: 1-32. Ankara

KOÇAK, A. Ö. & S. SEVEN., 1994. Türkiye Lepidoptera faunasina katkilar-II. – *Misc. Pap.,* 21: 1-8. Ankara

KOÇAK, A. Ö. & S. SEVEN., 1996. Tokat Papilionoidea ve Hesperioidea faunasi ve ekolojisi hakkinda (Lepidoptera). – *Priamus* 7: 93-116.

KOÇAK, A. Ö. & S. SEVEN., 1998. A Tentative List of the Threatened Butterflies in Turkey. – *Misc. Pap.* 52: 3-8. Ankara.

KOLEV. Z., 1994. Two *Polyommatus (Agrodiaetus)* species new to Bulgaria, with notes on the related Bulgarian taxa (Lepidoptera, Lycaenidae). – *Phegea* 22 (2): 61-71.

KOLEV, Z. & W. DE PRINS, 1995. A new species of the "brown *Agrodiaetus*" complex from the Crimea (Lepidoptera: Lycaenidae). - *Phegea* 23: 119-132. *Phegea* 23 (2): 119-132.

KOLEV, Z. & D. VAN DER POORTEN, 1997. Review of the distribution of the Balkan endemic *Polyommatus (Agrodiaetus) aroaniensis* (Lepidoptera: Lycaenidae), with notes on its sympatry with related species. - *Phegea* 25: 35-40. *Phegea* 25 (1): 35-40.

KORSHUNOV, Z. P., 1972. Catalogue of Diurnal butterflies (Lepidoptera, Rhopalocera) of the fauna of the U.S.S.R. [in Russian]. – *Entomol. Obozhr.* 51 (1): 136-154, (2): 352-368.

KRZHIZHANOVSKY, O., 1965. Sostav i proiskhozhdenie nazemnoi fauni Srednei Azii (Composition and origion of the terrestrial fauna of Middle Asia). – *Nauka, Moskva-Leningrad,* 420 pp. [in Russian].

KUDRNA, O., 1986. Butterflies of Europe. 8. Aspects of the Consevation of Butterflies in Europe. – Wiebaden *(Aula Verlag),* 323 pp.

KUDRNA, O. 2002. The Distribution Atlas of European Butterflies. – Oedippus 20: 1-342.

KUMAR, S., K. TAMURA & M. NEI, 1993. MEGA: Molecular evolutionary genetics analysis, Version 1.01. The Pennsylvania State University. University Park.

KUMAR, S., K. TAMURA, I.B. JAKOBSEN & M. NEI, 2001. MEGA2: Molecular Evolutionary Genetics Analysis software, Bioinformatics 17:1244-1245.

KUMAR, S., K. TAMURA & M. NEI, 2003. MEGA3: An integrated software for Molecular Evolutionary Genetics Analysis and sequence alignment, Arizona State University, Tempe, Arizona, USA.

LARSEN, T. B., 1973. Communal Roosting among butterflies in the Lebanon. – *Ent.scand.* 4: 299-301.

LARSEN, T. B., 1974a. Butterflies of Lebanon. – National Council for Scientific Research (C.N.R.S.), Beirut. Distrib. E.W. Classey, Faringdon, Berks., XVI + 256 p., 5 tab., 9 figs., 16 col. pls.

LARSEN, T. B., 1974b. Une espèce et deux sous-espèces nouvelles de Lycaenidae du Liban. - *Alexanor* 8: 301-307.

LARSEN, 1975. Chromosome Numbers and Notes on Testicular Morphology of some Lebanese Rhopalocera (Insecta: Lepidoptera). - *Ent. scand.* 6: 253-260.

LE CERF, F., 1909. Collections recueillies en Perse par M. J. DE MORGAN. Lépidoptéres. Description d'espèces nouvelles des genres *Lycaena* et *Phlyctoenodes. – Bulletin du Muséum d'Histoire Naturelle* 1909 (8): 535-536.

LE CERF, F., 1913. Contribution à la faune lépidoptérologique de la Perse (Catalogue des Rhopalocères). – *Annls Hist. nat. Déleg. Perse* 2(2): I-XII, 1-88, 46 figs., 2 pl., 1 carte.

LEDERER, J., 1852. Versuch, die europäischen Lepidopteren (einschliesslich der ihrem Habitus nach noch zur europäischen Fauna gehörenden Arten Labradors, der asiatischen Türkei und des asiatischen Russlands) in möglichst natürliche Reihenfolge zu stellen, nebst Bemerkungen zu einigen Familien und Arten. I. Abtheilung: Die Rhopaloceren. – *Verh.zool.-bot.Ver.Wien* 2: 14-54.

LEDERER, J., 1855. Beitrag zur Schmetterlings-Fauna von Cypern, Beirut und einem Theile Klein-Asiens. – *Verh. zool.-bot. Ver. Wien* 5: 177-254, Taf. 3.

LEDERER, J., 1869. Verzeichnis der von Herrn Jos. Haberhauer bei Astrabad in Persien gesammelten Schmetterlinge. – *Horae Soc. ent. ross.* 6: 73-93, Taf. IV-V (mit 28 Abb.).

LEDERER, J., 1870. Contributions à la faune des Lépidoptères de la Transcaucasie. – *Annls. Soc. ent. Belg.* 13(1869-1870): 17-54, Pl. I-II (avec 29 figs.).

LEDERER, J., 1871. Nachtrag zum Verzeichnisse der von Herrn Jos. HABERHAUER bei Astrabad in Persien gesammelten Schmetterlinge. - *Horae Soc. ent. ross.* 8 (1): 3-28; Tafel I.

LEIGHEB, G., 1987. *Lysandra coridon* ssp. *gennargenti* nova (Lepidoptera, Lycaenidae) nuovo licenide della Sardegna. – *Boll. Mus. Region. Sci. Nat. Torino* 5 : 447-454.

LELIEVRE, T., 1992. Phylogenie des Polyommatinae et structure genetique de six espèces du genre *Lysandra*, Hemming (Lepidoptères Lycaenidae). 219 pp. Thèse Doctorat. Marseille.

LESSE, H. DE, 1952. Quelques formules chromosomiques nouvelles chez les Lycaenidae (Lépidoptères Rhopalocères). - *C. r. hebd. Séanc. Acad. Sci. Paris* 235 (25): 1692-1694.

LESSE, H. DE, 1957. Description de deux nouvelles expèces d'*Agrodiaetus* (Lep. Lycaenidae) séparées à la suite de la découverte de leurs formules chromosomiques. - *Lambillionea* 57 (9/10): 65-71.

LESSE, H. DE, 1959a. Description d'une nouvelle sous-espèce d'*Agrodiaetus dama* Stgr. (Lep. Lycaenidae) et de sa formule chromosomique. - *Bull. Soc. ent. Mulhouse* 1959: 13-15.

LESSE, H. DE, 1959b. Note sur deux espèces d'*Agrodiaetus* (Lep. Lycaenidae) rècemment séparées d'après leurs formules chromosomiques. - *Lambillionea* 59 (1-2): 5-10.

LESSE, H. DE, 1959c. Description d'une nouvelle sous-espèce d'*Agrodiaetus hopfferi* H.S. (Lep. Lycaenidae) et de sa formule chromosomique particulière. - *Bull. mens. Soc. linn. Lyon* 28 (5): 149-151.

LESSE, H. DE, 1959d. Caractères externes et formule chromosomique d'*Agrodiaetus baytopi* n. sp. (Lep. Lycaenidae). - *Bull. Soc. ent. Mulhouse* 1959: 44-48.

Lesse, H. de, 1959e. Nouvelle étude chorologique et cytologique conduisant à changer l'application du nom d'*Agrodiaetus iphigenia* H. S. (Lep. Lycaenidae). - *Lambillionea* 59 (7-8): 56-61.

Lesse, H. de, 1959f. Sur la valeur spécifique de deux sous-espèces d'*Agrodiaetus* (Lep. Lycaenidae) récemment décrites. - *Bull. mens. Soc. linn. Lyon* 28 (10): 312-315, 5 figs.

Lesse, H. de, 1960a. Spéciation et variation chromosomiques chez les Lépidoptères Rhopalocères. - *Annls Sci. nat., Zool. (sér. 12)* 2 (1-14): 1-223.

Lesse, H. de, 1960b. Les nombres de chromosomes dans la classification du groupe d'*Agrodiaetus ripartii* Freyer (Lepidoptera, Lycaenidae). - *Revue fr. Ent.* 27 (3): 240-263.

Lesse, H. de, 1960c. *Agrodiaetus iphigenia* H.S. et son espèce jumelle *A. tankeri* n. sp. séparées d'après sa formule chromosomique (Lepid. Lycaenidae). - *Bull. Soc. ent. Mulhouse* 1960: 75-78.

Lesse, H. de, 1961a. Les nombres de chromosomes chez *Agrodiaetus dolus* Hübner et les espèces voisines (Lycaenidae). - *Alexanor* 2 (2): 57-63, (3): 72, pl. III, figs. 1-6.

Lesse, H. de, 1961b. Deux nouvelles formules chromosomiques où n dépasse 100 chez les Lycaenidae (Lépidoptères Rhopalocères). - *C. r. hebd. Séanc. Acad. Sci. Paris* 253 (18): 1982-1984.

Lesse, H. de, 1961c. Variations géographiques des caractères externes chez les espèces autrefois réunies sous le nom d'*Agrodiaetus ripartii* Freyer (Lep. Lycaenidae). - *Revue fr. Ent.* 28 (1960) (2): 93-100.

Lesse. H. de, 1961d. Cohabitation en Espagne d'*Agrodiaetus Ripartii* Freyer et A. *Fabressei* Oberthür (Lepidoptera Lycaenidae). – Revue fr. Ent. 50-53.

Lesse, H. de, 1962a. Variation chromosomique chez *Agrodiaetus actis* H.S. et *A. altivagans* Forst. (Lep. Lycaenidae). - *Revue fr. Ent.* 29 (1961) (1): 66-77, 2 tab., 6 figs.

Lesse, H. de, 1962b. Variation chromosomique chez *Agrodiaetus dolus* Hb. (Lep. Lycaenidae). - *Alexanor* 2: 283-286.

Lesse, H. de, 1963a. Lépidoptères Lycaenidae récoltés en Iran en 1961. - *Alexanor* 2 (1962) (8): 305-312, 3(1963) (1): 33-38.

Lesse, H. de, 1963b. Variation chromosomique chez les *Agrodiaetus carmon* H.S. et *A. cyanea* Stgr. (Lep. Lycaenidae). - *Revue fr. Ent.* 30 (3): 177-181.

Lesse, H. de, 1963c. Variation chromosomique chez les *Agrodiaetus* (Lep. Lycaenidae). - *Revue fr. Ent.* 30 (3): 182-189, 4 figs.

Lesse, H. de, 1964. Une nouvelle sous-espèce d'*Agrodiaetus altivagans* Forster (Lep. Lycaenidae). - *Alexanor* 3 (1963) (4): 167-168.

Lesse, H. de, 1966. Variation chromosomique chez *Agrodiaetus dolus* Hubner (Lep. Lycaenidae). - *Annls Soc. entomol. Fr.* 2 (1): 209-214.

Lesse, H. de, 1968. *Agrodiaetus Ripartii* Frey dans la region de Barcelone (Lycaenidae). - *Alexanor* 5: 203-205.

Lesse, H. de, 1969. Les nombres de Chromosomes dans le groupe de *Lysandra coridon* (Lepidoptera). - *Ann. Soc. Ent. Fr.* (N.S.), 5(2): 469-518, 2 col. pls.

Liu, H. & A. T. Beckenbach., 1992. Evolution of the Mitochondrial Cytochrome Oxidase II Gene among 10 Orders of Insects. – *Molecular Phylogenetics and Evolution,* 1 (1): 41-52.

Loiselle, R., A. Francouer, K. Fischer & A. Buschinger, 1990. Variations and taxonomic significance of the chromosome numbers in the Nearctic species of the genus *Leptothorax* sensu strictu (Formicidae, Hymenoptera). - *Caryologia* 43: 321-334.

Lorković, Z., 1941. Die Chromosomenzahlen in der Spermatogenese der Tagfalter. *Chromosoma* 2: 155-191.

Lorković, Z., 1990. The butterfly chromosomes and their application in systematics and phylogeny. - In: Kudrna, O. (ed.): *Butterflies of Europe. Vol. 2. Introduction to Lepidopterology.* Aula Verlag, Wiesbaden, p. 332-396, 36 figs., 2 diagr., 2 col. pls. 559 pp.

Lukhtanov, V.A., 1989. Karyotypes of some blue butterflies of the *Agrodiaetus* species groups (Lepidoptera, Lycaenidae). – *Suomen hyönt.Aikak. Ann. Entomol. Fennici* 55: 137-144, 6 text figs.

Lukhtanov, V. A. & A. Lukhtanov, 1994. Die Tagfalter Nordwestasiens (Lepidoptera, Diurna). – *Herbipoliana, Marktleuthen,* 3: 1-440.

Lukhtanov, V.A., A. Dantchenko & N.P. Kandul, 1997. Die Karyotypen von *Polyommatus (Agrodiaetus) damone damone* und *P. (A.) damocles rossicus* nebst einigen Problemen bei

Agrodiaetus (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo* (Frankfurt), Suppl. 16: 43-48. 1 Taf., 1 Abb.

LUKHTANOV, V.A., N.P. KANDUL, W.O. DE PRINS & D. VAN DER POORTEN, 1998. Karyology of species of *Polyommatus (Agrodiaetus)* from Turkey: New data and their taxonomic consequences (Lepidoptera: Lycaenidae). - *Holarctic Lepidoptera* 5 (1): 1-8. 1 tab., 15 figs.

LUKHTANOV, V.A. & J. PUPLESIENE, 1999. Polyploidy in bisexual Lepidoptera species (Insecta: Lepidoptera): old hypotheses and new data. - *Bonn. zool. Beitr.* 48(3-4): 313-328.

LUKHTANOV, V.A. & A. DANTCHENKO, 2002a. Principles of the highly ordered arrangement of metaphase I bivalents in spermatocytes of *Agrodiaetus* (Insecta, Lepidoptera). – *Chromosome Research* 10: 5-20, 2002.

LUKHTANOV, V.A. & A. DANTCHENKO, 2002b. Descriptions of new taxa of the genus *Agrodiaetus* HÜBNER, [1822] based on karyotype investigation (Lepidoptera, Lycaenidae). – *Atalanta* 33 (1/2): 81-107, colour plate I.

LUKHTANOV, V.A., M. WIEMERS & K. MEUSEMANN, *in print*. Description of a new species of the “brown” *Agrodiaetus* complex from South-East Turkey (Lepidoptera, Lycaenidae). – *Nota lepid.*

LUYKX, P., 1990. A cytogenetic survey of 25 species of lower termites from Australia. - *Genome* 33 (1): 80-88

LUYKX P., D.A. NICKLE & B.I. CROTHER, 1990. A morphological allozymic and karyotypic assessment of the phylogeny of some lower termites (Isoptera, Kalotermitidae). - *Proc. ent. Soc. Washington* 92 (3): 385-399.

MAEKI, K., 1970. A chromosomal study in interspecific hybrids of butterflies (Lepidoptera, Papilionidae). – *Spec.Bull. Lep. Soc. Jap.* 131-139, 15 figs.

MAKITA, H., T SHINKAVA, K. KONDO, L. XING & T. NAKAZAWA, 2003. Phylogeny of the *Graphium* butterflies inferred from nuclear 28S rDNA and mitochondrial ND5 gene sequences. – *Trans. lepid. Soc. Japan* 54 (2): 91-110.

MANLEY, W. B. L. & H. G. ALLCARD, 1970. A field guide to the butterflies and burnets of Spain. – *Hampton (E. W. Classey)*, 192 pp.

MARCHI, A., G. ADDIS, V. EXPOSITO HERMOSA & R. CRNJAR, 1995. Genetic divergence and evolution of *Polyommatus coridon gennargenti* (Lepidoptera: Lycaenidae) in Sardinia. Heredity, 77: 16-22.

MATOV, A. Y. & A. I. IVANOV, 1999. About the northern limit of the distribution of *Agrodiaetus damon* ([DENIS & SCHIFFERMÜLLER], 1775) in Europe (Lepidoptera, Lycaenidae). – *Atalanta* 29 (1/4): 149-150.

MATTONI, R.H.T., 1977. The Scolitantidini. Part 1. Two new genera and generic rearrangement (Lycaenidae). - *J. Res. Lepid.* 16:223-242.

MCCUNE, A. R. & N. R. LOVEJOY, 1998. The relative rate of sympatric and allopatric speciation in fishes - Tests using DNA sequence divergence between sister species and among clades. In Howard, D. J., and S. H. Berlocher, Eds., Endless Forms: Species and Speciation, pp. 172-185. New York, NY: Oxford University Press.

MEGENS, H., 2002. Understanding the diversity of the speciose tropical butterfly genus *Arhopala* – a molecular phylogenetic approach. PhD thesis. 154 pp. Leiden.

MELIORANSKY, W., 1897. Einiges über die Grossschmetterlinge der Südküste der Halbinsel Krim. – *Horae Soc.ent.ross.* 31: 216-239, Taf. VII (mit 7 Abb.) (In Russian, title in German).

MENSI, P., L. CASSULO & E. BALLETTO., 1989. Electrophoretic investigations in the *Polyommatus (Lysandra) albicans – P. (L.) hispanus* complex (Lycaenidae). – *Nota lepid.* 12, Suppl. 1: 36-37.

MENSI, P., A. LATTES, L. CASSULO & E. BALLETTO, 1994. Biochemical taxonomy and evolutionary relationships in *Polyommatus* (subgenus *Agrodiaetus*) (Lepidoptera, Lycaenidae). - *Nota lepid.,* Suppl. 5 (Proc. VIII. Congr. Eur. Lepid., Helsinki): 105-114.

MEYER-DÜR, [L. R.] 1852. Verzeichniss der Schmetterlinge der Schweiz. I. Abtheilung. Tagfalter. Mit Berücksichtigung ihrer klimatischen Abweichungen nach horizontaler und vertikaler Verbreitung. – *Neue Denkschr. Schweiz. Ges. Naturw.* 12: 1-239, 1 kol. Taf.

MIGRANOV, M., 1991. Rhopalocera of the Baschkiria. – *Ufa, Baschkirian National Press Centr.,* 132 pp., [in Russian].

MONTEIRO, A. & N. E. PIERCE., 2001. Phylogeny of *Bicyclus* (Lepidoptera: Nymphalidae) Inferred from COI, COII, and EF-1α Gene sequences. – *Molecular Phylogenetic and Evolution* 18 (2): 264-281.

MORAN, C. & D.D. SHAW, 1977. Population Cytogenetics of the Genus *Caledia* (Orthoptera: Acridinae). III. Chromosomal Polymorphism, Racial Parapatry and Introgression. - *Chromosoma* 63: 181-204.

MORGAN-RICHARDS, M., 1997. Intraspecific karyotype variation is not concordant with allozyme variation in the Auckland tree weta of New Zealand, *Hemideina thoracica* (Orthoptera: Stenopelmatidae). - *Biol. J. Linn. Soc.* 60: 423-442.

MULLIS, K.B. & F.A. FALOONA, 1987. Specific synthesis of DNA in vitro via a polymerase catalyzed chain reaction. - *Meth. Enzymol.* 155: 335-350.

MUNGUIRA, M.L., J. MARTÍN & M. PÉREZ-VALIENTE, 1995. Karyology and distribution as tools in the taxonomy of Iberian *Agrodiaetus* butterflies (Lepidoptera: Lycaenidae). - *Nota lepid.* 17 (3/4): 125-140.

NAGARAJU, J. & M.S. JOLLY, 1986. Interspecific hybrids of *Antheraea roylei* and *A. pernyi* – a cytogenetic reassessment. – *Theor. Appl. Genet.* 72: 269-273.

NEI, M. 1972. Genetic distance between populations. - *Amer. Nat.* 106: 283-292.

NEI, M. & S. KUMAR, 2000. Molecular evolution and phylogenetics. Oxford etc. (Oxford University Press), 333pp.

NEKRUTENKO, Y. P., 1985. The butterflies of the Crimea. A guide [in Russian]. – *Kiev (Naukova Dumka),* 152 pp., 24 pls. (In Russian).

NEKRUTENKO, Y., 1985. Rhopalocera of the Crimea. – *Kiev,* 152 pp. [in Russian].

NEKRUTENKO, Y. P., (2000). A catalogue of the type specimens of Palaearctic Riodinidae and Lycaenidae (Lepidoptera, Rhopalocera) deposited in the collection of Musuem für Naturkunde an der Humbolt-Universität zu Berlin. – *Nota lepid.* 23 (3/4): 192-253.

NICE, C. C. & A. M. SHAPIRO., 1999. Molecular and morphological divergence in the butterfly genus *Lycaeides* (Lepidoptera: Lycaenidae) in North America: evidence of recent speciation. – *J. Evol. Biol.* 12, 936-950.

NICHOLL, M., DE LA BECHE, 1901. Butterflies in the Lebanon. – *Entomologist´s Rec. J. Var.* 13: 169-173, 205-209.

OBERTHÜR, C., 1910. Notes pour servir à établir la Faune Française et Algérienne des Lépidoptéres (suite). – *Études de Lépidoptérologie Comparée* 4 (1) : 15-638.

OLIVIER, A., 1999. On the publication dates of the "Versuch einer Monographie der europäischen Schmetterlingsarten: *Thecla, Polyomattus* [sic], *Lycaena, Nemeobius.* Als Beitrag zur Schmetterlingskunde" by Paul Bernhard Gerhard (Lepidoptera: Lycaenidae). – *Phegea* 27 (4): 127-140, 3 figs.

OLIVER, A., 2000a. Discovery of the types of *Polyommatus (Agrodiaetus) actis* and its taxonomic consequences (Lycaenidae). *Nota lepid.* 23 (2): 86-118.

OLIVER, A., 2000b. Christian Friedrich Freyer's "Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur": an analysis, with new data on its publication dates (Insecta, Lepidoptera). – *Beitr. Ent.* 50(2): 407-486.

OLIVIER, A., D. VAN DER POORTEN & W. DE PRINS, 1998. Rhopalocera and Grypocera of Turkey 16. Taxonomic notes on *Plebeius christophi* and *Plebeius idas* in northeastern Turkey (Lepidoptera: Lycaenidae). - *Phegea* 26 (3): 87-102.

OLIVIER, A., PUPLESIENE, J., VAN DER POORTEN, D., DE PRINS, W., & M. WIEMERS, 1999a. Revision of some taxa of the *Polyommatus (Agrodiaetus) transcaspicus* group with description of a new species from Central Anatolia (Lepidoptera: Lycaenidae). – Phegea 27 (1): 1-24, 2 col.pls., 2 tabs., 7 figs.

OLIVER, A., W. DE PRINS, D. VAN DER POORTEN & J. PUPLESIENE, 1999b. On the identity of *Polymmatus (Agrodiaetus) dama,* with lectotype designation and redescription of its karyotype (Lycaenidae). *Nota lepid.* 22 (3): 197-211.

OLIVER, A., D. VAN DER POORTEN, J. PUPLESIENE & W. DE PRINS. 2000. *Polyommatus (Agrodiaetus) artvinensis* stat. nov. and *P. (A.) sigberti* sp. nov., two vicariant species known so far only from Turkey (Lepidoptera: Lycaenidae). Phegea 28 (2): 57-75, 1 tab., 3 col. pls (32 + 5 figs), 4 text figs.

OSTHELDER, L. & E. PFEIFFER 1931-1940. Lepidopteren-Fauna von Marasch in türkisch Nordsyrien. – *Mitt. münch. ent. Ges.* 21(2): 68-86, (1931); 22(1): 17-32; (2): 38-87, Taf. 2-4, (1932); 23(2): 45-102, (1933); 24(1): 1-18, Taf. 1-2; (2): 25-55, Taf. 3-6; (3): 73-104, (1934; 25(2): 56-58; (3): 67-90, (1935); 27(3): 154-163, (1937); Nachtrag Diurnae: 29(1): 78-103, Taf. 2, (1939); Nachtrag Heterocera: 30(1): 107-116, (1940).

PAGE, R.D.M. & E.C. HOLMES, 1998. Molecular Evolution. A Phylogenetic Approach. Oxford (Blackwell), 346pp.

PALUMBI, S. R., 1996. Nucleic Acids II: The Polymerase Chain Reaction. In Molecular Systematics (ed. D. M. Hillis, C. Moritz & B. K. Mable), pp. 205-247. Massachusetts: Sinauer Associates.

PASHLEY, D.P. & L.-D. KE. 1992. Sequence evolution in mitochondrial ribosomal and ND-1 genes in Lepidoptera: implications for phylogenetic analyses. - *Mol. Biol. Evol.* 9: 1061-1075.

PATTERSON, C., D.M. WILLIAMS & C.J. HUMPHRIES, 1993. Congruence between Molecular and Morphological Phylogenies. - *Ann. Rev. Ecol. Syst.* 24: 119-152.

PETITPIERRE, E., 1996. Molecular cytogenetics and taxonomy of insects, with particular reference to the Coleoptera. - *International Journal of Insect Morphology & Embryology* 25(1-2): 115-134.

PFEIFFER, E., 1938. Notizen über persische Lycaenidae (Lepidoptera). – *Mitt. Münch. Ent. Ges.* 27 (1): 312-336; 28 (2): 188-195; 395.

POLLOCK, D. D., W. B. WATT, V. K. RASHBROOK & E. V. IYENGAR., 1998. Molecular Phylogeny for *Colias* butterflies and their relatives (Lepidoptera: Pieridae). – *Annals of the Entomological Society of America* 91 (5): 524-531.

POSADA, D. & K. A. CRANDALL, 2001. Intraspecific gene genealogies: trees grafting into networks. – *Trends in Ecology and Evolution* 16 (1): 37-45.

POWELL, J.R. & R. DESALLE, 1995. *Drosophila* Molecular Phylogenies and Their Uses. - *Evolutionary Biology* 28: 87-138.

PUPLESIENE, J.V., 1993. A brief account of karyotypes of mining Lepidoptera. - *Rev. Entomol. Russ.* 72(2): 295-303 (in Russisch).

PUPLESIENE, J., 2000. The karyotype and chromosome number of *Polyommatus buzulmavi* (Lycaenidae). *Nota lepid.* 23 (1): 71-77.

PURO, J. & S. NOKKALA., 1977. Meiotic segregation of chromosomes in *Drosophila melanogaster* oocytes. A cytological approach. – *Chromosoma* 63: 273-286.

QUICKE D. J. & V. E. GOKHMAN., 1996. First Chromosome records for the superfamily Ceraphronoidea and New Data for some Genera and Species of Evanioidea and Chrysididae (Hymenoptera: Chrysidoidea). – *J. Hym. Res.* Vol. 5, pp. 203-205.

RAND, D. B., A. HEATH, T. SUDERMAN & N. E. PIERCE, 2000. Phyogeny and life history evolution of the genus *Chrysoritis* within the Aphnaeini (Lepidoptera: Lycaenidae), Inferred from Mitochondrial *cytochrome oxidase I* sequences. – *Molecular Phylogenetics and Evolution* 17 (1): 85-96.

RADDE, G., 1899. Lepidoptera Caucasica. *In:* Radde, G. (Hrsg.). Museum Caucasicum. Die Sammlungen des Kaukasischen Museums. Bd. 1. Zoologie. – *Typ. Kanz. Landeschefs, Tiflis,* S.419-422.

REBEL, H., 1901. Ueber einige neue von Herrn Max KORB in Westasien gesammelten Lepidopterenformen. – *Annalen des k. k. naturhistorischen Hofmuseums* 16(3): 165-169.

REBEL, H., 1920. *Lycaena* hybr. *meledamon*. – *Verh. Zool.-Botan. Ges. Wien* 70: 75-77.

REBEL, H., 1930a. *Lycaena* hybr. *corydamon*. – *Verh. Zool.-Botan. Ges. Wien* 79: 33-36

REBEL, H., 1930b. *Lycaena* hybr. *bion*. – *Verh. Zool.-Botan. Ges. Wien* 79: 38-40.

REED, R.D. & F.A.H. SPERLING. 1999. Interaction of Process Partitions in Phylogenetic Analysis: An Example from the Swallowtail Butterfly Genus *Papilio. – Mol. Biol. Evol.* 16(2): 286-297.

REINHARDT, R. & U. EITSCHBERGER., 1999. Überfamilie Papilionoidea Familie Lycaenidae. – *In:* REINHARDT, R., PIMPL, F. & U. EITSCHBERGER. (eds.), Fragmentarisches Verzeichnis der Schmetterlinge Europas und angrenzender Regionen mit einem vorläufigen Vorschlag zur Festlegung von Identifikationsnummern. – *Neue ent. Nachr.* 43(1): 328-361.

RILEY, N. D., 1921. Some undescribed Rhopalocera from Mesopotamia and N. W. Persia; and other notes. – *Ann. Mag. nat. Hist.* (9)8(47): 590-600.

ROBINSON, R., 1971. Lepidoptera genetics. – Pergamon Press, Oxford, New York, Toronto, Sydney, Braunschweig. 687p., 16 text figs, 63 tabs.

ROBINSON, R., 1990. Genetics of European butterflies. – In: Kudrna, O. (ed.), *Butterflies of Europe. Vol. 2: Introduction to Lepidopterology.* Aula Verlag, Wiesbaden, p. 234-291, 3 tab., 6 figs.

ROEHRDANZ, R.L., J.D. LOPEZ, J. LOERA & D.E. HENDRICKS, 1994. Limited mitochondrial DNA polymorphism in North American populations of *Heliothis virescens* (Lepidoptera: Noctuidae). - *Annals of the Entomological Society of America* 87: 856-866.

ROEHRDANZ, R. L. & M. E. DEGRUGILLIER., 1998. Long Sections of Mitochondial DNA amplified from fourteen orders of insects using conserved Polymerase chain reaction primers. – *Annals of the Entomological Society of America,* 771-777.

ROMANOFF, N. M., 1879. Quelques observations sur les Lépidoptéres de la partie du Haut-Plateau Arménien, comprise entre Alexandropol, Kars et Erzéroum. – *Horae Soc. ent. ross.* 14 : 483-495.

ROSE, K., 1978. Zwei neue Unterarten von *Agrodiaetus carmon* aus der Türkei (Lep.: Lycaenidae). – *Entomol. Z.*, Frankfurt a. Main 88 (22): 245-250; correction: 268.

ROSE, K., 1991. Bemerkungen zu *„Agrodiaetus (Sublysandra) eberti"* KOÇAK 1979 (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.11 (4): 185-188.

ROSE, K., 2002. Bemerkungen zu *Polyommatus (Agrodiaetus) carmon schuriani* (ROSE, 1978) – eine Richtigstellung zu einem Beitrag von KOÇAK (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.23 (1/2): 85-87.

ROSE, K. & K. SCHURIAN., 1977a. Beiträge zur Kenntnis der Rhopaloceren Irans. 7. Beitrag: Eine neue Unterart von *Agrodiaetus rjabovi* FORSTER. – *Journal of Entomological Society of Iran* 4 (1,2): 63.

ROSE, K. & K. SCHURIAN, 1977b. Beitraege zur Kenntnis der Rhopaloceren Irans. 8. Beitrag: Ein neues Lycaeniden-Genus (Lepidoptera, Lycaenidae). – *J. entomol. Soc. Iran* 4 (1/2): 65-69.

RÜHL, A. & F. HEYNE., 1892-1895. Die palaearktischen Grossschmetterlinge und ihre Naturgeschichte. – 1. Band: Tagfalter, 857 S..

RUNDLE, H. D., L. NAGEL, J. W. BOUGHMAN & D. SCHLUTER, 2000. Natural selection and parallel speciation in sympatric sticklebacks. - *Science* 287(5451): 306-308.

DE SAGARRA, I., 1925. Anotacions a la lepidopterologia ibèrica III (1). – Formes noves dignes d'esment. – *Butlleti de la Institución Catalana de Historia Natural* (2) 5 (9) : 270-274.

SCHLIEWEN, U., K. RASSMANN, M. MARKMANN, J. MARKERT, T. KOCHER, & D. TAUTZ, 2001. Genetic and ecological divergence of a monophyletic cichlid species pair under fully sympatric conditions in Lake Ejagham, Cameroon. *Molecular Ecology* 10(6): 1471-1488.

SEITZ, A., 1907-1909. Die Groß-Schmetterlinge der Erde. Eine systematische Bearbeitung der bis jetzt bekannten Großschmetterlinge des Palaearktischen Faunengebietes. I. Band: Tagfalter. – *Fritz Lehmann Verlag, Stuttgart, S.* I-VIII (1907), 8-18 (1908), 75-94 (1907), 114-154 (1908), 211-252 (1908), 253-328 (1909).

SEVEN, S., 1996. Türkiye Lepidoptera faunası ve ekolojisi üzerine araştırmalar – I. – *Priamus* 8(1/2): 1-52.

SCHEID, W. & H. TRAUT., 1975. On the structure of chromosome ends as revealed by trypsin treatment of *Locusta Migratoria* Chromosomes. – *Can. J. Genet. Cytol.* 17: 129-131.

SCHMITT, T & A. SEITZ, 2001. Intraspecific structuring of *Polyommatus coridon* (Lycaenidae). – *Nota lepid.* 24 (1/2): 53-63.

SCHURIAN, K. G., 1976. Beiträge zur Biologie der Gattung *Agrodiaetus*. 1. *Agrodiaetus ripartii* (FREYER) (Lep., Lycaenidae). – Entomol. Z., Frankfurt a. Main 86 (17): 196-200.

SCHURIAN, K. G., 1980a. Auf Colias-Fang in den Bergen Aserbaidschans. – *Nachr. ent. Ver. Apollo,* N.F. 1: 15-19.

SCHURIAN, K. G., 1980b. Lepidopterologische Aufsammlungen im Elbursgebirge. – *Nachr. ent. Ver. Apollo,* N.F. 1 (2): 32-38.

SCHURIAN, K., 1980c. Schmetterlinge am Demavend. – *Nachr. ent. Ver. Apollo,* N.F. 1(3/4): 64-67.

SCHURIAN, K. G., 1982. Beiträge zur Kenntnis der Rhopaloceren Irans: 18. Beitrag. Eine neue *Agrodiaetus*-Art aus Nordiran (Lepidoptera, Lycaenidae). – *Entomol. Z.,* Frankfurt a. M. 92-96.

SCHURIAN, K., 1983. Entomologische Aufsammlungen und Beobachtungen bei Kizilçahamam (Türkei). – *Nachr. ent. Ver. Apollo,* N.F. 3 (4): 111-127.

SCHURIAN, K. 1984. Was ist unter *„carmon"* und *„eurypilus"* zu verstehen? (Lepidoptera, Lycaenidae). – *Entomol. Z.,* Frankfurt a. M. 94 (24): 360-363.

SCHURIAN, K. G., 1988. Neueinteilung des Subgenus *Lysandra* der Gattung *Polyommatus* LATREILLE (Lepidoptera, Lycaenidae). – *Entomol. Z.,* Frankfurt a. M. 98 (10): 129-144, 2 Tafeln.

SCHURIAN, K. G., 1989a. Bemerkungen zu *Lysandra cormion* NABOKOV 1941 (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.10 (2): 183-192.

SCHURIAN, K. G., 1989b. Revision der *Lysandra*-Gruppe des Genus *Polyommatus* LATR. (Lepidoptera, Lycaenidae). – *Neue Entomol. Nachr.* 24, 181 pp.

SCHURIAN, K. G., 1989c. Ergänzungen und Berichtigungen zu: „Neueinteilung des Subgenus *Lysandra* der Gattung *Polyommatus* LATREILLE (Lepidoptera, Lycaenidae)“. – *Entomol. Z.,* Frankfurt a. M. 99 (21): 305-320.

SCHURIAN, K. G., 1991a. Eine neue Unterart von *Polyommatus (Lysandra) syriacus* (TUTT 1914) (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.12 (3): 153-161.

SCHURIAN, K. G., 1991b. Nachtrag zu den “Bemerkungen zu *„Lysandra cormion“* (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.12 (3): 193-195.

SCHURIAN, K. G., 1992. Nachtrag zu: “Eine neue Unterart von *Polymmatus (Lysandra) syriacus* (TUTT 1914) (Lepidoptera: Lycaenidae)“. – *Nachr. ent. Ver. Apollo,* N.F.12 (4): 233-234.

SCHURIAN, K. G., 1993. Description of the hitherto unkown female of *Polyommatus (Lysandra) dezinus* (DE FREINA & WITT, 1983) (Lepidoptera, Lycaenidae). – *Linn. belg.* 14 (1): 55-60.

SCHURIAN, K. G., 1997a. Eiablagestrategien bei Bläulingen (Lepidoptera: Lycaenidae), 1. Das Eiablageverhalten von *Plebeius (Plebeius) christophi* (STAUDINGER, 1874). – *Nachr. ent. Ver. Apollo,* N.F.18 (2/3): 165-172.

SCHURIAN, K. G., 1997b. Freilandexemplare des Hybriden *cormion (=Polyommatus (Meleageria) coridon × P. (M.) daphnis)* (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.18 (2/3): 227-230.

SCHURIAN, K. G., 1999. Eiablagestrategien bei Bläulingen (Lepidoptera: Lycaenidae). 2. Das Eiablageverhalten von *Polyommatus (Agrodiaetus) admetus* (ESPER, [1783]). – *Nachr. ent. Ver. Apollo,* N.F. 20 (2): 189-194.

SCHURIAN, K. G., 2002. Beobachtungen bei der Zucht von *Polyommatus (Aricia) torulensis* (Lepidoptera, Lycaenidae). – *Phegea* 30 (2): 55-60.

SCHURIAN, K. G. & W. ECKWEILER, 1997. Wiederfund von *Polyommatus (Agodiaetus) dama* STAUDINGER, 1892 in der Türkei (Lepidoptera: Lycaenidae). – *Nachr.ent. Ver.Apollo* (Suppl.) 16: 49-52.

SCHURIAN, K.G. & W. ECKWEILER, 1999. Eine neue Art des Subgenus *Agrodiaetus* HÜBNER, 1822 aus Ost-Iran (Lepidoptera; Lycaenidae). – *Nachr. ent. Ver. Apollo*, N.F. 20 (2): 119-126 & 20 (3/4): 332 (Corrigenda).

SCHURIAN, K. G & K. FIEDLER., 1994. Zur Biologie von *Polyommatus (Lysandra) dezinus* (DE FREINA & WITT) (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo*, N.F. 14 (4): 339-353.

SCHURIAN, K. & P. HOFMANN, 1975. Ein neuer Lycaeniden-Hybrid von *Agrodiaetus damon* SCHIFF. x *A. ripartii* FRR. (Lepidoptera, Lycaenidae). – *Atalanta* 6(4): 227-231.

SCHURIAN, K. G., & P. HOFMANN, 1980. Ein neuer Lycaeniden-Hybrid: *Agrodiaetus ripartii* FREYER X *Agrodiaetus menalcas* FREYER (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 1 (2): 21-23.

SCHURIAN, K. G. & A. REIF., 1992. Beitrag zur Biologie von *Polyommatus (Aricia) isaurica* (STAUDINGER) (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.12 (4): 255-261.

SCHURIAN, K. G. & W. TEN HAGEN., 2000. Beitrag zur Biologie von *Polyommatus (Agrodiaetus) glaucias* (LEDERER, 1871) (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.21 (1): 19-23.

SCHURIAN, K. G. & W. TEN HAGEN., 2001. Eine neue Bläulingsart des Genus *Polyommatus* LATREILLE, 1804 aus dem zentralen Zagrosgebirge in Iran (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.22 (1): 1-4.

SCHURIAN, K.G. & W. TEN HAGEN, 2003. *Polyommatus (Agrodiaetus) urmiaensis* sp. n. aus Nordwestiran (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo*, N.F. 24 (1/2): 1-5.

SCHURIAN, K. G., W. TEN HAGEN & H. MARK., 1999. Beitrag zur Biologie sowie Versuch einer taxonomischen Einordnung von *Plebeius (Vacciniina) loewii* (ZELLER, 1847) (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.20 (1): 1-16.

SCHURIAN, K.G., H. VAN OORSCHOT & H. VAN DEN BRINK, 1992. *Polyommatus (Agrodiaetus) poseidon* (H.-S.) und *Polyommatus (Agrodiaetus) theresiae* sp. nov. aus der Türkei (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo,* N.F. 12 (4): 217-232. 1 Farbtaf., 2 Abb.

SCHWINGENSCHUSS, L., 1935. [Versammlungen der Sektion für Lepidopterologie. 5. April 1935. Lepidopteren-Ausbeute aus Bithynien und Anatolien]. – *Verh. zool.-bot. Ges. Wien* 85: 131-132.

SCHWINGENSCHUSS, L., 1938-1939. Sechster Beitrag zur Lepidopterenfauna Inner-Anatoliens. – *Ent. Rdsch.* 55: 141-147, 157-164, 173-177, 181-184, 199-202, 223-226, 299-300, 337-340, 411-412, 454-457, 532, 700, (1938); 56: 133-135, 141-157, 250-251, (1939).

SCHWINGENSCHUSS, L., 1939. Beitrag zur Lepidopterenfauna von Iran (Persien) insbesondere des Elbursgebirges in Nordiran. – *Entomol. Z.*, Frankf. a. M. 52: 357-359, 369-371, 378-379; 53: 13-14, 36-38, 62-64, 86-88, 95-96, 125-128, 135-136, 149-152, 166-168, 200-210.

SCOTT, J.A. & D.M. WRIGHT, 1990. Butterfly phylogeny and fossils. – In: Kudrna, O. (Ed.): Butterflies of Europe 2 (Introduction to Lepidopterology): 152-208. Wiesbaden

SHANAHAN, C.M., 1989. Cytogenetics of Australian Scorpions II. Chromosome polymorphism in species of *Urodacus* (Family Scorpionidae). - *Genome* 32: 890-900.

SHAW, D.D., 1976. Population Cytogenetics of the Genus *Caledia* (Orthoptera: Acridinae). I. Inter- and Intraspecific Karyotype Diversity. - *Chromosoma* 54: 221-243.

SHELJUZHKO, L., 1928. Neue palaearktische Lycaeniden. – *Lep. Rundsch.* 2:44-46.

SHERBORN, C.D. 1922. *Index Animalium sive Index Nominum Quae Ab A:D MDCCLVIII Generibus et Speciebus Aniamalium Imposa Sunt.* [Part 1. Introduction, bibliography and index A-Aff. 1801-1850]. – Trustees of the British Museum (Natural History), London, i-cxxxi, 1-128.

SIEPE, W., 1995. Die Präimaginalstadien und die Aufzucht von *Polyommatus (Aricia) torulensis* HESSELBARTH & SIEPE, 1993 (Lepidoptera, Lycaenidae). – *Phegea* 23 (3) (1.IX.1995): 167.

SIMON, C., F. FRATI, A. BECKENBACH, B. CRESPI, H. LIU & P. FLOOK., 1994. Evolution, Weighting and Phylogenetic Utility of Mitochondrial gene sequences and a compilation of conserved polymerase chain reaction primers. – *Annals of the entomological Society of America,* 87 (5): 651-701.

SKALA, P., 2001. New taxa of the subgenus *Agrodiaetus* HÜBNER, 1822 from Iran: *Polyommatus (Agrodiaetus) faramarzii* sp. n., *P. (A.) sharami* sp. n., and *P. (A.) pfeifferi astyages* ssp. n. (Lepidoptera: Lycaenidae) – *Nachr. ent. Ver. Apollo,* N.F. 22 (2): 101-108.

SKALA, P., 2002a. A new species of the subgenus *Neolysandra* from Iran (Lepidoptera, Lycaenidae). – *Linn. belg.* 18 (5): 255-262.

SKALA, P., 2002b. Contributions to the knowledge of *Polyommatus (Agrodiaetus) pfeifferi* (BRANDT, 1938) and its relatives (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.23 (3): 119-134.

SKALA, P., 2002c. Distribution, habitat and variability of *Polyommatus stempfferi* BRANDT, 1938 (Lepidoptera, Lycaenidae). – *Linn. belg.* 18 (6): 289-300.

SKALA, P. & Z. WEIDENHOFFER., 2002. New taxa of the genus *Plebeius* from Iran (Lepidoptera, Lycaenidae). – *Linn. belg.* 18 (8): 405-422.

SMYLLIE, B., 1998. Similarites between Britain and north-west European *Aricia* “subspecies” (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.19 (1): 69-88.

SPERLING, F.A.H., 1993. Mitochondrial DNA variation and Haldane’s Rule in the *Papilio glaucus* and *Papilio troilus* species groups. - *Heredity* 71: 227-233.

SPERLING, F.A.H. & D.A. HICKEY D A., 1994. Mitochondrial DNA sequence variation in the spruce budworm species complex (*Choristoneura*: Lepidoptera). - *Molecular Biology & Evolution* 11: 656-665.

STAUDINGER, O. 1861. Macrolepidoptera. – *In:* Staudinger, O. & Wocke, M., *Catalog der Lepidopteren Europas und der angrenzenden Länder,* O. [tto] Staudinger, Hermann Burdach, Dresden, S. I-XVI, 1-192.1-84, 131-157, 184-192.

STAUDINGER, O., 1868. [C. G. Kaden] Necrolog. – *Ent. Ztg Stettin* 29: 107-109.

STAUDINGER, O., 1871. Macrolepidoptera. – *In:* Staudinger, O. & Wocke, M., *Catalog des Lepidopteren europaeischen Faunengebietes.* 2. Aufl., Hermann Burdach, O. [tto] Staudinger, Dresden, S. I-XXXVIII + 1-200, 347-382, 415-424.

STAUDINGER, O., 1879. Lepidopteren-Fauna Kleinasien’s. – *Horae Soc. ent. ross.* 14 (1878): 176-482, here: pp. 251-253.

STAUDINGER, O., 1878-1879. Lepidopteren-Fauna Kleinasien’s. – *Horae Soc. ent. ross.* 14: 129-320, Taf. 1-2(1878); 321-482, Taf. 3-4(1879).

STAUDINGER, O., 1881. Beitrag zur Lepidopterenfauna Central-Asiens. – *Stett. entomol. Z.* 42: 253-300, here: p. 264.

STAUDINGER, O., 1886-1889. Centralasiatische Lepidopteren. – *Ent. Ztg Stettin* 47: 193-215, 225-256, (1886); 48: 49-102, (1887); 49: 1-65, (1888); 50: 16-60, (1889).

STAUDINGER, O., 1892. Neue Arten und Varietäten von Lepidopteren des paläarktischen Faunengebiets. – *Dt. ent. Z. Iris* 4(1891): 224-339, 4 Taf., 5 Abb.

STAUDINGER, O., 1899. Ueber die Arten und Formen der *Lycaena Damon*-Gruppe. – Dtsch. entomol. Z. Iris, Dresden, 12: 137-155.

STAUDINGER, O. & REBEL, H., 1901. Catalog der Lepidopteren des palaearctischen Faunengebietes. I. Theil: Famil. Papilionidae-Hepialidae. – *R. Friedländer & Sohn, Berlin,* XXXII + 411 S.

SUOMALAINEN, E., 1965. On the chromosomes of the Geometrid moth genus *Cidaria*. - *Chromosoma* 16: 166-184.

SUOMALAINEN, E., 1969. Chromosome evolution in the Lepidoptera. - *Chromosome Today* 2: 132-138.

SUOMALAINEN, E., L.M. COOK & J.R.G. TURNER, 1973. Achiasmatic oogenesis in the Heliconiinae butterflies. - *Hereditas* 74: 302-304.

SUOMALAINEN, E., & K. S. BROWN, 1984. Chromosome number variation in *Philaethria* butterflies (Lepidoptera: Nymphalidae, Heliconiini). – *Chromosoma* 90 (3): 170-176.

SWOFFORD, D. L.,1998. PAUP* 4.0.: Phylogenetic analysis using parsimony (*and Other Methods. *Sinauer Associates*. Sunderland, Massachusetts.

TALIEV, V., 1901. Sur la flore du Krimée et sur la rôle de l´homme dans le developpement de sa vegetation. – Trav. Soc. natural. Univ. Imp. Kharkow 35 (1900) : 107-338, here : 291-299 [in Russian].

TAYLOR, M.F., S.W. MCKECHNIE, N. PIERCE & M. KREITMAN, 1993. The lepidopteran mitochondrial control region: structure and evolution. - *Mol. Biol. Evol.* 10(6): 1259-1272.

TEMPLETON, A. R., K. A. CRANDALL AND C. F. SING, 1992. A cladistic analysis of phenotypic associations with haplotypes inferred from restriction endonuclease mapping and DNA sequence data. III. Cladogram estimation. Genetics 132: 619-633.

TEN HAGEN, W., 1998. Eine neue Art des Subgenus *Agrodiaetus* HÜBNER, 1822 aus dem Iran (Lepidoptera: Lycaenidae). - *Nachr. ent. Ver. Apollo* 18(4): 315-318.

TEN HAGEN, W., 1999. Eine neue Art der Gattung *Polyommatus* LATREILLE, 1804 aus Iran (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo, Frankfurt am Main,* N.F. 20 (1): 19-24.

TEN HAGEN, W., 2002. Plebejus *(Vacciniina) eurypilus* (FREYER, [1851]) und verwandte Taxa in Iran (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.23 (3): 141-146.

TEN HAGEN, W., 2003. Freilandhybriden bei Bläulingen aus Ostanatalien und Iran (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 23 (4): 199-203.

TEN HAGEN, W. & W. ECKWEILER, 2000. Tagfalterbeobachtungen in Syrien (4. Beitrag) (Lepidoptera: Papilionoidea, Hesperioidea). – *Nachr. ent. Ver. Apollo,* N.F. 21 (2): 65-70 (2000).

TEN HAGEN, W. & W. ECKWEILER, 2001. Eine neue Art von *Polymmatus (Agrodiaetus)* aus Zentraliran (Lepidoptera: Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F. 22 (2): 53-56.

TEN HAGEN, W. & K. G. SCHURIAN., 2000. Eine neue Unterart von *Polyommatus (Agrodiaetus) darius* ECKWEILER & TEN HAGEN, 1998 aus Nordwestiran (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.21 (2): 113-115.

TEN HAGEN, W. & K. G. SCHURIAN., 2001. Ein Beitrag zur Kenntnis von *Plebeius (Vacciniina) morgianus* (KIRBY, 1871) (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo,* N.F.21 (4): 193-200.

TENNENT, J., 1996. The Butterflies of Morocco, Algeria and Tunisia. 217 pp., Wallingford.

THOMPSON, J.D., T.J. GIBSON, F. PLEWNIAK, F. JEANMOUGIN & D.G. HIGGINS, 1997. The ClustalX windows interface: flexible strategies for multiple sequence alignment aided by quality analysis tools. *Nucleic Acids Research* 24:4876-4882.

TOLMAN, T., 1995. Concerning the biology and conservation of *Polyommatus (Agrodiaetus) iphigenia* (HERRICH-SCHÄFFER, [1847]) in Greece (Lepidoptera, Lycaenidae). – *Phegea* 23 (2): 113-118.

TOLMAN, T. & R. LEWINGTON, 1997. Butterflies of Britain and Europe. - 320pp. HarperCollins (London u.a.).

TORRES, E., D. C. LEES, R.I. VANE-WRIGHT, C. KREMEN, J. A. LEONARD & R. K. WAYNE, 2001. Examining Monophyly in a large radiation of Madagascan butterflies (Lepidoptera: Satyrinae: Mycalesina) based on Mitochondrial DNA data. – *Molecular Phylogenetics and Evolution* 20 (3): 460-473.

TOSO, G. G. & E. BALLETTO, 1976. Una nueva specie del genere *Agrodiaetus* HÜBN. (Lepidoptera Lycaenidae). – *Annali Mus. civ. Stor. nat. Giacomo Doria* 81: 124.130.

TRAUT, W. & C. A. CLARKE., 1996. Cytogenetics of a moth species with a low chromosome number, *Orgyia thyellina. – Hereditas,* 125: 277-283.

TRAUT, W. & C. A. CLARKE., 1997. Karyotype evolution by chromosome fusion in the moth genus *Orgyia. – Hereditas* 129: 77-84.

TRAUT, W. & F. MAREC, 1997. Sex chromosome differentiation in some species of Lepidoptera (Insecta). - *Chromosome Research* 5: 283-291.

TREMEWAN, W. G. 1988. C.F. Freyer´s Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur. – *Bull. Br. Mus. nat. Hist.* (hist.Ser.) 16(1): 1-16, 6 figs.

TROIANO, G., E. BALLETTO & G.G. TOSO, 1979. The karyotype of *Agrodiaetus humedasae* Toso & Balletto, 1978. - *Boll. Soc. ent. ital.* 111: 141-143.

TROIANO, G. & M.A. GIRIBALDI, 1979. Karyotypic analysis. In: BALLETTO, E. & G.G. TOSO, On a new species of *Agrodiaetus* (Lycaenidae) from Southern Italy. - *Nota lepid.* 2 (1-2): 22-23.

TSHIKOLOVETS, V. V., 1998. *The butterflies of Turkmenistan.* – V.V. Tshikolovets, Kiev, Brno, 237p., 24 col. pls., 10 b/w pls., 4 + 157 maps.

TSHIKOLOWEZ, W. W., 1992. Eine Übersicht über das Lycaeniden-Subgenus *Paragrodiaetus* in Kirgisien, Usbekistan und Tadshikistan mit der Beschreibung von *Polyommatus (Paragrodiaetus) pulchra chaburobata* subspec. nov. (Lepidoptera, Lycaenidae, Polyommatinae). – *Atalanta* 23 (1/2): 159-168.

TSURUSAKI, N., M. MURAKAMI & K. SHIMOKAWA, 1991. Geographic variation of chromosomes in the Japanese Harvestman *Gagrellopsis nodulifera* with special reference to a hybrid zone in western Honshu (Japan). - Zoological Science (Tokyo) 8: 265-276.

TUZOV, V.K., P.V. BOGDANOV, S.V. CHURKIN, A.V. DANTCHENKO, A.L. DEVYATKIN, V.S. MURZIN, G.D. SAMODUROV & A.B. ZHDANKO, 2000. Guide to the Butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera). Vol. 2. Libytheidae, Danaidae, Nymphalidae, Riodinidae, Lycaenidae. Sofia & Moscow (Pensoft). 580 pp., 83 col. pls.

TUZOV, V.K., A.B. ZHDANKO & A.V. DANTCHENKO, 2000a. Genus *Polyommatus.* – In: TUZOV, V.K., P.V. BOGDANOV, S.V. CHURKIN, A.V. DANTCHENKO, A.L. DEVYATKIN, V.S. MURZIN, G.D. SAMODUROV & A.B. ZHDANKO. Guide to the Butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera). Vol. 2: 190-196.

VOGLER A. P. & R. DESALLE, 1993. Phylogeographic Patterns in Coastal North American Tiger Beetles (*Cicindela dorsalis* Say) Inferred from Mitochondrial DNA Sequences. - *Evolution* 47(4): 1192-1201.

VYSOTSKY, G., 1915. Flora of the Ergeni Height. – Bulletin of applied Botany, Petrograd, 1915, vol. 8 (10): 1113-1443, here p. 1400 (288) [in Russian].

WÄGELE, J.-W., 2000. Grundlagen der Phylogenetischen Systematik. München (Pfeil), 315pp.

WAGNER, F., 1929. Weiterer Beitrag zur Lepidopteren-Fauna Inner-Anatoliens. – *Mitt. münch. ent. Ges.* 19: 1-28, 57-80, 175-206, 2 Taf., 5 Texttab.

WAHLBERG, N. & M. ZIMMERMANN, 2000. Pattern of Phyogenetic relationships among members of the tribe Melitaeini (Lepidoptera: Nymphalidae) Inferred from Mitochondrial DNA sequences. – *Cladistics* 16: 347-363.

WAKEHAM-DAWSON, A. & P. SPURDENS, 1994. Anomalous blue butterflies of the genus *Agrodiaetus* HÜBNER (Lepidoptera: Lycaenidae) in southern Greece. – *Entomologists' Gaz.* 45 (1): 13-20.

WALTON, C. & BUTLIN, R. K., 1997. A phylogeny for grasshoppers of the genus *Chitaura* (Orthoptera: Acrididae) from Sulawesi, Indonesia, based on mitochondrial DNA sequence data. – *Biol. J. Linn. Soc.,* 62: 365-382, 5 figures.

WAYNE, R. K., NASH, W.G. & O´BRIEN, S.J., 1987. Chromosomal evolution of the Canidae. I. Species with high diploid numbers. – *Cytogenet Cell Genet* 44: 123-133.

WAYNE, R. K., NASH, W.G. & O´BRIEN, S.J., 1987a. Chromosomal evolution of the Canidae. II. Divergence from the primitive carnivore karyotype. – *Cytogenet Cell Genet* 44: 134-141.

WEEKERS, P. H. H., J. F. DE JONCKHEERE & H. J. DUMONT., 2001. Phylogenetic relationships inferred from Ribosomal ITS sequences and Biogeographic patterns in representatives of the genus *Calopteryx* (Insecta: Odonata) of the west Mediterranean and Adjacent West European zone. – *Molecular Phylogenetics and Evolution, Vol.* 20 (1): 89-99.

WELLER, S. J., FRIEDLANDER, T. P., MARTIN, J. A. & PASHLEY, D. P., 1992. Phylogenetic studies of Ribosomal RNA variation in higher moths and butterflies (Lepidoptera: Ditrysia). – *Molecular Phylogenetics and evolution,* 1 (4): 312-337.

WELLER, S.J., D.P. PASHLEY, J.A. MARTIN & CONSTABLE, 1994. Phylogeny of noctuoid moths and the utility of combining independent nuclear and mitochondrial genes. – *Systematic Biology,* 43(2): 194-211.

WELLER, S.J. & D.P. PASHLEY, 1995. In Search of Butterfly Origins. - *Molecular Phylogenetics & Evolution* 4: 235-246.

WELLER, S.J., D.P. PASHLEY & J.A. MARTIN, 1996. Reassessment of butterfly family relationships using independent genes and morphology. *Annals of the Entomological Society of America* 89: 184-192.

WESSON, D. M., C. H. PORTER & F. H. COLLINS., 1992. Sequence and secondary structure comparisons of ITS rDNA in Mosquitoes (Diptera: Culicidae). – *Molecular Phylogenetics and Evolution* 1 (4): 253-269.

WHITE, T.J., T. BRUNS, S. LEE, & TAYLOR, J. 1990. Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis, MA, Gelfand, DH, Sninsky, JJ, White TJ. Eds. PCR Protocols: a Guide to Methods and Applications. New York: Academic Press, 315-322.

WHITING, M.F., J.C. CARPENTER, Q.D. WHEELER & W.C. WHEELER, 1997. The Strepsiptera problem: Phylogeny of the holometabolous insect orders inferred from 18S and 28S ribosomal DNA sequences and morphology. - *Systematic Biology* 46: 1-68.

Wiemers, M. & J. De Prins, *in print*. *Polyommatus (Agrodiaetus) paulae* sp. nov. from Northwest Iran, discovered by means of molecular, karyological and morphological methods (Lepidoptera: Lycaenidae). – *Entomol. Z.,* Frankfurt a.M.

WILTSHIRE, E. P., 1957. The Lepidoptera of Iraq. – *Nicholas Kaye Ltd, London,* 162 p., 17 pls.

WINK, M., MIKES, Z. & RHEINHEIMER, J., 1997. Phylogenetic relationships in Weevils (Coleoptera: Curculionoidea) Inferred from Nucleotide sequences of mitochondrial 16S rDNA. – *Naturwissenschaften,* 84, 318-321.

WULFF, E., 1960. Flora Taurica, vol. II, Fasc. 2. – 312pp., here: pp. 214-217 [in Russian].

YAGI, T., G. SASAKI & H. TAKEBE, 1999. Phylogeny of Japanese papilionid butterflies inferred from Nucleotide sequences of Mitochondrial *ND5* gene. - *J. Mol. Evol.*, (1999) 48: 42-48

ZELLER, [P.C.] 1851. Versuch einer Monographie der Lycänen mit Abbildungen nach der Natur herausgegeben von Bernhard Gerhard, Mittglied des naturwissenschaftlichen Vereins zu Hamburg. Hamburg und Leipzig (1850). 4. Erstes Heft. – *Ent. Ztg Stettin* 12(1): 17-20.

ZERNY, H., 1932. Lepidopteren aus dem nördlichen Libanon. – *Dt. ent. Z. Iris* 46:157-191.

Hilfsmittel

Die Arbeit wurde auf einem PC mit MS Word 2000 verfasst. Die Tabellen wurden in MS Excel 2000 erstellt und für die Bearbeitung von Graphiken wurde MS Photo Editor und Adobe Photoshop Elements verwendet. Statistische Berechnungen erfolgten mit Analyse-It V.1.6.8. Für die molekulargenetische Auswertung kamen folgende Computerprogramme zum Einsatz: BioEdit V.5.0.9, ClustalX V.1.8.1, ForCon V.1.0, Mega V.1.0, V.2.1 & V.3.0 beta, MrBayes V.3.0b4, PAUP V.4.0 beta10, TCS V.1.13 und TreeView V.1.6.6.

Erklärung

Ich versichere, dass ich diese Arbeit selbständig verfasst, keine anderen Quellen und Hilfsmittel als die angegebenen benutzt und die Stellen der Arbeit, die anderen Werken dem Wortlaut oder dem Sinn nach entnommen sind, kenntlich gemacht habe.
Die Arbeit hat in gleicher oder ähnlicher Form keiner anderen Prüfungsbehörde vorgelegen.

Bonn, den 28. September 2003

Appendix 1

Karyological results in *Agrodiaetus*

Code		Genus	Species	Chromosomes	Date	Locality	Altitude	Province	Country
WE	02491	*Agrodiaetus*	*achaemenes*	many (atypical)	21.07.2002	Gardaneh ye Cheri	2800-3000m	Bakhtiari	Iran
WE	02492	*Agrodiaetus*	*achaemenes*	many (atypical)	21.07.2002	Gardaneh ye Cheri	2800-3000m	Bakhtiari	Iran
MW	98162	*Agrodiaetus*	*actis*	**n=ca.17**	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	98166	*Agrodiaetus*	*actis*	**n=17**	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	98057	*Agrodiaetus*	*admetus*	n=80	13.07.1998	Camkuyuzu	1750 m	Antalya	Turkey
MW	98082	*Agrodiaetus*	*admetus*	n=ca.73-80	15.07.1998	Cukurelma	1300 m	Antalya	Turkey
MW	98245	*Agrodiaetus*	*admetus*	n=78-80	29.07.1998	Saimbeyli-Fälle	1200-1500 m	Adana	Turkey
MW	01003	*Agrodiaetus*	*ainsae*	n=100-108	17.07.2001	Ilarduya	550 m	Alava	Spain
MW	01004	*Agrodiaetus*	*ainsae*	n=ca.108	17.07.2001	Ilarduya	550 m	Alava	Spain
MW	01054	*Agrodiaetus*	*ainsae*	n=ca.108	20.07.2001	Sta. Maria	500 m	Huesca	Spain
MW	00229	*Agrodiaetus*	*alcestis*	n=ca.19	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW	00231	*Agrodiaetus*	*alcestis*	n=ca.19	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW	98212	*Agrodiaetus*	*alcestis*	n=21	28.07.1998	Saimbeyli-Fälle	1500 m	Adana	Turkey
MW	98315	*Agrodiaetus*	*alcestis*	n=20	06.08.1998	Yellibeli Geçidi	1800 m	Karaman	Turkey
MW	99299	*Agrodiaetus*	*alcestis*	n=19	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99380	*Agrodiaetus*	*alcestis*	n=19	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW	99165	*Agrodiaetus*	*altivagans*	n=ca.21	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99240	*Agrodiaetus*	*altivagans*	n=21	17.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW	99253	*Agrodiaetus*	*altivagans*	n=ca.23	17.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW	99338	*Agrodiaetus*	*altivagans*	n=ca.21	19.07.1999	Güzeldere Geç.	2600 m	Van	Turkey
MW	99353	*Agrodiaetus*	*altivagans*	n=21-22	19.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW	99376	*Agrodiaetus*	*antidolus*	n>30	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW	99377	*Agrodiaetus*	*antidolus*	n=42	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW	99378	*Agrodiaetus*	*antidolus*	n>40	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW	99389	*Agrodiaetus*	*antidolus*	n=40-42	20.07.1999	Dilezi Geçidi	2100 m	Hakkari	Turkey
MW	99393	*Agrodiaetus*	*antidolus*	n=38-43	21.07.1999	Haruna Geçidi	2000 m	Hakkari	Turkey
MW	99394	*Agrodiaetus*	*antidolus*	n=42	21.07.1999	Haruna Geçidi	2000 m	Hakkari	Turkey
MW	99403	*Agrodiaetus*	*antidolus*	n=ca.40	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW	99406	*Agrodiaetus*	*antidolus*	n=ca.44	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW	99058	*Agrodiaetus*	*artvinensis*	n=20-25	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99064	*Agrodiaetus*	*artvinensis*	n=21-22	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99372	*Agrodiaetus*	*baytopi*	n=27-28	19.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW	00060	*Agrodiaetus*	*birunii*	n=11	11.07.2000	Pul-e Zanguleh	2400 m	Mazandaran	Iran
MW	00061	*Agrodiaetus*	*birunii*	2n=ca.21	11.07.2000	Pul-e Zanguleh	2400 m	Mazandaran	Iran
MW	00062	*Agrodiaetus*	*birunii*	2n=20-22	11.07.2000	Pul-e Zanguleh	2400 m	Mazandaran	Iran
MW	00068	*Agrodiaetus*	*birunii*	n=11	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW	00069	*Agrodiaetus*	*birunii*	2n=ca.20	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW	00070	*Agrodiaetus*	*birunii*	2n=20-22	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW	00071	*Agrodiaetus*	*birunii*	2n=22	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW	00072	*Agrodiaetus*	*birunii*	2n=20-22	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW	00102	*Agrodiaetus*	*birunii*	n=11	12.07.2000	Dizin Pass	3000 m	Tehran	Iran
MW	00103	*Agrodiaetus*	*birunii*	n=11	12.07.2000	Dizin Pass	3000 m	Tehran	Iran
MW	00115	*Agrodiaetus*	*birunii*	n=10-11	12.07.2000	Shemshak	2900 m	Tehran	Iran
MW	00267	*Agrodiaetus*	*birunii*	n=10	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00444	*Agrodiaetus*	*birunii*	n=11	26.07.2000	Polur	2200 m	Tehran	Iran
MW	00445	*Agrodiaetus*	*birunii*	2n=20	26.07.2000	Polur	2200 m	Tehran	Iran
MW	00450	*Agrodiaetus*	*birunii*	2n=20-22	26.07.2000	Polur	2200 m	Tehran	Iran
MW	00457	*Agrodiaetus*	*birunii*	2n=20-22	26.07.2000	Polur	2200 m	Tehran	Iran
MW	00463	*Agrodiaetus*	*birunii*	2n=20-22	26.07.2000	Polur	2200 m	Tehran	Iran
MW	00476	*Agrodiaetus*	*birunii*	2n=20-22	28.07.2000	Golestanak	2700-3200 m	Mazandaran	Iran
MW	00480	*Agrodiaetus*	*birunii*	2n=ca.20	28.07.2000	Golestanak	2700-3200 m	Mazandaran	Iran
MW	00482	*Agrodiaetus*	*birunii*	2n=ca.20	28.07.2000	Golestanak	2700-3200 m	Mazandaran	Iran
MW	00485	*Agrodiaetus*	*birunii*	2n=ca.20	28.07.2000	Golestanak	2700-3200 m	Mazandaran	Iran
MW	00487	*Agrodiaetus*	*birunii*	2n=ca.20	28.07.2000	Golestanak	2700-3200 m	Mazandaran	Iran
MW	00503	*Agrodiaetus*	*birunii*	2n=20	31.07.2000	Takht-e Suleyman	3000 m	Mazandaran	Iran
MW	00547	*Agrodiaetus*	*birunii*	n=10	04.08.2000	Dizin Pass	3200-3300 m	Tehran	Iran
MW	00335	*Agrodiaetus*	*caeruleus*	**n=20**	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00409	*Agrodiaetus*	*caeruleus*	**n=20**	23.07.2000	Hajiabad	2150 m	Golestan	Iran
MW	00421	*Agrodiaetus*	*caeruleus*	**n=19-20**	23.07.2000	Hajiabad	2150 m	Golestan	Iran
MW	99060	*Agrodiaetus*	*carmon*	n>=79	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99094	*Agrodiaetus*	*cyaneus*	n=17	11.07.1999	Kagizman	1400 m	Kars	Turkey
MW	99375	*Agrodiaetus*	*cyaneus*	n=18	20.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99448	*Agrodiaetus*	*cyaneus*	n=18	23.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99475	*Agrodiaetus*	*cyaneus*	n=18-19	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	99274	*Agrodiaetus*	*dantchenkoi*	**n=40-42**	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99276	*Agrodiaetus*	*dantchenkoi*	**n=40-43**	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99278	*Agrodiaetus*	*dantchenkoi*	**n=40-45**	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99319	*Agrodiaetus*	*dantchenkoi*	**n=42**	18.07.1999	Çatak	2000-2200 m	Van	Turkey
MW	99320	*Agrodiaetus*	*dantchenkoi*	**n=40-41**	18.07.1999	Çatak	2000-2200 m	Van	Turkey
MW	99471	*Agrodiaetus*	*dantch.Xmenal.*	n=45-50	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	00014	*Agrodiaetus*	*demavendi*	n>=68	09.07.2000	Samqabad	1900-2100 m	Tehran	Iran
MW	00015	*Agrodiaetus*	*demavendi*	n=65-75	09.07.2000	Samqabad	1900-2100 m	Tehran	Iran
MW	00183	*Agrodiaetus*	*demavendi*	n=ca.70-80	15.07.2000	Dugijan	2000 m	Azarbayjan-e Sharqi	Iran
MW	00185	*Agrodiaetus*	*demavendi*	n=many	15.07.2000	Dugijan	2000 m	Azarbayjan-e Sharqi	Iran
MW	00186	*Agrodiaetus*	*demavendi*	n=many	15.07.2000	Dugijan	2000 m	Azarbayjan-e Sharqi	Iran
MW	00189	*Agrodiaetus*	*demavendi*	n=many	15.07.2000	Dugijan	2000 m	Azarbayjan-e Sharqi	Iran
MW	99102	*Agrodiaetus*	*demavendi*	n>50	11.07.1999	Akçay	1200 m	Kars	Turkey
MW	99105	*Agrodiaetus*	*demavendi*	n=66	11.07.1999	Akçay	1200 m	Kars	Turkey

Appendix 1 Karyological results in *Agrodiaetus*

Code	Genus	Species	Chromosomes	Date	Locality	Altitude	Province	Country
MW 99110	*Agrodiaetus*	*demavendi*	n=55-70	11.07.1999	Akçay	1200 m	Kars	Turkey
MW 99142	*Agrodiaetus*	*demavendi*	n=ca.66	13.07.1999	Akçay	1200 m	Kars	Turkey
MW 99148	*Agrodiaetus*	*demavendi*	n=57-65	13.07.1999	Akçay	1200 m	Kars	Turkey
MW 99150	*Agrodiaetus*	*demavendi*	n=64-76	13.07.1999	Akçay	1200 m	Kars	Turkey
MW 99152	*Agrodiaetus*	*demavendi*	n>30	13.07.1999	Akçay	1200 m	Kars	Turkey
MW 99382	*Agrodiaetus*	*demavendi*	n=67-71	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW 99383	*Agrodiaetus*	*demavendi*	n=59	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW 99384	*Agrodiaetus*	*demavendi*	n=67	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW 99386	*Agrodiaetus*	*demavendi*	n=many	20.07.1999	Yüksekova	1800 m	Hakkari	Turkey
MW 99391	*Agrodiaetus*	*demavendi*	n=many	20.07.1999	Dilezi Geçidi	2100 m	Hakkari	Turkey
MW 99392	*Agrodiaetus*	*demavendi*	n=many	20.07.1999	Dilezi Geçidi	2100 m	Hakkari	Turkey
MW 99405	*Agrodiaetus*	*demavendi*	n=many	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 99407	*Agrodiaetus*	*demavendi*	n>60	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 00539	*Agrodiaetus*	*dizinensis*	**n=17**	04.08.2000	Dizin Pass	3200-3300 m	Tehran	Iran
MW 00051	*Agrodiaetus*	*elbursicus*	n=17	11.07.2000	Nesa	2100 m	Tehran	Iran
MW 00052	*Agrodiaetus*	*elbursicus*	2n>=28	11.07.2000	Nesa	2100 m	Tehran	Iran
MW 00057	*Agrodiaetus*	*elbursicus*	n=ca.17	11.07.2000	Kendevan	2150 m	Mazandaran	Iran
MW 00058	*Agrodiaetus*	*elbursicus*	n=18	11.07.2000	Pul-e Zanguleh	2400 m	Mazandaran	Iran
MW 00059	*Agrodiaetus*	*elbursicus*	n=16	11.07.2000	Pul-e Zanguleh	2400 m	Mazandaran	Iran
MW 00065	*Agrodiaetus*	*elbursicus*	n=17	11.07.2000	Gardaneh-ye Lavashm	2900 m	Mazandaran	Iran
MW 00107	*Agrodiaetus*	*elbursicus*	n=ca.15-20	12.07.2000	Shahrestanak	2000 m	Tehran	Iran
MW 00110	*Agrodiaetus*	*elbursicus*	n=17-18	12.07.2000	Shahrestanak	2000 m	Tehran	Iran
MW 00232	*Agrodiaetus*	*elbursicus*	n=18	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00316	*Agrodiaetus*	*elbursicus*	n=16-18	19.07.2000	Asadbar	2500 m	Tehran	Iran
MW 98097	*Agrodiaetus*	*ernesti*	**n=18**	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey
MW 00393	*Agrodiaetus*	*erschoffii*	n=ca.14	23.07.2000	Hajiabad	2150 m	Golestan	Iran
MW 00406	*Agrodiaetus*	*erschoffii*	n=ca.13-14	23.07.2000	Hajiabad	2150 m	Golestan	Iran
MW 01036	*Agrodiaetus*	*fabressei*	n=many	19.07.2001	Abejar	1100 m	Soria	Spain
MW 01039	*Agrodiaetus*	*fabressei*	n>75	19.07.2001	Abejar	1100 m	Soria	Spain
MW 00226	*Agrodiaetus*	*femininoides*	**n=27**	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00227	*Agrodiaetus*	*femininoides*	**n=ca.27**	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00228	*Agrodiaetus*	*femininoides*	**n=27**	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
WE 02671	*Agrodiaetus*	*femininoides*	**n=27**	31.07.2002	Khalkhal, Gollijeh	1900m	Ardabil	Iran
WE 02672	*Agrodiaetus*	*femininoides*	**n=27**	31.07.2002	Khalkhal, Gollijeh	1900m	Ardabil	Iran
MW 00216	*Agrodiaetus*	*firdussii*	n=ca.29	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00217	*Agrodiaetus*	*firdussii*	n=29	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00218	*Agrodiaetus*	*firdussii*	n=28	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 00234	*Agrodiaetus*	*firdussii*	n>=24	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW 99006	*Agrodiaetus*	*firdussii*	n=ca.30	05.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW 99007	*Agrodiaetus*	*firdussii*	n=28-31	05.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW 99172	*Agrodiaetus*	*firdussii*	n=32	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW 99241	*Agrodiaetus*	*firdussii*	n=25	17.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW 99247	*Agrodiaetus*	*firdussii*	n=ca.24	17.07.1999	Güzeldere Geç.	2500 m	Van	Turkey
MW 99413	*Agrodiaetus*	*firdussii*	n=25	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 99417	*Agrodiaetus*	*firdussii*	n=26	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 99422	*Agrodiaetus*	*firdussii*	n=ca.25	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 99441	*Agrodiaetus*	*firdussii*	n=25	23.07.1999	Dez Çay	1500-1700 m	Hakkari	Turkey
MW 99443	*Agrodiaetus*	*firdussii*	n=27	23.07.1999	Dez Çay	1500-1700 m	Hakkari	Turkey
MW 99444	*Agrodiaetus*	*firdussii*	n=ca.25	23.07.1999	Dez Çay	1500-1700 m	Hakkari	Turkey
MW 99457	*Agrodiaetus*	*firdussii*	n=26	24.07.1999	Çatak	1600-1900 m	Van	Turkey
MW 01106	*Agrodiaetus*	*fulgens*	n=ca.98-103	23.07.2001	Sta. Coloma de Queralt	700 m	Tarragona	Spain
MW 01107	*Agrodiaetus*	*fulgens*	n>90	23.07.2001	Sta. Coloma de Queralt	700 m	Tarragona	Spain
MW 00129	*Agrodiaetus*	*gorbunovi*	**n=20**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW 00177	*Agrodiaetus*	*gorbunovi*	**n=ca.20**	15.07.2000	Dugijan	2000 m	Azarbayjan-e Sharqi	Iran
WE 02675	*Agrodiaetus*	*gorbunovi*	**n=19**	31.07.2002	Khalkhal, Gollijeh	1900m	Ardabil	Iran
MW 98293	*Agrodiaetus*	*guezelmavi*	n=43	04.08.1998	Taskent	1450 m	Konya	Turkey
MW 98297	*Agrodiaetus*	*guezelmavi*	n=ca.40-43	04.08.1998	Taskent	1450 m	Konya	Turkey
MW 98298	*Agrodiaetus*	*guezelmavi*	n=ca.40	04.08.1998	Taskent	1450 m	Konya	Turkey
MW 00004	*Agrodiaetus*	*hamadanensis*	n=22	09.07.2000	Samqabad	1900-2100 m	Tehran	Iran
MW 00005	*Agrodiaetus*	*hamadanensis*	n=ca.22	09.07.2000	Samqabad	1900-2100 m	Tehran	Iran
MW 00032	*Agrodiaetus*	*hamadanensis*	n=ca.22	10.07.2000	Safedabad	2000 m	Tehran	Iran
WE 02676	*Agrodiaetus*	*hamadanensis*	n=21	31.07.2002	Khalkhal, Gollijeh	1900m	Ardabil	Iran
MW 98189	*Agrodiaetus*	*hopfferi*	n=15-16	27.07.1998	Gündüzbey	1300 m	Malatya	Turkey
MW 98190	*Agrodiaetus*	*hopfferi*	n=15-16	27.07.1998	Gündüzbey	1300 m	Malatya	Turkey
MW 98191	*Agrodiaetus*	*hopfferi*	2n=30	27.07.1998	Gündüzbey	1300 m	Malatya	Turkey
MW 99408	*Agrodiaetus*	*hopfferi*	n=15	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW 99453	*Agrodiaetus*	*hopfferi*	n=15	24.07.1999	Çatak	1600-1900 m	Van	Turkey
MW 99053	*Agrodiaetus*	*huberti*	n=36	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW 99095	*Agrodiaetus*	*huberti*	n=33-34	11.07.1999	Kagizman	1400 m	Kars	Turkey
MW 99552	*Agrodiaetus*	*huberti*	n=ca.33	29.07.1999	Kop Geçidi	2350 m	Bayburt	Turkey
MW 99590	*Agrodiaetus*	*humedasae*	2n=ca.70-80	14.08.1999	Pondel	900 m	Aosta	Italy
MW 99591	*Agrodiaetus*	*humedasae*	n=ca.38	14.08.1999	Pondel	900 m	Aosta	Italy
MW 99595	*Agrodiaetus*	*humedasae*	2n>66	14.08.1999	Pondel	900 m	Aosta	Italy
MW 99596	*Agrodiaetus*	*humedasae*	2n=ca.76	14.08.1999	Pondel	900 m	Aosta	Italy
MW 99164	*Agrodiaetus*	*interjectus*	n=31	14.07.1999	Çiftlik	1900 m	Erzurum	Turkey
MW 98101	*Agrodiaetus*	*iphicarmon*	**n=ca.30**	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey
MW 98102	*Agrodiaetus*	*iphicarmon*	**n=ca.30**	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey
MW 98104	*Agrodiaetus*	*iphicarmon*	**n=29**	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey

Appendix 1

Karyological results in *Agrodiaetus*

Code		*Genus*	*Species*	Chromosomes	Date	Locality	Altitude	Province	Country
MW	00269	*Agrodiaetus*	*iphidamon*	n=ca.14	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00274	*Agrodiaetus*	*iphidamon*	n=14	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00287	*Agrodiaetus*	*iphidamon*	n=14	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00338	*Agrodiaetus*	*iphidamon*	n=ca.14	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00362	*Agrodiaetus*	*iphidamon*	n=14	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00381	*Agrodiaetus*	*iphidamon*	n=14	21.07.2000	Shakuh	3000 m	Golestan	Iran
MW	00424	*Agrodiaetus*	*iphidamon*	n=13-15	23.07.2000	Hajiabad	2150 m	Golestan	Iran
MW	98049	*Agrodiaetus*	*iphigenia*	n=14	12.07.1998	Salur Dagi	1700-1900 m	Fethiye	Turkey
MW	98106	*Agrodiaetus*	*iphigenia*	n=15	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey
MW	99009	*Agrodiaetus*	*iphigenia*	n=12	05.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99154	*Agrodiaetus*	*iphigenia*	n=11-14	13.07.1999	Kagizman	1400 m	Kars	Turkey
MW	99170	*Agrodiaetus*	*iphigenia*	n=12	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99465	*Agrodiaetus*	*kanduli*	n=25	24.07.1999	Çatak	1600-1900 m	Van	Turkey
WE	02611	*Agrodiaetus*	*karindus*	**n=68**	27.07.2002	40 km SW Saqqez	1800-1900m	Kordestan	Iran
WE	02612	*Agrodiaetus*	*karindus*	**n>=66**	27.07.2002	40 km SW Saqqez	1800-1900m	Kordestan	Iran
MW	00259	*Agrodiaetus*	*klausschuriani*	**n=56-58**	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00261	*Agrodiaetus*	*klausschuriani*	**n>47**	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00262	*Agrodiaetus*	*klausschuriani*	**n=56**	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	00264	*Agrodiaetus*	*klausschuriani*	**n=56**	18.07.2000	Veresk	1800-1950 m	Mazandaran	Iran
MW	99286	*Agrodiaetus*	*kurdistanicus*	n=54-56	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99287	*Agrodiaetus*	*kurdistanicus*	n=56-68	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99288	*Agrodiaetus*	*kurdistanicus*	n=62	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99473	*Agrodiaetus*	*kurdistanicus*	n>=55	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	98069	*Agrodiaetus*	*lycius*	n=21-22	15.07.1998	Cukurelma	1300 m	Antalya	Turkey
MW	98070	*Agrodiaetus*	*lycius*	n=21-22	15.07.1998	Cukurelma	1300 m	Antalya	Turkey
MW	98071	*Agrodiaetus*	*lycius*	n=22	15.07.1998	Cukurelma	1300 m	Antalya	Turkey
MW	98072	*Agrodiaetus*	*lycius*	n=21-22	15.07.1998	Cukurelma	1300 m	Antalya	Turkey
MW	98170	*Agrodiaetus*	*maraschi*	n=16	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	98022	*Agrodiaetus*	*menalcas*	n=85	12.07.1998	Gülübeli Geçidi	1500 m	Fethiye	Turkey
MW	98064	*Agrodiaetus*	*menalcas*	n>75	13.07.1998	Camkuyuzu	1750 m	Antalya	Turkey
MW	99496	*Agrodiaetus*	*menalcas*	n=85	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	99057	*Agrodiaetus*	*merhaba*	n=ca.17	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99059	*Agrodiaetus*	*merhaba*	n=15-17	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	98203	*Agrodiaetus*	*mithridates*	n=23	27.07.1998	Gündüzbey	1300 m	Malatya	Turkey
WE	02453	*Agrodiaetus*	*mofidii*	**n=ca.45**	17.07.2002	Kuh-e-Sorkh, Kadkan	2100-2500m	Khorasan	Iran
WE	02454	*Agrodiaetus*	*mofidii*	**2n>80**	17.07.2002	Kuh-e-Sorkh, Kadkan	2100-2500m	Khorasan	Iran
WE	02614	*Agrodiaetus*	*morgani*	n=27	27.07.2002	40 km SW Saqqez	1800-1900m	Kordestan	Iran
MW	99508	*Agrodiaetus*	*ninae*	n=34	26.07.1999	Agrı	1800 m	Agrı	Turkey
MW	00126	*Agrodiaetus*	*paulae*	**n=17**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00127	*Agrodiaetus*	*paulae*	**n=17**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00155	*Agrodiaetus*	*paulae*	**n=ca.18**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00157	*Agrodiaetus*	*paulae*	**n=ca.17**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00158	*Agrodiaetus*	*paulae*	**n=ca.17**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00161	*Agrodiaetus*	*paulae*	**n=17**	13.07.2000	Ahar Pass	1800-1850 m	Azarbayjan-e Sharqi	Iran
WE	02591	*Agrodiaetus*	*peilei*	**n=39**	27.07.2002	Qamchiyan	1800-1900m	Kordestan	Iran
WE	02592	*Agrodiaetus*	*peilei*	**n=39**	27.07.2002	Qamchiyan	1800-1900m	Kordestan	Iran
WE	02593	*Agrodiaetus*	*peilei*	**n=39**	27.07.2002	Qamchiyan	1800-1900m	Kordestan	Iran
MW	00236	*Agrodiaetus*	*phyllis*	n=many	16.07.2000	Qazayd Dagh	2300 m	Zanjan	Iran
MW	00307	*Agrodiaetus*	*phyllis*	n=76-78	19.07.2000	Asadbar	2900 m	Tehran	Iran
MW	00348	*Agrodiaetus*	*phyllis*	n=82-86	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00355	*Agrodiaetus*	*phyllis*	n=many	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00452	*Agrodiaetus*	*phyllis*	n>75	26.07.2000	Polur	2200 m	Tehran	Iran
MW	99292	*Agrodiaetus*	*pierceae*	n=21	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99341	*Agrodiaetus*	*pierceae*	n=22-24	19.07.1999	Güzeldere Geç.	2600 m	Van	Turkey
MW	99416	*Agrodiaetus*	*pierceae*	n=22	22.07.1999	Dez Çay	1500 m	Hakkari	Turkey
MW	98137	*Agrodiaetus*	*poseidon*	n=21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98138	*Agrodiaetus*	*poseidon*	n=20-21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98141	*Agrodiaetus*	*poseidon*	n=21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98144	*Agrodiaetus*	*poseidon*	n=21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98145	*Agrodiaetus*	*poseidon*	n=20	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98154	*Agrodiaetus*	*poseidon*	n=21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98178	*Agrodiaetus*	*poseidon*	n=19	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	98180	*Agrodiaetus*	*poseidon*	n=19	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	98183	*Agrodiaetus*	*poseidon*	n=19	25.07.1998	Gökpinar	1700 m	Sivas	Turkey
MW	00347	*Agrodiaetus*	*posthumus*	**n=ca.85**	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	00330	*Agrodiaetus*	*pseudoxerxes*	n=15	21.07.2000	Shakuh	2600 m	Golestan	Iran
MW	99061	*Agrodiaetus*	*putnami*	n=ca.25	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99501	*Agrodiaetus*	*putnami*	n=25	26.07.1999	Agrı	1800 m	Agrı	Turkey
MW	01014	*Agrodiaetus*	*ripartii*	n=ca.90	18.07.2001	Ubierna	900 m	Burgos	Spain
MW	01015	*Agrodiaetus*	*ripartii*	n=ca.90	18.07.2001	Ubierna	900 m	Burgos	Spain
MW	98100	*Agrodiaetus*	*ripartii*	n>80	21.07.1998	Dedegöl Geçidi	1700 m	Isparta	Turkey
MW	98215	*Agrodiaetus*	*ripartii*	n=ca.90	28.07.1998	Saimbeyli-Fälle	1500 m	Adana	Turkey
MW	99068	*Agrodiaetus*	*ripartii*	n=ca.90	08.07.1999	Kiliçkaya	1350 m	Artvin	Turkey
MW	99196	*Agrodiaetus*	*ripartii*	n>85	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99218	*Agrodiaetus*	*ripartii*	n=many	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99219	*Agrodiaetus*	*ripartii*	n=many	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99220	*Agrodiaetus*	*ripartii*	n=many	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99263	*Agrodiaetus*	*ripartii*	n>71	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey

Appendix 1 Karyological results in *Agrodiaetus*

Code		Genus	Species	Chromosomes	Date	Locality	Altitude	Province	Country
MW	99574	*Agrodiaetus*	*ripartii*	n=many	29.07.1999	Kop Geçidi	2350 m	Bayburt	Turkey
MW	98261	*Agrodiaetus*	*schuriani*	n=ca.75-80	30.07.1998	Gezbeli Geçidi	1800 m	Kayseri	Turkey
MW	99289	*Agrodiaetus*	*sekercioglui*	n>=46	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	98305	*Agrodiaetus*	*sertavulensis*	**n=20**	06.08.1998	Yellibeli Geçidi	1800 m	Karaman	Turkey
MW	98313	*Agrodiaetus*	*sertavulensis*	**n=ca.20**	06.08.1998	Yellibeli Geçidi	1800 m	Karaman	Turkey
MW	98279	*Agrodiaetus*	*sigberti*	n=28	31.07.1998	Ala Daglar	2900 m	Kayseri	Turkey
MW	98285	*Agrodiaetus*	*sigberti*	n=25	31.07.1998	Ala Daglar	2700 m	Kayseri	Turkey
MW	98240	*Agrodiaetus*	*theresiae*	n=59	29.07.1998	Saimbeyli-Fälle	1200-1500 m	Adana	Turkey
MW	98241	*Agrodiaetus*	*theresiae*	n=ca.59	29.07.1998	Saimbeyli-Fälle	1200-1500 m	Adana	Turkey
MW	98243	*Agrodiaetus*	*theresiae*	n=63	29.07.1998	Saimbeyli-Fälle	1200-1500 m	Adana	Turkey
MW	99258	*Agrodiaetus*	*turcicola*	n=20	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99262	*Agrodiaetus*	*turcicola*	n=20	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99272	*Agrodiaetus*	*turcicola*	n=ca.18-22	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99273	*Agrodiaetus*	*turcicola*	n=ca.18-22	17.07.1999	Kurubas Geçidi	2200 m	Van	Turkey
MW	99294	*Agrodiaetus*	*turcicola*	n=22	18.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99314	*Agrodiaetus*	*turcicola*	n=ca.20	18.07.1999	Çatak	2000-2200 m	Van	Turkey
MW	99321	*Agrodiaetus*	*turcicola*	n=20	18.07.1999	Çatak	2000-2200 m	Van	Turkey
MW	99464	*Agrodiaetus*	*turcicola*	n=20	24.07.1999	Çatak	1600-1900 m	Van	Turkey
MW	99478	*Agrodiaetus*	*turcicola*	n=19	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	99479	*Agrodiaetus*	*turcicola*	n=20	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	99483	*Agrodiaetus*	*turcicola*	n=19-20	25.07.1999	Erek Dagi	2200 m	Van	Turkey
MW	99135	*Agrodiaetus*	*turcicus*	2n=ca.50	12.07.1999	Badilli	1800-2000 m	Igdir	Turkey
MW	99189	*Agrodiaetus*	*turcicus*	n=ca.24	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	99203	*Agrodiaetus*	*turcicus*	n=22-24	15.07.1999	Çaglayan	1500 m	Erzincan	Turkey
MW	00498	*Agrodiaetus*	*valiabadi*	**n=23**	30.07.2000	5 km S Valiabad	1900 m	Mazandaran	Iran
MW	98136	*Agrodiaetus*	*wagneri*	n=18	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	98139	*Agrodiaetus*	*wagneri*	n=19/21	22.07.1998	Zelve	1100 m	Nevsehir	Turkey
MW	99228	*Agrodiaetus*	*zapvadi*	n=18	17.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99229	*Agrodiaetus*	*zapvadi*	n=ca.17	17.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99373	*Agrodiaetus*	*zapvadi*	n=18	20.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99374	*Agrodiaetus*	*zapvadi*	n=19	20.07.1999	Zernek Brj.	1900 m	Van	Turkey
MW	99476	*Agrodiaetus*	*zapvadi*	n=18-20	25.07.1999	Erek Dagi	2200 m	Van	Turkey
WE	02531	*Agrodiaetus*	*zarathustra*	**n=ca.22**	25.07.2002	30 km W Dorud	2100m	Lorestan	Iran
WE	02533	*Agrodiaetus*	*zarathustra*	**n=ca.22**	25.07.2002	30 km W Dorud	2100m	Lorestan	Iran

Chromosome numbers in bold type are new for this taxon.

Appendix 2 List of material

Code	Sex	Genus	Species	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
AD 98001	♂	*Agrodiaetus*	*surakovi*	1			1	1		1		1	I-1	20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98002	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98003	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98004	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98005	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98006	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98007	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98008	♂	*Agrodiaetus*	*surakovi*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98009	♂	*Agrodiaetus*	*pseudactis*	1			1	1		1		1	I-2	20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98010	♂	*Agrodiaetus*	*pseudactis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98011	♂	*Agrodiaetus*	*pseudactis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98012	♂	*Agrodiaetus*	*altivagans*	1			1	1		1		1		20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98013	♂	*Agrodiaetus*	*altivagans*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98014	♂	*Agrodiaetus*	*altivagans*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98015	♂	*Agrodiaetus*	*altivagans*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98016	♂	*Agrodiaetus*	*altivagans*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98017	♂	*Agrodiaetus*	*altivagans*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98018	♂	*Agrodiaetus*	*ninae*	1			1	1		1		1		20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98019	♂	*Agrodiaetus*	*ninae*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98020	♂	*Agrodiaetus*	*ninae*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98021	♂	*Agrodiaetus*	*ninae*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98022	♂	*Agrodiaetus*	*ninae*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98023	♂	*Agrodiaetus*	*ninae*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98024	♂	*Agrodiaetus*	*huberti*	1			1	1		1		1		20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98025	♂	*Agrodiaetus*	*huberti*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98026	♂	*Agrodiaetus*	*huberti*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98027	♂	*Agrodiaetus*	*huberti*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98028	♂	*Agrodiaetus*	*huberti*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98029	♂	*Agrodiaetus*	*iphigenia*	1			1	1		1				20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98030	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98031	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98032	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98033	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98034	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98035	♂	*Agrodiaetus*	*iphigenia*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98036	♂	*Agrodiaetus*	*phyllis*	1			1	1		1		1		20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98037	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98038	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98039	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98040	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98041	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98042	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98043	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98044	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98045	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98046	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98047	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98048	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
AD 98049	♂	*Agrodiaetus*	*phyllis*	1			1							20.07.1998	Gnyshik village	Aiotzdzorsky range	1800-2200 m	Transcaucasia	Armenia
DS 00001	♂	*Agrodiaetus*	*poseidonides*	1				1		1		1	I-3	23.06.2000	Safedou	Darvaz Mts.	2500 m		Tajikistan
DS 00002	♂	*Agrodiaetus*	*damone*	1				1					I-4	03.07.2000	Kuvandyk	South Urals	2000 m	Orenburg	Russia
DS 00003	♂	*Agrodiaetus*	*damocles*	1				1					I-5	05.07.2000	Kuvandyk	South Urals		Orenburg	Russia
DS 00004	♂	*Agrodiaetus*	*phyllides*	1				1					I-6	15.06.2000	Kitabsky national reserve	Zeravshansky Mts.	1500-2500 m		Uzbekistan
DS 00005	♂	*Agrodiaetus*	*dagmara*	1				1		1			I-7	23.06.2000	Nikolaevsky Pass	Khozratishoh Mts.	2500 m		Tajikistan
DS 01001	♂	*Agrodiaetus*	*iphigenides*	1				1		1		1	I-8	08.06.2001	Kitabsky national reserve	Zeravshansky Mts.	1500-2500 m		Uzbekistan
DS 95001	♂	*Agrodiaetus*	*actinides*	1				1					I-9	24.07.1995	Transalaisky Mts.	Aram-Kungei Range	3400-4400 m		Kirgizia
DS 99001	♂	*Agrodiaetus*	*damone*	1				1						12.07.1999	Kuray	Tadzhilu riv.	1700-1800 m	SE Altai Mts	Russia
DS 99002	♂	*Agrodiaetus*	*transcaspicus*	1				1						03.07.1999	Nohur	Kopet Dag			Turkmenia
JC 00029	♂	*Polyommatus*	*menelaos*	1			1	1		1		1		16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00038	♂	*Polyommatus*	*menelaos*	1			1							16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00039	♂	*Polyommatus*	*escheri*	1			1	1		1		1		09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00040	♂	*Agrodiaetus*	*aroaniensis*	1			1	1		1		1	I-10	04.07.2000	Mt. Helmos		1350 m	Peloponnisos	Greece
JC 00041	♂	*Agrodiaetus*	*aroaniensis*	1			1							04.07.2000	Mt. Helmos		1350 m	Peloponnisos	Greece
JC 00042	♂	*Polyommatus*	*eroides*	1			1	1		1		1		08.07.2000	Rodopi Mts.		1200 m	Macedonia	Greece
JC 00043	♂	*Agrodiaetus*	*ripartii*	1			1	1		1		1		21.06.2000	Mt. Helmos		1350-1500 m	Peloponnisos	Greece
JC 00044	♂	*Agrodiaetus*	*aroaniensis*	1			1							04.07.2000	Mt. Helmos		1350 m	Peloponnisos	Greece
JC 00045	♂	*Agrodiaetus*	*nephohiptamenos*	1			1	1		1		1	I-11	07.07.2000	Mt. Orvilos		1200-2100 m	Macedonia	Greece
JC 00046	♂	*Agrodiaetus*	*nephohiptamenos*	1			1	1		1				07.07.2000	Mt. Orvilos		1200-2100 m	Macedonia	Greece
JC 00047	♂	*Agrodiaetus*	*aroaniensis*	1			1							04.07.2000	Mt. Helmos		1350 m	Peloponnisos	Greece
JC 00048	♂	*Agrodiaetus*	*nephohiptamenos*	1			1							07.07.2000	Mt. Orvilos		1200-2100 m	Macedonia	Greece
JC 00051	♂	*Polyommatus*	*menelaos*	1			1	1		1		1		09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00053	♂	*Polyommatus*	*escheri*	1			1							09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00054	♂	*Agrodiaetus*	*ripartii*	1			1							21.06.2000	Mt. Helmos		1350-1500 m	Peloponnisos	Greece
JC 00055	♂	*Aricia*	*artaxerxes*	1			1	1		1		1		16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00056	♂	*Aricia*	*artaxerxes*	1			1							16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00057	♂	*Aricia*	*artaxerxes*	1			1	1		1	1			16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00060	♂	*Polyommatus*	*menelaos*	1			1							16.06.2000	Mt. Taiyetos		1180-1200 m	Peloponnisos	Greece
JC 00061	♂	*Polyommatus*	*andronicus*	1			1	1		1		1		09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00062	♂	*Aricia*	*agestis*	1			1	1		1				09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00063	♂	*Polyommatus*	*icarus*	1			1	1		1		1		09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00064	♂	*Polyommatus*	*andronicus*	1			1							07.07.2000	Mt. Orvilos		1200-2100 m	Macedonia	Greece
JC 00067	♂	*Polyommatus*	*icarus*	1			1							09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00070	♂	*Polyommatus*	*andronicus*	1			1							09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00072	♂	*Polyommatus*	*andronicus*	1			1							09.07.2000	Mt. Falakro		1650 m	Macedonia	Greece
JC 00074	♂	*Polyommatus*	*andronicus*	1			1							07.07.2000	Mt. Orvilos		1200-2100 m	Macedonia	Greece
JC 01014		*Agrodiaetus*	*admetus*	1			1	1		1		1	I-12	14.06.2001	Mt. Taiyetos		1200-1300 m	Peloponnisos	Greece
JC 01018		*Aricia*	*agestis*				1							14.06.2001	Mt. Taiyetos		1200-1300 m	Peloponnisos	Greece
JC 01020		*Agrodiaetus*	*admetus*				1							14.06.2001	Mt. Taiyetos		1200-1300 m	Peloponnisos	Greece
JC 01027		*Coenonympha*	*arcania*				1							08.07.2001	Vathirema	Rhodopi Mts.	1000 m	Macedonia	Greece
JC 01033		*Coenonympha*	*arcania*				1							08.07.2001	Vathirema	Rhodopi Mts.	1000 m	Macedonia	Greece
JC 01038		*Coenonympha*	*arcania*				1							08.07.2001	Vathirema	Rhodopi Mts.	1000 m	Macedonia	Greece
JC 01039		*Coenonympha*	*arcania*				1							08.07.2001	Vathirema	Rhodopi Mts.	1000 m	Macedonia	Greece
JC 02001		*Iphiclides*	*podalirius*				1	1		1				06.09.2002	Agia Marina	Spetses Island	0 m		Greece
JC 02002		*Pontia*	*daplidice*				1							06.09.2002	Agia Marina	Spetses Island	0 m		Greece
JC 02003		*Pontia*	*daplidice*				1							06.09.2002	Agia Marina	Spetses Island	0 m		Greece
JC 02004		*Pontia*	*daplidice*				1							06.09.2002	Agia Marina	Spetses Island	0 m		Greece
JC 02005		*Pontia*	*daplidice*				1							06.09.2002	Agia Marina	Spetses Island	0 m		Greece
JM 00001	♂	*Agrodiaetus*	*fabressei*	1			1	1		1		1	I-13	18.07.2000	Mogorrita	Tragacete		Cuenca	Spain
JM 00002	♂	*Agrodiaetus*	*fabressei*	1			1							18.07.2000	Mogorrita	Tragacete		Cuenca	Spain
JM 00003	♂	*Agrodiaetus*	*fabressei*	1			1							18.07.2000	Mogorrita	Tragacete		Cuenca	Spain
JM 00004	♂	*Agrodiaetus*	*fabressei*	1			1							18.07.2000	Mogorrita	Tragacete		Cuenca	Spain
MW 00001	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1	1		1				09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00002	♂	*Agrodiaetus*	*hamadanensis*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00003	♂	*Agrodiaetus*	*hamadanensis*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00004	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00005	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00006	♂	*Agrodiaetus*	*hamadanensis*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00007	♂	*Agrodiaetus*	*hamadanensis*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00008	♂	*Agrodiaetus*	*hamadanensis*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00009	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00010	♂	*Agrodiaetus*	*demavendi*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00011	♂	*Agrodiaetus*	*demavendi*	1	C		1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00012	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00013	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW 00014	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran

Appendix 2 List of material

Code		Sex	Genus	Species	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	00015	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1		1	I-14	09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00016	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00017	♂	*Lycaena*	*alciphron*	1			1	1		1				09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00018	♂	*Polyommatus*	*icarus*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00019	♂	*Polyommatus*	*icarus*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00020	♂	*Aricia*	*agestis*	1			1	1		1				09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00021		*Lycaena*	*phlaeas*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00022	♀	*Agrodiaetus*	*hamadanensis*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00023	♂	*Vacciniina*	*alcedo*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00024	♂	*Vacciniina*	*alcedo*	1			1	1		1		1		09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00025	♂	*Vacciniina*	*alcedo*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00026	♂	*Agrodiaetus*	*hamadanensis*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00027	♂	*Agrodiaetus*	*hamadanensis*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00028	♀	*Agrodiaetus*	*hamadanensis*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00029	♂	*Agrodiaetus*	*hamadanensis*	1			1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00030	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							09.07.2000	Samqabad	nordöstl. Abyek	1900-2100 m	Tehran	Iran
MW	00031	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00032	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1	1		1	1	1	I-15	10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00033	♂	*Agrodiaetus*	*hamadanensis*	1	C	P	1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00034	♀	*Agrodiaetus*	*hamadanensis*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00035	♀	*Agrodiaetus*	*hamadanensis*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00036	♀	*Agrodiaetus*	*hamadanensis*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00037	♀	*Agrodiaetus*	*hamadanensis*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00038	♂	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00039	♂	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00040	♂	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00041	♀	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00042	♀	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00043	♀	*Polyommatus*	*icarus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00044	♂	*Lycaena*	*asabinus*	1			1	1		1				10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00045	♂	*Lycaena*	*alciphron*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00046	♂	*Lycaena*	*phlaeas*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00047	♂	*Lycaena*	*tityrus*	1			1							10.07.2000	Safedabad	westl. Sirud / Karaj	2000 m	Tehran	Iran
MW	00048	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00049	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00050	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00051	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1		1		11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00052	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00053	♂	*Agrodiaetus*	*elbursicus*	1	C		1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00054	♂	*Agrodiaetus*	*elbursicus*	1	C		1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00055	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00056	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1	1			11.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW	00057	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW	00058	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1				11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00059	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1		1	I-16	11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00060	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1				11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00061	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00062	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00063	♂	*Agrodiaetus*	*birunii*	1	C		1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00064	♂	*Agrodiaetus*	*valiabadi*	1	C	P	1	1		1		1		11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00065	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00066	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00067	♂	*Agrodiaetus*	*elbursicus*	1	C		1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00068	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00069	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00070	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00071	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00072	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1	1	1		11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00073	♂	*Agrodiaetus*	*birunii*	1	C	P	1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00074	♀	*Agrodiaetus*	*birunii*	1			1							11.07.2000	Gardaneh-ye Lavashm	20 km NO Kendevan	2900 m	Mazandaran	Iran
MW	00075	♂	*Polyommatus*	*icarus*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00076	♂	*Meleageria*	*daphnis*	1			1	1		1	1	1		11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00077	♂	*Meleageria*	*daphnis*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00078	♂	*Meleageria*	*daphnis*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00079	♀	*Meleageria*	*daphnis*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00080	♀	*Meleageria*	*daphnis*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00081	♀	*Meleageria*	*daphnis*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00082	♂	*Polyommatus*	*amandus*	1			1							11.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW	00083	♂	*Polyommatus*	*amandus*	1			1							11.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW	00084	♂	*Plebeius*	*pylaon*	1			1							11.07.2000	Valiabad	nördl. Valiabad	1600 m	Mazandaran	Iran
MW	00085	♀	*Lycaena*	*alciphron*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00086	♂	*Polyommatus*	*icarus*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00087	♂	*Meleageria*	*marcida*	1			1	1		1				11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00088	♂	*Meleageria*	*marcida*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00089	♂	*Meleageria*	*marcida*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00090	♂	*Meleageria*	*marcida*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00091	♂	*Meleageria*	*marcida*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00092	♂	*Agrodiaetus*	*elbursicus*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00093	♂	*Agrodiaetus*	*elbursicus*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00094	♀	*Agrodiaetus*	*elbursicus*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00095	♀	*Agrodiaetus*	*elbursicus*	1			1							11.07.2000	Nesa	1 km N Nesa	2100 m	Tehran	Iran
MW	00096	♂	*Agrodiaetus*	*birunii*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00097	♂	*Agrodiaetus*	*birunii*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00098	♂	*Agrodiaetus*	*birunii*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00099	♂	*Agrodiaetus*	*phyllis*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00100	♂	*Agrodiaetus*	*birunii*	1			1							11.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00101	♂	*Agrodiaetus*	*darius*	1	C	P	1	1		1		1	I-17	12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00102	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1		1		12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00103	♂	*Agrodiaetus*	*birunii*	1	C	P	1							12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00104	♂	*Agrodiaetus*	*birunii*	1	C		1							12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00105	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00106	♂	*Agrodiaetus*	*elbursicus*	1	C		1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00107	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00108	♂	*Agrodiaetus*	*elbursicus*	1	C		1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00109	♂	*Agrodiaetus*	*elbursicus*	1	C		1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00110	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1		1		12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00111	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							12.07.2000	Shahrestanak	nördl. Tehran	2000 m	Tehran	Iran
MW	00112	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							12.07.2000	Gajereh		2200 m	Tehran	Iran
MW	00113	♂	*Agrodiaetus*	*elbursicus*	1	C		1							12.07.2000	Gajereh		2200 m	Tehran	Iran
MW	00114	♂	*Agrodiaetus*	*elbursicus*	1	C		1							12.07.2000	Gajereh		2200 m	Tehran	Iran
MW	00115	♂	*Agrodiaetus*	*birunii*	1	C	P	1							12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00116	♂	*Plebeius*	*argus*	1			1	1		1		1		12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00117	♂	*Neolysandra*	*corona*	1			1							12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00118	♂	*Neolysandra*	*corona*	1			1							12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00119	♂	*Lycaena*	*candens*	1			1	1		1				12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00120	♀	*Lycaena*	*candens*	1			1							12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00121	♂	*Lycaena*	*tityrus*	1			1							12.07.2000	Shemshak	südl. Dizin Pass	2900 m	Tehran	Iran
MW	00122	♂	*Vacciniina*	*morgianus*	1			1							12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00123	♂	*Neolysandra*	*corona*	1			1							12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00124	♂	*Neolysandra*	*corona*	1			1							12.07.2000	Dizin Pass	südl. Dizin	3000 m	Tehran	Iran
MW	00125	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1				13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00126	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00127	♂	*Agrodiaetus*	*paulae*	1	C	P	1	1		1		1	I-18	13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00128	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00129	♂	*Agrodiaetus*	*gorbunovi*	1	C	P	1	1		1		1	I-19	13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran

Code		Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	00130	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00131	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00132	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00133	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00134	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00135	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00136	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00137	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00138	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00139	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00140	♂	*Agrodiaetus*	*phyllis*	1	C		1	1		1				13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00141	♂	*Agrodiaetus*	*phyllis*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00142	♀	*Agrodiaetus*	*firdussii*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00143	♀	*Agrodiaetus*	*firdussii*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00144	♀	*Agrodiaetus*	*firdussii*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00145	♀	*Agrodiaetus*	*firdussii*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00146	♀	*Agrodiaetus*	*alcestis*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00147	♀	*Agrodiaetus*		1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00148	♀	*Agrodiaetus*	*phyllis*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00149	♂	*Polyommatus*	*icarus*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00150	♂	*Polyommatus*	*icarus*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00151	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1		1		13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00152	♂	*Agrodiaetus*	*firdussii*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00153	♂	*Agrodiaetus*	*firdussii*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00154	♂	*Agrodiaetus*	*firdussii*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00155	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00156	♂	*Agrodiaetus*	*firdussii*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00157	♂	*Agrodiaetus*	*paulae*	1	C	P	1	1		1				13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00158	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00159	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00160	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00161	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00162	♂	*Agrodiaetus*	*paulae*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00163	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00164	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00165	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00166	♂	*Agrodiaetus*	*phyllis*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00167	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00168	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00169	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00170	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00171	♂	*Plebeius*	*argus*	1	C		1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00172	♂	*Plebeius*	*argus*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00173	♂	*Polyommatus*	*thersites*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00174	♀	*Satyrium*	*abdominalis*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00175	♂	*Satyrium*	*abdominalis*	1			1							13.07.2000	Ahar Pass	20 km SW Ahar	1800-1850 m	Azarbayjan-e Sharqi	Iran
MW	00176	♂	*Agrodiaetus*	*rovshani*	1	C	P	1	1		1		1	I-20	15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00177	♂	*Agrodiaetus*	*gorbunovi*	1	C	P	1	1		1		1		15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00178	♂	*Agrodiaetus*	*gorbunovi*	1	C	P	1	1		1		1		15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00179	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1	1		1		1	I-21	15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00180	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00181	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00182	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00183	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00184	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00185	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1		1		15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00186	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00187	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00188	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00189	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1	1	1		15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00190	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00191	♂	*Lysandra*	*bellargus*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00192	♂	*Polyommatus*	*icarus*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00193	♂	*Polyommatus*	*thersites*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00194	♂	*Polyommatus*	*icarus*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00195	♂	*Polyommatus*	*icarus*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00196	♂	*Meleageria*	*daphnis*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00197	♂	*Meleageria*	*daphnis*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00198	♀	*Agrodiaetus*	*demavendi*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00199	♀	*Agrodiaetus*	*demavendi*	1			1							15.07.2000	Dugijan	30 km NO Marand	2000 m	Azarbayjan-e Sharqi	Iran
MW	00200	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00201	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00202	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00203	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00204	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00205	♀	*Agrodiaetus*	*phyllis*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00206	♂	*Polyommatus*	*icarus*	1	C		1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00207	♂	*Polyommatus*	*icarus*	1	C	P	1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00208	♂	*Agrodiaetus*	*phyllis*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00209	♀	*Agrodiaetus*	*phyllis*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00210	♀	*Agrodiaetus*	*phyllis*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00211	♀	*Agrodiaetus*	*phyllis*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00212	♀	*Agrodiaetus*	*phyllis*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00213	♂	*Lycaena*	*thersamon*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00214	♀	*Lycaena*	*thersamon*	1			1							15.07.2000	Dugijan	30 km NO Marand	3000 m	Azarbayjan-e Sharqi	Iran
MW	00215	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00216	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00217	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00218	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00219	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00220	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00221	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00222	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00223	♂	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00224	♂	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00225	♀	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00226	♂	*Agrodiaetus*	*femininoides*	1	C	P	1	1		1		1	I-22	16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00227	♂	*Agrodiaetus*	*femininoides*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00228	♂	*Agrodiaetus*	*femininoides*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00229	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1		1				16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00230	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00231	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1		1	1	1	I-23	16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00232	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1		1		16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00233	♂	*Agrodiaetus*	*firdussii*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00234	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1		1	I-24	16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00235	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00236	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00237	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00238	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00239	♂	*Agrodiaetus*	*phyllis*	1	C		1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00240	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00241	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00242	♀	*Agrodiaetus*	*femininoides*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00243	♀	*Agrodiaetus*	*femininoides*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00244	♀	*Agrodiaetus*	*alcestis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran

Appendix 2

List of material

Code		Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	00245	♂	*Agrodiaetus*	*phyllis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00246	♂	*Agrodiaetus*	*phyllis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00247	♂	*Agrodiaetus*	*phyllis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00248	♀	*Agrodiaetus*	*firdussii*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00249	♀	*Agrodiaetus*	*firdussii*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00250	♂	*Polyommatus*	*thersites*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00251	♂	*Polyommatus*	*icarus*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00252	♂	*Polyommatus*	*icarus*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00253	♂	*Plebeius*	*argus*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00254	♀	*Plebeius*	*argus*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00255	♂	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00256	♂	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00257	♀	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00258	♀	*Meleageria*	*daphnis*	1			1							16.07.2000	Qazayd Dagh	25 km O Zanjan	2300 m	Zanjan	Iran
MW	00259	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1	1		1				18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00260	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00261	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00262	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1	1		1		1	I-25	18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00263	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00264	♂	*Agrodiaetus*	*klausschuriani*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00265	♀	*Agrodiaetus*	*klausschuriani*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00266	♂	*Agrodiaetus*	*birunii*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00267	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1		1		18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00268	♂	*Agrodiaetus*	*birunii*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00269	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1	1		1		1	I-26	18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00270	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00271	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00272	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00273	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00274	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00275	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00276	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00277	♂	*Agrodiaetus*	*iphidamon*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00278	♂	*Agrodiaetus*	*iphidamon*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00279	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00280	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00281	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00282	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00283	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00284	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00285	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00286	♂	*Agrodiaetus*	*iphidamon*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00287	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00288	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00289	♀	*Vacciniina*	*alcedo*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00290	♂	*Meleageria*	*marcida*	1	C	P	1	1		1		1		18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00291	♂	*Meleageria*	*marcida*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00292	♂	*Meleageria*	*marcida*	1	C		1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00293	♂	*Meleageria*	*marcida*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00294	♂	*Meleageria*	*marcida*	1	C	P	1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00295	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00296	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00297	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00298	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00299	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00300	♂	*Meleageria*	*marcida*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00301	♀	*Lysandra*	*bellargus*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00302	♂	*Polyommatus*	*thersites*	1			1	1		1	1	1		18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00303	♂	*Polyommatus*	*icarus*	1			1							18.07.2000	Veresk	südl. Veresk	1800-1950 m	Mazandaran	Iran
MW	00304	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00305	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00306	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00307	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00308	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00309	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00310	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00311	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00312	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00313	♂	*Agrodiaetus*	*elbursicus*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00314	♂	*Agrodiaetus*	*elbursicus*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00315	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00316	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1	1		1		1		19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00317	♂	*Vacciniina*	*alcedo*	1	C		1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00318	♂	*Plebeius*	*loewii*	1			1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00319	♀	*Polyommatus*	*thersites*	1			1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00320	♂	*Aricia*	*agestis*	1			1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00321	♂	*Meleageria*	*daphnis*	1			1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00322	♀	*Meleageria*	*daphnis*	1			1							19.07.2000	Asadbar	westl. Nesa	2500 m	Tehran	Iran
MW	00323	♂	*Plebeius*	*loewii*	1			1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00324	♂	*Plebeius*	*loewii*	1			1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00325	♂	*Plebeius*	*loewii*	1			1							19.07.2000	Asadbar	westl. Nesa	2900 m	Tehran	Iran
MW	00326	♂	*Polyommatus*	*aedon*	1	C		1	1		1		1		21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00327	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1	1		1				21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00328	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1	1		1	1	1		21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00329	♂	*Agrodiaetus*	*pseudoxerxes*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00330	♂	*Agrodiaetus*	*pseudoxerxes*	1	C	P	1	1		1		1	I-27	21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00331	♂	*Agrodiaetus*	*pseudoxerxes*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00332	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00333	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00334	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00335	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1	1		1				21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00336	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00337	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00338	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00339	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00340	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00341	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00342	♀	*Agrodiaetus*	*caeruleus*	1			1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00343	♀	*Agrodiaetus*	*caeruleus*	1			1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00344	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00345	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00346	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00347	♂	*Agrodiaetus*	*posthumus*	1	C	P	1	1		1		1	I-28	21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00348	♂	*Agrodiaetus*	*phyllis*	1	C	P	1	1		1		1	I-29	21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00349	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00350	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00351	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00352	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00353	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00354	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00355	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00356	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00357	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00358	♂	*Agrodiaetus*	*posthumus*	1	C	P	1	1		1				21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00359	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran

Appendix 2 List of material

Code		Sex	Genus	Species	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	00360	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00361	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00362	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00363	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00364	♂	*Polyommatus*	*aedon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00365	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00366	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00367	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00368	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00369	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00370	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00371	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00372	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00373	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00374	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00375	♂	*Agrodiaetus*	*iphidamon*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00376	♂	*Agrodiaetus*	*caeruleus*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00377	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00378	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	3000 m	Golestan	Iran
MW	00379	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	3000 m	Golestan	Iran
MW	00380	♂	*Agrodiaetus*	*phyllis*	1	C		1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	3000 m	Golestan	Iran
MW	00381	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	3000 m	Golestan	Iran
MW	00382	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00383	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							21.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00384	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1							22.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00385	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1							22.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00386	♀	*Agrodiaetus*	*caeruleus*	1			1							22.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00387	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00388	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00389	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00390	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00391	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00392	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00393	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1	1		1		1	I-30	23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00394	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00395	♂	*Agrodiaetus*	*erschoffii*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00396	♂	*Agrodiaetus*	*erschoffii*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00397	♂	*Agrodiaetus*	*erschoffii*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00398	♂	*Agrodiaetus*	*erschoffii*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00399	♂	*Agrodiaetus*	*erschoffii*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00400	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00401	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00402	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00403	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							24.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00404	♂	*Agrodiaetus*	*phyllis*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00405	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00406	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00407	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00408	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00409	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1	1		1	1	1	I-31	23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00410	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00411	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00412	♂	*Polyommatus*	*icarus*	1	C		1	1		1	1	1		23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00413	♂	*Polyommatus*	*icarus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00414	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00415	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00416	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00417	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00418	♂	*Agrodiaetus*	*caeruleus*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00419	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							24.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00420	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00421	♂	*Agrodiaetus*	*caeruleus*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00422	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00423	♂	*Agrodiaetus*	*iphidamon*	1	C		1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00424	♂	*Agrodiaetus*	*iphidamon*	1	C	P	1	1		1				23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00425	♂	*Agrodiaetus*	*erschoffii*	1	C	P	1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00426	♀	*Agrodiaetus*	*caeruleus*	1	C		1						I-32	23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00427	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00428	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00429	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00430	♀	*Agrodiaetus*	*caeruleus*	1			1							23.07.2000	Hajiabad	25 km SSW Gorgan	2150 m	Golestan	Iran
MW	00431	♂	*Polyommatus*	*aedon*	1	C		1							24.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00432	♂	*Agrodiaetus*	*phyllis*	1	C		1							24.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00433	♂	*Agrodiaetus*	*caeruleus*	1	C		1							24.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00434	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							24.07.2000	Shakuh	35 km S Gorgan	2900 m	Golestan	Iran
MW	00435	♂	*Polyommatus*	*aedon*	1	C		1							25.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00436	♂	*Polyommatus*	*aedon*	1	C	P	1							25.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00437	♂	*Polyommatus*	*aedon*	1	C	P	1							25.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00438	♂	*Agrodiaetus*	*posthumus*	1	C	P	1							25.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00439	♂	*Agrodiaetus*	*phyllis*	1			1							25.07.2000	Shakuh	36°32.418'N-54°25.956 E	2600 m	Golestan	Iran
MW	00440	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00441	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00442	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00443	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00444	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1		1		26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00445	♂	*Agrodiaetus*	*birunii*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00446	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00447	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00448	♂	*Agrodiaetus*	*darius*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00449	♂	*Agrodiaetus*	*birunii*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00450	♂	*Agrodiaetus*	*birunii*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00451	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00452	♂	*Agrodiaetus*	*phyllis*	1	C	P	1	1		1		1		26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00453	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00454	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00455	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00456	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00457	♂	*Agrodiaetus*	*birunii*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00458	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00459	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00460	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00461	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00462	♂	*Agrodiaetus*	*phyllis*	1	C		1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00463	♂	*Agrodiaetus*	*birunii*	1	C	P	1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00464	♂	*Agrodiaetus*	*phyllis*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00465	♂	*Agrodiaetus*	*phyllis*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00466	♀	*Agrodiaetus*	*birunii*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00467	♂	*Lycaena*	*thetis*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00468	♂	*Lycaena*	*thetis*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00469	♂	*Lysandra*	*bellargus*	1			1	1		1		1		26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00470	♂	*Polyommatus*	*icarus*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00471	♂	*Polyommatus*	*icarus*	1			1							26.07.2000	Polur	südl. Polur	2200 m	Tehran	Iran
MW	00472	♂	*Agrodiaetus*	*birunii*	1	C	P	1							27.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00473	♂	*Agrodiaetus*	*birunii*	1	C		1							27.07.2000	Pul-e Zanguleh	15 km NO Kendevan	2400 m	Mazandaran	Iran
MW	00474	♂	*Polyommatus*	*aedon*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 00475	♂	*Neolysandra*	*corona*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00476	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1				28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00477	♂	*Agrodiaetus*	*iphidamon*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00478	♂	*Agrodiaetus*	*iphidamon*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00479	♂	*Agrodiaetus*	*iphidamon*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00480	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00481	♂	*Agrodiaetus*	*birunii*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00482	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00483	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00484	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00485	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00486	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00487	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00488	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00489	♂	*Agrodiaetus*	*birunii*	1	C	P	1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00490	♂	*Polyommatus*	*eroides*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00491	♂	*Polyommatus*	*eroides*	1	C		1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00492	♂	*Polyommatus*	*eroides*	1			1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00493	♂	*Polyommatus*	*eroides*	1			1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00494	♂	*Agrodiaetus*	*birunii*	1			1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00495	♀	*Agrodiaetus*	*birunii*	1			1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 00496	♀	*Lampides*	*boeticus*	1			1							30.07.2000	5 km S Valiabad	Valiabad	1900 m	Mazandaran	Iran
MW 00497	♂	*Favonius*	*quercus*	1			1	1		1	1			30.07.2000	5 km S Valiabad	Valiabad	1900 m	Mazandaran	Iran
MW 00498	♂	*Agrodiaetus*	*valiabadi*	1	C	P	1	1		1		1	I-33	30.07.2000	5 km S Valiabad	Valiabad	1900 m	Mazandaran	Iran
MW 00499	♂	*Agrodiaetus*	*elbursicus*	1	C	P	1							30.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW 00500	♂	*Agrodiaetus*	*elbursicus*	1	C		1							30.07.2000	Kendevan	5 km N Kendevan	2150 m	Mazandaran	Iran
MW 00501	♂	*Agrodiaetus*	*phyllis*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00502	♂	*Agrodiaetus*	*birunii*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00503	♂	*Agrodiaetus*	*birunii*	1	C	P	1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00504	♂	*Neolysandra*	*corona*	1	C		1	1		1		1		31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00505	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00506	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00507	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00508	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00509	♂	*Agrodiaetus*	*birunii*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00510	♂	*Neolysandra*	*corona*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00511	♀	*Neolysandra*	*corona*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00512	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00513	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00514	♂	*Neolysandra*	*corona*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00515	♂	*Vacciniina*	*morgianus*	1	C		1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00516	♂	*Polyommatus*	*amandus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3000 m	Mazandaran	Iran
MW 00517	♂	*Vacciniina*	*morgianus*	1			1	1		1		1		31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00518	♂	*Vacciniina*	*morgianus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00519	♀	*Vacciniina*	*morgianus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00520	♀	*Vacciniina*	*morgianus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00521	♂	*Vacciniina*	*morgianus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00522	♂	*Vacciniina*	*morgianus*	1			1							31.07.2000	Takht-e Suleyman	südwestl. Marzanabad	3600 m	Mazandaran	Iran
MW 00523	♂	*Neolysandra*	*corona*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00524	♂	*Neolysandra*	*corona*	1	C	P	1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00525	♂	*Cyaniris*	*semiargus*	1	C		1	1		1		1		01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00526	♂	*Cyaniris*	*semiargus*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00527	♂	*Vacciniina*	*morgianus*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00528	♂	*Vacciniina*	*morgianus*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00529	♂	*Vacciniina*	*morgianus*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00530	♂	*Polyommatus*	*eroides*	1	C		1	1		1	1	1		01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00531	♂	*Polyommatus*	*eroides*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00532	♂	*Polyommatus*	*eroides*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00533	♂	*Polyommatus*	*eroides*	1	C		1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00534	♂	*Polyommatus*	*eroides*	1	C	P	1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00535	♀	*Polyommatus*	*eroides*	1			1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00536	♀	*Cyaniris*	*semiargus*	1			1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00537	♂	*Lycaena*	*thersamon*	1			1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00538	♀	*Lycaena*	*thersamon*	1			1							01.08.2000	Takht-e Suleyman	südwestl. Marzanabad	3500-3700 m	Mazandaran	Iran
MW 00539	♂	*Agrodiaetus*	*dizinensis*	1	C	P	1	1		1		1	I-34	04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00540	♂	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00541	♂	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00542	♂	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00543	♂	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00544	♂	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00545	♂	*Agrodiaetus*	*dizinensis*	1	C	P	1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00546	♀	*Agrodiaetus*	*dizinensis*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00547	♂	*Agrodiaetus*	*birunii*	1	C	P	1	1		1		1	I-35	04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00548	♂	*Agrodiaetus*	*birunii*	1	C	P	1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00549	♂	*Agrodiaetus*	*posthumus*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00550	♂	*Agrodiaetus*	*posthumus*	1	C		1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00551	♀	*Agrodiaetus*	*posthumus*	1			1							04.08.2000	Dizin Pass	südl. Dizin	3200-3300 m	Tehran	Iran
MW 00552	♀	*Lycaena*	*thersamon*	1			1							28.07.2000	Golestanak Nature Reserve	25 km NO Kendevan	2700-3200 m	Mazandaran	Iran
MW 01001	♂	*Agrodiaetus*	*ainsae*	1	C	P	1	1		1		1		17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01002	♂	*Agrodiaetus*	*ainsae*	1	C		1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01003	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01004	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01005	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01006	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01007	♂	*Agrodiaetus*	*ainsae*	1	C		1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01008	♂	*Agrodiaetus*	*ainsae*	1	C		1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01009	♂	*Polyommatus*	*escheri*	1	C	P	1	1		1				17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01010	♂	*Polyommatus*	*escheri*	1	C	P	1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01011	♂	*Lysandra*	*bellargus*	1	C		1	1		1		1		17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01012	♂	*Polyommatus*	*escheri*	1	C		1							17.07.2001	Ilarduya	westl. Eguino	550 m	Alava	Spain
MW 01013	♂	*Agrodiaetus*	*ripartii*	1	C		1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01014	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1		1	I-36	18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01015	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01016	♂	*Agrodiaetus*	*ripartii*	1	C		1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01017	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01018	♂	*Lysandra*	*coridon*	1	C		1	1		1		1		18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01019	♂	*Polyommatus*	*dorylas*	1	C	P	1	1		1		1		18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01020	♂	*Polyommatus*	*dorylas*	1	C		1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01021	♀	*Polyommatus*	*dorylas*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01022	♂	*Lampides*	*boeticus*	1			1	1		1				18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01023	♂	*Leptotes*	*pirithous*	1			1	1		1				18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01024	♂	*Aricia*	*agestis*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01025	♀	*Polyommatus*	*icarus*	1			1	1		1		1		18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01026	♂	*Plebeius*	*argus*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01027	♀	*Satyrium*	*esculi*	1			1	1		1				18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01028	♀	*Satyrium*	*esculi*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01029	♀	*Satyrium*	*esculi*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01030	♂	*Satyrium*	*esculi*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01031	♀	*Satyrium*	*spini*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01032	♀	*Satyrium*	*spini*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01033	♂	*Gonepteryx*	*cleopatra*	1			1							18.07.2001	Ubierna	20 km N Burgos	900 m	Burgos	Spain
MW 01034	♂	*Lysandra*	*albicans*	1	C	P	1	1		1		1		19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01035	♂	*Lysandra*	*albicans*	1	C		1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01036	♂	*Agrodiaetus*	*fabressei*	1	C	P	1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01037	♂	*Agrodiaetus*	*fabressei*	1	C	P	1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain

Appendix 2 List of material

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 01038	♂	*Agrodiaetus*	*fabressei*	1	C	P	1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01039	♂	*Agrodiaetus*	*fabressei*	1	C	P	1	1		1		1		19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01040	♂	*Agrodiaetus*	*fabressei*	1	C	P	1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01041	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01042	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01043	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01044	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01045	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01046	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01047	♀	*Agrodiaetus*	*fabressei*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01048	♂	*Aricia*	*agestis*	1			1	1		1		1		19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01049	♀	*Polyommatus*	*icarus*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01050	♂	*Lycaeides*	*idas*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01051	♀	*Satyrium*	*acaciae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01052	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01053	♂	*Agrodiaetus*	*ainsae*	1	C	P	1	1		1		1	I-37	20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01054	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01055	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01056	♂	*Agrodiaetus*	*ainsae*	1	C		1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01057	♂	*Agrodiaetus*	*ainsae*	1	C		1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01058	♂	*Agrodiaetus*	*ainsae*	1	C		1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01059	♂	*Lysandra*	*albicans*	1	C	P	1	1		1		1		20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01060	♂	*Polyommatus*	*thersites*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01061	♂	*Aricia*	*cramera*	1			1	1		1		1		20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01062	♂	*Leptidea*	*sinapis*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01063	♂	*Coenonympha*	*dorus*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01064	♂	*Pyronia*	*cecilia*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01065	♂	*Pyronia*	*tithonus*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01066	♀	*Pyronia*	*bathseba*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01067	♀	*Maniola*	*jurtina*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01068	♂	*Hipparchia*	*semele*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01069	♂	*Hipparchia*	*fagi*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01070	♂	*Hipparchia*	*fidia*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01071	♂	*Hipparchia*	*fidia*	1			1							20.07.2001	Sta. Maria	Embalse de la Pena	500 m	Huesca	Spain
MW 01072	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1				21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01073	♂	*Agrodiaetus*	*ripartii*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01074	♂	*Agrodiaetus*	*ripartii*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01075	♂	*Agrodiaetus*	*ainsae*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01076	♂	*Agrodiaetus*	*ainsae*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01077	♂	*Agrodiaetus*	*ainsae*	1	C	P	1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01078	♂	*Agrodiaetus*	*ainsae*	1	C	P	1	1		1				21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01079	♂	*Agrodiaetus*	*ainsae*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01080	♂	*Lysandra*	*albicans*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01081	♂	*Lysandra*	*albicans*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01082	♂	*Polyommatus*	*escheri*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01083	♂	*Polyommatus*	*thersites*	1	C		1	1		1		1		21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01084	♂	*Polyommatus*	*thersites*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01085	♂	*Polyommatus*	*thersites*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01086	♂	*Polyommatus*	*thersites*	1	C		1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01087	♀	*Polyommatus*	*thersites*	1			1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01088	♂	*Coenonympha*	*arcania*	1			1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01089	♀	*Coenonympha*	*dorus*	1			1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01090	♂	*Lasiommata*	*megera*	1			1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01091	♂	*Melanargia*	*galathea*	1			1							21.07.2001	Triste	Embalse de la Pena	600 m	Huesca	Spain
MW 01092	♂	*Lysandra*	*albicans*	1	C		1	1		1		1		22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01093	♂	*Agrodiaetus*	*ainsae*	1	C		1							22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01094	♀	*Agrodiaetus*	*ainsae*	1			1							22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01095	♀	*Agrodiaetus*	*ainsae*	1			1							22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01096	♀	*Agrodiaetus*	*ainsae*	1			1							22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01097	♂	*Leptotes*	*pirithous*	1			1							22.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01098	♂	*Agrodiaetus*	*ainsae*	1	C		1							23.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01099	♂	*Lysandra*	*albicans*	1	C		1							23.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01100	♂	*Lysandra*	*albicans*	1	C		1							23.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01101	♂	*Papilio*	*machaon*	1			1							23.07.2001	Boltana	Pirineos Centrals	650 m	Huesca	Spain
MW 01102	♂	*Lysandra*	*coridon*	1	C		1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01103	♂	*Lysandra*	*coridon*	1	C		1	1		1				23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01104	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01105	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1				23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01106	♂	*Agrodiaetus*	*fulgens*	1	C	P	1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01107	♂	*Agrodiaetus*	*fulgens*	1	C	P	1	1		1		1	I-38	23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01108	♂	*Agrodiaetus*	*fulgens*	1	C	P	1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01109	♂	*Agrodiaetus*	*fulgens*	1	C	P	1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01110	♂	*Agrodiaetus*	*fulgens*	1	C	P	1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01111	♀	*Agrodiaetus*	*fulgens*	1			1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01112	♀	*Agrodiaetus*	*fulgens*	1			1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01113	♂	*Lasiommata*	*megera*	1			1							23.07.2001	Sta. Coloma de Queralt		700 m	Tarragona	Spain
MW 01114	♀	*Iphiclides*	*feisthamelii*	1			1	1		1				24.07.2001	Taradell	SO Vic	700 m	Barcelona	Spain
MW 01115	♂	*Lysandra*	*coridon*	1			1							24.07.2001	Taradell	SO Vic	700 m	Barcelona	Spain
MW 01116	♂	*Lysandra*	*coridon*	1			1	1		1		1		24.07.2001	Taradell	SO Vic	700 m	Barcelona	Spain
MW 01117	♂	*Arethusana*	*arethusa*	1			1							24.07.2001	Seva	S Vic	600 m	Barcelona	Spain
MW 01118	♂	*Pararge*	*aegeria*	1			1							25.07.2001	Lloret de Mar		600 m	Girona	Spain
MW 01119	♂	*Pararge*	*aegeria*	1			1							25.07.2001	Lloret de Mar		600 m	Girona	Spain
MW 01120	♂	*Cacyreus*	*marshalli*	1			1	1		1				27.07.2001	Maruéjols-les-Gardons		100 m	Hérault	France
MW 01121	♂	*Minois*	*dryas*	1			1							27.07.2001	Maruéjols-les-Gardons		100 m	Hérault	France
MW 01401		*Zygaena*	*filipendulae*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01402		*Zygaena*	*filipendulae*	1			1							19.07.2001	Abejar	Sierra de Cabrejas	1100 m	Soria	Spain
MW 01403		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01404		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01405		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01406		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01407		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01408		*Zygaena*	*filipendulae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01409		*Zygaena*	*lonicerae*	1			1							19.07.2001	Montenegro de Camaros	Sierra de Urbión	1200 m	Soria	Spain
MW 01410		*Zygaena*	*hilaris*	1			1							21.07.2001	Triste	Sierra de Urbión	600 m	Soria	Spain
MW 01411		*Zygaena*	*occitanica*	1			1							21.07.2001	Triste	Sierra de Urbión	600 m	Soria	Spain
MW 01412		*Zygaena*	*occitanica*	1			1							21.07.2001	Triste	Sierra de Urbión	600 m	Soria	Spain
MW 01413		*Zygaena*	*fausta*	1			1							21.07.2001	Triste	Sierra de Urbión	600 m	Soria	Spain
MW 01414		*Zygaena*	*occitanica*	1			1							21.07.2001	Triste	Sierra de Urbión	600 m	Soria	Spain
MW 01415		*Zygaena*	*filipendulae*	1			1							24.07.2001	Taradell	SO Vic	600 m	Barcelona	Spain
MW 01416		*Zygaena*	*filipendulae*	1			1							24.07.2001	Taradell	SO Vic	600 m	Barcelona	Spain
MW 02001	♂	*Polyommatus*	*amandus*	1			1	1		1		1		09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02002	♂	*Polyommatus*	*amandus*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02003	♂	*Polyommatus*	*amandus*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02004	♀	*Polyommatus*	*amandus*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02005	♀	*Polyommatus*	*amandus*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02006	♂	*Polyommatus*	*icarus*	1			1	1		1		1		09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02007	♀	*Lycaena*	*alciphron*	1			1	1		1				09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02008	♀	*Celastrina*	*argiolus*	1			1	1		1				09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02009	♂	*Lycaena*	*phlaeas*	1			1	1		1				09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02010	♂	*Pararge*	*aegeria*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02011	♂	*Hyponephele*	*maroccana*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02012	♂	*Gonepteryx*	*cleopatra*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02013	♀	*Argynnis*	*pandora*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2300m	Marrakech	Morocco
MW 02014	♂	*Aricia*	*artaxerxes*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2400m	Marrakech	Morocco
MW 02015	♂	*Pseudochazara*	*atlantis*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2800m	Marrakech	Morocco

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 02016	♂	*Pseudochazara*	*atlantis*	1			1							09.07.2002	Oukaimeden	Hoher Atlas	2800m	Marrakech	Morocco
MW 02017	♂	*Coenonympha*	*vaucheri*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3000m	Marrakech	Morocco
MW 02018	♀	*Pieris*	*segonzaki*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3200m	Marrakech	Morocco
MW 02019	♂	*Pontia*	*daplidice*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3200m	Marrakech	Morocco
MW 02020	♀	*Hipparchia*	*aristaeus*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3200m	Marrakech	Morocco
MW 02021	♂	*Zizeeria*	*knysna*	1			1	1		1				11.07.2002	10 km N Tizi-n-Test	Hoher Atlas	1700m	Marrakech	Morocco
MW 02022	♂	*Berberia*	*lambessanus*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3000m	Marrakech	Morocco
MW 02023	♂	*Berberia*	*lambessanus*	1			1							12.07.2002	Tizi-n-Tacheddirt	Hoher Atlas	3000m	Marrakech	Morocco
MW 02024	♀	*Iphiclides*	*feisthamelii*	1			1	1		1				11.07.2002	10 km N Tizi-n-Test	Hoher Atlas	1700m	Marrakech	Morocco
MW 02025	♂	*Tarucus*	*theophrastus*	1			1	1		1		1		14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02026	♂	*Tarucus*	*theophrastus*	1			1							14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02027	♂	*Polyommatus*	*icarus*	1			1							14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02028	♀	*Lampides*	*boeticus*	1			1	1		1				14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02029	♀	*Hyponephele*	*maroccana*	1			1							14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02030	♀	*Hyponephele*	*maroccana*	1			1							14.07.2002	Tourchte	Hoher Atlas	1400m	Marrakech	Morocco
MW 02031	♀	*Pseudophilotes*	*abencerragus*	1			1	1		1				15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02032	♀	*Pseudophilotes*	*abencerragus*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02033	♂	*Aricia*	*artaxerxes*	1			1	1		1		1		15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02034	♂	*Cyaniris*	*semiargus*	1			1	1		1		1		15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02035	♀	*Polyommatus*	*icarus*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02036		*Carcharodus*	*tripolinus*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02037	♂	*Satyrus*	*ferula*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02038		*Issoria*	*lathonia*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02039	♂	*Gonepteryx*	*cleopatra*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02040	♂	*Colias*	*crocea*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02041	♂	*Thymelicus*	*acteon*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 02042	♂	*Pieris*	*brassicae*	1			1							15.07.2002	Oukaimeden	Hoher Atlas	2700m	Marrakech	Morocco
MW 98001	♂	*Polyommatus*	*icarus*	1	C		1	1						11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98002	♂	*Cupido*	*osiris*	1	C		1	1		1				11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98003	♀	*Cupido*	*osiris*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98004	♀	*Plebeius*	*loewii*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98005	♂	*Plebeius*	*loewii*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98006	♂	*Lycaena*	*thersamon*	1	C		1	1	1					11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98007	♂	*Polyommatus*	*thersites*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98008	♂	*Polyommatus*	*thersites*	1	C		1	1		1				11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98009	♂	*Agrodiaetus*	*carmon*	1	C	P	1	1		1		1	I-39	11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98010	♂	*Agrodiaetus*	*carmon*	1	C	P	1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98011	♂	*Meleageria*	*daphnis*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98012	♂	*Meleageria*	*daphnis*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98013	♂	*Meleageria*	*daphnis*	1	C		1							11.07.1998	Karabayir	südl. Korkuteli	1400 m	Antalya	Turkey
MW 98014	♀	*Satyrium*	*ilicis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98015	♂	*Plebeius*	*loewii*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98016	♂	*Plebeius*	*loewii*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98017	♀	*Aricia*	*agestis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98018	♂	*Polyommatus*	*icarus*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98019	♂	*Agrodiaetus*	*menalcas*	1	C		1	1						12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98020	♂	*Agrodiaetus*	*menalcas*	1	C	P	1	1		1				12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98021	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98022	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98023	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98024	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98025	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98026	♂	*Agrodiaetus*	*admetus*	1	C	P	1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98027	♂	*Agrodiaetus*	*admetus*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98028	♂	*Meleageria*	*daphnis*	1	C		1	1						12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98029	♂	*Meleageria*	*daphnis*	1	C		1	1		1		1		12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98030	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98031	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98032	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98033	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98034	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98035	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98036	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98037	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98038	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98039	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98040	♂	*Meleageria*	*daphnis*	1	C	P	1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98041	♂	*Meleageria*	*daphnis*	1	C	P	1	1						12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98042	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98043	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98044	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98045	♂	*Agrodiaetus*	*menalcas*	1	C		1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98046	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98047	♂	*Agrodiaetus*	*menalcas*	1	C	P	1	1						12.07.1998	Gülübeli Geçidi	westl. Elmali	1500 m	Fethiye	Turkey
MW 98048	♀	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98049	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1	1		1		1		12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98050	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98051	♂	*Meleageria*	*daphnis*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98052	♂	*Plebeius*	*loewii*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98053	♂	*Lycaena*	*alciphron*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98054	♂	*Lycaena*	*alciphron*	1	C		1							12.07.1998	Salur Dagi	westl. Elmali	1700-1900 m	Fethiye	Turkey
MW 98055	♂	*Agrodiaetus*	*admetus*	1	C	P	1	1	1					13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98056	♂	*Agrodiaetus*	*admetus*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98057	♂	*Agrodiaetus*	*admetus*	1	C	P	1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98058	♂	*Agrodiaetus*	*admetus*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98059	♂	*Agrodiaetus*	*admetus*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98060	♂	*Agrodiaetus*	*admetus*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98061	♀	*Agrodiaetus*	*admetus*	1			1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98062	♂	*Agrodiaetus*	*admetus*	1	C	P	1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98063	♀	*Agrodiaetus*	*admetus*	1			1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98064	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98065	♂	*Agrodiaetus*	*menalcas*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98066	♂	*Agrodiaetus*	*menalcas*	1	C		1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98067	♂	*Agrodiaetus*	*menalcas*	1			1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98068	♀	*Agrodiaetus*	*menalcas*	1			1							13.07.1998	Camkuyuzu	Bey Daglari	1750 m	Antalya	Turkey
MW 98069	♂	*Agrodiaetus*	*lycius*	1	C	P	1	1						15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98070	♂	*Agrodiaetus*	*lycius*	1	C	P	1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98071	♂	*Agrodiaetus*	*lycius*	1	C	P	1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98072	♂	*Agrodiaetus*	*lycius*	1	C	P	1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98073	♀	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98074	♂	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98075	♂	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98076	♂	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98077	♂	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98078	♂	*Agrodiaetus*	*lycius*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98079	♂	*Agrodiaetus*	*lycius*	1			1	1		1		1	I-40	15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98080	♂	*Agrodiaetus*	*menalcas*	1	C		1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98081	♂	*Agrodiaetus*	*menalcas*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98082	♂	*Agrodiaetus*	*admetus*	1	C	P	1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98083	♀	*Agrodiaetus*	*admetus*	1	C		1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98084	♀	*Agrodiaetus*	*admetus*	1			1	1		1				15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98085	♀	*Agrodiaetus*	*admetus*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98086	♂	*Agrodiaetus*	*admetus*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98087	♀	*Agrodiaetus*	*admetus*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey
MW 98088	♂	*Agrodiaetus*	*admetus*	1			1							15.07.1998	Cukurelma	nördl. Elmali	1300 m	Antalya	Turkey

Appendix 2

List of material

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 98089	♂	*Agrodiaetus*	*lycius*	1	C	P	1	1		1				20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98090	♂	*Agrodiaetus*	*lycius*	1	C	P	1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98091	♀	*Agrodiaetus*	*ripartii*	1	C		1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98092	♂	*Agrodiaetus*	*alcestis*	1	C		1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98093	♀	*Plebeius*	*argus*	1	C		1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98094	♀	*Lycaena*	*thersamon*	1	C		1	1		1				20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98095	♂	*Lycaena*	*thersamon*	1	C		1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98096	♂	*Lycaena*	*thetis*	1	C		1							20.07.1998	Güneykent	Barla Dagi	1300 m	Isparta	Turkey
MW 98097	♂	*Agrodiaetus*	*ernesti*	1	C	P	1	1		1		1	I-41	21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98098	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98099	♂	*Polyommatus*	*dorylas*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98100	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1						21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98101	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98102	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1	1	1					21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98103	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1	1		1		1	I-42	21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98104	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98105	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98106	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1	1		1				21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98107	♂	*Agrodiaetus*	*iphicarmon*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98108	♂	*Agrodiaetus*	*ripartii*	1	C		1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98109	♂	*Agrodiaetus*	*ripartii*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98110	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98111	♂	*Agrodiaetus*	*ripartii*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98112	♂	*Agrodiaetus*	*ripartii*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98113	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98114	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98115	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98116	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98117	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98118	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98119	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98120	♂	*Agrodiaetus*	*ripartii*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98121	♂	*Agrodiaetus*	*iphicarmon*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98122	♂	*Agrodiaetus*	*ernesti*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98123	♂	*Lycaena*	*thetis*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98124	♂	*Lycaena*	*virgaureae*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98125	♂	*Lycaena*	*virgaureae*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98126	♀	*Lycaena*	*phlaeas*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98127	♂	*Polyommatus*	*dorylas*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98128	♂	*Polyommatus*	*dorylas*	1			1	1		1				21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98129	♂	*Lysandra*	*ossmar*	1			1	1		1		1		21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98130	♂	*Lysandra*	*ossmar*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98131	♂	*Meleageria*	*daphnis*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98132	♂	*Meleageria*	*daphnis*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98133	♂	*Polyommatus*	*icarus*	1			1	1		1				21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98134	♂	*Polyommatus*	*icarus*	1			1							21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98135	♂	*Polyommatus*	*icarus*	1			1	1						21.07.1998	Dedegöl Geçidi	westl. Kurucuova	1700 m	Isparta	Turkey
MW 98136	♂	*Agrodiaetus*	*wagneri*	1	C	P	1	1		1		1	I-43	22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98137	♂	*Agrodiaetus*	*poseidon*	1	C	P	1	1						22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98138	♂	*Agrodiaetus*	*poseidon*	1	C	P	1	1		1		1		22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98139	♂	*Agrodiaetus*	*wagneri*	1	C	P	1	1		1		1		22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98140	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98141	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98142	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98143	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98144	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98145	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98146	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98147	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98148	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98149	♂	*Agrodiaetus*	*wagneri*	1	C	P	1	1						22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98150	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98151	♀	*Agrodiaetus*	*wagneri*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98152	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98153	♂	*Agrodiaetus*	*poseidon*	1	C		1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98154	♂	*Agrodiaetus*	*poseidon*	1	C	P	1	1		1	1	1	I-44	22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98155	♂	*Lysandra*	*ossmar*	1	C	P	1							22.07.1998	Zelve	nördl. Ürgüp	1100 m	Nevsehir	Turkey
MW 98156	♂	*Agrodiaetus*	*iphigenia*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98157	♂	*Agrodiaetus*	*iphigenia*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98158	♂	*Agrodiaetus*	*actis*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98159	♂	*Agrodiaetus*	*actis*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98160	♂	*Agrodiaetus*	*actis*	1	C	P	1	1						25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98161	♂	*Agrodiaetus*	*poseidon*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98162	♂	*Agrodiaetus*	*actis*	1	C	P	1	1		1		1	I-45	25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98163	♂	*Agrodiaetus*	*actis*	1			1	1						25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98164	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98165	♀	*Agrodiaetus*	*actis*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98166	♂	*Agrodiaetus*	*actis*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98167	♂	*Agrodiaetus*	*poseidon*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98168	♂	*Agrodiaetus*	*actis*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98169	♂	*Agrodiaetus*	*poseidon*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98170	♂	*Agrodiaetus*	*maraschi*	1	C	P	1	1		1		1	I-46	25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98171	♂	*Agrodiaetus*	*actis*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98172	♂	*Agrodiaetus*	*menalcas*	1	C		1	1		1	1	1	I-47	25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98173	♂	*Agrodiaetus*	*actis*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98174	♂	*Agrodiaetus*	*maraschi*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98175	♂	*Agrodiaetus*	*poseidon*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98176	♂	*Agrodiaetus*	*actis*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98177	♂	*Agrodiaetus*	*menalcas*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98178	♂	*Agrodiaetus*	*poseidon*	1	C	P	1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98179	♂	*Agrodiaetus*	*poseidon*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98180	♂	*Agrodiaetus*	*poseidon*	1	C	P	1	1		1		1		25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98181	♂	*Agrodiaetus*	*poseidon*	1			1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98182	♂	*Agrodiaetus*	*poseidon*	1			1	1						25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98183	♂	*Agrodiaetus*	*poseidon*	1	C	P	1	1		1				25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98184	♀	*Agrodiaetus*	*actis*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98185	♂	*Lysandra*	*ossmar*	1	C		1	1		1		1		25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98186	♂	*Pseudophilotes*	*vicrama*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98187	♂	*Lysandra*	*ossmar*	1	C		1							25.07.1998	Gökpinar	Gürün	1700 m	Sivas	Turkey
MW 98188	♂	*Agrodiaetus*	*hopfferi*	1	C		1	1						27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98189	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1	1		1		1	I-48	27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98190	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98191	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98192	♂	*Agrodiaetus*	*hopfferi*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98193	♂	*Agrodiaetus*	*hopfferi*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98194	♂	*Agrodiaetus*	*hopfferi*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98195	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98196	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98197	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98198	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98199	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98200	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98201	♂	*Agrodiaetus*	*hopfferi*	1			1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98202	♂	*Agrodiaetus*	*hopfferi*	1			1	1						27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98203	♂	*Agrodiaetus*	*mithridates*	1	C	P	1	1		1		1	I-49	27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 98204	♀	*Agrodiaetus*	*hopfferi*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98205	♂	*Agrodiaetus*	*dama*				1	1		1		1		27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98206	♀	*Agrodiaetus*	*hopfferi*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98207	♂	*Meleageria*	*daphnis*	1	C		1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98208	♂	*Lysandra*	*bellargus*	1	C	P	1							27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98209	♂	*Agrodiaetus*	*hopfferi*	1			1	1						27.07.1998	Gündüzbey	Yesilyurt	1300 m	Malatya	Turkey
MW 98210	♂	*Agrodiaetus*	*admetus*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98211	♂	*Agrodiaetus*	*admetus*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98212	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1		1		1		28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98213	♂	*Agrodiaetus*	*alcestis*	1	C		1	1						28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98214	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98215	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98216	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98217	♀	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98218	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98219	♂	*Plebeius*	*loewii*	1	C		1	1						28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98220	♂	*Plebeius*	*loewii*	1			1	1		1		1		28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98221	♀	*Plebeius*	*loewii*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98222	♂	*Polyommatus*	*cornelia*	1	C	P	1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98223	♂	*Polyommatus*	*cornelia*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98224	♂	*Polyommatus*	*cornelia*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98225	♂	*Polyommatus*	*cornelia*	1	C	P	1	1	1					28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98226	♂	*Polyommatus*	*cornelia*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98227	♂	*Polyommatus*	*thersites*	1	C		1	1						28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98228	♂	*Lysandra*	*syriaca*	1	C		1	1		1	1	1		28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98229	♀	*Lycaena*	*tityrus*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98230	♂	*Lycaena*	*tityrus*	1			1	1		1				28.07.1998	Saimbeyli-Fälle	Saimbeyli	1500 m	Adana	Turkey
MW 98231	♀	*Lycaena*	*tityrus*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98232	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98233	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98234	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98235	♂	*Polyommatus*	*cornelia*	1	C		1	1		1		1		28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98236	♂	*Polyommatus*	*cornelia*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98237	♂	*Polyommatus*	*cornelia*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98238	♂	*Lysandra*	*syriaca*	1	C		1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98239	♂	*Celastrina*	*argiolus*	1			1							28.07.1998	Saimbeyli-Fälle	Saimbeyli	1200 m	Adana	Turkey
MW 98240	♂	*Agrodiaetus*	*theresiae*	1	C	P	1	1		1		1	I-50	29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98241	♂	*Agrodiaetus*	*theresiae*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98242	♂	*Agrodiaetus*	*theresiae*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98243	♂	*Agrodiaetus*	*theresiae*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98244	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1						29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98245	♂	*Agrodiaetus*	*admetus*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98246	♂	*Lysandra*	*syriaca*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98247	♂	*Polyommatus*	*thersites*	1			1	1						29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98248	♂	*Polyommatus*	*icarus*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98249	♂	*Polyommatus*	*thersites*	1	C		1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98250	♂	*Polyommatus*	*icarus*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98251	♂	*Polyommatus*	*thersites*	1	C	P	1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98252	♂	*Plebeius*	*loewii*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98253	♂	*Plebeius*	*loewii*	1			1	1						29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98254	♂	*Polyommatus*	*cornelia*	1			1	1						29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98255	♂	*Meleageria*	*daphnis*	1	C		1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98256	♂	*Meleageria*	*daphnis*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98257	♂	*Meleageria*	*daphnis*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98258	♂	*Meleageria*	*daphnis*	1			1							29.07.1998	Saimbeyli-Fälle	Saimbeyli	1200-1500 m	Adana	Turkey
MW 98259	♂	*Agrodiaetus*	*iphigenia*	1	C		1							30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98260	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98261	♂	*Agrodiaetus*	*schuriani*	1	C	P	1	1		1		1	II-1	30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98262	♀	*Agrodiaetus*	*firdussii*	1	C		1							30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98263	♂	*Agrodiaetus*	*ripartii*	1	C		1							30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98264	♂	*Polyommatus*	*cornelia*	1			1	1		1		1		30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98265	♂	*Lampides*	*boeticus*	1			1	1		1				30.07.1998	Gezbeli Geçidi		1800 m	Kayseri	Turkey
MW 98266	♂	*Agrodiaetus*	*iphigenia*	1	C		1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98267	♂	*Agrodiaetus*	*iphigenia*	1	C		1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98268	♂	*Agrodiaetus*	*iphigenia*	1	C		1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98269	♂	*Aricia*	*isauricus*	1			1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98270	♂	*Aricia*	*anteros*	1	C	P	1	1		1		1		30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98271	♂	*Meleageria*	*daphnis*	1	C		1	1	-					30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98272	♂	*Meleageria*	*daphnis*	1	C		1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98273	♂	*Meleageria*	*daphnis*	1	C		1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98274	♂	*Meleageria*	*daphnis*	1			1	1		1				30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98275	♂	*Meleageria*	*daphnis*	1			1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98276	♂	*Meleageria*	*daphnis*	1			1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98277	♂	*Meleageria*	*daphnis*	1			1							30.07.1998	Erciyes Dagi	Kayakevi	2000 m	Kayseri	Turkey
MW 98278	♂	*Lysandra*	*bellargus*	1			1	1		1		1		30.07.1998	Ala Daglar	Yahyali	1600 m	Kayseri	Turkey
MW 98279	♂	*Agrodiaetus*	*sigberti*	1	C	P	1							31.07.1998	Ala Daglar	Yahyali	2900 m	Kayseri	Turkey
MW 98280	♂	*Polyommatus*	*icarus*	1			1							31.07.1998	Ala Daglar	Yahyali	2900 m	Kayseri	Turkey
MW 98281	♂	*Polyommatus*	*icarus*	1			1							31.07.1998	Ala Daglar	Yahyali	2900 m	Kayseri	Turkey
MW 98282	♀	*Agrodiaetus*	*sigberti*	1	C		1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98283	♂	*Agrodiaetus*	*sigberti*	1	C	P	1	1						31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98284	♂	*Agrodiaetus*	*sigberti*	1	C	P	1	1		1			II-2	31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98285	♂	*Agrodiaetus*	*sigberti*	1	C	P	1	1		1		1	II-3	31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98286	♂	*Agrodiaetus*	*sigberti*	1	C		1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98287	♂	*Agrodiaetus*	*sigberti*	1	C		1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98288	♂	*Agrodiaetus*	*sigberti*	1	C		1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98289	♂	*Agrodiaetus*	*iphigenia*	1	C		1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98290	♂	*Agrodiaetus*	*sigberti*	1	C	P	1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98291	♂	*Agrodiaetus*	*sigberti*	1			1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98292	♂	*Agrodiaetus*	*sigberti*	1			1							31.07.1998	Ala Daglar	Yahyali	2700 m	Kayseri	Turkey
MW 98293	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1	1						04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98294	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1	1		1		1	II-4	04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98295	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98296	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98297	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98298	♂	*Agrodiaetus*	*guezelmavi*	1	C	P	1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98299	♀	*Agrodiaetus*	*guezelmavi*	1	C	P	1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98300	♂	*Polyommatus*	*thersites*	1	C		1							04.08.1998	Taskent		1450 m	Konya	Turkey
MW 98301	♀	*Agrodiaetus*	*guezelmavi*	1	C		1							05.08.1998	Taskent		1450 m	Konya	Turkey
MW 98302	♀	*Agrodiaetus*	*ripartii*	1	C		1							05.08.1998	Taskent		1450 m	Konya	Turkey
MW 98303	♂	*Lysandra*	*bellargus*	1			1							05.08.1998	Taskent		1450 m	Konya	Turkey
MW 98304	♂	*Agrodiaetus*	*iphigenia*	1			1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98305	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1	1						06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98306	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98307	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98308	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98309	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98310	♀	*Agrodiaetus*	*sertavulensis*	1	C		1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98311	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98312	♂	*Agrodiaetus*	*iphigenia*	1	C		1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98313	♂	*Agrodiaetus*	*sertavulensis*	1	C	P	1	1		1		1	II-5	06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98314	♀	*Agrodiaetus*	*sertavulensis*	1	C		1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98315	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1		1		1		06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98316	♀	*Agrodiaetus*	*alcestis*	1	C		1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98317	♂	*Meleageria*	*daphnis*	1			1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98318	♂	*Meleageria*	*daphnis*	1			1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey

Appendix 2 List of material

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 98319	♂	*Polyommatus*	*cornelia*	1	C	P	1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98320	♀	*Satyrium*	*spini*	1			1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98321	♂	*Lycaena*	*thersamon*	1			1	1						06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 98322	♀	*Lycaena*	*thersamon*	1			1							06.08.1998	Yellibeli Geçidi	Ermenek	1800 m	Karaman	Turkey
MW 99001	♂	*Aricia*	*torulensis*	1	C	P	1	1		1		1		04.07.1999	Torul	15 km SO Torul	1100 m	Gümüshane	Turkey
MW 99002	♂	*Polyommatus*	*amandus*	1			1							04.07.1999	Tersundagi Geç.	Siran	2000 m	Gümüshane	Turkey
MW 99003	♂	*Polyommatus*	*amandus*	1			1							04.07.1999	Tersundagi Geç.	Siran	2000 m	Gümüshane	Turkey
MW 99004	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99005	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99006	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1		1	II-6	05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99007	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99008	♂	*Agrodiaetus*	*firdussii*	1	C		1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99009	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1	1		1		1	II-7	05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99010	♂	*Agrodiaetus*	*firdussii*	1	C		1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99011	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99012	♂	*Neolysandra*	*coelestina*	1	C		1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99013	♂	*Neolysandra*	*coelestina*	1	C	P	1	1		1		1		05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99014	♂	*Polyommatus*	*dorylas*	1	C		1	1		1	1	1		05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99015	♂	*Agrıades*	*pyrenaicus*	1	C		1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99016	♂	*Agrodiaetus*	*turcicus*	1	C		1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99017	♂	*Agrıades*	*pyrenaicus*	1	C	P	1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99018	♂	*Agrıades*	*pyrenaicus*	1			1	1		1		1		05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99019	♂	*Agrıades*	*pyrenaicus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99020	♂	*Agrıades*	*pyrenaicus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99021	♂	*Agrıades*	*pyrenaicus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99022	♂	*Agrıades*	*pyrenaicus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99023	♂	*Turanana*	*endymion*	1			1	1						05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99024	♂	*Turanana*	*endymion*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99025	♂	*Plebeius*	*loewii*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99026	♂	*Plebeius*	*loewii*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99027	♂	*Polyommatus*	*icarus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99028	♂	*Aricia*	*agestis*	1			1	1		1				05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99029	♂	*Polyommatus*	*icarus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99030	♂	*Polyommatus*	*icarus*	1			1							05.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99031	♂	*Agrodiaetus*	*hopfferi*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99032	♀	*Agrodiaetus*	*ripartii*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99033	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99034	♀	*Agrodiaetus*	*ripartii*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99035	♀	*Agrodiaetus*	*ripartii*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99036	♂	*Agrodiaetus*	*admetus*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99037	♂	*Agrodiaetus*	*admetus*	1	C		1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99038	♂	*Polyommatus*	*cornelia*	1			1	1		1		1		06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99039	♂	*Lysandra*	*bellargus*	1			1							06.07.1999	Çaglayan	5 km O Çaglayan	1500 m	Erzincan	Turkey
MW 99040	♂	*Polyommatus*	*myrrhinus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99041	♂	*Polyommatus*	*myrrhinus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99042	♂	*Lysandra*	*corydonius*	1			1	1		1				07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99043	♂	*Lysandra*	*corydonius*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99044	♂	*Plebeius*	*loewii*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99045	♀	*Maculinea*	*arion*	1			1	1		1	1			07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99046	♀	*Kretania*	*eurypilus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99047	♂	*Polyommatus*	*amandus*	1			1	1		1		1		07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99048	♀	*Polyommatus*	*amandus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99049	♂	*Polyommatus*	*amandus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99050	♂	*Polyommatus*	*amandus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99051	♂	*Polyommatus*	*amandus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99052	♂	*Polyommatus*	*amandus*	1			1							07.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99053	♂	*Agrodiaetus*	*huberti*	1	C	P	1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99054	♂	*Agrodiaetus*	*huberti*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99055	♂	*Agrodiaetus*	*huberti*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99056	♂	*Agrodiaetus*	*huberti*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99057	♂	*Agrodiaetus*	*merhaba*	1	C	P	1	1		1		1	II-8	08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99058	♂	*Agrodiaetus*	*artvinensis*	1	C	P	1	1		1		1	II-9	08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99059	♂	*Agrodiaetus*	*merhaba*	1	C	P	1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99060	♂	*Agrodiaetus*	*carmon*	1	C	P	1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99061	♂	*Agrodiaetus*	*putnami*	1	C	P	1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99062	♂	*Agrodiaetus*	*iphigenia*	1	C		1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99063	♂	*Agrodiaetus*	*artvinensis*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99064	♂	*Agrodiaetus*	*artvinensis*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99065	♂	*Agrodiaetus*	*artvinensis*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99066	♂	*Agrodiaetus*	*artvinensis*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99067	♂	*Agrodiaetus*	*ninae*	1	C	P	1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99068	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1	1			08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99069	♂	*Agrodiaetus*	*iphigenia*	1	C		1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99070	♂	*Agrodiaetus*	*ripartii*	1	C		1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99071	♂	*Agrodiaetus*	*ripartii*	1	C		1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99072	♂	*Polyommatus*	*thersites*	1	C		1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99073	♂	*Polyommatus*	*icarus*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99074	♀	*Polyommatus*	*icarus*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99075	♂	*Polyommatus*	*icarus*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99076	♂	*Lysandra*	*corydonius*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99077	♂	*Plebeius*	*loewii*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99078	♂	*Meleageria*	*daphnis*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99079	♂	*Meleageria*	*daphnis*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99080	♂	*Pseudophilotes*	*vicrama*	1			1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99081	♂	*Pseudophilotes*	*vicrama*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99082	♂	*Pseudophilotes*	*vicrama*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99083	♂	*Celastrina*	*argiolus*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99084	♂	*Celastrina*	*argiolus*	1			1	1		1				08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99085	♂	*Celastrina*	*argiolus*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99086	♂	*Cupido*	*osiris*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99087	♂	*Lycaena*	*alciphron*	1			1							08.07.1999	Kiliçkaya	Yusufeli	1350 m	Artvin	Turkey
MW 99088	♂	*Agrodiaetus*	*iphigenia*	1	C		1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99089	♂	*Agrodiaetus*	*iphigenia*	1	C		1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99090	♂	*Polyommatus*	*dorylas*	1			1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99091	♂	*Polyommatus*	*eros*	1			1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99092	♂	*Polyommatus*	*eros*	1			1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99093		*Satyrium*	*ilicis*	1			1							09.07.1999	Demirkent	20 km O Demirkent	1600 m	Artvin	Turkey
MW 99094	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1	1		1		1		11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99095	♂	*Agrodiaetus*	*huberti*	1	C	P	1	1		1		1	II-10	11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99096	♀	*Agrodiaetus*	*cyaneus*	1	C		1							11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99097	♂	*Aricia*	*isauricus*	1	C		1	1		1		1		11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99098	♂	*Aricia*	*isauricus*	1	C		1							11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99099	♂	*Aricia*	*isauricus*	1	C	P	1							11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99100	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							11.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99101	♂	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99102	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99103	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99104	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99105	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1	1	1	II-11	11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99106	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99107	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99108	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99109	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99110	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99111	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey

Appendix 2 List of material

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 99112	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99113	♂	*Agrodiaetus*	*demavendi*	1	C		1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99114	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99115	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99116	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99117	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99118	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99119	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99120	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99121	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99122	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99123	♀	*Agrodiaetus*	*demavendi*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99124	♀	*Plebeius*	*christophi*	1			1	1		1				11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99125	♂	*Cupido*	*osiris*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99126	♂	*Polyommatus*	*thersites*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99127	♂	*Polyommatus*	*thersites*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99128	♂	*Polyommatus*	*thersites*	1			1	1		1				11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99129	♂	*Polyommatus*	*icarus*	1			1							11.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99130	♂	*Agrodiaetus*	*huberti*	1	C	P	1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99131	♂	*Agrodiaetus*	*huberti*	1	C	P	1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99132	♂	*Agrodiaetus*	*huberti*	1	C	P	1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99133	♀	*Agrodiaetus*	*huberti*	1	C		1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99134	♀	*Aricia*	*eumedon*	1			1	1		1		1		12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99135	♂	*Agrodiaetus*	*turcicus*	1	C	P	1	1		1	1	1		12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99136	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99137	♂	*Agrodiaetus*	*firdussii*	1	C		1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99138	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99139	♂	*Polyommatus*	*dorylas*	1			1							12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99140	♂	*Lysandra*	*corydonius*	1			1	1		1				12.07.1999	Badilli	Tuzluca	1800-2000 m	Igdir	Turkey
MW 99141	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99142	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99143	♂	*Agrodiaetus*	*demavendi*	1	C		1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99144	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99145	♂	*Agrodiaetus*	*demavendi*	1	C		1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99146	♂	*Agrodiaetus*	*demavendi*	1	C		1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99147	♂	*Agrodiaetus*	*demavendi*	1	C		1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99148	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99149	♂	*Agrodiaetus*	*demavendi*	1	C		1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99150	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99151	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99152	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							13.07.1999	Akçay	Kagizman	1200 m	Kars	Turkey
MW 99153	♂	*Agrodiaetus*	*iphigenia*	1	C		1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99154	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99155	♂	*Agrodiaetus*	*huberti*	1	C	P	1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99156	♂	*Agrodiaetus*	*huberti*	1	C	P	1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99157	♀	*Agrodiaetus*	*huberti*	1			1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99158	♂	*Satyrium*	*hyrcanicum*	1			1	1		1				13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99159	♂	*Satyrium*	*hyrcanicum*	1			1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99160	♀	*Satyrium*	*hyrcanicum*	1			1							13.07.1999	Kagizman	30 km SW Kagizman	1400 m	Kars	Turkey
MW 99161	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							14.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99162	♂	*Agrodiaetus*	*turcicus*	1	C		1							14.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99163	♂	*Plebeius*	*pylaon*	1	C		1	1		1		1		14.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW 99164	♂	*Agrodiaetus*	*interjectus*	1	C	P	1	1		1	1	1	II-12	14.07.1999	Çiftlik	5 km NO Çiftlik	1900 m	Erzurum	Turkey
MW 99165	♂	*Agrodiaetus*	*altivagans*	1	C	P	1	1		1				15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99166	♂	*Agrodiaetus*	*firdussii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99167	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99168	♂	*Agrodiaetus*	*damon*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99169	♂	*Agrodiaetus*	*huberti*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99170	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1	1		1				15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99171	♂	*Agrodiaetus*	*firdussii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99172	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99173	♂	*Agrodiaetus*	*huberti*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99174	♂	*Agrodiaetus*	*phyllis*	1	C	P	1	1		1		1		15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99175	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99176	♂	*Agrodiaetus*	*iphigenia*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99177	♂	*Agrodiaetus*	*turcicus*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99178	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99179	♂	*Agrodiaetus*	*huberti*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99180	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99181	♂	*Agrodiaetus*	*iphigenia*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99182	♂	*Agrodiaetus*	*damon*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99183	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99184	♂	*Agrodiaetus*	*turcicus*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99185	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99186	♂	*Agrodiaetus*	*firdussii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99187	♂	*Agrodiaetus*	*phyllis*	1	C		1	1		1				15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99188	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99189	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99190	♂	*Agrodiaetus*	*turcicus*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99191	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99192	♂	*Agrodiaetus*	*turcicus*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99193	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99194	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99195	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99196	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1		1	II-13	15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99197	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99198	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99199	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99200	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99201	♂	*Agrodiaetus*	*phyllis*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99202	♂	*Agrodiaetus*	*turcicus*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99203	♂	*Agrodiaetus*	*turcicus*	1	C	P	1	1		1		1	II-14	15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99204	♂	*Agrodiaetus*	*firdussii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99205	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99206	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99207	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99208	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99209	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99210	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99211	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99212	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99213	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99214	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99215	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99216	♂	*Agrodiaetus*	*ripartii*	1	C		1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99217	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99218	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99219	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99220	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99221	♂	*Turanana*	*endymion*	1			1	1		1				15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99222	♂	*Turanana*	*endymion*	1			1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99223	♂	*Neolysandra*	*coelestina*	1			1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99224	♂	*Neolysandra*	*coelestina*	1			1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99225	♂	*Polyommatus*	*dorylas*	1			1							15.07.1999	Çaglayan	5 km SO Çaglayan	1500 m	Erzincan	Turkey
MW 99226	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1	1		1		1		17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey

Code		Sex	Genus	Species	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	99227	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99228	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99229	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99230	♀	*Agrodiaetus*	*zapvadi*	1	C		1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99231	♀	*Agrodiaetus*	*zapvadi*	1	C		1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99232	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99233	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99234	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99235	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW	99236	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99237	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99238	♂	*Agrodiaetus*	*firdussii*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99239	♂	*Agrodiaetus*	*altivagans*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99240	♂	*Agrodiaetus*	*altivagans*	1	C	P	1	1		1		1	II-15	17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99241	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99242	♂	*Agrodiaetus*	*huberti*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99243	♂	*Agrodiaetus*	*firdussii*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99244	♂	*Agrodiaetus*	*phyllis*	1	C		1	1						17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99245	♂	*Agrodiaetus*	*phyllis*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99246	♂	*Agrodiaetus*	*firdussii*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99247	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1		1		17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99248	♂	*Agrodiaetus*	*phyllis*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99249	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99250	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99251	♂	*Agrodiaetus*	*phyllis*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99252	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99253	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99254	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99255	♀	*Agrodiaetus*	*?*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99256	♀	*Agrodiaetus*	*?*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99257	♂	*Polyommatus*	*icarus*	1	C		1							17.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW	99258	♂	*Agrodiaetus*	*turcicola*	1	C	P	1	1	1					17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99259	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99260	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99261	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99262	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99263	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1				17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99264	♂	*Agrodiaetus*	*ripartii*	1	C	P	1	1		1				17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99265	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99266	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99267	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99268	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99269	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99270	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99271	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99272	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99273	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99274	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1	1		1		1	II-16	17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99275	♀	*Agrodiaetus*	*dantchenkoi*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99276	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1	1		1		1		17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99277	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99278	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99279	♂	*Meleageria*	*daphnis*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99280	♂	*Meleageria*	*daphnis*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99281	♂	*Meleageria*	*daphnis*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99282	♂	*Meleageria*	*daphnis*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99283	♂	*Kretania*	*eurypilus*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99284	♂	*Polyommatus*	*thersites*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99285	♂	*Polyommatus*	*icarus*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99286	♂	*Agrodiaetus*	*kurdistanicus*	1	C	P	1	1		1		1	II-17	18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99287	♂	*Agrodiaetus*	*kurdistanicus*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99288	♂	*Agrodiaetus*	*kurdistanicus*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99289	♂	*Agrodiaetus*	*sekercioglui*	1	C	P	1	1		1			II-18	18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99290	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99291	♂	*Agrodiaetus*	*sekercioglui*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99292	♂	*Agrodiaetus*	*pierceae*	1	C	P	1	1		1		1		18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99293	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99294	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99295	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99296	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99297	♂	*Agrodiaetus*	*iphigenia*	1	C		1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99298	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99299	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99300	♂	*Vacciniina*	*alcedo*	1	C		1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99301	♂	*Neolysandra*	*fatima*	1	C		1	1		1		1		18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99302	♂	*Turanana*	*endymion*	1	C		1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99303	♂	*Kretania*	*eurypilus*	1			1	1		1		1		18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99304	♂	*Plebeius*	*loewii*	1	C		1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99305	♀	*Pseudophilotes*	*vicrama*	1	C		1							18.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99306	♂	*Agrodiaetus*	*iphigenia*	1	C		1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99307	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99308	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99309	♂	*Agrodiaetus*	*baytopi*	1	C-		1	1		1		1	II-19	18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99310	♂	*Agrodiaetus*	*iphigenia*	1	C		1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99311	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99312	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99313	♂	*Agrodiaetus*	*iphigenia*	1	C		1	1						18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99314	♂	*Agrodiaetus*	*turcicola*	1	C	P	1	1		1				18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99315	♂	*Agrodiaetus*	*firdussii*	1	C		1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99316	♂	*Agrodiaetus*	*firdussii*	1	C		1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99317	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99318	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99319	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1	1		1		1		18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99320	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1	1		1				18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99321	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99322	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99323	♂	*Neolysandra*	*fatima*	1	C	P	1							18.07.1999	Çatak	25-32 km N Çatak	2000-2200 m	Van	Turkey
MW	99324	♂	*Agrodiaetus*	*turcicola*	1	C		1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99325	♂	*Agrodiaetus*	*dantchenkoi*	1	C	P	1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99326	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99327	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99328	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99329	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99330	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99331	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99332	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99333	♂	*Agrodiaetus*	*turcicola*	1			1							17.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99334	♂	*Agrodiaetus*	*turcicola*	1	C		1							19.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99335	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							19.07.1999	Kurubas Geçidi	Gürpinar	2200 m	Van	Turkey
MW	99336	♂	*Agrodiaetus*	*altivagans*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW	99337	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW	99338	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW	99339	♂	*Agrodiaetus*	*pierceae*	1	C		1	1						19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW	99340	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW	99341	♂	*Agrodiaetus*	*pierceae*	1	C	P	1	1		1		1	II-20	19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 99342	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99343	♂	*Agrodiaetus*	*phyllis*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99344	♂	*Agrodiaetus*	*baytopi*	1	C	P	1	1		1				19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99345	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99346	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99347	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99348	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99349	♂	*Agrodiaetus*	*iphigenia*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99350	♂	*Agrodiaetus*	*iphigenia*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99351	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2600 m	Van	Turkey
MW 99352	♂	*Agrodiaetus*	*turcicola*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99353	♂	*Agrodiaetus*	*altivagans*	1	C	P	1	1		1		1	II-21	19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99354	♂	*Agrodiaetus*	*firdussii*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99355	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99356	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99357	♂	*Agrodiaetus*	*altivagans*	1	C	P	1	1		1				19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99358	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99359	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99360	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99361	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99362	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99363	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99364	♂	*Agrodiaetus*	*baytopi*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99365	♂	*Agrodiaetus*	*pierceae*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99366	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99367	♂	*Agrodiaetus*	*baytopi*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99368	♂	*Agrodiaetus*	*baytopi*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99369	♂	*Agrodiaetus*	*baytopi*	1	C		1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99370	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99371	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99372	♂	*Agrodiaetus*	*baytopi*	1	C	P	1	1		1		1		19.07.1999	Güzeldere Geç.	Baskale	2500 m	Van	Turkey
MW 99373	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							20.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99374	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1	1		1		1	II-22	20.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99375	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							20.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99376	♂	*Agrodiaetus*	*antidolus*	1	C	P	1	1		1				20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99377	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99378	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99379	♀	*Agrodiaetus*	*antidolus*	1	C		1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99380	♂	*Agrodiaetus*	*alcestis*	1	C	P	1	1		1				20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99381	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1				20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99382	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1		1		20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99383	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99384	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99385	♀	*Agrodiaetus*	*demavendi*	1	C		1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99386	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99387	♀	*Lycaena*	*alciphron*	1	C		1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99388	♂	*Lycaena*	*tityrus*	1	C		1							20.07.1999	Yüksekova	22 km NW Yüksekova	1800 m	Hakkari	Turkey
MW 99389	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							20.07.1999	Dilezi Geçidi	nordöstl. Yüksekova	2100 m	Hakkari	Turkey
MW 99390	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Dilezi Geçidi	nordöstl. Yüksekova	2100 m	Hakkari	Turkey
MW 99391	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Dilezi Geçidi	nordöstl. Yüksekova	2100 m	Hakkari	Turkey
MW 99392	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							20.07.1999	Dilezi Geçidi	nordöstl. Yüksekova	2100 m	Hakkari	Turkey
MW 99393	♂	*Agrodiaetus*	*antidolus*	1	C	P	1	1		1		1	II-23	21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99394	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99395	♀	*Agrodiaetus*	*antidolus*	1	C		1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99396	♂	*Lycaena*	*thersamon*	1	C	P	1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99397	♀	*Polyommatus*	*icarus*	1			1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99398	♂	*Satyrium*	*myrtale*	1			1	1		1				21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99399	♀	*Satyrium*	*myrtale*	1			1	1						21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99400	♀	*Satyrium*	*myrtale*	1			1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99401	♀	*Satyrium*	*myrtale*	1			1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99402	♀	*Satyrium*	*myrtale*	1			1							21.07.1999	Haruna Geçidi	südöstl. Yüksekova	2000 m	Hakkari	Turkey
MW 99403	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99404	♂	*Agrodiaetus*	*antidolus*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99405	♂	*Agrodiaetus*	*demavendi*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99406	♂	*Agrodiaetus*	*antidolus*	1	C	P	1	1		1	1	1	II-24	22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99407	♂	*Agrodiaetus*	*demavendi*	1	C	P	1	1		1		1		22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99408	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1	1		1		1	II-25	22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99409	♂	*Agrodiaetus*	*hopfferi*	1	C-	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99410	♂	*Agrodiaetus*	*hopfferi*	1	C-		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99411	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99412	♂	*Agrodiaetus*	*phyllis*	1	C		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99413	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1		1	II-26	22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99414	♂	*Agrodiaetus*	*altivagans*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99415	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99416	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99417	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99418	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99419	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99420	♂	*Agrodiaetus*	*iphigenia*	1	C		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99421	♂	*Agrodiaetus*	*iphigenia*	1	C		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99422	♂	*Agrodiaetus*	*firdussii*	1	C	P	1	1		1				22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99423	♂	*Agrodiaetus*	*iphigenia*	1	C		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99424	♂	*Lysandra*	*bellargus*	1	C		1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99425	♂	*Chilades*	*trochylus*	1			1	1		1				22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99426	♂	*Chilades*	*trochylus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99427	♂	*Cyaniris*	*semiargus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99428	♂	*Polyommatus*	*icarus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99429	♂	*Polyommatus*	*icarus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99430	♂	*Vacciniina*	*alcedo*	1			1	1		1				22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99431	♂	*Vacciniina*	*alcedo*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99432	♂	*Vacciniina*	*alcedo*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99433	♂	*Vacciniina*	*alcedo*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99434	♂	*Lysandra*	*bellargus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99435	♂	*Lysandra*	*bellargus*	1			1	1		1				22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99436	♂	*Polyommatus*	*icarus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99437	♂	*Polyommatus*	*icarus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99438	♀	*Kretania*	*eurypilus*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99439	♀	*Lycaena*	*phlaeas*	1			1							22.07.1999	Dez Çay	nordöstl. Hakkari	1500 m	Hakkari	Turkey
MW 99440	♂	*Agrodiaetus*	*iphigenia*	1	C	P	1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99441	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99442	♂	*Agrodiaetus*	*phyllis*	1	C		1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99443	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99444	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99445	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99446	♂	*Lysandra*	*bellargus*	1			1	1						23.07.1999	Dez Çay	nordöstl. Hakkari	1500-1700 m	Hakkari	Turkey
MW 99447	♂	*Agrodiaetus*	*pierceae*	1	C	P	1							23.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99448	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1	1		1		1	II-27	23.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99449	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1	1		1				23.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99450	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							23.07.1999	Zernek Brj.	Güzelsu	1900 m	Van	Turkey
MW 99451	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW 99452	♂	*Agrodiaetus*	*phyllis*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW 99453	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW 99454	♂	*Agrodiaetus*	*baytopi*	1	C-		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW 99455	♂	*Agrodiaetus*	*baytopi*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW 99456	♂	*Agrodiaetus*	*phyllis*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey

Code		Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW	99457	♂	*Agrodiaetus*	*firdussii*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99458	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99459	♂	*Agrodiaetus*	*phyllis*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99460	♂	*Agrodiaetus*	*baytopi*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99461	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99462	♂	*Agrodiaetus*	*phyllis*	1	C		1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99463	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99464	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							24.07.1999	Çatak	25 km N Çatak	1600-1900 m	Van	Turkey
MW	99465	♂	*Agrodiaetus*	*kanduli*	1	C	P	1	1		1		1	II-28	24.07.1999	Çatak	25 km N Çatak	1600-1900 m	Van	Turkey
MW	99466	♂	*Agrodiaetus*	*iphigenia*	1	C		1							24.07.1999	Çatak	25 km N Çatak	1600-1900 m	Van	Turkey
MW	99467	♂	*Neolysandra*	*fatima*	1			1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99468	♂	*Neolysandra*	*fatima*	1			1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99469	♂	*Neolysandra*	*fatima*	1			1	1		1				24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99470	♂	*Meleageria*	*daphnis*	1			1							24.07.1999	Çatak	5-18 km N Çatak	1600-1900 m	Van	Turkey
MW	99471	♂	*Agrodiaetus*	*dantch.Xmenalc.*	1	C	P	1	1		1	1	1	II-29	25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99472	♂	*Agrodiaetus*	*kurdistanicus*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99473	♂	*Agrodiaetus*	*kurdistanicus*	1	C	P	1	1		1				25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99474	♀	*Agrodiaetus*	*kurdistanicus*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99475	♂	*Agrodiaetus*	*cyaneus*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99476	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1	1		1				25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99477	♂	*Agrodiaetus*	*zapvadi*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99478	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99479	♂	*Agrodiaetus*	*turcicola*	1	C	P	1	1		1		1	II-30	25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99480	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99481	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99482	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99483	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99484	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99485	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99486	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99487	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99488	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99489	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99490	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99491	♂	*Agrodiaetus*	*turcicola*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99492	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99493	♂	*Agrodiaetus*	*turcicola*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99494	♂	*Agrodiaetus*	*menalcas*	1	C	P	1	1		1			II-31	25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99495	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99496	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99497	♂	*Agrodiaetus*	*menalcas*	1	C		1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99498	♂	*Agrodiaetus*	*menalcas*	1	C	P	1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99499	♂	*Agrodiaetus*	*menalcas*	1			1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99500	♂	*Agrodiaetus*	*menalcas*	1			1							25.07.1999	Erek Dagi	Van	2200 m	Van	Turkey
MW	99501	♂	*Agrodiaetus*	*putnami*	1	C	P	1	1		1		1	II-32	26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99502	♂	*Agrodiaetus*	*huberti*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99503	♂	*Agrodiaetus*	*huberti*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99504	♂	*Agrodiaetus*	*putnami*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99505	♂	*Agrodiaetus*	*putnami*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99506	♂	*Agrodiaetus*	*putnami*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99507	♂	*Agrodiaetus*	*putnami*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99508	♂	*Agrodiaetus*	*ninae*	1	C	P	1	1		1		1	II-33	26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99509	♂	*Agrodiaetus*	*ninae*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99510	♂	*Agrodiaetus*	*ninae*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99511	♂	*Agrodiaetus*	*ninae*	1	C	P	1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99512	♂	*Meleageria*	*daphnis*	1			1							26.07.1999	Agrı	15 km N Agrı	1800 m	Agrı	Turkey
MW	99513	♂	*Agrodiaetus*	*huberti*	1	C	P	1							26.07.1999	Cumaçay	5 km N Cumaçay	2000 m	Agrı	Turkey
MW	99514	♂	*Lysandra*	*corydonius*	1			1	1		1		1		26.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99515	♂	*Lycaena*	*virgaureae*	1			1	1		1				26.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99516	♂	*Agrodiaetus*	*wagneri*	1	C	P	1							27.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99517	♂	*Agrodiaetus*	*baytopi*	1	C	P	1							27.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99518	♂	*Lysandra*	*corydonius*	1	C		1							27.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99519	♂	*Lysandra*	*corydonius*	1	C		1							27.07.1999	Gaziler	10 km N Gaziler	1800 m	Igdir	Turkey
MW	99520	♂	*Lycaena*	*thetis*	1			1	1		1				28.07.1999	Sac Geçidi	20 km W Eleckirt	2000 m	Agrı	Turkey
MW	99521	♂	*Agrodiaetus*	*damon*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99522	♂	*Agrodiaetus*	*damon*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99523	♂	*Agrodiaetus*	*damon*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99524	♂	*Agrodiaetus*	*wagneri*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99525	♂	*Agrodiaetus*	*wagneri*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99526	♂	*Agrodiaetus*	*turcicus*	1	C	P	1	1		1				28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99527	♂	*Agrodiaetus*	*turcicus*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99528	♂	*Agrodiaetus*	*turcicus*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99529	♂	*Agrodiaetus*	*turcicus*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99530	♂	*Agrodiaetus*	*damon*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99531	♂	*Agrodiaetus*	*damon*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99532	♂	*Agrodiaetus*	*menalcas*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99533	♂	*Agrodiaetus*	*alcestis*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99534	♂	*Polyommatus*	*myrrhinus*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99535	♂	*Polyommatus*	*myrrhinus*	1	C		1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99536	♂	*Lysandra*	*corydonius*	1	C	P	1	1		1		1		28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99537	♂	*Polyommatus*	*myrrhinus*	1			1	1		1		1		28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99538	♂	*Polyommatus*	*myrrhinus*	1			1	1		1				28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99539	♂	*Lysandra*	*corydonius*	1			1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99540	♂	*Lysandra*	*corydonius*	1			1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99541	♂	*Lysandra*	*corydonius*	1			1	1						28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99542	♂	*Polyommatus*	*icarus*	1			1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99543	♂	*Polyommatus*	*icarus*	1			1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99544	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99545	♂	*Agrodiaetus*	*alcestis*	1	C	P	1							28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99546	♂	*Agrodiaetus*	*damon*	1			1	1		1		1		28.07.1999	Köskköy	25 km N Erzurum	1900 m	Erzurum	Turkey
MW	99547	♀	*Satyrium*	*myrtale*	1			1							29.07.1999	Kop Geçidi	nördl. Askale	2200 m	Erzurum	Turkey
MW	99548	♂	*Lycaena*	*thetis*	1			1							29.07.1999	Kop Geçidi	nördl. Askale	2200 m	Erzurum	Turkey
MW	99549	♂	*Plebeius*	*loewii*	1			1							29.07.1999	Kop Geçidi	nördl. Askale	2200 m	Erzurum	Turkey
MW	99550	♂	*Polyommatus*	*myrrhinus*	1	C	P	1	1		1	1	1		29.07.1999	Kop Geçidi	nördl. Askale	2200 m	Erzurum	Turkey
MW	99551	♂	*Agrodiaetus*	*hopfferi*	1	C	P	1							29.07.1999	Kop Geçidi	nördl. Askale	2200 m	Erzurum	Turkey
MW	99552	♂	*Agrodiaetus*	*huberti*	1	C	P	1	1		1		1		29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99553	♂	*Agrodiaetus*	*huberti*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99554	♂	*Agrodiaetus*	*damon*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99555	♂	*Agrodiaetus*	*firdussii*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99556	♂	*Agrodiaetus*	*damon*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99557	♂	*Agrodiaetus*	*huberti*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99558	♂	*Agrodiaetus*	*huberti*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99559	♂	*Agrodiaetus*	*tankeri*	1	C	P	1	1		1		1		29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99560	♂	*Agrodiaetus*	*phyllis*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99561	♂	*Agrodiaetus*	*phyllis*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99562	♂	*Agrodiaetus*	*huberti*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99563	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99564	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99565	♂	*Agrodiaetus*	*tankeri*	1	C	P	1	1		1		1	II-34	29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99566	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99567	♂	*Agrodiaetus*	*damon*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99568	♂	*Agrodiaetus*	*damon*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99569	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99570	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW	99571	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey

Appendix 2 List of material

Code	Sex	*Genus*	*Species*	Wgs	Fix	Kar	Alc	DNA	Cytb	CO1	ND1	ITS2	Fig.	Date	Locality	Area	Altitude	Province	Country
MW 99572	♂	*Agrodiaetus*	*phyllis*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99573	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99574	♂	*Agrodiaetus*	*ripartii*	1	C	P	1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99575	♂	*Plebeius*	*pylaon*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99576	♂	*Polyommatus*	*eros*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99577	♂	*Polyommatus*	*eros*	1	C		1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99578	♂	*Polyommatus*	*eros*	1			1	1						29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99579	♂	*Polyommatus*	*eros*	1			1	1		1				29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99580	♂	*Polyommatus*	*eros*	1			1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99581	♂	*Polyommatus*	*eros*	1			1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99582	♂	*Polyommatus*	*eros*	1			1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99583	♂	*Polyommatus*	*eros*	1			1							29.07.1999	Kop Geçidi	südl. Maden	2350 m	Bayburt	Turkey
MW 99584	♂	*Agrodiaetus*	*ninae*	1	C	P	1							30.07.1999	Gölyurt Geçidi	Pazaryolu	2350 m	Erzurum	Turkey
MW 99585	♂	*Agrodiaetus*	*huberti*	1	C	P	1							30.07.1999	Gölyurt Geçidi	Pazaryolu	2350 m	Erzurum	Turkey
MW 99586	♂	*Agrodiaetus*	*tankeri*	1	C	P	1							30.07.1999	Gölyurt Geçidi	Pazaryolu	2350 m	Erzurum	Turkey
MW 99587	♂	*Agrodiaetus*	*phyllis*	1	C		1							30.07.1999	Gölyurt Geçidi	Pazaryolu	2350 m	Erzurum	Turkey
MW 99588	♂	*Agrodiaetus*	*humedasae*	1	C	P	1	1						14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99589	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99590	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99591	♂	*Agrodiaetus*	*humedasae*	1	C	P	1	1		1		1	II-35	14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99592	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99593	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99594	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99595	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99596	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99597	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99598	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99599	♂	*Agrodiaetus*	*humedasae*	1	C	P	1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99600	♀	*Agrodiaetus*	*humedasae*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99601	♀	*Agrodiaetus*	*humedasae*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99602	♀	*Agrodiaetus*	*humedasae*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99603	♀	*Agrodiaetus*	*humedasae*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99604	♀	*Agrodiaetus*	*humedasae*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99605	♀	*Agrodiaetus*	*humedasae*	1			1	1		1		1		14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99606	♂	*Agrodiaetus*	*damon*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99607	♀	*Agrodiaetus*	*damon*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99608	♂	*Lysandra*	*bellargus*	1			1	1		1		1		14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99609	♂	*Lysandra*	*coridon*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99610	♂	*Lysandra*	*coridon*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99611	♂	*Lysandra*	*coridon*	1			1							14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99612	♂	*Lysandra*	*coridon*	1			1	1		1		1		14.08.1999	Pondel	Val di Cogne	900 m	Aosta	Italy
MW 99613	♂	*Agrodiaetus*	*damon*	1			1	1		1		1	II-36	17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
MW 99614	♂	*Agrodiaetus*	*damon*	1			1							17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
MW 99615	♂	*Agrodiaetus*	*damon*	1			1							17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
MW 99616	♂	*Agrodiaetus*	*damon*	1			1							17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
MW 99617	♀	*Agrodiaetus*	*damon*	1			1							17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
MW 99618	♂	*Lysandra*	*coridon*	1			1							17.08.1999	Col de Tende	Tende	1850 m	Alpes Maritimes	France
OK 96022	♂	*Lysandra*	*caelestissimus*	1				1		1		1		30.07.1996	Moscardon	Montes Universales	1600 m	Teruel	Spain
OK 99001	♂	*Lysandra*	*gennargenti*	1				1		1				29.07.1999	M. Perda Liana	Lnusei	1150 m	Sardinia	Italy
WE 00001	♂	*Agrodiaetus*	*tenhageni*	1				1						19.05.2000	25 km N Torbat-e-Heydariyeh	Kuh-e-Sorkh	1700-1800 m	Khorasan	Iran
WE 00002	♂	*Agrodiaetus*	*glaucias*	1				1		1		1	II-37	24.05.2000	Voluyeh	südöstl. Sari	1500-1600 m	Mazandaran	Iran
WE 00003		*Neolysandra*	*diana*					1		1				02.06.2000	Kotayk, vill. Geghadir				Armenia
WE 02321	♂	*Agrodiaetus*	*pseudoxerxes*	1				1		1				13.07.2002	25 km W Fulad Mahalleh		2300 m	Semnan	Iran
WE 02421	♂	*Agrodiaetus*	*mofidii*		C	P		1		1				15.07.2002	Chaman Bid		1700-2000m	Khorasan	Iran
WE 02431	♂	*Agrodiaetus*	*khorasanensis*		C	P		1		1		1		16.07.2002	5 km SW Firizi		1700-1900m	Khorasan	Iran
WE 02451	♂	*Agrodiaetus*	*tenhageni*	1	C	P		1		1		1	II-38	17.07.2002	Kuh-e-Sorkh, Kadkan		2100-2500m	Khorasan	Iran
WE 02452	♂	*Agrodiaetus*	*tenhageni*	1	C	P								17.07.2002	Kuh-e-Sorkh, Kadkan		2100-2500m	Khorasan	Iran
WE 02453	♂	*Agrodiaetus*	*mofidii*		C	P								17.07.2002	Kuh-e-Sorkh, Kadkan		2100-2500m	Khorasan	Iran
WE 02454	♂	*Agrodiaetus*	*mofidii*	1	C	P		1				1	II-39	17.07.2002	Kuh-e-Sorkh, Kadkan		2100-2500m	Khorasan	Iran
WE 02491	♂	*Agrodiaetus*	*achaemenes*		C	P		1		1		1		21.07.2002	Gardaneh ye Cheri, W Samsami		2800-3000m	Bakhtiari	Iran
WE 02492	♂	*Agrodiaetus*	*achaemenes*		C	P								21.07.2002	Gardaneh ye Cheri, W Samsami		2800-3000m	Bakhtiari	Iran
WE 02531	♂	*Agrodiaetus*	*zarathustra*	1	C	P		1		1		1	II-40	25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02532	♂	*Agrodiaetus*	*zarathustra*		C	P								25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02533	♂	*Agrodiaetus*	*zarathustra*	1	C	P								25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02534	♂	*Agrodiaetus*	*lorestanus*	1				1				1		25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02535	♂	*Agrodiaetus*	*lorestanus*	1				1		1		1	II-41	25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02536	♂	*Agrodiaetus*	*damalis*	1				1		1			II-42	25.07.2002	Dorud, 30 km W Dorud (Paß) E-Seite		2100m	Lorestan	Iran
WE 02591	♂	*Agrodiaetus*	*peilei*	1	C	P		1		1		1	II-43	27.07.2002	Qamchiyan, 30 km N Chenareh		1800-1900m	Kordestan	Iran
WE 02592	♂	*Agrodiaetus*	*peilei*	1	C	P								27.07.2002	Qamchiyan, 30 km N Chenareh		1800-1900m	Kordestan	Iran
WE 02593	♂	*Agrodiaetus*	*peilei*		C	P								27.07.2002	Qamchiyan, 30 km N Chenareh		1800-1900m	Kordestan	Iran
WE 02611	♂	*Agrodiaetus*	*karindus*	1	C	P								27.07.2002	40 km SW Saqqez		1800-1900m	Kordestan	Iran
WE 02612	♂	*Agrodiaetus*	*karindus*	1	C	P		1		1			II-44	27.07.2002	40 km SW Saqqez		1800-1900m	Kordestan	Iran
WE 02613	♂	*Agrodiaetus*	*karindus*		C	P								27.07.2002	40 km SW Saqqez		1800-1900m	Kordestan	Iran
WE 02614	♂	*Agrodiaetus*	*morgani*		C	P		1		1		1		27.07.2002	40 km SW Saqqez		1800-1900m	Kordestan	Iran
WE 02621	♂	*Agrodiaetus*	*sennanensis*					1		1		1		28.07.2002	20 km E Mahabad		1900m	Azarbayjan-e-Gharbi	Iran
WE 02622	♂	*Agrodiaetus*	*sennanensis*											28.07.2002	20 km E Mahabad		1900m	Azarbayjan-e-Gharbi	Iran
WE 02661	♂	*Agrodiaetus*	*arasbarani*					1		1		1		29.07.2002	Mahmutabad, W Kaleybar		2200-2400m	Azarbayjan-e-Sharqi	Iran
WE 02662	♂	*Agrodiaetus*	*rovshani*					1		1		1		29.07.2002	Mahmutabad, W Kaleybar		2200-2400m	Azarbayjan-e-Sharqi	Iran
WE 02671	♂	*Agrodiaetus*	*femininoides*	1	C	P		1		1		1	II-45	31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02672	♂	*Agrodiaetus*	*femininoides*		C	P								31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02673	♂	*Agrodiaetus*	*femininoides*		C	P								31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02674	♂	*Agrodiaetus*	*gorbunovi*	1	C	P		1		1		1		31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02675	♂	*Agrodiaetus*	*gorbunovi*	1	C	P								31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02676	♂	*Agrodiaetus*	*hamadanensis*	1	C	P		1		1				31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 02677	♂	*Agrodiaetus*	*demavendi*					1		1		1		31.07.2002	Khalkhal, Gollijeh		1900m	Ardabil	Iran
WE 37001		*Agrodiaetus*	*mithridates*					1						13.07.1995	Gündüzbey		1000-1100 m	Malatya	Turkey
WE 38601		*Agrodiaetus*	*carmon*					1						24.07.1995	7-15 km N Saimbeyli		1400-1600 m	Adana	Turkey
WE 85001	♂	*Agrodiaetus*	*shahrami*					1		1		1		23.07.2002	30 km N Chelgerd (Pass)		3000-3200m	Bakhtiari	Iran
WE 92001		*Agrodiaetus*	*phyllides*					1						20.04.1992	Kuschka		700 m		Turkmenistan
WE 92002		*Agrodiaetus*	*phyllides*					1						20.04.1992	Kuschka		700 m		Turkmenistan
WE 94001	♂	*Agrodiaetus*	*actinides*					1				1		11.07.1994	Aram-Kungei valley, Alytyn Dara river		3000 m	West Transalai	Kirgizia
WE 94002		*Plebeius*	*cyane*					1						15.07.1994	Chatir Kul, SW Naryn, Ak Bashi range			Tianshan	Kirgizia
WE 98001	♂	*Agrodiaetus*	*iphigenides*					1		1				22.07.1998	25 km S Song Kul, Molto Tau		2000m	Inner Tianshan	Kirgizia
WE 99001		*Agrodiaetus*	*barmifiruze*					1						11.06.1999	Ardakan			Yazd	Iran
Sum				**1895**	**1145**	**624**	**1877**	**370**	**6**	**312**	**25**	**202**	**95**						

Explanations:

Code = individual code number used for all parts of a specimens (wings, karyological fixations & preparations, DNA-extraction, PCR and sequencing;
in most cases made of collector initials, collecting year and a 3-digit number)

Wgs = wing vouchers scanned

Fix = chromosome fixations available (C)

Kar = karyological preparations carried out (P)

Alc = alcohol material available ('1'), otherwise dried material

DNA = DNA extractions carried out

Cytb = Cytochrome b sequenced

CO1 = Cytochrome Oxidase I sequence

ND1 = NADH dehydrogenase subunit 1 sequenced

ITS2 = Internal Transcribed Spacer 2 sequenced

Fig. = wings figured on plates

Date = collecting date

Locality : collecting locality (incl. altitude, Province, country

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
               5         15         25         35         45         55         65         75         85         95         105        115        125        135        145        155        165        175
AD98001    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGaACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
AD98009    NNNNNNNNNN NNNNNNNNNC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
AD98012    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
AD98018    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
AD98024    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAAT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
AD98029    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
AD98036    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTGTA TTTTATTTTT GGGATTTGAG CAGGAATAGT GGGAACATCC CTAAGAaTTT TAATTCGTAT AGAACTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCCCATGCA
DS00001    NNNNNNNNNN NNNNNNNNNN NNNNNNNNAT AAAGATATTG GAACGTTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTACAAtA CTATTGTTAC AGCCCATGCA
DS00005    NNNNNNNNNN NNNNNNNNTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTACAATA CTATTGTTAC AGCCCATGCA
DS01001    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGACGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
JC00029    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00039    CAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGGACATCT TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGAAT CcTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00040    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
JC00042    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATtATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00043    TCGCGAAAaT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGaACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATTGTCAC AGCTCATGCA
JC00045    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
JC00046    NNNNNAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
JC00051    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCTGGAT CcTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00055    NNNNNNNNAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTCATTTTT GGTATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCGGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00057    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGGG CAGGAATGGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00061    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACCCCTGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATCGTTAC AGCTCATGCA
JC00062    TAGCGAAAAT GACTTTTTTC NACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGGG CAGGAATGGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
JC00063    TAGCGAAAAT GACTTTTTTC NACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACACCTGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATCGTTAC AGCTCATGCA
JC01014    NNNNNNNNNN NNNNNNNNNN NNCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT AGAATTGAGA ACCCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
JC02001    TNGCGAAAAT GACTTTATTC TACAAATCAT AAAGATATTG GAACATTATA TTTCATTTTT GGAATTTGAT CAGGAATAGT AGGAACTTCA TTAAGAATAA TTATTCGAAC TGAATTAGGT AATCCAGGTT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCACATGCT
JM00001    NNNNNNNNNN NNNNNNNNNN NNNAAATCAt AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAaTTT TAATTCGTAT GGAATTAAGA ACTCCNGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCG
MW00001    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGGATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00015    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW00017    TAGCGAAAAT GAaTTTATTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTtGAG cTGGAATAGT TGGAACCTCT TTAAGaATTT TAATTCGTCT TGAATtAGGT AcCCCAGGAT CTTTAATtGG TGATGATCaA ATCTATAATA CTATTGtAAC TGCTCATGCT
MW00020    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGGG CAGGAATGGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00024    TAGCGAAAAT GACTTTTTTC tACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CCGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAACTAAGA ATTCCTAGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC AGCTCACGCA
MW00032    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGGATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00044    TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CTGGAATAGT TGGAACTTCT TTAAGAATTC TAATTCGTCT TGAATTAGGA ACTCCAGGAT CTTTAATTAG AGATGATCAA ATTTATAACA CTATTGTAAC TGCTCATGCT
MW00051    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00056    NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATCG GNACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC NTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00058    NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00059    TAACGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00060    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00064    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGGG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CTTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00072    NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00076    TGGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC TTAAGAATTT TGATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00087    NNNNNNNNNN GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC TTAAGAATTT TGATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00101    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW00102    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00110    NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00116    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCT TTAAGAATCT TAATTCGAAT AGAATTAGGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00119    TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CTGGAATAAT TGGAACTTCC TTAAGAATTT TAATTCGCCT TGAATTAGGT ACTTCAGGGT CTTTAATtGG AGAtGATCaA ATTTATAATA CTATCGTAAC TGCTCATGCT
MW00125    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00127    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00129    TCGCGAAAAT GACTTTTTTC TNNNAATCAT AAAGATATTG GaaCATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGt AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00140    NNNNNNNNNN NNNTTTTTTC TACAAATCAT AAAGATATTG GGACATTGTA TTTTATTTTT GGGATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAACTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCTCATGCA
MW00151    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATtT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00157    TAGGGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00176    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTTAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00177    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00178    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00179    TCGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00183    TCGCGAAAAT GACTTTTTTC CNCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW00185    TCGNGAAAAN GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW00186    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTtT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW00189    NNNNNNNNNN NNNNNNNNNN NNCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW00226    TAGCGAAAAT GACTTTTTTC NACAAATCaT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCGGGAT CCTTAATTGG AGACGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00229    NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00231    NGGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00232    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00234    NNNNNNNNNN NNNNNNNNNN NNNNNNNCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00259    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00262    NNNNNNNNNN NNNTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5          15          25          35          45          55          65          75          85          95         105         115         125         135         145         155         165         175
MW00267   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00269   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTGTTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ATTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00290   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT TCTTAATTGG AGATGATCAA ATTTACAATA CTATTGTTAC AGCTCATGCA
MW00302   TTGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00316   NNNNNNNNNN NNNNNNNNTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00326   TCGCGAAAAT GATTATATTC AACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGAAT AGAATTAAGA ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW00327   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGTATTTGAG CAGGGATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTGAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00328   TAGCGAAAAT GACTTTTTNN NNNNAATCAT AAAGATATTG GAACATTATA TTTTGTTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ATTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00330   TCGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00335   NNNNNNNNNN NNNNNNTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CGGGAATAGT GGGAACATCC CTAAGAATCT TAATTCGTAT AGAATTAAGA ACTCCTGGGT CCTTAATCGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00347   NNNNNNNNNT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW00348   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAACTGAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCCCATGCA
MW00358   NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW00393   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGTATTTGAG CAGGGATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT GGAATTGAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00409   TCGCGAAAAT GACTTTTTTC NNNNAATCAT AAAGATATTG GNACATTATA TTTTATTTTT GGAGTTTGAG CGGGAATAGT GGGAACATCC CTAAGAATCT TAATTCGTAT AGAATTAAGA ACTCCTGGGT CCTTAATCGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00412   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACCCCTGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATCGTTAC AGCTCATGCA
MW00424   NNNNNNNNNN NNNNNNNNNN NNNNNNNNAT AAAGATATTG GAACATTATA TTTTGTTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ATTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00444   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00452   NNNNNNNNNN NNNNTTTTTC TACAAATCAT AAAGATATTG GGACATTAtA TTTTATTTTt GGAATTTGAG CAGGAATAGT GGGAACAtCC CTAAGAATTT TAATTCGTAT AGAGCTGAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCCCATGCA
MW00469   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00476   NNNNNNNNNN NNNNNNNNNC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW00497   TAGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT NNNNTTTGAG CAGGAATATT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTAGGA ACTCCTGGAT CTTTAATTGG TAATGATCAA ATTTATAATA CAATTGTTAC AGCTCATGCA
MW00498   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGGG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CTTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00504   TAGCGAAAAT GACTTTTTTC tACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00517   TAGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGAAT AGAATTAAGA ACACCTGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00525   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAATCT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG TGATGATCAA ATTTATAACA CCATTGTAAC AGCTCATGCT
MW00530   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW00539   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ATTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW00547   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01001   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCG
MW01009   NNNNNNNNNT GANTNNNTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGAAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW01011   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW01014   TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCGGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW01018   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTGATTGG GGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01019   NNNNNNNNNN NNNNNNNNNN NNNAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGAAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW01022   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT GGGAACATCA TTAAGAATTT TAATTCGAAT AGAGTTAGGA ACTCCAGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW01023   TAGCGAAAAT GACTTTTTTT CACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAA GAGGAATATT AGGAACTTCA TTAAGAATTT TAATTCGAAT AGAATTAGGA ACACCAGGAT CTTTTATTGG TGATGATCAA ATTTATAATA CAATCGTCAC AGCTCATGCT
MW01025   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACCCCTGGAT CATTGATTGG AGATGATCAA ATTTATAACA CTATCGTTAC AGCTCATGCA
MW01027   AAGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CAGGAATACT AGGAACATCT TTAAGAATTC TAATTCGAAT AGAATTAGGA ACACCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATCGTAAC AGCTCATGCT
MW01034   NNNNNNNNNT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01039   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCG
MW01048   NNNNNNNNNN NNCTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTCATTTTT GGtATTTGAG CAGGAATAGT AGGaACATCT TTAAGAaTTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW01053   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCG
MW01059   TTGGGAAAAN AACTTTTTTN TAAAAATCAT AAAGATATTG GAACNTTATN TTTTATTTTT GAAATTTGAG CNGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCNTGGAT CTTTGATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01061   NNNNNNNNNN NNNNNNNNNN TACAAATCAT AAAGATaTTG GAACATTATA TTTCATTTTT GGTATTTGAG CAGGAATAGT AGGAACAtCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01072   TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCGGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW01078   NNNNNNNNNN NNNNNNNNTC TACAAATCAT ACAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAGTTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCG
MW01083   TTGCGAAAAT GACTTTTTTC CaCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01092   NNGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW01103   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW01105   NNNCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW01107   NNNNNNNNAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCG
MW01114   ATGCGAAAAT GACTTTATTC TACAAATCAT AAAGATATTG GAACATTATA TTTCATTTTT GGAATTTGAT CAGGAATAGT AGGAACTTCA TTAAGAATAA TTATTCGAAC TGAATTAGGT AATCCAGGTT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCACATGCT
MW01116   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CGGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTGATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW01120   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT AGGAACATCT TTAAGAATCT TAATTCGTAT AGAATTAGGA AATCCCGGAT CTTTAATTGG AGACGATCAA ATTTACAATA CTATTGTTAC AGCTCATGCT
MW02001   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ATTCCTGGAT TCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW02006   TAGCGAAAAT GATTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGGATAGT GGGAACATCC TTAAGAATTC TAATTCGTAT AGAATtAAGA ACTCCTGGAT CTTTAATCGG AGATGATCaA ATTTATAATA CTATTGTtAC AGCTCATGCA
MW02007   NAGCGAAAAT GAATTTATTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATCTTT GGAATTTGAG CTGGAATAGT AGGAACCTCT TTAAGAATTT TAATTCGTCT TGAATTAGGT ACCCCAGGAT CTTTAATTGG TGATGATCAA ATCTATAATA CTATTGTAAC TGCCCATGCT
MW02008   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTC GGGATTTGAG CAGGTATATT AGGAACATCA TTAAGAATCT TAATTCGTAT AGAGTTAGGA ACACCGGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCT
MW02009   TTGCGAAAAT GACTTTTTTN NACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACCTCC TTAAGAATTT TAATTCGTCT TGAATTAGGT ACTCCAGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC TGCACATGCC
MW02021   NNNNNNNNNT GATTATTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT AGGAACATCA TTAAGAATTT TAATTCGAAT AGAATTAGGT ACTCCTGGAT CATTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW02024   NNNNNNNAAT GACTTTATTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAaTTTGAT CAGGAATAGT AGGAACTTCA TTAAGAATAA TTATTCGAAC TGAATTAGGT AATCCAGGTT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCACATGCT
MW02025   NNNNNNNNNN NACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTAtTTTT GGAATTTGGG CAGGAATATT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTAGGA ACACCCGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW02028   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT GGGAACATCA TTAAGAATTT TAATTCGAAT AGAGTTAGGA ACTCCAGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW02031   NNNNNNNNNN NACTTTTTTC AACAAATCAT AAaGATATTG GAaCTTTATA TTTTATTTTT GGAATTTGAG caGGAATATT AGGAaCATCT TTAAGaATTT TAATTCGTAT AGAATTAGGA ACACCTGGAT CATTAATTGG AGATGATCaA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW02033   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTCATTTTT GGTATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW02034   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATCT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CCATTGTAAC AGCTCATGCT
MW98002   TAGCGAAAAT GAnTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT AGGAACATCT TTAAGAATTT TAATTCGAAT AGAATTAGGA ACCCCAGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCT
```

Appendix 3: Sequence data Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5          15         25         35         45         55         65         75         85         95         105        115        125        135        145        155        165        175
MW98008   TTGCGAAAAT GACTTTTTTC NACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW98009   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98020   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98029   TTGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAATTTGAG CAGGAAtAGt AGGAACATCC TTAAGAATTT TGATTCGTAT GGAATTAAGA ACTCCTGGAT TCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98049   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW98079   TCTCGAAAAT GACTTTTTTC TACaAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98084   TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT AGGAACATCT TTAAGAGTTT TAATTCGTAT AGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW98089   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98094   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CTGGAATAAT TGGAACTTCT TTAAGAATTT TAATTCGTCT TGAATTAGGA ACACCAGGAT CTTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC TGCTCATGCT
MW98097   TAGGGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98103   TCGCGAAAAT GACTTTTTTC TACAaATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98106   NNNNNNNNNN NNNNNNNNNN NACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW98128   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGG AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGAAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW98129   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACaTTATA TTTTANTTTT GGAATTTGAG CAGGAATAAT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98133   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTC TAATTCGTAT AGAATTGAGA ACCCCTGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATCGTtAC AGCTCATGCA
MW98136   TCGCGAAAaT GACTTTTTTC TNCAAATCAT AAAGATATTG GaACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98138   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTNGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98139   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98154   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98162   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98170   TCGCGAAAAT GACTTTTTTC TACAAATCaT AAAGATATTG GaACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGaATTT TAATTCGTAT AGAATTAAGA aCTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98172   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCTGGAT CCTTAATCGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98180   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98183   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGNNTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98185   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW98189   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98203   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98205   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98212   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98220   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAAcaTTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATCT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG tGATGATCAA ATTTATAATA CTATCGTTAC AGCTCATGCA
MW98228   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ATCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98230   TAGCGAAAAT GATTTTTTTC AACAAATCaT AAAGATATTG GAANTTTATA TTTTATTTTT GGAATTTGAG CTGGAATAAT TGGAACTTCT TTAAGAATTT TAATTCGTCT TGAATTAGGT ACTCCAGGAT CTTTAATTGG AGATGATCAA ATCTATAATA CTATTGTAAC TGCTCATGCT
MW98235   TCGCGAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGATT AGAGCTAAGG ACCCCAGGAT CATTAATTGG TGACGACCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW98240   CAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGTNTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98261   NNNNNNNNNN NNNNNNNNNN TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98264   TCGCGAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGGNTTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGATT AGAGCTAAGA ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTACAATA CTATTGTCAC AGCCCATGCA
MW98265   TAGCGAAAAT GACTTTTTTN NNNAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT GGGAACATCA TTAAGAATTT TAATTCGAAT AGAGTTAGGA ACTCCAGGAT CTTTAATTGG TGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW98270   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGTATTTGAG CAGGAATAGT AGGAACATCA TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCAGGGT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98274   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TGATTCGTAT GGAATTAAGA ACTCCTGGAT TCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98278   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98284   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98285   NNNNNNNNNN NNCTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98294   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW98313   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAaCATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW98315   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99001   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTCATTTTT GGTATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAAGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99006   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99009   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW99013   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAAGTTTATA TTTTAATTTT GGNNTTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGAAT GgAATTAAGA ACTCCTGGAT CTTTAATTGG AGANGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99014   TAGCGAAAAT GACTTTTTTC cACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTAAAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
MW99018   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAAATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCTGGAT CTTTAATCGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99028   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNCGTAT GGAATTAAGA ATtCCAGGAT CTTTaATTGG AGATGaTCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99038   NNNNNAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGATT AGAGCTAAGG ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW99042   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAAcaTTATA TTTTAATTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99045   NNNNNAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATATT AGGAATATCT TTAAGAATTT TAATTCGAAT AGAATTAAGA ACTCCAGGAT ATTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCT
MW99047   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAGTTAAGA GTTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAACT CTATTGTTAC AGCTCATGCA
MW99053   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW99057   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99058   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATttGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99059   NNNNNNNNNN NNCTTTTTTC TACAAACCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99060   NNNNNAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99061   NNNNNNNNNN NNNNNNNNNN NNCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99068   TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGaT CTTTAATTGG AGATGATCAA ATTTATaATA CCATTGTTAC AGCTCATGCA
MW99080   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CAGGAATATT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTAGGA ACACCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW99084   TAGCGAAAAT GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTAATTTT NNNNTTTGAG CAGGTATATT AGGAACATCA TTAAGAATCT TAATTCGTAT AGAGTTAGGA ACACCAGGAT CATTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCtCATGCT
MW99094   TCGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GaACATTATA TTTTATTTTT GGNATTTGAG CAGGAATAGT AGGAACATCA CTAAGAaTTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTtAC AGCCCATGCA
MW99095   NNNNNNNNNN NNNNNNNNNN NACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW99097   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATa TTTCATTTTT GGTATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ATTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                   5         15         25         35         45         55         65         75         85         95        105        115        125        135        145        155        165        175
MW99102    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTAAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99104    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGANTTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99105    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99124    TAGCGAAAAT AAATTTTTTC NNNNAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATCT TAATTCGTAT AGAATTAGGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCtCATGCA
MW99128    TTGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTtAC AGCTCATGCA
MW99134    TAGCGAAAGT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATCT TAATTCGTAT GGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99135    NNNNNNNNNN NNNNNNNNNC TACAAATAAT AAAGATNTNG GAACANTATA TTTTATTTTT GGAATATGAG CAGGAATAGC AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99140    NNNNNAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99141    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGANTTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99158    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT NNNATTTGAG CAGGAATATT AGGAACATCT TTAAGAaTTC TAATTCGAAT AGAATTAGGA ACCCCCGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW99163    TAGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGGATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAACTAAGA ATTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99164    TCGCGaAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATAGT NGGAACATCc CTaaGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99165    NNNNNNNNNN NNNNNNNNNC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99170    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTCAC AGCCCATGCA
MW99174    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTtaTTTTT GGGATTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT AGAACTGAGA ACTCCTGGAT CCTtAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCCCATGCA
MW99187    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGGATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAACTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTATTAC AGCCCATGCA
MW99196    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTAATTGG aGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99203    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGC AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99221    TAGCGAAAAT GACTTTTTTC NNcAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGTATTTGAG CAGGAATATT AGGAACATCC TTAAGAATTT TAATCCGTAT AGAATTAGGA ACCCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCT
MW99226    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99240    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGNNTTTGAG CAGGAATAGT NGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CNATTGTTAC AGCCCATGCA
MW99247    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99263    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99264    TCGCGAAAAT GACTTTTTtN NACaaATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATTGTTAC AGCTCATGCA
MW99274    NNNNGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99276    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99286    TAGCGAAAAT GACTTTTTTC TACAAAtCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99289    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGGNTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99292    NNNNGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99301    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW99303    TAGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GaACATTATA TTTTATNTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAACTAAGA ATTCCTGGAT CTTTAATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99309    NNNNNNNNNT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99314    NNNNNAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99319    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99320    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGaATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99341    NNNNNNNNNN NNNNNTTTTC TACTAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTtAC AGcTCATGCA
MW99344    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99353    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99357    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99372    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99374    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99376    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99380    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99381    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW99382    TCGCGAAAAT GACTTTTTTC CACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
MW99393    NNNNNNNNNN NNNNNNNNNC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99398    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTt NNAATTTGAG CAGGAATATT AGGAACATCT TTAAGAATTC TAATTCGAAT AGAATTGGGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW99406    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99407    TCGCGAAAAT TACTTTTTTN NACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGt AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAt CTTTGATTGG AGATGATCAA ATTTATAATa CCATTGTTAC AGCTCATGCA
MW99408    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99413    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99422    NNNNNNNNNN NNNNNNNNTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99425    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTAGGA ACACCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATTGTAAC TGCTCATGCT
MW99430    TAGCGAAAAT GACTTTTTTC TACAaATCAT AAAGATATTG GAACATTATA TTTTATCTTT GGAATTTGAG CCGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAACTAAGA ATTCCTAGAT CTTTAATTGG TGATGATCAA ATTTANAATA CTATTGTAAC AGCTCACGCA
MW99435    CGGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99448    TCGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CtATTGTTAC AGCCCATGCA
MW99449    TCGCGAAAAT GACTTTTTTC TACAAACCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99465    NNNNNNNNNN GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99469    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATGGT NGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTNAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW99471    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCCGGAT CCTTAATTGG GAATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
MW99473    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99476    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GGACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99479    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGANTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATCGTTAC AGCTCATGCA
MW99494    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCAGGAT CCTTAATTGG GAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99501    TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99508    TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99514    TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99515    TAGCGAAAAT GACTTTTTTA AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG cTGGAATAAT tGGAACTTCT TTAAGAATTT TaATTCGCCT TGAATTAGGT ACTCCAGGAT CTTTAATTGG AGATGATCAA ATCTATAATA CTATTGTAAC TGCTCATGCT
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5         15         25         35         45         55         65         75         85         95        105        115        125        135        145        155        165        175
MW99520   NNNNNNNNNN GACTTTTTTC AACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGAATTTGAG CTGGAATAAT TGGAACTTCT CTAAGAATTC TAATTCGTCT TGAGTTAGGA ACTCCAGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTAAC AGCTCATGCT
MW99526   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGC AGGAACATCC CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99536   NTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99537   TCGCGAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGATT AGAGCTAAGA ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTACAATA CTATTGTCAC AGCCCATGCA
MW99538   TCGCGAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGATT AGAGCTAAGA ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTACAATA CTATTGTCAC AGCCCATGCA
MW99546   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAAcATTATA TTTTATTTTT GGAATTTGAG CAGGAATAAT AGGAACATCT TTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99550   TCGCGAAAAT GATTTTTTTC CACAAATCAT AAAGACATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGATT AGAGCTAAGA ACCCCAGGAT CATTAATTGG TGATGACCAA ATTTACAATA CTATTGTCAC AGCCCATGCA
MW99552   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCACGCA
MW99559   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGGATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
MW99565   NNNNGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCACGCA
MW99579   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA TtaAGAATTC TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATa CTATTGTTAC AGCTCATGCA
MW99591   NNNNNNNNNN NNNNNNNNNN TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAACGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW99605   TCGCGAAAAT GACTTTTTTC TACAAATcAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCT CTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCTGGAT CCTTAATTGG AAACGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
MW99608   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99612   TTGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAAGATTATA TTTTAATTTT GGAATTTGAG CAGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTAATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
MW99613   TCGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAAT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
OK96022   NNNNNNNNNN NNNNNNNNTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT GGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTGATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
OK99001   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNT AAAGATATTG GAACATTATA TTTTATTTTT GGGATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CTTTGATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE00002   NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATTG GGACATTATA TTTTATTTTT GGAATTTGAG CGGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCTCATGCA
WE00003   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACTTTATA TTTTATTTTT GGNNTTTGAG CAGGAATAGT AGGAACATCT TTAAGAATTT TAATTCGAAT AGAATTAAGA ACTCCAGGAT CTTTAATTGG GGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02321   NNNNNNNAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02421   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02431   NNNNNNNNNN NNNNNNNNNN NNCAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGGG CAGGAATAGT GGGAACATCT TTAAGAATTT TAATTCGTAT GGAATTAAGA ACTCCGGGAT CTTTAATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
WE02451   NNNNNNNAAT GACTTTTTTC NNCAAATCAT AAAGATATTG GGACATTATA CTTTATTTTT GGTATTTGAG CAGGAATAGT GGGAACATCT CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT TCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02491   NNNNNNNNNN NNNNNNNNNC TACAAATCAT AAAGATATTG GAACGTTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
WE02531   NNNNNNNNNN NNNNNTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCATGCA
WE02535   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NAAGATATTG GAACATTATA CTTTATTTTT GGAATTTGGG CAGGAATGGT AGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATTGTCAC AGCTCATGCA
WE02536   NNNNNNNNNN NNNNNNNNNN NNNNAATCAT AAAGATATTG GAACACTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTAAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02591   NNNNNNNNNN NNNNNNNNNN NNNNNNNCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CGGGAATAGT GGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02612   TAGCGAAAAT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CGGGAATAGT GGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02614   NNNNNNNNNN NNNNNNNNNN NNNNNNGCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CGGGAATAGT GGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTGAGA ACTCCGGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02621   NNNNNNNNNN NNNNNNNNNN NNNNNNNCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02661   NNNNNNNNNT GACTTTTTTC TACAAATCAT AAAGATATCG GAACACTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTCAC AGCTCACGCA
WE02662   NNNNNNNNNN NNNNNNNNNN NNNAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC CTTAGAATTT TAATCCGTAT AGAATTAAGA ACTCCTGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02671   NNNNNNNNNN NNNNNTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC TTAAGAATTC TAATTCGTAT AGAATTAAGA ACTCCAGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02674   NNNNNNNNNN NNNNNNNNNN NNNAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCA CTAAGAATTT TAATTCGTAT AGAATTAAGA ACCCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCCCATGCA
WE02676   NNNNNNNNNT GACTTTTTTC TACAAATCAT AAAGATATCG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGGATAGT AGGAACATCC CTAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA
WE02677   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNT AAAGATATTG GAACATTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT GGGAACATCT TTAAGAGTTT TAATTCGTAT GGAATTGAGA ACTCCAGGAT CTTTGATTGG AGATGATCAA ATTTATAATA CCATCGTTAC AGCTCATGCA
WE85001   NGAAAAAATG ACTTTTTTTC TACAAATCAT AAAGATATTG GAACGTTATA TTTTATTTTT GGAATTTGAG CAGGAATAGT AGGAACATCC TAAAGAATTT TAATTCGTAT AGAATTGAGA ACTCCTGGAT CCTTAATTGG AGATGATCAA ATTTATAACA CTATTGTTAC AGCCCATGCA
WE98001   NNNNNNNAAT GACTTTTTTC TACAAATCAT AAAGATATTG GAACATTATA TTTTATTTTT GGAGTTTGAG CAGGAATAGT AGGAACATCC CTAAGAATTT TAATCCGTAT AGAATTGAGA ACTCCCGGAT CCTTAATTGG AGACGATCAA ATTTATAATA CTATTGTTAC AGCTCATGCA

          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
            185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355
AD98001   TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
AD98009   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
AD98012   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
AD98018   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
AD98024   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
AD98029   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTT TGGTTATTAC CACCATCATT AATACTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
AD98036   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CGCCATCATT AATATTACTA ATTTCCAGAA GAATTCTAGA AAATGGAGCA
DS00001   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GTTTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATTCTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
DS00005   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTTCCTC GATTAAATAA CATAAGATTC TGATTATTAC CACCATCATT AATTCTATTA ATTTCCAGAA GAATTGTAGA AAATGGGGCA
DS01001   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
JC00029   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT GATGCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00039   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA ATTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTC TGATTATTGC CCCCATCCCT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00040   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCCTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATGAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00042   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT GATGCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00043   TTTATTATaA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTTCCTTTAA TGTTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00045   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00046   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00051   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT GATGCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC00055   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCCC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
JC00057   TTCATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
JC00061   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT GATTCTACTA ATTTCTAGAA GAATTGTAGA AAATGGGGCA
JC00062   TTCATTATAA TTTTTTTTAT AGTTATACCT ATTATaATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
JC00063   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT GATTCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC01014   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
JC02001   TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC TCCTGATATA GCATTTCCTC GTATAAATAA TATAAGATTT TGATTATTAC CCCCCTCTCT AATTCTATTA ATTTCAAGAA GAATTGTAGA AAATGGTGCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355
JM00001   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00001   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00015   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGAtTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00017   TTTAtTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTT ATTCCTTTAA TATTAGGAGC TCCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT ATTATTGTTA ATTTCAAGAA GAATCGTTGA AAATGGAGCA
MW00020   TTCATTATAA TTTTTTTTAT AGTTATACCT ATTATaATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW00024   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTA ATTCCTTTAA TATTGGGAGC ACCTGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGACTATTAC CACCATCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00032   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00044   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG CAATTGACTT GtCCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT ATTATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW00051   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00056   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00058   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00059   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00060   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00064   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TGTTAGGAGC ACCTGATATA GCTTTCCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00072   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00076   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW00087   TTTATTAtAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW00101   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTT TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00102   TTtATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00110   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG NAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00116   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC CCCAGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00119   TTTATTATAA TTTTTTTTAT AGTAAtACCT ATTATAATTG GAGGATTTGG AAATTGACTT GtACCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GAATAAATAA TATAAGATTT TGATTGTTAC CTCCATCCTT ATTATTATTA ATTTCAAGAA GAATCGTCGA AAATGGAGCA
MW00125   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00127   TTTATtATaA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GANTAAaTAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00129   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAaTAA TATGAGATTT TGATTACTAC CGCCTTCACT AATaCTATTA ATTTCCAGAA GAATCGTAGA AAATGGaGCa
MW00140   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CGCCATCATT AATATTACTA ATTTCCAGAA GAATTCTAGA AAATGGAGCA
MW00151   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00157   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00176   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00177   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTATTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00178   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTATTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00179   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAAtTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00183   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00185   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00186   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AAtACTACTA ATTTCTAGAA GAATCGTAGA AAaTGGAGCA
MW00189   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTGTTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00226   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG CAACTGATTA GTTCCTTTAA TATTAGGAGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCTAGAA GAGTTGTAGA AAATGGAGCA
MW00229   TTTATTATAa TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00231   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00232   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00234   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTAATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00259   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TACTAGGGGC ACCTGATATA GCTTTTCCAC GATTAAATAA TATAAGATTC TGATTACTTC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGGGCA
MW00262   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TACTAGGGGC ACCTGATATA GCTTTTCCAC GATTAAATAA TATAAGATTC TGATTACTTC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGGGCA
MW00267   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00269   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTTCCAC GATTAAACAA TATAAGATTC TGATTATTGC CACCATCATT AATATTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00290   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC GCCTGATATA GCTTTTCCTC GATTAAaTAA CATAAGATTC TGATTATTGC CTCCGTCATT AATACTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCG
MW00302   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCTC GATTAAACAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00316   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00326   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTA GTTCCTTTAA TATTAGGAGC ACCAGATATA GCTTTCCCAC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATATTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW00327   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GNGGATTTGG TAACTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCGC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00328   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTTCCAC GATTAAACAA TATAAGATTC TGATTATTGC CACCATCATT AATATTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00330   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW00335   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00347   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00348   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCATT AATATTACTA ATTTCCAGAA GAATTCTAGA AAATGGAGCA
MW00358   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00393   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCGC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGGGCA
MW00409   TTTATTAtAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTaGA AAATGGAGCA
MW00412   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT GATTCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00424   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTTCCAC GATTAAACAA TATAAGATTC TGATTATTGC CaCCATCATT AATATTACTA aTTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00444   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00452   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCATT AATATTACTA ATTTCCAGAA GAATCCTAGA AAATGGAGCA
MW00469   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00476   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW00497   TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATTG GGGGATTTGG AAATtGATTA GTCCCTTTAA TATTAGGGGC TCCAGATATA GCTTTCCCCC GAATAAATAA TATAAGaTTT TGATTATTAC CTCCCTCATT AATACTTTTA ATTAGAAGTA GAATTGTAGA AAATGGAGCA
MW00498   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TGTTAGGAGC ACCTGATATA GCTTTCCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW00504   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA ATTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTTCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW00517   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTG GTTCCATTGA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGTA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
                ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                      185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355
MW00525         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00530         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT GATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW00539         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA CATAAGATTC TGATTATTGC CGCCATCATT AATATTGCTA ATCTCCAGAA GAATTGTAGA AAATGGAGCA
MW00547         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTCGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTCC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCG
MW01001         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01009         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA ATTCCTTTAA TATTAGGGGC ACCCGATATA GCCTTTCCTC GATTAAATAA TATAAGATTC TGATTATTGC CCCCATCCCT AATACTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01011         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GtACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCG
MW01014         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01018         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GtACCTTTAA TATTAGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01019         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTGA TGTTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CCCCATCATT AATACTTCTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01022         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GTGGATTTGG AAACTGATTA ATCCCATTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCGTCATT AATATTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW01023         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GTGCCTTTAA TATTAGGAGC CCCTGATATA GCTTTTCCAC GAATAAATAA CATAAGATTT TGATTATTAC CTCCATCCCT TATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW01025         TTTATTATAA TTTTTTTTAT AGTTAtACCC ATTATAATCG GAGGGTTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT GATTCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01027         TTTATCATAA TTTTTTTTAT AGTAATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GTGCCATTAA TATTAGGAGC CCCAGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CACCCTCACT AATATTATTA ATTAGAAGAA GAATTGTAGA AAATGGAGCA
MW01034         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTACCTTTAA TATTGGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01039         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01048         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGAA GAATCGTAGA AAATGGAGCA
MW01053         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01059         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01061         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW01072         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01078         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01083         TTTATTATAA TCTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCTC GATTAAACAA TATAAGATTC TGATTACTAC CTCCATCATT AATACTGCTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01092         TTtATTATaA TTTTTTTTAT AGTTATACCT ATTATAATtG GAGGGtTTGG TAACTGATTA GTACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01103         TTTATCATAA TTTTTTTTAT AGTtATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GtACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01105         TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01107         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GATTAAATAA CATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01114         TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATtG GAGGATTTGG tAATTGATTA GTACCTTTAA TATTAGGAGC TCCTGATATA GCATTTCCTC GTATAAATAA TATAAGATTT TGATTATTAC CCCCCTCTCT AATTCTATTA ATTTCAAGAA GAATTGTAGA AAATGGTGCA
MW01116         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG CAACTGATTA GtACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW01120         TTTATCATAA TTTTCTTCAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GTTCCACTTA TATTAGGTGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW02001         TTTATTATAA TTTTTTTTAT AGtTATACCT ATTATAATTG GAGGATTTGG TAATTGATTG GTTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTCCCTC GATTAAATAA CATAAGATTT TGATTATTAC CCCCATCATT AATACTACTG ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW02006         TTTATCATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TGTTAGGGGC ACNTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCACT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW02007         TTTATCATAA TTTTTTTTAT AGtTATACCT ATTATAATTG GAGGATTTGG TAATTGACTT ATCCCTTTAA TATTAGGAGC CCCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCCTT ATTATTATTA ATTTCAAGAA GAATCGTTGA AAATGGAGCA
MW02008         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCATTTCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCTTT GATACTGTTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW02009         TTCATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTT GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCTTT ATTATTATTA ATTTCAAGAA GAATTGTTGA AAATGGAGCA
MW02021         TTTATTATAA TTTTCTTTAT AGTTATACCT ATTATAATTG GTGGATTTGG AAATTGATTA GTTCCATTAA TATTAGGAGC CCCTGATATA GCATTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCCTT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW02024         TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC CCCTGATATA GCATTTCCTC GTATAAATAA TATAAGATTT TGATTATTAC CTCCCTCTTT AATTCTCCTA ATTTCAAGAA GAATTGTAGA AAATGGTGCA
MW02025         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGACTT GTACCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW02028         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GTGGATTTGG AAACTGATTA ATCCCATTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCGTCATT AATATTGCTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW02031         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GtACCTTTAA TATTAGGAGC ACCTGATATA GCATTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGTA GAATTGTAGA AAATGGAGCA
MW02033         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG tAATTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCTTTTCCCC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW02034         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTCCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98002         TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATTG GAGGATTTGG AAATTGATTA GTACCATTAA TATTAGGTGC TCCAGATATA GCATTTCCTC GAATAAATAA CATAAGATTT TGATTGTTAC CACCATCATT AATACTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98008         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCTC GATTAAACAA TATAAGATTc TGATTAcTAC CCCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98009         TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTCCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW98020         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTGA TATTAGGAGC ACCTGATATG GCTTTCCCAC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW98029         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA ATTCCTTTAA TATTNGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98049         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTATTA ATTTCTAGAA GAATTGTAGA AAACGGAGCA
MW98079         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGNGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CACCTTCATT AATATTACTA ATTTCTAGAA GAATCTTAGA AAATGGAGCA
MW98084         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTAGGGGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98089         TTTATtATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGGTTTGG TAACTGATTG GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CACCTTCaTT AATATTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW98094         TTTATTATAA TTTTTTTTAT AGTtATACCT ATTATAATTG GAGGATTTGG TAATTGACTT GTtCCTTTAA TATTAGGAGC NCCTGATATA GCTTTTCCAC GAATAAATAA CATAAGATTT TGATTATTAC CNCCATCATT ATTATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98097         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98103         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW98106         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTT TGGTTATTAC CACCATCATT AATACTATTA ATTTCTAGAA GAATTGTAGa AAATGGGGCA
MW98128         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACtGATTA GTTCCTTTAA TGTTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC tGATTATTAC CGCCATCATT AATACTTCTA ATTTCTAGaA GAATTGTAGA AAATGGAGCA
MW98129         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC ACCCGATATA GCATTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98133         TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT GATTCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98136         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98138         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98139         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98154         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98162         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC aCCTGATATA GCCTTTCCTC GATTAAaTAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98170         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATG GCCTTTCCtC GATTAAaTAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98172         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTGA TATTAGGAGC ACCTGATATG GCTTTCCCAC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW98180         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98183         TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98185         TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355
MW98189    TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CACCTTCATT AATATTGCTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98203    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATG GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98205    TTTATTATAA TTTTTTTTAT GGTTATACCT ATCATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW98212    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAaGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW98220    TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATATTGTTA ATTTCTAGTA GAATTGTAGA AAATGGAGCA
MW98228    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGaTTTGG TAACTGATTA GTACCTTTAA TGTTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTGTTAC CCCCATCACT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98230    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGACTT ATCCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCTCT ATTATTATTA ATTTCAAGAA GAATTGTTGA AAATGGAGCA
MW98235    TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCCTTAA TATTAGGGGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98240    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW98261    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTATTA ATTTCCAGAA GGATTGTAGA AAATGGAGCA
MW98264    TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTCCCCTTAA TATTAGGAGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98265    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GTGGATTTGG AAACTGATTA ATCCCATTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCGTCATT AATATTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98270    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTCCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW98274    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTC TGATTATTAC CCCCATCATT AATGCTACTA ATTTCAAGAA GAATCGTAGA AAATGGAGCA
MW98278    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTACCTTTAA TATTGGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW98284    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98285    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98294    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW98313    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW98315    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGaTTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99001    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATGAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99006    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99009    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGGTTATTAC CGCCATCATT AATACTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99013    TTTATTATAA TTTTTTTCAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTCCCCTTAA TATTAGGAGC ACCTGATATA GCTTTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT AATATTACTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99014    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TGTTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATtAC CACCATCATT AATACTTCTA ATTTCTAGGA GAATTGTAGA AAATGGAGCA
MW99018    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCAC GAATAAATAA TATAAGATTT TGATTATTAC CACCATCACT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99028    TTCATTATAA TTTTTtTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTtTAA TATTAGGAGC ACCTGATATa GCTCTCCCTC GAATaAATAA TATAAGATTT TGAttATTAC CCCCATCATT AaTATTATTA ATTTCAAGAA GAATtGTAGA AAATGGAGCA
MW99038    TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCCTTAA TATTGGGGGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CTCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99042    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTTCCTC GATTAAATAA TATAAgATTC TGATTATTAC CTCCATCATT AATACTTTTA ATTTCtAGAA GAATTGTAGA AAATGGAGCA
MW99045    TTTATTATAA TTTTTTTTAT AGTTATACCA ATTATAATTG GTGGATTTGG AAATTGATTA GTACCTTTAA TATTAGGAGC TCCTGATATA GCTTTTCCAC GAATAAATAA CATAAGATTT TGATTATTAC CACCTTCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99047    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG CAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTCCCTC GATTAAATAA CATAAGATTT TGATTATTAC CCCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99053    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99057    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATG GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CACCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99058    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GaGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA CATAAGATTT TGATTATTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99059    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAgCA
MW99060    TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99061    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99068    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGNGC aCCTGATATa gCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99080    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGACTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTTCCAC GAATAAATAA CATAAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGTA GAATTGTAGA AAATGGAGCA
MW99084    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA ATTCCTTTAA TATTAGGAGC ACCTGATATA GCATTtCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCTTT GATATTGTTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99094    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGNTTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99095    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99097    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCTTTCCCTC GAATAAATAA TATGAGATTT TGATTATTAC CTCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99102    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CGCCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99104    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTGCTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99105    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTGCTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99124    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC TCCAGATATA GCTTTCCCTC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99128    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCTC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99134    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC CCCTGATATA GCCTTCCCTC GAATAAATAA CATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AACTGGAGCA
MW99135    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99140    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99141    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTGCTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99158    TTTATTATAA TTTTCTTTAT AGTAATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GTACCACTAA TATTAGGAGC ACCAGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGATTATTAC CTCCTTCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99163    TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTTCCCC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATATTATTA GTTTCAAGAA GTATTGTAGA AAATGGAGCA
MW99164    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GNGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTT TGATTATTaC CACCATCATT AATACTACTA ATTTCtAGAA GAATCGTAGA AAATGGAGCA
MW99165    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATG GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99170    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGGTTATTAC CGCCATCATT AATACTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99174    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CGCCATCATT AATATTACTA ATTTCCAGAA GAATTCTAGA AAATGGGGCA
MW99187    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GNGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CGCCATCATT AATATTACTA ATTTCCAGAA GAATTCTAGA AAATGGGGCA
MW99196    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99203    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTCCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99221    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GTGGATTTGG AAATTGACTA GTACCTTTAA TATTAGGAGC TCCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCTTCATT AATATTATTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99226    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99240    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATG GCCTTTCCtC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99247    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99263    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99264    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99274    TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355     
MW99276   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99286   TTTATTATAA TTTTTTTTAT AGTTATACCT ATtATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGAtTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99289   TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99292   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99301   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GGGGATTTGG TAATTGATTG ATTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99303   TTTATCATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCCC GAATAAATAA CATAAGATTT TGATTACTAC CACCATCATT AATATTATTA ATTTCTAGAA GTATTGTAGA AAATGGAGCA
MW99309   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCCGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99314   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99319   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99320   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAaGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99341   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTaC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99344   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99353   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99357   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTATTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99372   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99374   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99376   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99380   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99381   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99382   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99393   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99398   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG AAATTGATTA GTACCATTAA TATTNGGAGC TCCAGATATA GCTTTTCCTC GAATAAATAA TATAAGATTT TGATTATtAC CTCCTTCACT AATATTATTA ATTTCAAGAA GAATCGTAGA AAATGGAGCA
MW99406   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99407   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99408   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99413   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCa
MW99422   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTACTAC CGCCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99425   TTTATTATAA TTTTCTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGATTA GTACCTTTAA TATTGGGAGC CCCTGATATA GCTTTCCCTC GAATAAATAA CATAAGATTT TGATTATTAC CCCCATCATT AATTTTATTA ATTTCAAGAA GAATCGTAGA AAATGGAGCA
MW99430   TtTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTA ATTCCTTTAA TATTGGGAGC aCCTGATATA GCTTTTCCtC GAATAAATAA TATAAGATTT TGACTATTAC CACCATCATT AATATTATTA ATTTCtAGAA GAATTGTAGA AAATGGAGCA
MW99435   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99448   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GNGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99449   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99465   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTATTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99469   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GGGGATTTGG TAATTGATTG ATTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99471   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCATTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99473   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99476   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99479   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99494   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGaTTTGG TAACTGATTA GTTCCTTTGA TATTAGGAGC ACCTGATATG GCTTTCCCAC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATATTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99501   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATAAGATTT TGATTGCTAC CACCTTCATT AATATTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
MW99508   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99514   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
MW99515   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG AAATTGACTT GTCCCCTTAA TATTAGGAGC ACCTGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT ATTATTATTA ATTTCAAGAA GAATTGTCGA AAATGGAGCA
MW99520   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGACTT GTACCTTTAA TATTAGGAGC CCCCGATATA GCTTTTCCAC GAATAAATAA TATAAGATTT TGATTATTAC CTCCATCTTT ATTATTGTTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99526   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99536   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTTCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99537   TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCCTTAA TATTAGGAGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99538   TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCCTTAA TATTAGGAGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99546   TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTTCTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99550   TTTATTATAA TTTTTTTCAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTTCCCTTAA TATTAGGAGC ACCAGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGACTATTAC CCCCATCATT AATATTATTA ATTTCAAGAA GAATTGTAGA AAATGGAGCA
MW99552   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GACTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99559   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGAGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99565   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
MW99579   TTTATTATAA TTTTTTTTAT AGTTATACCC ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGACATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT GATGCTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99591   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCCTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99605   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCCTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTT TGATTATTAC CGCCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99608   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTACCTTTAA TATTAGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99612   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTC TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
MW99613   TTTATTATAA TTTTTTTCAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGAtTC TGATTATTAC CCCCATCATT AATACTTCTA ATTTCCAGAA GAATTGTAGA AAGTGGAGCA
OK96022   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGGTTTGG CAACTGATTA GTACCTTTAA TATTGGGAGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
OK99001   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGGTTTGG TAACTGATTA GTACCTTTAA TATTGGGGGC ACCTGATATA GCATTCCCTC GATTAAATAA TATAAGATTT TGATTATTAC CTCCATCATT AATACTTTTA ATTTCTAGAA GAATTGTAGA AAACGGAGCA
WE00002   TTTATCATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CACCTTCATT AATACTaCTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE00003   TTCATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTCTAA TATTAGGGGC ACCTGATATA GCTTTCCCCC GATTAAATAA TATAAGATTT TGATTATTAC CCCCATCTTT AATACTGTTA ATTTCAAGAA GAGTTGTAGA AAATGGAGCA
WE02321   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCTTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
WE02421   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTAGGGGC ACCTGATATG GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
WE02431   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAACTGATTA GTTCCTTTAA TACTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGGA GAATTGTAGA AAATGGAGCA
WE02451   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATATTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02491   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCAC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
```

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                185        195        205        215        225        235        245        255        265        275        285        295        305        315        325        335        345        355
WE02531   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02535   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GGGGATTTGG TAATTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCCTTCCCTC GATTAAATAA TATAAGATTC TGATTACTTC CACCATCCTT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
WE02536   TTTATTATAA TTTTTTTTAT GGTTATACCT ATCATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGAGC ACCTGATATG GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
WE02591   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02612   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02614   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02621   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CACCTTCACT AATACTACTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
WE02661   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CGCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02662   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATCG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATG GCTTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02671   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC GCCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTGC CACCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE02674   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTG GTTCCTTTAA TATTGGGGGC ACCTGATATA GCCTTTCCTC GATTAAATAA TATGAGATTT TGATTACTAC CGCCTTCACT AATACTATTA ATTTCCAGAA GAATCGTAGA AAATGGAGCA
WE02676   TTTATTATAA TTTTTTTTAT GGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTTCCAC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTACTA ATTTCTAGAA GAATTGTAGA AAATGGAGCA
WE02677   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TACTGGGAGC ACCTGATATA GCATTCCCCC GATTAAATAA TATAAGATTC TGATTACTAC CACCATCCTT AATACTACTA ATTTCTAGAA GAATCGTAGA AAATGGAGCA
WE85001   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAACTGATTA GTTCCTTTAA TATTAGGGGC ACCTGATATA GCCTTCCCAC GATTAAATAA TATAAGATTC TGATTACTAC CCCCATCATT AATACTACTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA
WE98001   TTTATTATAA TTTTTTTTAT AGTTATACCT ATTATAATTG GAGGATTTGG TAATTGATTA GTTCCTTTAA TATTAGGAGC ACCTGATATA GCCTTCCCCC GATTAAATAA TATAAGATTC TGATTATTAC CACCATCATT AATACTATTA ATTTCCAGAA GAATTGTAGA AAATGGAGCA

          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                365        375        385        395        405        415        425        435        445        455        465        475        485        495        505        515        525        535
AD98001   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCACTTA GCAGGAATTT CTTCAATTTT AGGAGCaATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
AD98009   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
AD98012   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCGTCT GTAGATTTAG CAATTTTCTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAACC TATCTTTTGA TCAAATATCA
AD98018   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
AD98024   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
AD98029   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCACTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT tAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
AD98036   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TAACCTTTGA TCAAATAtCA
DS00001   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTGGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTCATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
DS00005   GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTa CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
DS01001   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGG GTAAATAATT TATCATTTGA TCAAATATCA
JC00029   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
JC00039   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCTGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATACCA
JC00040   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATGG GGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
JC00042   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
JC00043   GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
JC00045   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACtATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
JC00046   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
JC00051   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
JC00055   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCTGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCGTTTGA CCAAATATCA
JC00057   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAACA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA CCAAATATCA
JC00061   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
JC00062   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCaTTTGA CCAAATATCA
JC00063   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCaATT AATTTTATTA CAACTATCAT TAATAtACGA GTAAATAATT TATCCTTTGA TCAAATATCA
JC01014   GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
JC02001   GGAACTGGAT GAACAGTCTA CCCCCCACTA TCATCTAATA TTGCACATAG AGGAAGATCT GTTGATCTTG CTATTTTTTC ACTTCACTTA GCTGGTATTT CATCTATTTT AGGTGCAATT AATTTTATTA CAACAATTAT TAATATACGA ATTAATAATA TATCATTTGA TCAAATACCT
JM00001   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGaATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00001   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CTACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00015   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW00017   GGAACAGGAT GAACAGTTTA CCCCCCaCTT TCATCTAATA TTGCTCATAG AGGATCATCT GTTGATTTAA CTATTTTTTC TTTACATTTA GCAGGTATTT CCTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCTTTTGA TCAAATATCT
MW00020   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA CCAAATATCA
MW00024   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGGTCATCT GTTGATTTAG CAATTTTTTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTaTTA CAACTATTAT TAATATGCGA GTAAACAATA TATCTTTTGA TCAAATATCT
MW00032   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CTACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00044   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCTTCT GTTGATTTAG CTATTTTCTC TTTACATTTA GCAGGTATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCATTTGA TCAAATATCT
MW00051   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00056   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00058   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00059   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00060   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00064   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATAtGCGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00072   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00076   GGAACAGGAT GAACGGTTTA CCCCCCGCTT TCATCTAATA TTGCACATAG AGGGTCATCT GTAGACTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00087   GGAACAGGAT GAACGGTTTA CCCCCCGCTT TCATCTAATA TTGCACATAG AGGGTCATCT GTAGACTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTNT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00101   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00102   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00110   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00116   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00119   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCCCATAG AGGATCGTCT GTTGATTTAG CTATTTTTTC TTTACATTTA GCGGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCTTTTGA CCAAATATCT
MW00125   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW00127   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCNCATAG AGGaTCATCT GTAGATTTAG CaATTtTCTC GCTTCATTTA GCCGGAaTTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTga TCAAATATCA
MW00129   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG aGGaTCATCT GTAGATTTaG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              365        375        385        395        405        415        425        435        445        455        465        475        485        495        505        515        525        535
MW00140    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TAACCTTTGA TCAAATATCA
MW00151    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAAAT TATCTTTTGA TCAAATATCA
MW00157    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00176    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00177    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTa CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW00178    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW00179    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW00183    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW00185    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW00186    GGAACAGGAT GAACAGTTTA CCCNCCAcTT TCATCTAATA TTGCACATGG AGGATCNTCT GTAGANTTAG CaATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATtaT CAATATGCGA GTAAATAATT TATCTtTTGA TCAAATATCT
MW00189    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG GGGATCATCT GTAGATTTAG CAATTTTTTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW00226    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00229    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW00231    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW00232    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00234    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW00259    GGAACGGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCGCACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00262    GGAACGGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCGCACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00267    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00269    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TtGCACATAG AGGATCGTCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00290    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGACTTAG CAATTTTCTC CCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00302    GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCTGGAATTT CCTcAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00316    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00326    GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCCAATA TTGCGCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTT CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW00327    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCNCACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTaTtAT TaATATACGG GTAAATAACT TATCCTTTGA TCAAATATCA
MW00328    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCGTCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00330    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CTATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAACC TATCTTTTGA TCAAATATCA
MW00335    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGACTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGG GTAAATAACT TATCCTTTGA TCAAATATCA
MW00347    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCTTTTGA TCAAATATCA
MW00348    GGAACGGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGGTCATCT GTGGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGaGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TAACCTTTGA TCAAATATCA
MW00358    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00393    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TATCCTTTGA TCAAATATCA
MW00409    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGACTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTGT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00412    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW00424    GGaACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCGTCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00444    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00452    GGAACGGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGGTCATCT GTGGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TAACCTTTGA TCAAATATCA
MW00469    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00476    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAACT TATCCTTTGA TCAAATATCA
MW00497    GGAACAGGAT GAACAGTATA CCCCCCACTT TCATCTAATA tCGCCCATAG AGGAGCTTCT GTTGATTTAG CTATTTTTTC ATTACATTTA GCTGGTATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGA ATTAGTAATT TATCCTTTGA TCAAATATCA
MW00498    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATGCGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW00504    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATAtACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW00517    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCCGGAATTT CTTCAATTTT AGGGGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATaATT TATCTTTTGA TCAAATATCA
MW00525    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATCTTTTC TCTTCATTTA GCTGGAATTT CTTCAATTCT AGGAGCAATT AATTTTATTA CCACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW00530    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW00539    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCACTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CTACTATTAT TAATAtACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW00547    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTGAATAACT TATCCTTTGA TCAAATATCA
MW01001    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01009    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAACATACGA GTAAATAATT TATCCTTTGA TCAAATACCA
MW01011    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW01014    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW01018    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01019    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCA GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW01022    GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGTTCATCT GTTGATTTAG CAATTTTTTC ATTACACTTA GCTGGTATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CTACTATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW01023    GGAACAGGAT GAACAGTGTA TCCCCCACTA TCATCTAATA TTGCTCATGG AGGATCTTCT GTAGATTTAG CTATTTTTTC TTTACATTTA GCTGGAATTT CTTCAATTTT AGGTGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTTAATAATT TATCTTTTGA CCAAATATCT
MW01025    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW01027    GGAACTGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCA GTTGATTTAG CCATTTTTTC TCTTCATTTA GCAGGAATTT CATCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGC ATTAATAATT TATCTTTTGA TCAAATATCA
MW01034    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTGT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01039    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01048    GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAaTCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA CCAAATATCA
MW01053    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01059    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01061    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA CCAAATATCA
MW01072    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW01078    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01083    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCCAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTCCATTTA GCTGGAATTT CCTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01092    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01103    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
```

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             365        375        385        395        405        415        425        435        445        455        465        475        485        495        505        515        525        535
MW01105   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW01107   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACCATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01114   GGAACTGGAT GAACAGTCTA CCCCCCACTA TCATCTAATA TTGCACATAG AGGAAGATCT GTTGATCTTG CTATTTTTTC ACTTCACTTA GCTGGTATTT CATCTATTTT AGGTGCAATT AATTTTATTA CAACAATTAT TAATATACGA ATTAATAATA TATCATTTGA TCAAATACCT
MW01116   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW01120   GGAACAGGAT GAACAGTGTA CCCCCCACTA TCATCTAATA TTGCCCATGG TGGATCATCC GTTGATTTAG CAATTTTTTC TTTACACCTA GCAGGAATTT CATCTATTTT AGGAGCTATT AATTTTATTA CAACTATCAT TAATATACGA GTTAATAATC TTTCATTCGA TCAAATATCT
MW02001   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACATAG TGGATCATCC GTAGACTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW02006   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG TGGATCTTCT GTAGATTTAG CGATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAGTAATT TATCCTTTGA TCAAATATCA
MW02007   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCCCATAG AGGGTCATCT GTTGATTTAG CTATTTTTTC ATTACATTTA GCAGGTATTT CATCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCTTTTGA TCAAATATCT
MW02008   GGAACAGGAT GAACAGTGTA CCCCCCACTA TCATCTAATA TTGCACATAG TGGATCATCT GTAGATCTAG CAATTTTCTC ATTACATTTA GCAGGTATTT CATCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW02009   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCTTCT GTTGATTTAG CTATTTTTTC TTTACATTTA GCAGGTATTT CTTCAATTCT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCCTTTGA TCAAATATCA
MW02021   GGAACTGGAT GAACTGTGTA CCCCCCaCTA TCATCAAATA TTGCTCATAG AGGATCTTCT GTTGATTTAG CTATTTTTTC TTTACATTTA GCCGGAATTT CTTCAATTTT AGGTGCAATT AATTTTATTA CAACTATTAT TAACATACGT GTAAATAATT TATCTTTTGA CCAAATATCA
MW02024   GGAACTGGAT GAACAGTCTA CCCCCCACTA TCATCTAATA TTGCCCATAG AGGAAGATCT GTCGATCTTG CTATTTTCTC ACTTCACTTA GCTGGTATTT CTTCTATTTT AGGTGCAATT AATTTTATTA CAACAATTAT TAATATACGA ATTAATAATA TATCATTTGA TCAAATaCCT
MW02025   GGAACAGGAT GAACAGTGTA CCCCCCACTA TCATCAAATA TTGCACATAG AGGATCTTCA GTCGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CATCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATC TATCATTTGA TCAAATATCA
MW02028   GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGTTCATCT GTTGATTTAG CAATTTTTTC ATTACACTTA GCTGGTATTT CTTCAATTTT GGGAGCTATT AATTTTATTA CTACTATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW02031   GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGTTCATCT GTTGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATTT CATCAATTTT AGGAGCAATT AATTTTATTA CTACAATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW02033   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA CCAAATATCA
MW02034   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATCTTTTC TCTTCATTTA GCTGGAATTT CTTCAATTCT AGGAGCAATT AATTTTATTA CTACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
MW98002   GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTTGATTTAG CAATTTTTTC TTTACACTTA GCAGGAATTT CATCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTTAATAATT TATCATTTGA TCAAATATCA
MW98008   GGGACAGGAT GAACAGttTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCTGGAATTT CCTCAaTTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW98009   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98020   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98029   GGAACAGGAT GAACGGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGACTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98049   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98079   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTaT caATATACGG GTATATAAAT TATCTTTTGA TCAAATATCA
MW98084   GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW98089   GGAaCAGGaT GAAcAGTTTA CCCCCCaCTT TCATCTAATa TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATtAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98094   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCtAATA TTGCTCATAG AGGATCATCT GTGGATTTAG CtATTTTTTC TTTACATTTA GCAGGTATTT CTTCAATTTT AGGAGCTATT AATTTTATCA CAACTATTAT TAATATACGA ATTAATAATT TATCTTTTGA TCAAATATCT
MW98097   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98103   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCCCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW98106   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTTGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98128   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCA GTAGATTTAG TAATTTTCTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW98129   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGCATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98133   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW98136   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CaACTATTAT CAATATACGA GTAAATAACC TATCCTTTGA TCAAATATCA
MW98138   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAACATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98139   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCaATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW98154   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98162   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCG
MW98170   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG aGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCCTTTGA TCAAATATCA
MW98172   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98180   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98183   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCaATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98185   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98189   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98203   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCCTTTGA TCAAATATCA
MW98205   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98212   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98220   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTTTC tCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATCA CAACAATTAT TAATATACGA GTAAATAGTT TATCTTTTGA TCAAATATCA
MW98228   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98230   GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCCCATAG AGGATCATCT GTTGATTTAG CTATTTTTTC CTTACATTTA GCAGGTATTT CATCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGA ATTAATAATT TATCATTTGA TCAAATATCT
MW98235   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACTTG GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW98240   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW98261   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98264   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACTTG GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW98265   GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGTTCATCT GTTGATTTAG CAATTTTTTC ATTACACTTA GCTGGTATTT CTTCAATTTT GGGAGCTATT AATTTTATTA CTACTATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW98270   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCTGGAATTT CTTCAATCTT AGGAGCTATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA CCAAATATCA
MW98274   GGAACAGGAT GAACGGTTTA CCCCCCGCTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGACTTAG CAATTTTCTC GCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW98278   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW98284   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCG
MW98285   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW98294   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW98313   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW98315   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99001   GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTCCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGG GTAAATAACT TATCTTTTGA CCAAATATCA
MW99006   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99009   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99013   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCaCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAAAC TATCCTTTGA TCAAATATCA
MW99014   GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCA GTAGATTTAG TAATTTTCTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                 365        375        385        395        405        415        425        435        445        455        465        475        485        495        505        515        525        535
MW99018    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATCTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGa GTAAATAATT TATCTTTTGa TCAAATaTCa
MW99028    GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TtGCTCATGG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA CCAAATATCA
MW99038    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACTTG GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW99042    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCtCATAG AGGATCATCT GTAGATTTAG CAATTTTCtC ACTTCATTTA GCTGGCATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTAGCAT TAATATACGA GTaAATAATT TATCTTTTGA TCAAATATCG
MW99045    GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTTGATTTAG CAATTTTTTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACAATTAT TAATATAAAA GTAAATAATT TATTTTTTGA TCAAATATCA
MW99047    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99053    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99057    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99058    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTcAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTGAATAAAT TATCTTTTGA TCAAATATCA
MW99059    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99060    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCACTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99061    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99068    GGaACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTaT CaATATACGA GTAAATAATT TaTCTTTTGA TCAAATATCC
MW99080    GGAACAGGAT GAACAGTGTA CCCCCCACTT TCATCTAATA TTGCCCATAG AGGATCATCT GTTGATTTAG CAATTTTTTC ACTTCATTTA GCAGGAATTT CATCAATTTT AGGAGCAATT AATTTTATTA CTACAATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW99084    GGAACAGGAT GAACAGTGTA CCCCCCACCA TCATCTAATA TTGCaCATAG TGGAtCATCT GTAGATCTAG CAATTTTCTC ATTACATTTA GCAGGTATTT CATCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99094    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGNGCAATT AATTTTATTA CAACTATTAT CaATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99095    GGAaCAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99097    GGAACAGGAT GAACAGTCTA TCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTCCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAACT TATCTTTTGA CCAAATATCA
MW99102    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99104    GGAACAGGGT GAACAGTTTA CCCTCCACTT TCATCTAATA TTGCACATGG GGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99105    GGAACAGGGT GAACAGTTTA CCCTCCACTT TCATCTAATA TTGCACATAG GGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99124    GGAACAGGAT GAACAGTTTA CCCACCACTT TCATCtAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99128    GGGACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCTGGAATTT CCTCAATTTT aGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99134    GGAACAGGAT GAACGGTTTA CCCCCCGCTT TCATCAAATA TTGCACATAG AGGATCATCT GTTGATTTAG CAATTTTTTC ACTTCATTTA GCTGGAATTT CTTCTATTTT AGGAGCTATT AACTTTATTA CTACTATTAT TAACATACGA GTNAATAATT TATCTTTTGA TCAATTATCA
MW99135    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTC CAACTATTAT TAATAGACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99140    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99141    GGAACAGGGT GAACAGTTTA CCCTCCACTT TCATCTAATA TTGCACATGG GGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99158    GGGACTGGAT GAACAGTTTA TCCCCCACTT TCATCCAATA TTGCCCATAG AGGATCATCA GTTGATTTAG CTATTTTTTC TTTACATTTA GCAGGTATTT CATCAATCTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA aTTAATAATT TATCTTTTGA TCAAATATCA
MW99163    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCCTCA GTAGATCTAG CAATTTTTTC TCTTCATCTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW99164    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATcAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99165    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCCTTTGA TCAAATATCA
MW99170    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99174    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TAACCTTTGA TCAAATATCA
MW99187    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99196    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99203    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGACTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99221    GGAACAGGAT GAACAGTGTA CCCCCCACTC TCATCTAATA TTGCTCATAG AGGTTCTTCT GTTGATTTAG CTATTTTTTC TCTTCATTTA GCTGGAATCT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACAATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99226    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
MW99240    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCCTTTGA TCAAATATCA
MW99247    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATCTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99263    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99264    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
MW99274    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99276    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99286    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99289    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCACTTA GCAGGGATTT CTTCAATTTT AGGAGCaATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99292    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99301    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99303    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATGG AGGATCCTCA GTAGATTTAG CAATTTTTTC TCTTCATCTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAGTT TATCTTTTGA TCAAATATCT
MW99309    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99314    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
MW99319    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99320    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99341    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99344    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99353    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99357    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99372    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99374    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
MW99376    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99380    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCGTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99381    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW99382    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
MW99393    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99398    GGAACTGGAT GAACAGTTTA TCCCCCACTT TCATCTAAtA TTGCTCATAG AGGATCATCA GTTGATCTAG CTATTTTTTC TCTTCATTTA GCAGGtATCT CATCAATTTT AGGaGCCATT AATTTTATTA CAACTATTAT NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99406    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99407    GGAACAGGAT GANCaGTTTa CCCCCCaCTT TCATCTAATA TTGCACATGG AGGNTCNTCT GTAGANTTAG CAATTTTCTC ACTTCANTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATtAT CAATATACGA GTAAATAAtT TATCTTTTGA TCAAATATCC
MW99408    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCCTTTGA TCAAATATCA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              365        375        385        395        405        415        425        435        445        455        465        475        485        495        505        515        525        535
MW99413    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99422    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99425    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCTCATGG AGGATCTTCA GTTGATTTAG CAATTTTTTC ATTACACTTA GCTGGTATTT CCTCAATCTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCATTTGA TCAAATATCC
MW99430    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGGTCATCT GTTGATTTAG CAATTTTTTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAACAATA TATCTTTTGA TCAAATATCT
MW99435    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99448    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTaGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99449    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99465    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
MW99469    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99471    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99473    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99476    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCT
MW99479    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99494    GGAACAGGAT GAGNAGTTTA CCCCCCACTT TCATCAAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATCtA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99501    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGG GTAAATAAAT TATCTTTTGA TCAAATATCA
MW99508    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99514    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGGATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99515    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TGGCTCATAG AGGACCTTCT GTTGATTTAG CTATTTTTTC TTTACATTTA GCAGGTATTT CTTCAATTTT AGGTGCTATT AATTTTATTA CAACTATTAT CAATATACGA ATCAATAATT TATCTTTTGA TCAAATATCT
MW99520    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCTAATA TTGCCCATAG AGGATCTTCT GTTGATTTAG CTATTTTTTC TTTACATTTA GCAGGTATTT CTTCAATTTT AGGAGCCATT AATTTTATTA CAACTATTAT TAATATACGA ATTAATAACT TATCCTTTGA TCAAATATCC
MW99526    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99536    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGCATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCG
MW99537    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACCTG GCTGGAATTT CTTCAATTtT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW99538    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACTTG GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW99546    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAA CAATTTTCTC ACTTCATTTG GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99550    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TCGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TTTACACCTG GCTGGAATTT CTTCAATTTT AGGAGCTATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA
MW99552    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99559    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTaTTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99565    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99579    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCTTCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
MW99591    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA ACAAATATCA
MW99605    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCAAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99608    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
MW99612    GGAACAGGAT GAACAGTTTA TCCCCCACTT TCATCAAATA TTGCCCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCAATTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
MW99613    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAA CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
OK96022    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
OK99001    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCTCATAG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCTGGAATTT CTTCAATTTT AGGAGCTATT AACTTTATTA CAACTATCAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE00002    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCGCACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCCTTTGA TCAAATATCA
WE00003    GGAACAGGAT GAACAGTCTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCACTTA GCTGGAATTT CTTCAATTTT AGGGGCTATT AATTTTATTA CAACTATCAT TAATATACGA GTAAGTAATT TATCATTTGA CCAAATATCA
WE02321    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
WE02421    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
WE02431    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCC
WE02451    GGAACGGGAT GAACAGTTTA CCCCCCACTT TCATCCAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAAAT TATCCTTTGA TCAAATATCA
WE02491    GGAACGGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAACT TATCCTTTGA tCAAATATCA
WE02531    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02535    GGAACAGGGT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAATT TGTCTTTTGA TCAAATATCC
WE02536    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
WE02591    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02612    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02614    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCGGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02621    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTNTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATtA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
WE02661    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC GCTTCATTTA GCCGGAATTT CTTCAATTTT AGGGGCAATT AATTTTATTA CAACTATTAT TAATATACGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02662    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTCCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
WE02671    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC CCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCA
WE02674    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAACA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTTTC TCTTCATTTG GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATACGA GTAAATAACC TATCTTTTGA TCAAATATCA
WE02676    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CTACTATTAT TAATATACGG GTAAATAATT TATCTTTTGA TCAAATATCA
WE02677    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATGG AGGATCATCT GTAGATTTAG CAATTTTCTC ACTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT CAATATGCGA GTAAATAATT TATCTTTTGA TCAAATATCT
WE85001    GGAACGGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACACAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCAGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTC CAACTATTAT TAATATACGG GTAAATAACT TATCCTTTGA TCAAATATCA
WE98001    GGAACAGGAT GAACAGTTTA CCCCCCACTT TCATCTAATA TTGCACATAG AGGATCATCT GTAGATTTAG CAATTTTCTC TCTTCATTTA GCGGGAATTT CTTCAATTTT AGGAGCAATT AATTTTATTA CAACTATTAT TAACATACGA GTAAATAATT TATCATTTGA TCAAATATCA

           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
AD98001    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAATCTTA ACACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
AD98009    CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
AD98012    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
AD98018    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTANNNNNN
AD98024    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCNNNN NNNNNNNNNN
AD98029    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGaG GNNNNNNNNN NNNNNNNNNN
AD98036    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTa aTACCTCTTT CTTTGACCCN GCTGGTGGGG GNNNNNNNNN NNNNNNNNNN
```

Appendix 3: Sequence data Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
DS00001   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
DS00005   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATGTT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GCGATCCAAT TTTNNNNNNN
DS01001   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCATT TTNATATCAA
JC00029   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCaA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGGG GAGATCCAAT TTTATATCAA
JC00039   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TCACTATATT ATTAACTGAT CGAAATCTTA ATACCTCATT CTTTGATCCT GCAGGAGGAG GAGATCCAAT TTTATATCAA
JC00040   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
JC00042   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGGG GAGATCCAAT TTTATATCAA
JC00043   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATcNN
JC00045   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTNNNNNNN
JC00046   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATTTCNN
JC00051   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGGG GAGATCCAAT TTTATATCAA
JC00055   TTATTTATTT GAGCAGTAGG TATTACCGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATATTA ACACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCNNN NNNNNNNNNN
JC00057   TTATTTATTT GAGCAGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATATTA aTACCTCATT TTTTGATCCT GCTGGaGGAG GAGATCCTAT TTTNNNNNNN
JC00061   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATATCAA
JC00062   TTATTTATTT GAGCAGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCaA TTACTATaTT ATTAACTGAT CGAAATATTA ATNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
JC00063   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACGGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGGG GAGATCCAAT TTTATATCAA
JC01014   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
JC02001   TTATTTATTT GAGCTGTTGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCAGTATTA GCTGGAGCTA TTACCATATT ACTTACCGAT CGAAATTTAA ATACTTCATT TTTTGATCCA GCAGGAGGAG GAGATCCTAT TTTATATCAA
JM00001   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCaA TTACCATATT ATTAACAGAT CGAAATCTTA aTACCTCATT TTTTGACCCN GCTGGCGGAG GAGATCCAAT TTTANNNNNN
MW00001   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCCTT ACCTGTATTA GCTGGAGCaA TTACCATATT ATTAACCGAT CGAAACCTTA ACACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT TTTATACCAN
MW00015   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCCGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW00017   TTATTTATTT GAGCAGTAGG AATTACAGCT TTATTATTAT TATTATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGTAATCTAA ATACATCTTT TTTTNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00020   TTATTTATTT GAGCAGTAGG TATTACTGCA TTATNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00024   TTATTTATTT GGGCGGTAGG TATTACTGCT CTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCCGGAGGAG GAGATCCAAT TTTATATCAA
MW00032   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCCTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ACACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT TTTATACCAA
MW00044   TTATTTATTT GAGCTGTAGG AATTACAGCT TTATTATTAT TATTATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGTAATTTAA ATACTTCATT TTTTNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00051   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAN
MW00056   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCaA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCNN
MW00058   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00059   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00060   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGAtCCTAT TTTATATCAA
MW00064   TTATTTATtT GGGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGGGcAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGCGGAG GAGATCCAAT TTTATNNNNN
MW00072   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCTAT TTTATATCAA
MW00076   TTATTTGTTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTAA ATACCTCATT CTTTGATCCT GCTGGTGGAG GAGATCCCAT TTTATATCAA
MW00087   TTATTTGTTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTAA ATACCTCATT CTTTGATCCT GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW00101   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCAGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGGAACCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCTAT TTTATATCAA
MW00102   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTaCCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCTAT TTTATATCAA
MW00110   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00116   TTATTTATTT GAGCGGTCGG AATTACTGCA TTATTATTAC TTTTATCCCT ACCTGTATTA GCTGGAGCAA TTACTATGTT ATTAACAGAT CGGAATCTTA ATANNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00119   TTATTTATTT GAGCTGTAGG AATTACAGCT TTACTATTAT TATTATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGTAATTTAA ATACTTCTTT TTTTGATCCT GCAGGAGGTG GAGACCCAAT TTTATATCAA
MW00125   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCTAT TTTANNNNNN
MW00127   TTATTTATTT GAGCAgTAGG AATTAcGGCA TTAtTATTAC TTTTATCTTT AcCTGTaTTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT NTTTGATCCA GCTGGTGGAG GNNNNNNNNN NNNNNNNNNN
MW00129   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGaGCTA TNACCATATT ATTAACCGAT cGAAACCTTA aNACNTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATNNNNN
MW00140   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TTTATATCAA
MW00151   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
MW00157   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00176   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW00177   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW00178   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW00179   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW00183   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCCGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW00185   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCCGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW00186   TTATTTATTT GAGCAGTAGG AATTACAGCA TtATTATtAC TTTTATCTTT ACCCGTATTA GCTGGAGCAA TTACCATATT ATTAACNGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW00189   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ACACCTCGTT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW00226   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTaTTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT TTTATANCAA
MW00229   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCAGGTGGGG GAGATCCAAT TTTATATCAA
MW00231   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCAGGTGGGG GAGATCCAAT TTTATATCAA
MW00232   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00234   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCNN
MW00259   TTATTTATTT GAGCAGTAGG AATTACAGCA CTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCGTT CTTTGACCCA NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00262   TTATTTATTT GAGCAGTAGG AATTACAGCA CTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCGTT CTTTGACCCA GCTGGCGGGG GGGATCCTAT NNNNNNNNNN
MW00267   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGANNNNNN NNNNNNNNNN
MW00269   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW00290   TTATTTGTTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACTATACT ATTAACTGAT CGAAACCTAA ATACCNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW00302   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTaACTGAT CGAAATCTAA ACACCTCATT CTTTGATCCT GCTGGAGGAG GNNNNNNNNN NNNNNNNNNN
MW00316   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATtAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00326   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ACACCTCATT TTTTGACCCT GCTGGAGGAG GAGATCCTAT TTTATATCAA
MW00327   TTATTTATTT GAGCAGTaGG AATTACaGCA TTATTGTTAC TTCTGTCTTT ACCtGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCC GCTGGTGGAG GAGATCCTAT TTTATATCAA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
MW00328   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW00330   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCtATCTTT ACCTGTATTA GCTGGaGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGaG GAGATCCAAT TTTATACCAA
MW00335   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTGTTA GCTGGAGCAA TCACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCTAT TTTATATCAA
MW00347   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TTTATATCAA
MW00348   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TCTATACCAa
MW00358   TTATTTATTT GAGCAGTAGG AATTACAgCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAaCCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TTTATANNNN
MW00393   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTGTTAC TTCTGTCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCC GCTGGTGNNN NNNNNNNNNN NNNNNNNNNN
MW00409   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTGTTA GCTGGAGCAA TCACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGCGGAG GAGATCCTAT TTTATATCAA
MW00412   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTaCTATATT ATTAACGGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW00424   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TNNNNNNNNN
MW00444   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TTNNNNNNNN
MW00452   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCCGTATTA GCTGGAGCAA TTaCCATATT ATTAACTGAt CGAAACCTTA ATACCTCATT CTTTGACCCG GCTGGTGGGG GAGATCCTAT TTNATANCAA
MW00469   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTCA ACACTTCATT TTTTGATCCT GCAGGAGGAG GAGATCCAAT CTTATATCAA
MW00476   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCTAT TTTATATCAA
MW00497   TTATTTATTT GAGCTGTAGG AATTACAGCG TTATTATTAT TATTATCATT ACCAGTATTA GCTGGAGCTA TTACTATATT ATTAACAGAC CGAAATTTAA ATACtTCATT TTTTGACCCA GCAGGTGGAG GAGATCCTAT TCTTTACCAA
MW00498   TTATTTATTT GGGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGGGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGCGGAG GAGATCCAAT TTTATATCAA
MW00504   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCATT TTTTGATCCA GCTGGCGGGG GAGATCCNAT TTTATATCAA
MW00517   TTATTTATTT GAGCAGTAGG TATTACAGCT TTACTATTAC TTTTATCATT ACCTGTTTTA GCTGGAGCAA TTACTATATT ATTAACTGAC CGAAATCTTA ATACTTCATT TTTCGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAN
MW00525   TTATTTATTT GAGCAGTAGG AATCACCGCT CTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGGGCAA TTACTATATT ATTAACTGAT CGAAATCTTA ATACTTCATT TTTTGATCCG GCTGGAGGAG GAGATCCAAT CTTANNNNNN
MW00530   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTANNNNNN
MW00539   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCtGGaGCaA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW00547   TTATTTATTT GAGCGGTAGG AATTACNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW01001   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT TTTTGACCCC GCTGGCGGAG GAGATCCAAT TTTATATCAA
MW01009   TTATTTGTAT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCT GCAGGAGGAG GAGATCCAAT TTTATATCAC
MW01011   TTATTCATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTCA ACACTTCATT TTTTGATCCT GCAGGAGGAG GAGATCCAAT TTTATATCAA
MW01014   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW01018   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TCTATACCAA
MW01019   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01022   TTATTTATTT GAGCTGTTGG TATTACAGCA TTATTATTAT TATTATCTTT ACCTGTTTTA GCGGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ATACTTCTTT TTTTGATCCT GCTGGAGGAG GAGATCCAAT CTTATATCAA
MW01023   TTATTTATTT GAGCCGTTGG AATTaCAGCA TTATTACTAT TATTATCTTT ACCTGTATTA GCAGGAGCTA TTACTATATT ATTAACAGAT CGAAATTTAA ATACTTCATT TTTTGACCCT GCCGGAGGAG GAGATCCAAT TTTATATCAA
MW01025   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01027   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCAGTATTA GCAGGTGCTA TTACTATATT ACTAACTGAT CGAAATTTAA ATACTTCATT TTTTGACCCT GCAGGAGGAG GAGATCCAAT TTTATATCAA
MW01034   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT NTTTGATCCT GCTGGAGGAG GAGATCCAAN NNNNNNNNNN
MW01039   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT TTTTGACCCC GCTGGCGGAG GAGATCCAAT TTTATATCAA
MW01048   TTATTTATTT GAGCAGTAGG TATTACCGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGGGCAA TTACTATATT ATTAACTGAT CGAAATATTA ATACCTCATT TTTtGATCCT GcTGGAGGAG GAGATCCNNN NNNNNNNNNN
MW01053   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT TTTTGACCCC GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01059   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCNGGNGGNG GAGANNNNNN NNNNNNNNNN
MW01061   TTATTTATTT GAGCTGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATATTA ATACTTCATT TTTTGATCCT GCTGGAGGAG GAGANCCAAT TTNATATCAA
MW01072   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW01078   TTATTTATTT GAGCAGTGGG AATTACAGCT TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT TTTTGACCCC GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01083   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTAA ACACCTCATT CTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01092   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TNTATATCAN
MW01103   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01105   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCG GCTGGNGGAG GAGATCCAAT TTTATATCAA
MW01107   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT TTTTGACCCC GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01114   TTATTTATTT GAGCTGTTGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCAGTATTA GCTGGAGCTA TTACCATATT ACTTACTGAT CGAAATTTAA ATACTTCATT TTTTGATCCA GCAGGAGGAG GAGATCCTAT TTTATATCAA
MW01116   TTATTTATTT GAGCGGTAGG AATTACAGCA TTGTTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW01120   TTATTTATTT GAGCTGTTGG TATCACAGCA TTATTACTAC TTTTATCTCT TCCAGTTTTA GCTGGGGCTA TTACTATACT ACTAACCGAT CGAAATTTAA ACACCTCCTT TTTTGACCCT GCAGGGGGAG GTGATCCAAT TTTATATCAA
MW02001   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ACTAACTGAT CGAAACCTTA ATACCTCATT TTTTGATCCA GCTGGTGGGG GGGATCCAAT TTTATATCNN
MW02006   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCGGTATTG GCTGGAGCAA TTACTATATT ACTAACAGAT CGAAACCTTA ATACATCATT CTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW02007   TTATTTATCT GAGCAGTAGG AATTACAGCT CTATTATTAC TACTATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGTAATCTAA ATACATCTTT TTTTGATCCT GCAGGAGGAG GTGACCCAAT TTTATATCAA
MW02008   TTATTTATTT GAGCAGTAGG AATTACAGCA CTATTACTTC TTCTTTCTTT ACCTGTTTTA GCTGGTGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ATACTTCATT TTTTGACCCT GCTGGAGGAG GAGACCCAAT TTTATATCAN
MW02009   TTATTTATTT GAGCTGTAGG AATTACAGCT TTATTATTAT TATTATCTTT ACCTGTTTTA GCTGGAGCTA TTACAATATT ATTAACTGAC CGTAATTTAA ATACATCNTT TTTTGACCCT GCAGGAGGAN NNNNNNNNNN NNNNNNNNNN
MW02021   CTATTTATTT GAGCTGTTGG TATTACAGCT TTATTACTTC TTTTATCTTT ACCTGTTTTA GCAGGGGCTA TTACTATATT ATTAACAGAT CGAAATTTAA ATACCTCATT TTTTGATCCA GCTGGAGGAG GTGATCCAAT TTTATATCAA
MW02024   TTATTTATTT GAGCTGTTGG AATTACAGCA TTATTATTAT TATTATCCTT ACCAGTATTA GCTGGAGCTA TTACCATATT ACTTACGGAT CGAAATTTAA ATACTTCATT TTTTGATCCA GCAGGAGGAG GAGATCCTAT TTTATATCAA
MW02025   TTATTTATCT GAGCTGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCAGTATTA GCTGGTGCTA tTACCATATT ATTAACAGAT CGAAATCTTA ATACATCATT TTTTGATCCA GCAGGAGGAG GAGATCCAAT TTTATATCAA
MW02028   TTATTTATTT GAGCTGTTGG TATTACAGCA TTATTATTAT TATTATCTTT ACCTGTTTTA GCGGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ATACTTCTTT TTTTGATCCT GCTGGAGGAG GAGATCCAAT CTTATATCAA
MW02031   TTATTTATTT GAGCAGTAGG TATTACAGCA TTATTATTAT TATTATCTTT ACCTGTTTTA GCGGGTGCTA TTACTATATT ACTAACAGAT CGAAATCTTA ATACTTCTTT NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW02033   TTATTTATTT GAGCAGTAGG TATTACCGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATATTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW02034   TTATTTATTT GAGCAGTAGG AATCACCGCT CTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGGGCAA TTACTATATT ATTAACCGAT CGAAATCTTA ATACTTCATT TTTTGATCCG GCTGGAGGAG GAGATCCAAT CTTATATCAA
MW98002   TTATTTATTT GAGCTGTAGG AATTaCAGCA TTATTATTAT TGTTATCATT aCCAGTTTTA GCTGGAGCTA TTACAATATT ATTAACTGAT CGAAATTTAA ATACTTCATT TTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW98008   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTAtTA GCTGGNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW98009   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAATCTTA ACACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW98020   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACTATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT NNNNNNNNNN
MW98029   TTATTTGTTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTAA ATACCTCATT CTTCGATCCT GCTGGTGGAG GAGATCCAAT TNNNNNNNNN
MW98049   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW98079   CTATTTATTT GAGCTGTAGG AATTACTGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACTTCCTT TTTTGACCCA GCTGGGGGAG GNNNNNNNNN NNNNNNNNNN
MW98084   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA aCACCTCNTT CTTTGACCCG GCTGGTGGAG GaGATCCAAT TTTATATCAA
```

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
MW98089    CTATTTATTT GAGCTGTAGG AATTACTGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATNCTTCCTT NTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATATCAA
MW98094    TTATTTATTT GAGCTGTAGG AATTACAGCT TTATTATTAT TATtATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW98097    TTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ACACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
MW98103    TTATTTATTT GAGCGGTAGG AATCACAGCA TTATTATTAC TTTTACCTTt ACCTGTATTA GCTGGAGCAA TTACCATATT aTTAACCGAT CGAaACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGAG GAGATCCNNN NNNNNNNNNN
MW98106    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATtAC TTTTATCTTt ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGaT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGAG GGGATCCAAT TTTATACCAA
MW98128    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ACTAACTGAT CGAAATCTTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW98129    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTGACTGAT CGAAACCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GaGATCCAAT TTTNNNNNNN
MW98133    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACGGAT CGAAACCTCA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCNNNN NNNNNNNNNN
MW98136    TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW98138    CTATTTGTTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCGTT CTTTGACCCA GCTGGGGGAG GAGATCCANN NNNNNNNNNN
MW98139    TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAN
MW98154    CTATTTGTTT GAGCCGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCtGTATTA GCAGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATANNNN
MW98162    CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGANNNNNN NNNNNNNNNN
MW98170    TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTGACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW98172    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACTATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW98180    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCAGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATATCAA
MW98183    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCAGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGNN NNNNNNNNNN NNNNNNNNNN
MW98185    TTATTTATTT GAGCGGTAGG AATTACAGCA TTGTTATTAT TACTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW98189    CTATTTGTTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGGGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGNGGGG GAGATCCAAT TTTANNNNNN
MW98203    TTATTTATTT GGGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ACTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW98205    TTATTTATTT GAGCAGTGGG AATTACGGCA TTATTATTAC TTTTATCTTT GCCTGTATTA GCGGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCANT TTTATATCAA
MW98212    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT ACCTGTaTTA GCTGGAGCaA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGTGGAG GAGATCCAAT TTTANNNNNN
MW98220    TTATTTATTT GAGCAGTTGG TATTACTGCT TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACTATATT ATTAACAGAT CGAAATCtTA ATACTTCATT TTTTGATCCA GCTGGAGGAG GTGATCCAAT TTTATATCAN
MW98228    CTATTTATTT GAGCAGTAGG AATTACAGCA TTATTGTTAC TATTATCATT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAACCTTA ATACTTCATT TTTTGATCCT GCTGGAGGAG GGGATCCNNN NNNNNNNNNN
MW98230    TTATTTATTT GAGCTGTAGG AATTACAGCT TTATTATTAT TATTATCTTT ACCTGTTTTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGTAATTTAA ATACTTCTTT TTTTGATCCT GCAGGAGGTG GAGATCCAAT TTTATACCAA
MW98235    TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCT GCTGGAGGGG GAGATCCTAT TTTATATCAA
MW98240    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGACCCN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW98261    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCAAT TTTATACCAN
MW98264    TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCTAT TTTATATCAA
MW98265    TTATTTATTT GAGCTGTTGG TATTACAGCA TTATTATTAT TATTATCTTT ACCTGTTTTA GCGGGAGCTA TTACTATATT ATTAACTGAT CGNAAtCTTA ATACTTCNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW98270    TTATTTATTT GAGCTGTAGG TATTACTGCA TTATTACTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TCACTATATT ATTAACAGAT CGTAATCTTA ATACCTCATT TTTTGACCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW98274    TTATTTGTTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTAA ATACCTCATT CTTTGATCCT GCTGGTGGGG GGGATCCAAT TTTATATCAN
MW98278    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTCA ACACTTCATT TTTTGATCCT GCAGGAGGAG GAGATCCAAT CTTATATCAA
MW98284    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT NNNNNNNNNN
MW98285    CTATTTATTT GAGCTGTGGG AATTaCAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCANN NNNNNNNNNN
MW98294    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGcAA TTACCATATT ATTAACCGaT CGAAATCTTA ACACCTCATT CTTTGACCCA GNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW98313    TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTa ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAN NNNNNNNNNN
MW98315    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGNNNNN NNNNNNNNNN NNNNNNNNNN
MW99001    CTATTTATTT GAGCAGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACTATATT ATTAACAGAT CGAAATATTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT CTTATATCAA
MW99006    CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99009    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCNNNN NNNNNNNNNN
MW99013    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAGATCTTA ATACCTCATT TTTTGATCCt GCTGGTGGTG GAGNNNNNNN NNNNNNNNNN
MW99014    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACcTGTATTA GCTGGAGCTA TTACTATATT ACTAACTGAT CGAAATCTTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99018    TTaTTTaTTT GAGCaGTaGG AATTaCTGcA TTaTTaTTaC TTTTaTCTTT ACCTGTATTA GCTGGaGCAA TTACTATATT ATTAACTGAC CGAAACCTAA ATACTTCATT CTTTGaTCCA GCTGGAGGAG GAGANCCNNN NNNNNNNNNN
MW99028    TTATTTATTT GAGCAGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT AcCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAATATTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCTAT TTTATATCAA
MW99038    TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCC GCTGGAGGGG GAGATCCTAT TTTATATCAA
MW99042    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99045    TTATTTATTT GAGCAGTAGG TATTACAGCA TTATTATTAT TATTATCTTT ACCTGTTTTA GCTGGTGCTA TTACTATATT ATTAACAGAT CGAAACCTAA ATACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99047    CTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGANNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99053    TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99057    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GcTGGAGGAG GAGATCCAAT TTTATACCAa
MW99058    CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
MW99059    CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTANNNNNN
MW99060    TTATTTATCT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAATCTTA ACACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTNNNNNNN
MW99061    CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCAGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTNNNNNNN
MW99068    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGaGCAA TTACCATATT ATTAACCGAT CGAAATCTTA aNACNTCATT CTTTGATCCG GcTGGTGGAG GAGATCCAAT TTTATANNNN
MW99080    TTATTTATTT GAGCAGTAGG TATTACAGCA TTATTATTAT TACTATCTTT ACCTGTTTTA GCAGGTGCTA TTACTATATT ATTAACAGAT CGAAATCTTA ATACCTCTTT CTTTGATCCT GCTGGAGGAG GAGATCCAAT TCTATATCAA
MW99084    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATtACTTC TTCTTTCTTT ACCTGTTTTA GCTGGTGCTA TTACTATANN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99094    CTATTTATTT GGGCTGTAGG AATTACAGCA TtATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCNN
MW99095    TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99097    CTATTTATTT GAGCAGTAGG TATTACTGCA TTATTATTAC tTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACTATATT ATTAACAGAT CGAAATATTA ATACCTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT CTTATATCAA
MW99102    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99104    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTTA ACACCTCGTT CTTTGATCCG GCTGGTGGAG GAGATCCAAN NNNNNNNNNN
MW99105    TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTTA ACACCTCGTT CTTTGANCCG GCTGGTNNNN NNNNNNNNNN NNNNNNNNNN
MW99124    TTATTTATTT GAGCAGTCGG AATTACTGCA TTACTATTAC TTTTATCTCT ACCAGTATTA GCCGGAGCAA TTACTATATT ATTAACTGAT CGAAATCTTA ATACTTCATT TTTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATACNNN
MW99128    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTAA ACACCTCATT CTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW99134    TTATTTaTTT GAGCAGTAGG TATTACTGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCGGGTGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACTTCGTT TTTTGATCCG GCTGGAGGAG GGGATCCAAT TTTATATCAA
MW99135    TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGGGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGNNNNN NNNNNNNNNN NNNNNNNNNN
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
MW99140   TTATTTATTT GAGCGGTAGG AATTACAGCA TTGTTATTAT TACTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99141   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAACCTTA ACACCTCGTT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99158   TTATTTATTT GAGCAGTAGG AATTACAGCa TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGTGCTA TCACTATATT ATTAACTGAT CGAAATTTAA ATACTTCATT TTTTGACCCT GCAGGAGGAG GAGATCCAAT TTTATATCAA
MW99163   TTATTTATTT GAGCAGTAGG TATTACTGCT TTGTTATTAC TTTTATCTTT ACCTGTCTTA GCTGGAGCAA TTACTATATT ATTAACAGAT CGAAATCTTA ATACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAN
MW99164   TTATTTATTT GAGCAGTGGG AATTACcGCA TTATTATTAC TTTTATCATT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99165   TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99170   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTANNNNNN
MW99174   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCTAT TTTATATCAn
MW99187   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99196   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACTTCATT CTTTGATCCG GCTGGTGGAN NNNNNNNNNN NNNNNNNNNN
MW99203   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99221   TTATTTATTT GAGCTGTAGG TATTACTGCA CTATTATTAT GATTATCTTT ACCAGTTTTA GCTGGAGCTA TTACTATATt ATTAACAGAT CGAGATCTTA ATACTTCATT TTTTGACCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99226   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATATCAN
MW99240   TTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99247   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGNN NNNNNNNNNN NNNNNNNNNN
MW99263   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTNNNNNNNN
MW99264   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAt CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GNNNNNNNNN NNNNNNNNNN
MW99274   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGTGGGG GAGATCCAAT TTTATATCAA
MW99276   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGTGGGG GAGATCCAAT TTTNNNNNNN
MW99286   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGNNNNN NNNNNNNNNN NNNNNNNNNN
MW99289   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCaA TTACTATATT ATtaaCCGAT CGAGATCTTA ACACCTCATT TTTTGATCCA GCTGGTGGNN NNNNNNNNNN NNNNNNNNNN
MW99292   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCAAT TTTATACCAA
MW99301   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCGTT TTTTGACCCA GCTGGCGGGG GAGATCCAAT TTTATACCAA
MW99303   TTATTTATCT GAGCAGTAGG TATTACTGCT TTATTGTTAC TTTTATCTTT ACCTGTTTTA GCTGGAGCAA TTACTATATT ATTAACAGAT CGAAATCTTA ATACTTCATT TTTTGATCCT GCTGGAGGAG GAGANCCAAT TTTATATCAN
MW99309   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99314   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99319   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGTGGGG GAGATCCAAT TTTATATCAA
MW99320   TTATTTATTT GAGCAGTGGG AATTACNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99341   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ATACCTCATT CTTTGATCCA GCTGGTGGGG GAGATCCAAT TTTATACCAA
MW99344   TTATTTATTT GAGCGGtAGG AATCACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGAG GAGANNNNNN NNNNNNNNNN
MW99353   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAN
MW99357   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAN
MW99372   TTATTTATTT GAGCGGTAGG AATCACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT NNNNNNNNNN
MW99374   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTANNNNNN
MW99376   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW99380   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCAGGTGGGG GAGATCCAAT TTTATATCAA
MW99381   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGtGGGG GAGATCCAAT TTTNNNNNNN
MW99382   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTTATATCAA
MW99393   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW99398   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
MW99406   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAN
MW99407   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ANACNTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTTATANNNN
MW99408   CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGaT CGAAACCTCA ATACCTCATT CTtTGACCCA GCTGGGGGGG GGGATCCAAT NNNNNNNNNN
MW99413   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
MW99422   CTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
MW99425   TTATTTATTT GAGCTGTAGG AATTACTGCT TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCTA TTACTATATT ATTAACTGAT CGTAATCTTA ATACATCATT TTTTGACCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99430   TTATTTATTT GGGCGGTAGG TATTACTGCT CTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCCGGAGGAG GAGATCCAAT TTNNNNNNNN
MW99435   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTCA ACACTTCATT TTTTGATCCT GCAGGAGGAG GAGATCCAAT CTTATATCAA
MW99448   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW99449   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACcTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW99465   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCCGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
MW99469   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTTA ATACCTCGTT TTTTGACCCA GCTGGCGGGG GAGATCCAAT TTTATNNNNN
MW99471   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCAGGTGGGG NNNNNNNNNN NNNNNNNNNN
MW99473   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW99476   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99479   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCANN NNNNNNNNNN
MW99494   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCATT GCCTGTATTA GCTGGAGCAA TTACTATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCNNN NNNNNNNNNN
MW99501   CTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCAGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATATCAA
MW99508   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99514   TTATTTATTT GAGCGGTAGG AATTACAGCA TTGTTATTAT TACTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCtTA ACACtTCATT TTTTGATCCT GCNGGAGGAG GAGATCCAAT TTTANNNNNN
MW99515   TTATTTATTT GAGCTGTAGG AATTACAGCT TTACTATTAC TATTATCTTT ACCTGTTTTA GCTGGGGCTA TTACTATATT ATTAACTGAT CGTAATTTAA ATACTTCTTT TTTTGATCCT GCAGGAGGTG GAGATCCAAT TTTATATCAA
MW99520   TTATTTATTT GAGCTGTAGG AATTACAGCT TTATTACTAT TACTATCTTT ACCTGTTTTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGTAATTTAA AtACTTCTTT TTTTGATCCT GCAGGTGGTG GAGATCCNAT TTTATATCAA
MW99526   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGGGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCNNNN NNNNNNNNNN
MW99536   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAACCTTA ACACTTCATT TTTtGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
MW99537   TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCtGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCT GCTGGAGGGG GAGATCCTAT TTTATATCAA
MW99538   TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCT GCTGGAGGGG GAGATCCTAT TTTATATCAA
MW99546   TTATTTATTT GAGCTGTAGG AATTACAGCA TTATTATTAC TTTTATCCTT ACCCGTATTA GCTGGTGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGAGGAG GaGATCCAAT TTTATATCAA
MW99550   TTATTCATCT GAGCGGTAGG AATTACAGCA TTATTATTAC TCTTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATTTAA ATACCTCATT TTTTGATCCT GCTGGAGGGG GAGATCCTAT TTTATATCAA
```

Appendix 3: Sequence data

Cytochrome Oxidase I (COI)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
            545        555        565        575        585        595        605        615        625        635        645        655        665        675        685
MW99552   TTATTTATTT GAGCGGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99559   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAaTCTTA ATACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAaT TTTATATNNN
MW99565   TTATTTATTT GAGCGGTAGG AATCACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCAGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
MW99579   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACTATATT ATTAACTGAT CGAAACCTCA ATACCTCATT CtTTGATCCA GCTGGAGGAG GAGATCCAAT TTTATATCAN
MW99591   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCCGTATTA GCTGGGGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
MW99605   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCATT GCCCGTATTA GCTGGGGCAA TTACCATATT ATTAACAGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCNNNN NNNNNNNNNN
MW99608   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTCA ACACTTCATT TTTTGATCCT GCAGGAGGAG GAGATCCAAT CTTATATCAA
MW99612   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATaTT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCNNNN NNNNNNNNNN
MW99613   TTATTTATTT GAGCTGTGGG AATTACAGCA TTATTATTAC TTTTATCCTT ACCCGTATTA GCTGGTGCAA TTACCATATT ATTAACTGAT CGAAATCTTA ACACCTCATT CTTTGATCCG GCTGGANNNN NNNNNNNNNN NNNNNNNNNN
OK96022   TTATTTATTT GAGCGGTAGG AATTACAGCA TTGTTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ACTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATCAA
OK99001   TTATTTATTT GAGCGGTAGG AATTACAGCA TTATTATTAT TATTATCTTT ACCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ACACTTCATT TTTTGATCCT GCTGGAGGAG GAGATCCAAT TTTATATNNN
WE00002   TTATTTATTT GAGCAGTAGG AATtACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTGACAGAT CGAAACCTTA ATACTTCATT CTTTGATCCG GCTGGTGGGG GAGATCCTAT TCNNNNNNNN
WE00003   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTCT GCCTGTATTA GCTGGAGCTA TTACTATATT ATTAACTGAT CGAAATCTTA ATACCTCATT NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
WE02321   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCAGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGAG GAGATCCAAT TTTATACCAA
WE02421   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTCAATNNNN
WE02431   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATCAN
WE02451   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACTTCATT CTTTGATCCC GCTGGTGGAG GGGATCCTAT TTTATATCAA
WE02491   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTGTTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCCTAT TTTNNNNNNN
WE02531   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAC CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCNN
WE02535   TTATTTATTT GGGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ACACCTCATT CTTTGATCCG GCTGGTGGAG GAGATCCAAT TTNNNNNNNN
WE02536   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGGGGGG GAGATCCAAT TNNNNNNNNN
WE02591   TTATTTATTT GAGCAGTGGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACNNN
WE02612   TTATTTATTT GAGCAGTGGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
WE02614   TTATTTATTT GAGCAGTGGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ATACCTCATT TTTTGATCCA GCTGGTGGAG GAGATCCAAT TTNNNNNNNN
WE02621   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTNNNNNNN
WE02661   TTATTTATTT GAGCAGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAN NNNNNNNNNN
WE02662   TTATTTATTT GAGCAGTGGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGACCCG GCTGGTGGAG GAGATCCAAT TTTATATCAA
WE02671   TTATTTATTT GAGCGGTAGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGATCCA GCTGGTGGAG GAGATCCAAT TTTATACCAA
WE02674   CTATTTATTT GGGCTGTAGG AATTACAGCA TTATTATTAC TTCTATCTTT ACCTGTATTA GCTGGAGCTA TTACCATATT ATTAACCGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGAGGAG GAGATCCAAT TTTATACCAA
WE02676   TTATTTATTT GAGCAGTGGG AATTACGGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAACCTTA ACACCTCATT CTTTGATCCG GCTGGTGGGG GAGATCCAAT TTTATACCAA
WE02677   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACCGAT CGAAATCTTA ACACCTCATT CTTTGACCCA GCTGGTGGGG GAGATCCAAT TTNNNNNNNN
WE85001   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTGTTA GCTGGAGCAA TTACCATATT ATTAACTGAT CGAAACCTTA ATACCTCATT CTTTGATCCA GCTGGAGGAG GAGATCNNNN NNNNNNNNNN
WE98001   TTATTTATTT GAGCAGTAGG AATTACAGCA TTATTATTAC TTTTATCTTT ACCTGTATTA GCTGGAGCAA TTACCATATT ATTAACAGAT CGAAACCTTA ATACCTCATT CTTTGACCCA GCTGGTGGAG GAGATCCAAT TTTACATCAA
```

Cytochrome b (Cytb)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5         15         25         35         45         55         65         75         85         95        105        115        125        135
MW98006   ATTATTACAG GATTATTTTT AACTATATAT TATTCTGCTA ATATTAATTT AGCTTTTTAT AGTGTTAATT ACATTTGTCG AGATGTTAAT TATGGTTGAT TAATTCGAAC TCTTCATGCC AATGGAGCAT CTTTTTTTTT
MW98055   ATTATCACAG GATTATTTTT GACTATGTAC TACTCAGCTA ATATTAATTT AGCATTTTTT AGAGTAAATT ATATTTGTCG AGATGTAAAT TATGGATGAT TAATTCGAAC TTTACATGCT AATGGGGCTT CATTTTTTTT
MW98102   ATTATCACAG GATTATTTTT GACTATATAT TATTCAGCTA ATATTAATTT AGCATTTTTT AGAGTAAATT ATATTTGTCG AGATGTAAAT TACGGATGAT TAATTCGAAC TTTACATGCT AATGGAGCTT CTTTTTTTTT
MW98225   ATTTTTACAG GATTATTTTT AACTATATAT TACTCAGCTA ATATTAATTT AGCATTTTTC AGAGTAAATT ATATCTGCCG AGATGTAAAT TATGGATGAC TAATTCGAAC TTTACATGCC AATGGtGCTT CATTTTtCTT
MW99258   ATTATCACAG GATTATTTTT AACTATGTAC TATTCAGCTA ATATTAATTT AGCATTTTTT AGAGTAAATT ACATTTGTCG AGATGTAAAT ?ATGGATGAT TAATTCGAAC TTTACACGCT Aa?GGAGCTT CATTTTTTTT

          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|..
            145        155        165        175        185        195        205        215        225        235        245        255        265        275
MW98006   TATTTGtATT TtCACtCATA TtGGACgAGG AATTTATtAt gAATCATtC- --AATTtAAA ACTTACAtGA AtAATTGGTG tAATtATTTT ATTTATATTA ATAGCAACAg CATTtATAGG ATATGTCCTA CCTGGNN
MW98055   TGTTTGTATT TATACTCATA TTGGACGAGG AATTTATTAT GAATCCTTT- --AACCTAAA AATAACATGA ATAATCGGAG TATTGATTTT ATTTATATTG ATAGCAACAG CTTTtATAGG AtATGTTTTA CCTTNNN
MW98102   TGTTTGTATT TATATTCATA TtGGACGAGG AATTTATTAT GAATCCTTT- --AACTtAAA AAtAACATGA ATAATCGGAG TATTAATTTt ATTtATATtA ATAGCAACAG CTTTTATAGG AtAtgTTCTN CCCTNNN
MW98225   TATTTGCATT TATATTCATA TtGGACGAGG AATTTATCAT GAATCATTCA TTAATTTAAA ATtAACATGA ATAATTGGAG TGTtAAtCtt AtTtAtAtTA AtAGCAACaG CTTTTATAGG ATATGTTTTA CCTTGAG
MW99258   TGTTTGTATT TATATTCATA TTGGACGAGG AATTTATTAT GAATCCTTT- --AaCTtAAA AATAACATGA AtAATCGGAG TATTAATTTT ATTTATaTTA ATAGCAACAG CTTTTAtGGG ATACGTTTTA CCTTNNN
```

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5          15         25         35         45         55         65         75         85         95        105        115
JC00057   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGA CCTAATAAAG TTGGGTTTTT AGGAATATTA CAACCTTTTT CTGATGGTAT TAAATTATTT
MW00032   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTGAGAT ATATACAAAT TCGTAAAGGA CCAAATAAGG TTGGATTTTT AGGAGTATTA CAACCTTTTT CTGATGGTAT TAAATTATTT
MW00056   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ACATACAAAT TCGTAAAGGA CCAAATAAGG TTGGATTtTT AGGGATATTA CAACCTTTTT CTGATGGTAT TAAATtATTT
MW00072   TTAGCTTTTT TAACACTAAT ASAACGAAAA GTTTTGAGAT ATATTCAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT AGGGATATTA CAACCTTTTT CAGACGGTAT TAAATTATTT
MW00076   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT GGGAATATTA CAACCTTTTT CAGATGGTAT TAAATTATTT
MW00189   TTGGCTTTTT TGACACTAAT AGAACGAAAA GTTTTAAGAT ACATGCAAAT TCGTAAAGGT CCAAATAAGG TTGGATTTTT AGGGTTGTTA CAACCTTTTT CGGATGGTGT TAAATTATTT
MW00231   TTAGCTTTTT TGACATTAAT AGAACGAAAA GTTTTAAGAT ACATACAAAT TCGTAAAGGA CCGAATAAGG TTGGGTTTTT AGGAATATTA CAACCTTTTT CGGATGGTAT TAAATTATTT
MW00302   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATGCAAAT TCGTAAGGGA CCAAATAAGG TTGGATTTTT AGGGATATTA CAACCTTTTT CTGATGGTAT TAAATTATTT
MW00328   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTGAGAT ATATACAAAT TCGTAAAGGA CCAAATAAGG TTGGATTTTT AGGGATATTA CAACCTTTTT CTGACGGTGT TAAATTATTT
MW00409   TTAGCTtTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT AGGAATATTA CAACCTTTTT CAGATGGTGT TAAATTATTT
MW00412   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT GGGTATATTA CAGCCTTTTT CAGACGGTGT TAAATTGTTC
MW00497   TTAGCATTTT TAACTTTATT AGAACGAAAG GTTTTAAGAT ATATACAAAT TCGAAAAGGT CCTAATAAAA TAGGGTTTAT AGGAATGTTA CAGCCTTTTT CTGATGGAAT TAAGTTATTT
MW00530   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT AGGTATATTA CAGCCTTTTT CAGATGGTGT TAAATTGTTC
MW98154   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTGAGAT ATATGCAGAT TCGTAAAGGG CCGAATAAGG TTGGATTTTT AGGAATATTA CAACCTTTTT CAGATGGTAT TAAGTTATTT
MW98172   TTAGCTTTTT TGACATTAAT AGAACGAAAA GTTTTAAGAT ACATACAAAT TCGTAAAGGG CCAAATAAGG TTGGATTTTT AGGAATATTA CAACCTTTTT CGGATGGTAT TAAATTATTT
MW98228   CTACCTTTTT TGACATTAAT GGAGCGGAAG GTTTTAAGAT ATATACAAAT TCGTAAAGGT CCTAATAAGG TTGGATTTTT AGGGATATTA CAACCTTTTT CAGATGGTAT TAAGTTATTT
MW99014   TTaGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ACATACAAAT TCGTAAAGGA CCAAATAAAG TTGGATTTTT AGGAATATTA CAACCTTTTT CAGATGGTGT TAAATTATTT
MW99045   TTAGCTtTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGA CCTAATAAAA TTGGATTTTT AGGTATATTA CAACCATTTT CTGATGGTAT TAAATTATTC
MW99068   TTGGCCTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ACATGCAAAT TCGCAAAGGT CCAAATAAGG TTGGATTTTT AGGGTTATTA CAACCTTTTT CGGATGGTAT TAAATTATTT
MW99105   TTGGCCTTTT TGACACTAAT AGAACGAAAA GTTTTAAGAT ACATGCAAAT TCGTAAAGGT CCAAATAAGG TTGGATTTTT AGGGTTATTA CAACCTTTTT CGGATGGTGT TAAATTATTT
MW99135   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTGAGAT ATATACAAAT TCGAAAAGGG CCAAATAAGG TTGGGTTTTT AGGAATATTA CAACCTTTTT CTGACGGTAT TAAATTATTT
MW99164   TTAGCTttTT TGACATTAAT AGAACGAAAA GTTTTAAGAT ATATGCAAAT TCGTAAAGGA CCAAATAAGG TTGGGTTTTT AGGAATATTA CAACCTTTTT CGGATGGTAT TAAATTATTT
MW99406   TTAGCTTTTT TAACATTAAT AGAACGAAAA GTTTTAAGAT ATATACAAAT TCGTAAAGGA CCAAATAAGG TTGGGTTTTT AGGGATATTG CAACCTTTTT CTGATGGTAT TAAATTATTT
MW99471   TTAGCTTTTT TGACATTAAT AGAACGAAAA GTTTTAAGAT ACATACAAAT TCGTAAAGGA CCAAATAAGG TTGGGTTtTT AGGGATATTA CAACCTTTTT CGGATGGTAT TAAATTATTT
MW99550   TTAGCTTTTT TAACGTTAAT AGAACGAAAG GTTTTAAGAT ATATACAAAT TCGTAAGGGG CCTAATAAGG TTGGGTTTTT AGGAATATTA CAACCTTTTT CAGATGGTGT AAAACTATTT

          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             125        135        145        155        165        175        185        195        205        215        225
JC00057   ACTAAAGAAA TGATTTATTT AAATTCATCA AATTATATAT TTTATTATTT GTCTCCTATT ATAGGTTTTA TTTTATCTTT AATAATTTGA ATATTAATTC CTTATTATTT
MW00032   ACTAAAGAGA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT ATCTCCTATT GTAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW00056   ACTAAAGAGA TAATTTATTT AAATTTTTCA AATTATATAT TTTATTATTT GTCCCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATGTTAATTC CTTATTATTT
MW00072   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGGTTTGA ATATTAATTC CTTATTATTT
MW00076   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT GGTAATTTGA ATGTTAATTC CTTATTGTTT
MW00189   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATGT TTTATTATTT ATCCCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW00231   ACTAAAGAAA TAATTTATCT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT GGTGATTTGA ATATTAATTC CTTATTATTT
MW00302   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATGTTAATTC CTTATTATTT
MW00328   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT GTCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATGTTAATTC CTTATTATTT
MW00409   ACTAAAGAGA TAATTTATTT AAATTCTTCT AATTATATAT TTTATTATTT AtCCCCTATT ATAGGTTTtA TTTtATCTTT aGTAATTTGA ATATTAATTC CTtATTATTT
MW00412   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT TTCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ACATTAATTC CTTATTATTT
MW00497   ACAAAAGAAA TAATTTATTT AAATTCTTCT AATTATTTAT TTTATTATTT AGCTCCAGTT ATTGGATTTA TTTTATCTTT AATGGTTTGA ATATTAATTC CTTACTATTT
MW00530   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT TTCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW98154   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT GTCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW98172   ACTAAAGAAA TAATTTATCT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT GGTGATTTGA ATATTAATTC CTTATTATTT
MW98228   ACAAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT ATCTCCTATT ATAGGATTTA TTTTATCTTT AGTAATTTGA ATGTTAATTC CTTATTATTT
MW99014   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT ATCTCCTATT GTAGGTTTTA TTTTATCTTT AGTGGTTTGA ATATTAATTC CTTATTATTT
MW99045   ACAAAAGAAA TAATTTATTT AAATTCATCA AATTATTTAT TTTATTATTT ATCTCCAATT ATTGGTTTTA TATTATCTTT AATATTATGA ATATTAATTC CATATTATTT
MW99068   ACTAAGGAAA TAATTTATTT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW99105   ACTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATGT TTTATTATTT ATCCCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATATTAATTC CTTATTATTT
MW99135   TCTAAAGAAA TAATTTATTT AAATTCTTCA AATTATATAT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTCTATCTTT GGTAATTTGA GTGTTAATTC CTTATTATTT
MW99164   ACTAAAGAAA TAATTTATCT AAATTCTTCA AATTATATGT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT GGTGATTTGA ATATTAATTC CTTATTATTT
MW99406   ACTAAAGAGA TAATTTATTT AAATTCTTCA AACTATATAT TTTATTATTT GTCCCCTATT ATAGGTTTTA TTTTATCTTT AGTGATTTGA ATGTTAATTC CTTATTATTT
MW99471   ACTAAAGAAA TAATTTATCT AAATTCTTCA AATTATATGT TTTACTATTT ATCTCCTATT ATAGGTTTTA TTTTATCTTT GGTGATTTGA ATATTAATTC CTTATTATTT
MW99550   ACTAAAGAGA TAATTTATTT AAATTTTTCA AATTATATAT TTTATTATTT ATCTCCTATT ATAGGTTTTA TTTTATCCTT GGTGATTTGA ATATTAATTC CTTATTATTT
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5         15         25         35         45         55         65         75         85         95        105        115        125        135        145        155
AD98001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
AD98009   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
AD98012   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
AD98018   NNNNNGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
AD98024   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTYT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTYGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
AD98036   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
DS00001   TCATAGTGTG AANTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~CT~ ~~~~~~~~~~ ~~~~~~~~~~
DS01001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00029   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00039   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00040   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00042   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00043   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00045   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00051   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00055   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
JC00061   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC00063   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JC01014   NNNNNNNGTG AACTGCAGGA CACATKTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
JM00001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00015   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00024   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAATT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW00032   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00051   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00058   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00064   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00072   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00076   NNNTAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00101   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00102   NNATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00110   NNATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00116   NNATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC GTC~~~~GTC T~~~~~~~~~ ~~~~~~~~~~
MW00127   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00129   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00151   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00176   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00177   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00178   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00179   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GC~ ~~~~~~~~~~ ~~~~~~~~~~
MW00185   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00189   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00226   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00231   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00232   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00234   NNNNNNNNNG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00262   NNNTAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00267   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00269   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00290   T~ATASTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00302   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ATTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00316   NNNNNNTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00326   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00328   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00330   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00347   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00348   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00393   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00409   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATGTGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00412   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00444   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00452   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00469   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCT~~~ ~~~~~~~~~~
MW00498   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00504   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00517   NNNTAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC GT~~~~~AT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00525   TYATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT AATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW00530   NNNNNNNNTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW00539   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5         15         25         35         45         55         65         75         85         95        105        115        125        135        145        155
MW00547   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01001   NNNNNNNGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01011   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTC~T~~ ~~~~~~~~~~
MW01014   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01018   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTC~T~~ ~~~~~~~~~~
MW01019   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ATTGTTCGTG ~CCGACTGT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01025   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01034   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTC~ T~~~~~~~~~
MW01039   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01048   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW01053   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01059   NNNNNNTGCG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTC~T~~ ~~~~~~~~~~
MW01061   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW01083   NNNNNNNNNN AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ATTGTTCGTC ~T~GAC~GTT ~~~~~~~~~~ ~~~~~~~~~~
MW01092   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTC~T~~ ~~~~~~~~~~
MW01107   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW01116   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTC~T~~ ~~~~~~~~~~
MW02001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW02006   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW02025   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAC AATATGCCAC ACTGTTCGTC GTC~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW02033   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW02034   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT AATATGCCAC ACTGTTCGTC ~TC~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW98009   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98029   NNNTAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98049   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98079   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATGTGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98097   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGCC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98103   TCATAGTGTA AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGG~CCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98129   NNNNNNNGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTCG TCGTCGTCTC
MW98136   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98138   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98139   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98154   NNNTAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98162   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98170   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98172   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98180   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98185   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTC~ TC~~~~~~~~
MW98189   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98203   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98205   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98212   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98220   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~~~~~~~GTC T~~~~~~~~~ ~~~~~~~~~~
MW98228   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTCG TCGTCGTCTC
MW98235   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98240   NNNNNNNNNG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GC~ ~~~~~~~~~~ ~~~~~~~~~~
MW98261   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNACATT TCSAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTMGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98264   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTTT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98270   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW98278   NNATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCN~~~ ~~~~~~~~~~
MW98285   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98294   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GC~ ~~~~~~~~~~ ~~~~~~~~~~
MW98313   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW98315   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATGTGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99006   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99009   NC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99013   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99014   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ATTGTTCGTG ~C~~~C~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99018   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATGTGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99038   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99047   TMATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99057   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99058   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99094   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99095   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99097   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99105   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              5         15         25         35         45         55         65         75         85         95        105        115        125        135        145        155
MW99134   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99135   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99163   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99164   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99174   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99196   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99203   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99226   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99240   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99247   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99274   NNNNNNNNNN AACTGCAGGA CACATTWGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99276   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99286   TCATAGNGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99292   T~TTAGTGGG AACTGCAGGA CACATTTGAA CATCGACATT TCSAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99301   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99303   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TG~GTAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW99309   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99319   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99341   NNNNNNNNNN NNNNNNNNNA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99353   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99372   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99374   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99382   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99393   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99406   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99407   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99408   NNNNNNNNNG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99413   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99448   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99465   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99471   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99479   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99501   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99508   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99514   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTCG TC~~~~~~TC
MW99536   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCGTCG TCT~~~~~~~
MW99537   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99546   CTATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99550   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99552   TC~TAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99559   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNA CATCTACATT NCNAACGCNC ATTGCGGTCC GTGGAGAAAC ATCCANGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99565   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99591   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99605   TCATAGTGTG AACTG~AGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
MW99608   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTCGTC GTC~~~~GTC GTCGTCT~~~ ~~~~~~~~~~
MW99612   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTTT GAGGGCCGGC TGTATAAAAT CATACGCCAC ACTGTTNGTN GTN~~~~GTG GTCGTC~T~~ ~~~~~~~~~~
MW99613   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
OK96022   NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTTT GAGGGCNGGC TGTATAAAAT CATACGCCAC ACTGTTGGTN GTN~~~~GTG GTCGTC~T~~ ~~~~~~~~~~
WE00002   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02431   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02451   T~ATAGTGTG MACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02454   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02491   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02531   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02534   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02535   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02591   NNNNNNTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02614   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02621   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02661   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02662   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02671   T~ATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~C~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02674   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE02677   TCATAGTGTG AACTGCAGAA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE85001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAAT CATATGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
WE94001   TCATAGTGTG AACTGCAGGA CACATTTGAA CATCGACATT TCGAACGCAC ATTGCGGTCC GTGGAGAAAC ATCCAGGACC ACTCCTGTCT GAGGGCCGGC TGTATAAAGT CATGTGCCAC ACTGTTCGTC ~T~~~~~GT~ ~~~~~~~~~~ ~~~~~~~~~~
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
         ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             165        175        185        195        205        215        225        235        245        255        265        275        285        295        305        315
AD98001  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~ARA~ ~CTTA~~~TA
AD98009  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
AD98012  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
AD98018  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATGAAGA~ ~CGTAT~~~A
AD98024  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CTTG~~~TA
AD98036  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
DS00001  ~~~~~~~~~~ ~~~~~~~KCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
DS01001  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGCG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
JC00029  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
JC00039  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGT~~TACG T~AC~~~TGC ATACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATG~~~AA
JC00040  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
JC00042  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
JC00043  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGGGTGCG ~~~~~~~TCC CYACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
JC00045  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGGGTGCG ~~~~~~~TCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
JC00051  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
JC00055  ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC ATGCC~~GCG C~~~CTCAC~ G~TGCGGTCC ~GTTYAAAA~ ~~ATG~AGA~ ~CATA~~~AA
JC00061  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
JC00063  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
JC01014  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
JM00001  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW00015  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00024  ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGTTCCG ~GGAGGC~GT ~~~~~~~~CG CGCGCGTGCG ~~~~~~~~~~ TGGG~~CTCG ~~~~~~~TCC CCGCC~~GCG C~~~CACCC~ G~TGCGGTCC ~GTTCAAAA~ ~~ATG~ATA~ ~CATA~~~AA
MW00032  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG GG~~~~~~~~ TGCG~~T~CC ~~~~~~~CCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW00051  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG CGACGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW00058  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW00064  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00072  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00076  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TACG ~~~~~~~TCC CTACC~~GCG C~~~CTCC~~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW00101  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00102  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AAAA ~CATA~~~GA
MW00110  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG CGACGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTAT~~~A
MW00116  ~~~~~~~~~~ ~~~CACGGCG ~CGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~AGCG CGCG~~TGTG ~~~~~~~~~~ TGGG~~TTAG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~ATG~AAA~ ~CATA~~~~A
MW00127  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGG~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CGTGTTATA
MW00129  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00151  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00176  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00177  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00178  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00179  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00185  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00189  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00226  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~ATTA~~~TA
MW00231  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00232  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~ATA~ ~CGTA~~~TA
MW00234  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00262  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00267  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00269  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00290  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TACG ~~~~~~~TCC CTAMY~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AKA~ ~CATA~~~AA
MW00302  ~~~~~~~~~~ ~~~~GGGACG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ AGCGCTTGTG TT~~~~~~~~ TGGATATACG ~~~~~TATCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CACA~~~AA
MW00316  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG CGACGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTAT~~~A
MW00326  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TACC ~~~~~~~TCC CTATC~~GCG C~~~CACCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW00328  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00330  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00347  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00348  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCAG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~SA
MW00393  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CCGCC~~GCG C~~~GTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00409  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~GTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00412  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAATA TTATG~AGA~ ~CATA~~~AA
MW00444  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00452  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00469  ~~~~~~~~~~ ~~~CACGACG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW00498  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW00504  ~~~~~~~~~~ ~~~~~~~GCG ACGGACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TACG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW00517  ~~~~~~~~~~ ~CGC~~~~CG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~GTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW00525  ~~~~~~~~~~ ~~~~~~GCCG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~CG CGCGCGTG~~ ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW00530  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACG~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAATA TTATG~AGA~ ~CATA~~~AA
MW00539  ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTACC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              165        175        185        195        205        215        225        235        245        255        265        275        285        295        305        315
MW00547    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTNCC~ G~CGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW01001    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01011    ~~~~~~~~~~ ~~~CACGACG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW01014    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW01018    ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW01019    ~~~~~~~~~~ ~~~~~~~GGG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGGTGTACG T~ACGTATCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01025    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GACGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG TCACK~~TCC CTGCC~~KCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01034    ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW01039    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01048    ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC ATGCC~~GCG C~~~CTCAC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW01053    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01059    ~~~~~~CACG GCGCACGGCG TCGAACAATT GACG~TTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW01061    ~~~~~~~~~~ ~~~~~~AACG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC ANGCC~~GCG C~~~CTCAC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~TA
MW01083    ~~~~~~~~~~ ~~~~~CGACG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGATATGCG ~~~~~TATCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CACA~~~AA
MW01092    ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW01107    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW01116    ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW02001    ~~~~~~~~~~ ~~~~~~~GCG ACGGACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGT~~TACG ~~~~~~~TAC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW02006    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGG~~TACG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW02025    ~~~~~~~~~~ ~~~~~~~~TG TCGAACAATT GACGGTTCCT ~GAC~~~~GT ~~~~~~~~~G CACG~~~~~~ ~~~~~~~~~~ TGGG~~CGCG ~~~~~~~CGC G~A~~GCGCG CCTCGTCTC~ G~AACGGTCC ~GTTCAAAA~ ~~ATT~~~~~ ~C~~~~~~AA
MW02033    ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC ATGCC~~GCG C~~~CTCAC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~TA
MW02034    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~CG CGCGCGTG~~ ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW98009    ~~~~~~~~~~ ~~~~~~~GCG ACGGACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CTTA~~~TA
MW98029    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TACG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW98049    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98079    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98097    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98103    ~~~~~~~~~~ ~~~~~~~GCG ACKAACGATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98129    ACGGCACACG GCGCAGGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~CGAGCG CGCGCGCGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC G~~~~~~~~~ ~~~~~~~~~~ ~~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW98136    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGCG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCCC G~TGCGGTCC CGTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98138    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98139    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGCG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98154    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATTA~~GA
MW98162    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98170    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATATA~TA
MW98172    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~KA
MW98180    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98185    ACGGCGCACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~CGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC G~~~~~~~~~ ~~~~~~~~~~ ~~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW98189    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACTGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98203    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~CCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98205    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCCTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CTTA~~~TA
MW98212    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98220    ~~~~~~~~~~ ~~~CACGGCG GCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~CG CGCG~~TGCG TGTG~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTGCCGCGCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AAA~ ~CATA~~~AA
MW98228    ACGGCGCACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~CGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~GA
MW98235    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ ~~~~~~TA~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~CCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW98240    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TG
MW98261    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC CGTTTAAAT~ ~~ATG~AGAA CTTTG~~~TA
MW98264    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ YSCGCTTGTG TG~~~~~~~~ ~~~~~~TA~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~CCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW98270    ~~~~~~~~~~ ~~~~~~CGCG GCGAACAACT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW98278    ~~~~~~~~~~ ~~~NNNNNNN NNNNNNNNNN NACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGMGCGTGTG TGTA~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW98285    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW98294    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW98313    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~CGCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATR~AGA~ ~CACATA~KA
MW98315    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99001    ~~~~~~~~~~ ~~~~~~CGCG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC CTGCC~~GCG C~~~CTCGC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW99006    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99009    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99013    ~~~~~~~~~~ ~~~~~~AGCG ACGAACAATT GACTGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TACG ~~~~~~~TCC CTACCGCGCG C~~~CTACC~ G~TGCGGTCA ~GTTTAAATA TTGTG~AGA~ ~CATA~~~AA
MW99014    ~~~~~~~~~~ ~~~~~~~GGG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TT~~~~~~~~ TGGGTGTACG ~~~~~TATCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99018    ~~~~~~~~~~ ~~~~~~AACG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCGTGCG ~~~~~~~~~~ GGGG~~TTCG ~~~~~~~TCC CTCCC~~GCG C~~~TTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW99038    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ ~~~~~~TA~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~CCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99047    ~~~~~~~~~~ ~~~~~~~GCG ACGGACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGC~~~~~~~ AGGT~~TACG ~~~~~~~TAC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99057    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TGC CTGCC~~KCG C~~~CTCCC~ G~TGCGGKCC ~GTKTAAAT~ ~~ATG~ANA~ ~CATA~~~SA
MW99058    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99094    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTGTGTG TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99095    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CTTG~~~TA
MW99097    ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGTTCCG ~GGCGGC~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~CCC CTGCC~~GCG C~~~CTCGC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW99105    ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
                165        175        185        195        205        215        225        235        245        255        265        275        285        295        305        315
MW99134   ~~~~~~~~~~ ~~~~~~GACG ACGAACAATT GACGGTTCCG ~GRCGGT~GC ~~~~~~AGCG CGCGCGCGNN ~~~~~~~~~~ NNNN~~NNNN ~~~~~~~NNN NNNNN~~NNN N~~~NNNNN~ N~NNNNNNNN ~NNNNNNNN~ ~~NNN~NNN~ ~NNNN~~~NN
MW99135   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~TG ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99163   ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGCTCCG ~GGCGGTTGT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW99164   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99174   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99196   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99203   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~TG ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99226   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGG~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW99240   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99247   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99274   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99276   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99286   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CTTA~~~TA
MW99292   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GSC C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CTTATAATA
MW99301   ~~~~~~~~~~ ~~~~~~~GCG ACGGACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TACR ~~~~~~~YCC CTGYC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99303   ~~~~~~~~~~ ~~~~~~CACG ACGAACAATT GACGGCTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCGTGTG ~~~~~~~~~~ TGGG~~TTCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAA~ ~~ATG~AGA~ ~CATA~~~AA
MW99309   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACKGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99319   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99341   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~ANAC TCATAA~~TA
MW99353   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99372   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99374   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGG~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW99382   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99393   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC YTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~ATTA~~~TA
MW99406   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~ATTA~~~TA
MW99407   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTGAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99408   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99413   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99448   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99465   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTG~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99471   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99479   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW99501   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99508   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
MW99514   ACGGCGCACG GCGCACAGCG TYTAACAATT GACGGTTCCG ~GCCRGT~GT AYAGMGCGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW99536   ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GCCGGT~GT ~~~~AGAGCG CGCGCGCGTG TGTGTG~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW99537   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ ~~~~~~TA~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~CCC~ GGTGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99546   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TACG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99550   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ ~~~~~~TA~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~CCC~ GGTGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~AA
MW99552   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CTTG~~~TA
MW99559   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99565   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99591   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99605   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT RACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
MW99608   ~~~~~~~~~~ ~~~CACGACG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGCGGCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW99612   ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
MW99613   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TACG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
OK96022   ~~~~~~CACG GCGCACGGCG TCGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~AGAGCG CGCGCGTGTG TGTG~~~~~~ CGGG~~TTCG ~~~~~~~TCC GCACGC~GCG CCGCCTCCC~ G~TGCGGTCC ~GTTCAAAA~ ~~AT~~AGA~ ~CATA~~~AA
WE00002   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02431   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02451   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02454   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTGTGTG~~ TGGG~~TGCG ~~~~~~~TCC CTGCC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02491   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02531   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGG~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CCACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTCAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
WE02534   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~G TGCGCACGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC YTACC~~GCG C~~~YTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02535   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTCGTG TG~~~~~~~~ TGGG~~CGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02591   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAAYT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CTTA~~~TA
WE02614   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC YTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~ATTA~~~TA
WE02621   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CAYA~~~GA
WE02661   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CGTA~~~TA
WE02662   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02671   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGGG~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~ATTA~~~TA
WE02674   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TGTG~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE02677   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE85001   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
WE94001   ~~~~~~~~~~ ~~~~~~~GCG ACGAACAATT GACGGTTCCG ~GGCGGT~GT ~~~~~~~~~~ CGCGCTTGTG TG~~~~~~~~ TGGG~~TGCG ~~~~~~~TCC CTACC~~GCG C~~~CTCCC~ G~TGCGGTCC ~GTTTAAAT~ ~~ATG~AGA~ ~CATA~~~GA
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
         ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
            325        335        345        355        365        375        385        395        405        415        425        435        445        455        465        475
AD98001  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
AD98009  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
AD98012  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
AD98018  T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTAG~~~GA MCAGNNNNNN
AD98024  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TYGTGT~~~~ ~GGTGTG~~~ ~~~~TGC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
AD98036  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
DS00001  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
DS01001  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00029  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00039  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00040  T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
JC00042  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00043  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTMGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00045  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00051  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00055  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
JC00061  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC00063  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JC01014  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
JM00001  T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TCA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW00015  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTG~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00024  T~GTTATTAA TAATA~~~TG A~~~~~~~CG ~TTA~~AGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00032  C~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTG~~CGTG TCGTGT~~~~ ~GGTCTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00051  T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAAA~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00058  T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00064  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AGA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00072  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00076  T~T~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~GTAC~~~ GGTAGCGCGC TCGCGTCGGC GACRTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00101  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00102  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00110  T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~NN NNNNNNNNNN
MW00116  T~A~~~~~~~ AAANG~~~TA ATG~T~AACG CTTC~ACGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGAC GRCGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00127  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTGGCGCGC TCGCGTYGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG ASAGCGATTA
MW00129  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00151  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00176  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00177  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00178  T~G~~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00179  T~GT~~~~~~ GATTA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00185  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00189  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00226  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCAC GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00231  T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW00232  T~G~~~~~~~ TAATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00234  T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00262  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00267  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00269  T~GT~~~~~~ ~AATAT~ATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG NGAAGGTNNN NNN~~~~~~~ ~NNNN~~~NN NNNNNNNNNN
MW00290  T~T~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00302  T~G~~~~~~~ TTATTT~~TA AC~~~~~~CG ~TTN~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00316  T~GT~~~~~~ ~RATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~NN NNNNNNNNNN
MW00326  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00328  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00330  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~CCGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00347  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00348  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC SACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00393  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00409  T~GTT~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCCCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00412  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00444  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00452  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00469  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ TTTTG~~~CG AGAGCGATTA
MW00498  T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AGA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00504  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTKAA AAA~~~~~~~ ~TTTG~~~CG AGARCGATTA
MW00517  T~G~~~~~~~ CAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00525  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAACGTGAA AAA~~~~~~~ ~CTTG~~~CG AGAGCGATTA
MW00530  T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW00539  T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
```

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             325        335        345        355        365        375        385        395        405        415        425        435        445        455        465        475
MW00547   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01001   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTC~~ ~~~AGGTNNN NNN~~~~~~~ ~NNNN~~~NN NNNNNNNNNN
MW01011   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ TTTTG~~~CG AGAGCGATTA
MW01014   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~AGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01018   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTGTG~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01019   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGGA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01025   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTACGC GACGTGCGCC GCT~CCCCGC CKACGCTCCG NGAAGGTGAA AAA~~~~~~~ ~TNNN~~~NN NNNNNNNNNN
MW01034   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01039   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW01048   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW01053   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW01059   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01061   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW01083   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01092   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW01107   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW01116   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW02001   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW02006   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW02025   T~GT~~~~~~ TA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~T~~~~ ~GGTGTGTG~ ~~~~~~C~~~ ~CGAGCGCGC TCTCGTTAGC GACGTGCGCC CCG~CC~~GC CGACGCTCCG TGAAGTTGTG ACTATAACAC TTGTG~~~CG AGAGCGATTA
MW02033   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW02034   T~G~~~~~~T TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAAC~~~~~~ ~TTTGAGACG AGAGCGATTA
MW98009   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98029   T~T~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~GTAC~~~ GGTAGCSCGC TCGCGTCGGC GACGTGCGCC GYT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98049   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98079   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98097   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98103   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98129   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTGTG~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCTCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98136   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGARGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98138   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98139   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TRC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98154   ATGT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98162   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98170   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTSGGA SACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98172   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC SGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW98180   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98185   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTGTG~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98189   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98203   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGGA AAA~~~~~~~ ~TTTG~~~CG WGAGCGATTA
MW98205   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCGC GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAAAAA~~~~ ~TTTG~~~CG AGAGCGATTA
MW98212   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW98220   TTGT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98228   T~A~~~~~~~ TGATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98235   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98240   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98261   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGCAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98264   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98270   T~T~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTACACGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW98278   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ TTTTG~~~CG AGAGCGATTA
MW98285   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98294   T~GT~~~~~~ ~AATG~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AGA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98313   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGM GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW98315   T~GTT~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99001   TTG~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW99006   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99009   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99013   T~G~~~~~TG TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99014   T~G~~~~~~~ TAATA~~~TA G~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99018   T~G~~~~TAA TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99038   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99047   T~G~~~~~~~ TAATA~~~TA A~~~~~~CGT ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99057   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CK ~TTA~~CGTG YC~TGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGSKCGC TCGCNTTNGT GACGCRCGCC GCT~CCCYGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99058   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99094   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99095   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TGC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99097   TTG~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGTGATTA
MW99105   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             325        335        345        355        365        375        385        395        405        415        425        435        445        455        465        475
MW99134   T~T~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGMGTCGAC RACGTGCGCC GCT~CCCCAC CGACGMTCCG TGAAGGTAAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99135   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99163   T~G~~~~~~~ TAATA~~~TA AMCKTWAACG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCCACCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99164   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99174   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99196   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99203   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99226   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGTCGTG TGGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTMGGN GACGTGCGCC GCT~CCCCGC MGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCKATTA
MW99240   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99247   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99274   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCKSC KACGTGCRCC GCT~CCCCGC MGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TKTA~~~CG AGAGCGATTA
MW99276   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99286   T~GT~~~~~~ ~AATA~~~T~ ~~~~~~~~~G ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCAC GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99292   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCNN NNNNNNNGAA AAA~~~~~~~ ~NNNN~~~NN NNNNNNNNNN
MW99301   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99303   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCCACCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99309   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99319   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99341   T~GT~~~~~~ ~AATA~TATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99353   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99372   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99374   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCCTCGGC WACGTGCGCC GCT~CCCCTC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99382   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99393   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TACCGC GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99406   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCGC GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99407   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AGA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99408   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99413   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CN ~TTN~~CNTG TCTGGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGACGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99448   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99465   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99471   T~GTT~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99479   T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99501   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTACCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99508   T~GT~~~~~~ ~AATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99514   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99536   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99537   T~G~~~~~~~ TAATAATATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99546   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99550   T~G~~~~~~~ TAATAATATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGT TCGCGTCGGC GACGTGCGCC GCT~CCCAGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99552   TTGT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TGC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99559   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99565   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99591   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99605   T~GT~~~~~~ TAATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTA~~~CG AGAGCGATTA
MW99608   T~G~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAG~~~~~~~ TTTTG~~~CG AGAGCGATTA
MW99612   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
MW99613   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
OK96022   T~A~~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TTGTGT~~~~ ~GGTGTG~~~ TGTGTAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCAC CGACGCTCCG TGAAGGTGAG AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE00002   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02431   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02451   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG T~AAGGTAAA AAT~~~~~~~ ~TTTG~~~CG AGAGCNATTA
WE02454   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGGA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02491   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACKCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02531   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TGC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02534   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGM AACGTGCNCC GYT~CCCCGC CGACGYTCCG T~AAGGNKAA AAA~~~~~~~ ~TTTG~~~CR AGAGCRATTA
WE02535   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02591   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCAC GGGAACNCGC TCGCGTNGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02614   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TYA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCAC GGWAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTYCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02621   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGGA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02661   T~GT~~~~~~ ~GATATTATA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02662   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02671   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TACCAC GGTAACCCGC TCGCGTCGGC GACGTGCGCC GNT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02674   T~GT~~~~~~ ~AATA~~~TG A~~~~~~~CG ~TTA~~CGTG TCGTGC~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGCGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE02677   T~GT~~~~~~ TAATA~~~TA A~~~~~~~CG ~TTR~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE85001   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
WE94001   T~GT~~~~~~ ~AATA~~~TA A~~~~~~~CG ~TTA~~CGTG TCGTGT~~~~ ~GGTGTG~~~ ~~~~TAC~~~ GGTAGCGCGC TCGCGTCGGC GACGTGCGCC GCT~CCCCGC CGACGCTCCG TGAAGGTGAA AAA~~~~~~~ ~TTTG~~~CG AGAGCGATTA
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             485        495        505        515        525        535        545        555        565        575        585        595        605        615        625        635
AD98001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGC ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AAT~~~~AAA A~~NN~~~NN NNNN~~~~NN N~NNNNNNNN N~~~NNNN~~
AD98009   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
AD98012   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
AD98018   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
AD98024   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CKGCGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT GT~~~~~~~~ ~~~~~~AACG AA~~~~~AAA G~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
AD98036   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
DS00001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TTT~~~~~~~ ~~~~~~GACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC A~AAAACACT G~~~TTAT~~
DS01001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTCTTTT T~~~~~~~~~ ~~~~~~GACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTATTA
JC00029   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTT~ CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00039   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AT~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00040   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00042   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTT~ CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00043   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CRAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00045   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00051   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCGGTGTA CACTCTTTT~ CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00055   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CKGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00061   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTTT CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC00063   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTTT CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
JC01014   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~TGTTAT~~
JM00001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00015   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTT~ C~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00024   TCGGTGAG~~ CGGGGCGTGN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN ~~NNNN~~~~ ~~~~~~~~~~ ~~~~TGTACG AGAGT~~~~~ A~~CA~~~CC ACCG~~~~TC G~AAAACGCT G~~~TTAT~~
MW00032   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~AAGA A~~CA~~~CC ACCG~~~~TC G~GAAACACT G~~~TTAT~~
MW00051   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00058   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00064   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00072   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00076   TCGGCGAG~~ CGGGGCGAGC GCGC~~AC~~ ~KT~CTAA~C T~GTGT~CGT ~CAACKCKC~ ~AAGGCGCG~ CTGCG~TGTA CACGTTTTT~ ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00101   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00102   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GGGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00110   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNNNNNNN ~~~~~~~~~~ ~~~~~~NNNN AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00116   TCGGTGAG~~ CGGGGCGTGC ACGCC~AG~~ ~GT~CGAA~C TTGCGT~CGT ~CGACGCGC~ ~AGAGTGCG~ CTGCG~CGTA C~~GTTT~~~ GCGT~TTAAC ~~~TGTTT~A AA~~~CG~CG ~~~CA~~~CC GCCG~~~~TC G~AAAACGCT G~~~TTAT~~
MW00127   TCGGCCAR~~ CGGGGCGTGC ACSC~~KC~~ ~GT~HSWA~C T~GTGT~YGM ~CGACSCGC~ ~ARAACGCG~ CTGSG~~K~A CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00129   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGRACGCG~ CTGCG~~~TA CACGTTTCTT CTTTT~~~~~ ~~~~~~AAMG AA~~~~~AAA A~~CA~~~CC ACCGTCTGTC C~GAAACACT G~~~TTAT~~
MW00151   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00176   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00177   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGGACGCG~ CTGCG~~~TA CACGTTTCTT CTTTT~~~~~ ~~~~~~AAAG AA~~~~~AAA A~~CA~~~CC ACCGTCTGTC C~GAAACACT G~~~TTAT~~
MW00178   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGGACGCG~ CTGCG~~~TA CACGTTTCTT CTTTT~~~~~ ~~~~~~AAAG AA~~~~AAAA ~~~CA~~~CC ACCGTCTGTC C~GAAACACT G~~~TTAT~~
MW00179   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT CA~~~~~~~~ ~~~~~TAACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~GAAACACT G~~~TTAT~~
MW00185   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~CA CACGTTTTT~ C~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00189   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CRACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TT~~~~~~~~ ~~~~~~AAMG AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00226   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGGGC~ ~AGAACGCG~ CTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00231   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CKACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00232   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT GTTGTATT~~
MW00234   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CKACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC K~AAAACACT G~~~TTAT~~
MW00262   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CG~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00267   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00269   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~AAA CMAGTTTTTT ~~~~~~~~~~ ~~~~~~AAMG AA~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00290   TCGGCGAG~~ CGGGGCGAGC GCGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CRCGTTTTT~ ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00302   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TTTTTTTTTT G~CAAAAAGG AA~~~AAAGA A~~CA~CACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00316   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNNNNNNN ~~~~~~~~~~ ~~~~~~NNNN NN~~~~~NNN N~~NN~~~NN NNNN~~~~~C S~AAAA~~~~ ~~~~~~~~~~
MW00326   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00328   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00330   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CA~~~CC ACAGTCTGTC C~GAAACACT G~~~TTAT~~
MW00347   TCGGCGAG~G CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C Y~KTKT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00348   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00393   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTCTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00409   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTCTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00412   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTTT CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00444   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00452   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00469   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW00498   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00504   TCGGCGAG~~ CGGGGNNNNN NNNN~~NN~~ ~NN~NGAA~C T~GTGT~TGT ~YGACGCGC~ ~ARAACGCG~ CTGGGK~~~A CACGTTTTTT AATG~~~AA~ ~~~~~~AAAA AA~AAAGAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00517   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTTTT~ ~~~~~~~~~~ ~~~~~~AAC~ AA~~~~~AAA ~~~CAACACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00525   TCGGTGAG~~ AGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTTTTT ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~A A~~CA~~~CC ACCG~~~~TC GAAAAACACA G~~~TTAT~~
MW00530   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACTCTTTTT CCT~~~~~~~ ~~~~~~AACG AA~~~~GAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW00539   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
              485        495        505        515        525        535        545        555        565        575        585        595        605        615        625        635
MW00547   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~ANAACGCN~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01001   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNNTTTTW ~~~~~~~~~~ ~~~~~~AASR AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01011   TCGGTGAG~~ CGGGGCGTGC GCGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW01014   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01018   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW01019   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CAAGTTTTTT TCT~~~~~~~ ~~~~~AAACG AA~~~~~AAA A~~CA~CACC ACCG~~~~TC G~AAAGCACT G~~~TTAT~~
MW01025   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NGAACGCG~ TTGGG~TGWA CATTTTTTTT CCT~~~~~~~ ~~~~~~AAMR AA~~~~GAMA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01034   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC RCCG~~~~TC G~AAAACACT G~~GTTAT~~
MW01039   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01048   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01053   TCGGCGAG~~ CGGGGCGTGC ACGC~~KC~~ ~NN~NNNN~C T~GTGT~CKT ~MTACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01059   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW01061   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01083   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CAAGTTTTTT TTTTTTT~~~ G~CAAAAAGG AA~~~AGAGA A~~CA~CGCC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01092   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW01107   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW01116   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW02001   TCGGCGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~AAAAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW02006   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TCT~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CAACACC ACCG~~~~TC G~AAAACACT G~~~TTGT~~
MW02025   TCGGT~TA~~ AGGG~CGGGY GTGC~~AC~~ ~~T~CGAA~C TT~TGT~CGT ~CTA~GCGTT GAGAATGCG~ CGAGG~~~TG CTCTCCAT~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~
MW02033   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACACT G~~~TTAT~~
MW02034   TCGGTGAG~~ AGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTTTTT ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~A A~~CA~~~CC GCCG~~~~TC GAAAAACACA G~~~TTAT~~
MW98009   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGGACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AATAAAAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98029   TCGGCRAG~~ CGGGGCGAGC GCGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGGGCGCG~ CTGCG~TGTA CACGTTTTT~ ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98049   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~GGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98079   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~ARAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98097   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98103   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98129   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~TGT ~CAACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW98136   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW98138   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AG~~~~~AAA A~~CA~~~CC ACCT~~~~TC G~AAAACACT G~~~TTAT~~
MW98139   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW98154   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AG~~~~~AAA A~~CA~~~CC ACCT~~~~TC G~AAAACACT G~~~TTAT~~
MW98162   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98170   TCGGMGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~MAAA~C T~GTGT~CGT ~~~ACACGC~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~T ~~~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW98172   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CASGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98180   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AG~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98185   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW98189   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~ANAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~AAAAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98203   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~A T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98205   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTAT TTTTTCCTTT TTTT~~AACG AA~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98212   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98220   TCGGTGAG~~ CGGGGCGTGC ACGCGCAC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~ATNNNNNN~ ~~~~~~~~~~ ~~~~~~NNNA AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TCGT~~
MW98228   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACC G~~GTTAT~~
MW98235   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~~~~~ AA~CGGAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98240   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~AGRACGCG~ CTGCG~~~TA CACGTTTTTT TTTTTT~~~~ ~~~~~AAACG AAACGAAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98261   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AATAAAAAAA A~~CA~~~CC ACMG~~~~TC G~AAAACACT G~~~TTAT~~
MW98264   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98270   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTC~~~ ~~~~~~~~~~ ~~~~~AAAC~ ~A~~~~GAAA ~~~CA~CACC ACCG~~~~TC G~AAAACACG G~~~TTAT~~
MW98278   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CAACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW98285   TCGGMGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~ANAA~C T~GTGT~CGT ~MSACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTATTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98294   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TTTTTTTTTT TTTT~WAACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW98313   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW98315   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99001   TCGGTGTG~~ CGGGGCGTGC GCGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACGCT G~~~TTAT~~
MW99006   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGK ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99009   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99013   TCGGCGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTTCG~~~TA ~~CGTTT~~~ ~~~~~~~~~~ ~~~~~~AACA AAA~~C~~AA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTATAT
MW99014   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CAAGTTTTTT CTTT~~~~~~ ~~~~~AAACG AA~~~~~AAA A~~CA~CACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99018   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTT~~~ ~~~~~~~~~~ ~~~~~~~~~A AA~~~CAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99038   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~ASAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~~~~~ AA~CGGAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TKAT~~
MW99047   TCGGCGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~TGTA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~AAGAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99057   TMKGYCAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CYAA~C T~GTGT~STT ~CNACTCAC~ ~ACAACGCG~ CTGCG~~~TA CGCGTTTNTT TT~~~~~~~~ ~~~~~~WWCK AA~~~~AGAA A~~CA~~~CC CCCG~~~~TC G~AAAACACT G~~~TTAT~A
MW99058   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99094   TCGGCGAG~~ CGGGGCG~GC ACGC~~NN~~ ~NN~NNNN~N NNNNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNTTTTTT TT~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~GAGACACT G~~~TTAT~~
MW99095   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~GTAACG AA~~~~~AAA G~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99097   TCGGTGTG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~GTGATGCG~ CTGCG~~~TA ~~CGTT~~~~ ~~~~~~~~~~ ~~~~~~~~CG AA~~~CGAAA A~~CA~~~CC GCCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99105   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
             485        495        505        515        525        535        545        555        565        575        585        595        605        615        625        635
MW99134   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCG~G CAGAGTGCG~ CTGCG~~~TA ~~CGTGTTTT TGTTTATT~~ ~~~~~~AAC~ AA~~~~~AAA ~~~CAACACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99135   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TT~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99163   TCGGTGAG~~ CGGGGCG~GC ACGC~~AC~~ ~NN~NNNN~N N~NNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNNNNNN~ ~~~~~~~~~~ ~~~~~~NNNN NN~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~T~TTAT~~
MW99164   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99174   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99196   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GTTCGAAAC T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99203   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99226   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGC ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99240   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~TGAA~N T~GTGT~CGT CAGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW99247   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CKACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99274   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAW~C T~GTGT~CGT ~NNACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAM A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99276   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99286   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99292   NNNNNNNN~~ NNNNNNNNNN NNNN~~NN~~ ~NN~NNNN~N NNNNNN~NNN ~NNNNNNNN~ ~NNNNNNNN~ NNNNN~~~NN NNNNNNNNNN ~~~~~~~~~~ ~~~~~~NNNN NN~~~~~NNC A~~CC~~~CC MCYG~~~~TM G~AACACTST G~~~TTAT~~
MW99301   TCGGCGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C K~GTGT~CGG ~SGAAGCGCA ~AGAACGCG~ CTGCG~~~TA CACGTTATTT TNTG~GGAA~ ~~~~~~AATA AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99303   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAATGCG~ CTGCG~~~TA ~~CGTTTCTT ~~~~~~~~~~ ~~~~~~AACG ~~~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~T~TTAT~~
MW99309   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAW A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99319   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACRCT G~~~TTAT~~
MW99341   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGGACGCG~ CTGCG~~~TA CACGTTCTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTRT~~
MW99353   TCGGCGAG~~ CGGGGCGTGC RCGC~~GC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AA~~~~AGAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW99372   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C K~GTGT~CGK ~SKACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACSTTTYTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99374   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGC ~CGACGCGC~ ~AGAACGCG~ CTGSG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CM~~~CC CCCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99382   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTT~ C~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99393   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99406   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CKAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99407   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99408   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99413   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99448   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TCG~T~~~~~ ~~~~~~AACT AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~GAGACACT G~~~TTAT~~
MW99465   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CGCGTTTCTT TT~~~~~~~~ ~~~~~~AACG AAA~~~GAAA ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~A
MW99471   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99479   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CGCGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC K~AAAACACT G~~~TTAT~~
MW99501   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AG~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99508   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99514   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTTGTT~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW99536   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGC~CG CAGAATGCG~ CTGCG~~~TA CTCGTTGTT~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW99537   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~~AAA A~~CACCACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99546   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99550   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG GA~~~~~AAA A~~CACCACC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99552   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~GTAACG AA~~~~~AAA G~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99559   TCKGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CCAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99565   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99591   TCGGCGAG~~ CGGGGCGTGC GCGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99605   TCGGCGAG~~ CGGGGCGTGC GCGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CKACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
MW99608   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGTTCGT TCGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW99612   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
MW99613   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
OK96022   TCGGTGAG~~ CGGGGCGTGC ACGC~~AC~~ ~GT~CGAA~C TTGTGT~CGT ~CGACGCGCG CAGAATGCG~ CTGCG~~~TA CTCGTT~~~~ ~~~~~~~~~C GTTCGTTGCG AA~~~CGCCG ~~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~GTTAT~~
WE00002   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT TTT~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02431   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~TGTTAT~~
WE02451   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGGCGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AGCG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02454   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~TAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02491   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02531   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGC ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02534   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CRAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTYTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02535   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02591   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTT~ ~~~~~~~~~~ ~~~~~CAACG AAG~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02614   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGRCGGGC~ ~AGAACGCG~ YTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~AAAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02621   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02661   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGCACGCG~ CTGCG~~~TA CACGTTTTTT T~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02662   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~TC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02671   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGSGC~ ~AGAACGCG~ CTGCG~~~TG CA~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~AAAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE02674   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTCTT CTTTT~~~~~ ~~~~~~AAAG AA~~~~~AAA A~~CA~~~CC ACCGTCTGTC C~GAAACACT G~~~TTAT~~
WE02677   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~YA CACGTTTTT~ C~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE85001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGT~CGT ~CGACGCGC~ ~AGAACGCG~ CTGCG~~~TA CACGTTTTTT ~~~~~~~~~~ ~~~~~~AACG AA~~~~~AAA A~~CA~~~CC ACCG~~~~TC G~AAAACACT G~~~TTAT~~
WE94001   TCGGCGAG~~ CGGGGCGTGC ACGC~~GC~~ ~GT~CGAA~C T~GTGTTCGT ~CGACGCGC~ TAGANNNNN~ NNNNN~~~NN NNNNNNNNNN ~~~~~~~~~~ ~~~~~~NNNN NN~~~~~NNN N~~NN~~~NN NNNN~~~~NN N~NNNNNNNN N~~~NNNN~~
```

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|..
             645        655        665        675        685        695        705        715        725        735        745        755        765        775        785        795
AD98001   ~NNN~~~~NN NNNNNN~~NN N~NN~~~NNN N~~~~~NN~N NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNN~~~N NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNN
AD98009   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
AD98012   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
AD98018   ~ATT~~~~AT CAATTGTGAA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
AD98024   ~ATT~~~~AT CAATTG~~AA TATT~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACKTCCR AAGGGCGCGT TTTCAACCCC GACGTG~~~C CSATNGATTT CGGTCGCGGA GGCGGAGTCG TTGCNCTNNN NNNNNNNNNN NNNNNNNNNN NNNNNNN
AD98036   ~ATT~~~~AT CAATTG~~AA C~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCTGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
DS00001   ~ATT~~~~GT TAATTG~~AA T~TA~TAATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGTGCGCGT CGTCNACCCC CACNTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCC TTGCGCTTAC GGATATCGCG TCTGCCTCAA TTTTTTA
DS01001   TATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00029   ~ATT~~~~AT ~~~TTG~~AA A~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00039   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00040   ~ATT~~~~AT TAATTG~~AA TATA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00042   ~ATT~~~~AT ~~~TTG~~AA A~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00043   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00045   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00051   ~ATT~~~~AT ~~~TTG~~AA A~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
JC00055   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
JC00061   ~ATT~~~~AT ~~~TTG~~AA A~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGTTTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC00063   ~ATT~~~~AT ~~~TTG~~AA A~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGTTTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
JC01014   ~ATT~~~~AT TAATTG~~AA T~YA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTT~A
JM00001   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00015   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00024   ~ATT~~~~AT ~~~TTG~~AA T~TG~~~AAT CA~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW00032   ~ATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00051   ~ATT~~~~AT CAATCG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00058   ~ATT~~~~AT CAATCG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00064   ~ATT~~~~AT TAATCG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00072   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00076   ~ATT~~~~AT ~~~TTGAGAA T~TA~~~ATA GAA~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTNNNNNNN NNNNNNN
MW00101   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCNN NNNNNNN
MW00102   ~ATT~~~~AT TGATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00110   ~ATT~~~~AT CAATCG~~AA T~TR~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
MW00116   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG GA~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATWTATA
MW00127   ~ATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATCGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00129   ~RTT~~~~GT TAATTG~~AA T~TA~~~ATT G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00151   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00176   ~AATA~~TAT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00177   ~ATT~~~~GT TAATTG~~AA T~TA~~~ATT G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00178   ~ATT~~~~GT TAATTG~~AA T~TA~~~ATT G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00179   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00185   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTC~ TTGCGCTGAC NGATATCGCG TCTGCCTCAA TTTTTTA
MW00189   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00226   ~ATT~~~~AT CGATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCTGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00231   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00232   ~ATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00234   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00262   ~ATTATTTAT TAATTA~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAN NNNNNNN
MW00267   ~ATT~~~~AT TGATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00269   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
MW00290   ~ATT~~~~AT ~~~TTGAGAA T~TA~~~ATA GAA~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAW ATTTTTA
MW00302   ~ATT~~~~AT ~~~TCG~~AA T~CA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCMTCAA TTNTATN
MW00316   ~~~~~~~~~T CAATCG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAN NNNNNNN
MW00326   ~ATT~~~~AT ~~~TTGA~AA TG~A~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00328   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00330   ~ATT~~~~GT TAATTG~~AA T~TA~~~ATT G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCNN NNNNNNN
MW00347   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00348   ~ATT~~~~AT CAATTG~~AA C~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CTGTCGCGGA GGCTGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00393   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTCN
MW00409   ~ATT~~~~AT TAATTG~~AA C~TA~~~ATA GAG~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00412   ~ATT~~~~AT ~~~TTG~~AA A~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00444   ~ATT~~~~AT TAATTG~~AA T~CA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00452   ~ATT~~~~AT CAATTG~~AA C~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC KACGTG~~~C CGATTGATTT CGGTCGCGGA GGCTGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00469   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW00498   ~ATT~~~~AT TAATCG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW00504   ~ATT~~~~AT ~~~TCG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTNN
MW00517   ~ATT~~~~GT TTGTTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW00525   ~ATT~~~~AT ~~~TCG~~AA T~TG~~~ATA A~~~ACA~GA GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW00530   ~ATT~~~~AT ~~~TTG~~AA A~TG~~~ATA G~~~~~ACAA GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTT~A
MW00539   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA T~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
```

Appendix 3: Sequence data

Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|..
                645        655        665        675        685        695        705        715        725        735        745        755        765        775        785        795
MW00547   ~GTT~~~~AT TAATTG~~AA T~TA~~~ACA N~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACNTG~~~C CNATNGATTT CGGTCNCGGA GGCGGANTCN TTGCNCTGCN NGNNNTCGNG TNTGCCTNAA TTTTTTN
MW01001   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTNN
MW01011   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGNNNNNN NNNNNNN
MW01014   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW01018   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01019   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW01025   ~ATT~~~~AT ~~~TTG~~AA A~YA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGTTTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW01034   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01039   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW01048   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01053   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTGTTTA
MW01059   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01061   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01083   ~ATT~~~~AT ~~~TCG~~AA T~CA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTCN
MW01092   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW01107   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG THTGCCTCAA TTTTT~A
MW01116   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW02001   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW02006   ~ATT~~~~AT ~~~TTG~~AA T~CA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW02025   ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~C~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CG~TTCA~CG CGGTT~CGGA GGCGTAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW02033   ~ATT~~~~GT ~~~TTG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW02034   ~ATT~~~~AT ~~~TCG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW98009   ~ACT~~~~AT CAAATG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98029   ~ATT~~~~AT ~~~TTGAGAA T~TA~~~ATA GAA~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW98049   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98079   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98097   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98103   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98129   ~GTT~~~~AT ~~~ACG~~GA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATNNNNNN NNNNNNNNNN NNNNNNN
MW98136   TATT~~~~AT CAATTG~~RA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98138   ~ATC~~~~AT TAATTG~~AA TTCA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98139   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98154   ~ATC~~~~AT TAATTG~~AA TTCA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTNNNNN
MW98162   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98170   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98172   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGGTTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98180   ~ATC~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98185   ~GTT~~~~AT ~~~ACG~~GA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW98189   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98203   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98205   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98212   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98220   ~ATT~~~~AT ~~~TCG~~AA T~TA~~~ATA G~~~~~AA~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTGN
MW98228   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTN
MW98235   ~ATT~~~~AT ~~~TTGA~AA TTCA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98240   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98261   ~ACT~~~~AT CAAATG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98264   ~ATT~~~~AT ~~~TTGA~AA TTCA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98270   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~ACAA GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGACAT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW98278   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW98285   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTYTA
MW98294   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98313   TGTT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW98315   ~ATTT~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA NNNNNNN
MW99001   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99006   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99009   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
MW99013   TATT~~~~AT ~~~TTG~~AA T~CA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99014   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ACA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99018   ~~~~~~~~~~ ~~~~~~~~AA T~TA~~~ATA TA~CACAC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99038   ~ATT~~~~AT ~~~TTGA~AA TTCA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CTGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCKCG TCTGCCTCAA TTTTTTA
MW99047   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99057   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99058   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99094   ~ATCAA~TAT ~AATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99095   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TNNNNNN
MW99097   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATG A~~~~~AA~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGCA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG YTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTGA
MW99105   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
```

Appendix 3: Sequence data Internal transcribed spacer 2 (ITS-2)

```
          ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|..
             645        655        665        675        685        695        705        715        725        735        745        755        765        775        785        795
MW99134   ~ATT~~~~AT ~~~TTG~~AA T~TG~~~ATA TAA~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99135   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99163   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA AN~~~~ACCA GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA NNNNNNN
MW99164   TATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99174   ~ATT~~~~AT CAATTG~~AA C~TAATAATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCTGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99196   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTN
MW99203   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTYTA
MW99226   ~ATT~~~~AT CGATTG~~AA T~TAAT~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATCGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99240   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAN NNNNNNN
MW99247   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99274   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCKCGGA GGCGGAGTCG TTGCGSTGAC GGATATCGCG TCKGCCTCAA TTKTYTA
MW99276   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99286   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCTGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99292   ~ATT~~~~AT CGWTTR~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTNNN
MW99301   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99303   ~ATT~~~~AT ~~~TTG~~AA T~TA~~~ATA ATAA~~ACCA GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99309   ~ATTA~TTAT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99319   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTKTYTA
MW99341   ~ATT~~~~AT CGATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99353   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99372   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99374   ~ATT~~~~AT CGATTG~~AA T~TAAT~ATA G~~~~~MC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATCGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATSGCG TYKGCCTCAA TTKTYCA
MW99382   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACTCC GACNTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTNAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99393   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCTGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTKTTTA
MW99406   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCTGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCMTSAA TYYTTTA
MW99407   ~ATT~~~~AT TAACTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99408   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99413   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA NNNNNNN
MW99448   ~ATCAA~TAT ~AATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99465   TATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99471   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGGTTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTNN
MW99479   ~ATT~~~~AT CAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99501   ~ATT~~~~AT TAATTG~~AA TTCA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99508   ~ATT~~~~AT CAATTGTGAA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCCGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99514   ~GTT~~~~GT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTKA
MW99536   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99537   ~ATT~~~~AT ~~~TTGA~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTACTAC CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99546   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99550   ~ATT~~~~AT ~~~TTGA~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTACTAC CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99552   ~ATT~~~~AT CAATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99559   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGNA GGCGGAGTCG NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNN
MW99565   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99591   ~ATT~~~~AT TAATTG~~AA TATA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99605   ~ATT~~~~AT TAATTG~~AA TATA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
MW99608   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTTTA
MW99612   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTT~A
MW99613   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTA~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
OK96022   ~GTT~~~~AT ~~~ACG~~AA T~TA~~~ACG A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACNCC CACCTA~~~C CGATTGATTT CNGTCGCGGA GGCGGAGTCG TTGCGCTGAC NGATATCGCG TCTGCCTCAA ATTTTTA
WE00002   ~ATT~~~~AT AAATTA~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02431   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02451   ~ATT~~~~AT TAATTA~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02454   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02491   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02531   ~ATT~~~~AT CAATCG~~AA T~TA~~~ACA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02534   ~ATT~~~~AT TAATYG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TNNNNNN
WE02535   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02591   ~ATT~~~~AT CAATTG~~AW T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02614   ~ATT~~~~AT CGATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCKGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02621   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02661   ~ATT~~~~AT CAATTGTGAA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02662   ~AATA~~TAT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02671   ~ATT~~~~AT CRATTG~~AA T~TG~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCTGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02674   ~RTT~~~~GT TAATTG~~AA T~TA~~~ATT G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE02677   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA A~~~~~AC~A GTANGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATCT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA ATTTT~A
WE85001   ~ATT~~~~AT TAATTG~~AA T~TA~~~ATA G~~~~~AC~A GTAGGCGGAC TCGACGTCCG AAGGGCGCGT CGTCGACGCC GACGTG~~~C CGATTGATTT CGGTCGCGGA GGCGGAGTCG TTGCGCTGAC GGATATCGCG TCTGCCTCAA TTTTTTA
WE94001   ~NNN~~~~NN NNNNNN~~NN N~NN~~~NNN N~~~~~NN~N NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNN~~~N NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN NNNNNNN
```

Legend Plate 1 & 2. *Agrodiaetus*-wings

Plate 1

Fig.	Code			Species	
1	AD	98001	M	*Agrodiaetus*	*surakovi*
2	AD	98009	M	*Agrodiaetus*	*pseudactis*
3	DS	00001	M	*Agrodiaetus*	*poseidonides*
4	DS	00002	M	*Agrodiaetus*	*damone*
5	DS	00003	M	*Agrodiaetus*	*damocles*
6	DS	00004	M	*Agrodiaetus*	*phyllides*
7	DS	00005	M	*Agrodiaetus*	*dagmara*
8	DS	01001	M	*Agrodiaetus*	*iphigenides*
9	DS	95001	M	*Agrodiaetus*	*actinides*
10	JC	00040	M	*Agrodiaetus*	*aroaniensis*
11	JC	00045	M	*Agrodiaetus*	*nephohiptamenos*
12	JC	01014	M	*Agrodiaetus*	*admetus*
13	JM	00001	M	*Agrodiaetus*	*fabressei*
14	MW	00015	M	*Agrodiaetus*	*demavendi*
15	MW	00032	M	*Agrodiaetus*	*hamadanensis*
16	MW	00059	M	*Agrodiaetus*	*elbursicus*
17	MW	00101	M	*Agrodiaetus*	*darius*
18	MW	00127	M	*Agrodiaetus*	*paulae*
19	MW	00129	M	*Agrodiaetus*	*gorbunovi*
20	MW	00176	M	*Agrodiaetus*	*rovshani*
21	MW	00179	M	*Agrodiaetus*	*cyaneus*
22	MW	00226	M	*Agrodiaetus*	*femininoides*
23	MW	00231	M	*Agrodiaetus*	*alcestis*
24	MW	00234	M	*Agrodiaetus*	*firdussii*
25	MW	00262	M	*Agrodiaetus*	*klausschuriani*
26	MW	00269	M	*Agrodiaetus*	*iphidamon*
27	MW	00330	M	*Agrodiaetus*	*pseudoxerxes*
28	MW	00347	M	*Agrodiaetus*	*posthumus*
29	MW	00348	M	*Agrodiaetus*	*phyllis*
30	MW	00393	M	*Agrodiaetus*	*erschoffii*
31	MW	00409	M	*Agrodiaetus*	*caeruleus*
32	MW	00426	F	*Agrodiaetus*	*caeruleus*
33	MW	00498	M	*Agrodiaetus*	*valiabadi*
34	MW	00539	M	*Agrodiaetus*	*dizinensis*
35	MW	00547	M	*Agrodiaetus*	*birunii*
36	MW	01014	M	*Agrodiaetus*	*ripartii*
37	MW	01053	M	*Agrodiaetus*	*ainsae*
38	MW	01107	M	*Agrodiaetus*	*fulgens*
39	MW	98009	M	*Agrodiaetus*	*carmon*
40	MW	98079	M	*Agrodiaetus*	*lycius*
41	MW	98097	M	*Agrodiaetus*	*ernesti*
42	MW	98103	M	*Agrodiaetus*	*iphicarmon*
43	MW	98136	M	*Agrodiaetus*	*wagneri*
44	MW	98154	M	*Agrodiaetus*	*poseidon*
45	MW	98162	M	*Agrodiaetus*	*actis*
46	MW	98170	M	*Agrodiaetus*	*maraschi*
47	MW	98172	M	*Agrodiaetus*	*menalcas*
48	MW	98189	M	*Agrodiaetus*	*hopfferi*
49	MW	98203	M	*Agrodiaetus*	*mithridates*
50	MW	98240	M	*Agrodiaetus*	*theresiae*

Plate 2

Fig.	Code			Species	
1	MW	98261	M	*Agrodiaetus*	*schuriani*
2	MW	98284	M	*Agrodiaetus*	*sigberti*
3	MW	98285	M	*Agrodiaetus*	*sigberti*
4	MW	98294	M	*Agrodiaetus*	*guezelmavi*
5	MW	98313	M	*Agrodiaetus*	*sertavulensis*
6	MW	99006	M	*Agrodiaetus*	*firdussii*
7	MW	99009	M	*Agrodiaetus*	*iphigenia*
8	MW	99057	M	*Agrodiaetus*	*merhaba*
9	MW	99058	M	*Agrodiaetus*	*artvinensis*
10	MW	99095	M	*Agrodiaetus*	*huberti*
11	MW	99105	M	*Agrodiaetus*	*demavendi*
12	MW	99164	M	*Agrodiaetus*	*interjectus*
13	MW	99196	M	*Agrodiaetus*	*ripartii*
14	MW	99203	M	*Agrodiaetus*	*turcicus*
15	MW	99240	M	*Agrodiaetus*	*altivagans*
16	MW	99274	M	*Agrodiaetus*	*dantchenkoi*
17	MW	99286	M	*Agrodiaetus*	*kurdistanicus*
18	MW	99289	M	*Agrodiaetus*	*sekercioglui*
19	MW	99309	M	*Agrodiaetus*	*baytopi*
20	MW	99341	M	*Agrodiaetus*	*pierceae*
21	MW	99353	M	*Agrodiaetus*	*altivagans*
22	MW	99374	M	*Agrodiaetus*	*zapvadi*
23	MW	99393	M	*Agrodiaetus*	*antidolus*
24	MW	99406	M	*Agrodiaetus*	*antidolus*
25	MW	99408	M	*Agrodiaetus*	*hopfferi*
26	MW	99413	M	*Agrodiaetus*	*firdussii*
27	MW	99448	M	*Agrodiaetus*	*cyaneus*
28	MW	99465	M	*Agrodiaetus*	*kanduli*
29	MW	99471	M	*Agrodiaetus*	*dantchenkoiXmenalcas*
30	MW	99479	M	*Agrodiaetus*	*turcicola*
31	MW	99494	M	*Agrodiaetus*	*menalcas*
32	MW	99501	M	*Agrodiaetus*	*putnami*
33	MW	99508	M	*Agrodiaetus*	*ninae*
34	MW	99565	M	*Agrodiaetus*	*tankeri*
35	MW	99591	M	*Agrodiaetus*	*humedasae*
36	MW	99613	M	*Agrodiaetus*	*damon*
37	WE	00002	M	*Agrodiaetus*	*glaucias*
38	WE	02451	M	*Agrodiaetus*	*tenhageni*
39	WE	02454	M	*Agrodiaetus*	*mofidii*
40	WE	02531	M	*Agrodiaetus*	*zarathustra*
41	WE	02535	M	*Agrodiaetus*	*lorestanus*
42	WE	02536	M	*Agrodiaetus*	*damalis*
43	WE	02591	M	*Agrodiaetus*	*peilei*
44	WE	02612	M	*Agrodiaetus*	*karindus*
45	WE	02671	M	*Agrodiaetus*	*femininoides*

1a	**1c**	**2**	**3**	**4**	**5**
1b	**1d**				
6		**7**	**8**	**9**	**10**
:		**:**	**:**	**:**	**:**

a & b: upperside; c & d: underside; a & c: forewing; b & d:hindwing

Index Plate 1 & 2. *Agrodiaetus*-wings

Index A-H

Species	Plate	Fig.	Code		Sex
actinides	**1**	**9**	DS	95001	M
actis	**1**	**45**	MW	98162	M
admetus	**1**	**12**	JC	01014	M
ainsae	**1**	**37**	MW	01053	M
alcestis	**1**	**23**	MW	00231	M
altivagans	**2**	**15**	MW	99240	M
altivagans	**2**	**21**	MW	99353	M
antidolus	**2**	**23**	MW	99393	M
antidolus	**2**	**24**	MW	99406	M
aroaniensis	**1**	**10**	JC	00040	M
artvinensis	**2**	**9**	MW	99058	M
baytopi	**2**	**19**	MW	99309	M
birunii	**1**	**35**	MW	00547	M
caeruleus	**1**	**31**	MW	00409	M
caeruleus	**1**	**32**	MW	00426	F
carmon	**1**	**39**	MW	98009	M
cyaneus	**1**	**21**	MW	00179	M
cyaneus	**2**	**27**	MW	99448	M
dagmara	**1**	**7**	DS	00005	M
damalis	**2**	**42**	WE	02536	M
damocles	**1**	**5**	DS	00003	M
damon	**2**	**36**	MW	99613	M
damone	**1**	**4**	DS	00002	M
dantch.Xmenal.	**2**	**29**	MW	99471	M
dantchenkoi	**2**	**16**	MW	99274	M
darius	**1**	**17**	MW	00101	M
demavendi	**1**	**14**	MW	00015	M
demavendi	**2**	**11**	MW	99105	M
dizinensis	**1**	**34**	MW	00539	M
elbursicus	**1**	**16**	MW	00059	M
ernesti	**1**	**41**	MW	98097	M
erschoffii	**1**	**30**	MW	00393	M
fabressei	**1**	**13**	JM	00001	M
femininoides	**1**	**22**	MW	00226	M
femininoides	**2**	**45**	WE	02671	M
firdussii	**1**	**24**	MW	00234	M
firdussii	**2**	**6**	MW	99006	M
firdussii	**2**	**26**	MW	99413	M
fulgens	**1**	**38**	MW	01107	M
glaucias	**2**	**37**	WE	00002	M
gorbunovi	**1**	**19**	MW	00129	M
guezelmavi	**2**	**4**	MW	98294	M
hamadanensis	**1**	**15**	MW	00032	M
hopfferi	**1**	**48**	MW	98189	M
hopfferi	**2**	**25**	MW	99408	M
huberti	**2**	**10**	MW	99095	M
humedasae	**2**	**35**	MW	99591	M

Index I-Z

Species	Plate	Fig.	Code		Sex
interjectus	**2**	**12**	MW	99164	M
iphicarmon	**1**	**42**	MW	98103	M
iphidamon	**1**	**26**	MW	00269	M
iphigenia	**2**	**7**	MW	99009	M
iphigenides	**1**	**8**	DS	01001	M
kanduli	**2**	**28**	MW	99465	M
karindus	**2**	**44**	WE	02612	M
klausschuriani	**1**	**25**	MW	00262	M
kurdistanicus	**2**	**17**	MW	99286	M
lorestanus	**2**	**41**	WE	02535	M
lycius	**1**	**40**	MW	98079	M
maraschi	**1**	**46**	MW	98170	M
menalcas	**1**	**47**	MW	98172	M
menalcas	**2**	**31**	MW	99494	M
merhaba	**2**	**8**	MW	99057	M
mithridates	**1**	**49**	MW	98203	M
mofidii	**2**	**39**	WE	02454	M
nephohiptamenos	**1**	**11**	JC	00045	M
ninae	**2**	**33**	MW	99508	M
paulae	**1**	**18**	MW	00127	M
peilei	**2**	**43**	WE	02591	M
phyllides	**1**	**6**	DS	00004	M
phyllis	**1**	**29**	MW	00348	M
pierceae	**2**	**20**	MW	99341	M
poseidon	**1**	**44**	MW	98154	M
poseidonides	**1**	**3**	DS	00001	M
posthumus	**1**	**28**	MW	00347	M
pseudactis	**1**	**2**	AD	98009	M
pseudoxerxes	**1**	**27**	MW	00330	M
putnami	**2**	**32**	MW	99501	M
ripartii	**1**	**36**	MW	01014	M
ripartii	**2**	**13**	MW	99196	M
rovshani	**1**	**20**	MW	00176	M
schuriani	**2**	**1**	MW	98261	M
sekercioglui	**2**	**18**	MW	99289	M
sertavulensis	**2**	**5**	MW	98313	M
sigberti	**2**	**2**	MW	98284	M
sigberti	**2**	**3**	MW	98285	M
surakovi	**1**	**1**	AD	98001	M
tankeri	**2**	**34**	MW	99565	M
tenhageni	**2**	**38**	WE	02451	M
theresiae	**1**	**50**	MW	98240	M
turcicola	**2**	**30**	MW	99479	M
turcicus	**2**	**14**	MW	99203	M
valiabadi	**1**	**33**	MW	00498	M
wagneri	**1**	**43**	MW	98136	M
zapvadi	**2**	**22**	MW	99374	M
zarathustra	**2**	**40**	WE	02531	M

Plate 1. *Agrodiaetus*-wings

Plate 2. *Agrodiaetus*-wings