

Faunistic and taxonomic updates on the Tenebrionidae of Malta (Coleoptera)

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ABSTRACT. In the present work, original data is provided for two species of Alleculinae (Tenebrionidae) which were previously omitted from recent works related to this family. The old record of *Isomira nitidula* is found to be incorrect and should refer to *I. melanophthalma*. The record of *Odocnemis exaratus* must be attributed to a different species. Original data is also provided for a new record, *Lyphia tetraphylla* and for some other previously recorded species. *Clamoris crenatus*, *Stenosis elongata* and *S. sardoa* are excluded from the tenebrionid fauna of Malta whereas the record of *Sepidium tricuspdatum tomentosum* and *Gunarus parvulus* requires validation. An alien species, *Zophobas opacus*, is also recorded but its establishment in Malta cannot be confirmed. A check-list of the 61 species of Tenebrionidae known from Malta is also provided.

KEY WORDS. Maltese Islands, Mediterranean, Alleculinae.

INTRODUCTION

In recent years numerous publications have appeared on the Tenebrionidae of the Maltese Islands. An almost complete account of what was published on this group of beetles from Malta up to 1998 is to be found in MIFSUD & SCUPOLA (1998). One historical publication, the list of Lepidoptera, Hemiptera and Coleoptera compiled by ANDRES (1916) during the time he spent as a prisoner of war in Malta, was however overlooked. Andres listed a total of eight species of Tenebrionidae, including *Alphitobius piceus* (Olivier, 1795), a synonym of *A. laevigatus* (Fabricius, 1781), then a new record for Malta that should therefore be attributed to ANDRES (1916) and not to MIFSUD & SCUPOLA (1998). Later, MIFSUD (1999) gave an account of eleven species of Tenebrionidae associated with sandy shores, and SCUPOLA & MIFSUD (2002) described *Heliopathes avarus dwejrensis* from material collected from Gozo. The type material of this species has recently been re-examined by FERRER & IWAN (2012) who confirm the status of this taxon. CAMERON & CARUANA GATTO (1907) included three species of Alleculinae in the Tenebrionidae. These species were never referred to again in works related to Maltese Tenebrionidae because this group was often considered as a distinct family, the Alleculidae. Recent studies have shown that the Alleculidae should be included in the Tenebrionidae (e.g. DOYEN, 1972; WATT, 1974; LAWRENCE & NEWTON, 1995). For this reason, in the present work we have also included all available information related to the Alleculinae of Malta. Besides, we have included information on a new record, and on some other species for which either only fragmentary information was previously available or which were wrongly cited. An alien species which does not seem to be as yet established in Malta is also included.

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MATERIAL AND METHODS

In recent years, additional historical material of Tenebrionidae from Malta not previously studied and reported on by MIFSUD & SCUPOLA (1998) and conserved at The Natural History Museum in London, UK became available for study. This material consists of two collections, one of which was collected in Malta by Malcolm Cameron (MC) either alone or in collaboration with the Maltese naturalist Alfredo Caruana Gatto. Material from this collection is labelled as "Cameron Coll. B.M. 1936-555". In part, material from this collection included individual label numbers which correspond to numbers in Cameron's private notes and refer to the following information (partially or fully): date of collection, name of the species, name of person who identified it, locality name and ecological data. In the present work, this information is added in square brackets after the label number. The other collection includes material collected from the Maltese Islands by Commander James John Walker between 1874-76 almost exclusively between the months of October and March and is labelled as "G.C. Champion Coll. B.M. 1927-409". Except for the name Malta, there is no other data accompanying this material. Both collections formed the basis of the Coleoptera list of the Maltese Islands published by CAMERON & CARUANA GATTO (1907).

Other collectors have provided material. Their names are given in initials as follows: AS - Anthony Seguna, DM - David Mifsud, DMA - Dennis Magro, JJB - John J. Borg, HBB - Henry Borg Barthet, ML - Martin Lillig and PS - Paul Sammut. All material is in the private collection of the authors except for the historical material conserved at the BMNH and material collected by JJB, HBB and PS which is mostly housed at the National Museum of Natural History (NMNH) at Mdina in Malta. Species sequence follows that of LÖBL & SMETANA (2008) as well as global distribution of species.

ANNOTATED FAUNISTIC RECORDS FOR SOME TENEBRIONIDAE FROM MALTA

Leptoderis collaris (Linné, 1767)

Material examined. MALTA: Zebbug, Main Street, 1.v./14.x.2003, 2 exs., in human habitation (old building), HBB; Mellieħa, Parish Street, 19.ix./4.x.2004, 3 exs., in human habitation (old building), HBB; Rabat, 4.ii.2002, 1 ex., PS; Rabat, 15.iv.2003, 1 ex., JJB; Mdina, Vilhena Tunnel, 22.iii.2002, 1 ex., JJB & PS; Mdina, inside bastion walls, 20.v.2002, 1 ex., PS.

Notes. We have included the above data for this species as it seems to be a taxon on the decline through most of its distribution range (e.g. SOLDATI, 2007). In fact, CAMERON & CARUANA GATTO (1907) recorded the occurrence of this species in Malta as present "here and there" but MIFSUD & SCUPOLA (1998) found only a single specimen from Zebbug. The above data extends the previous distribution of this species in Malta.

Odocnemis sp.

Material examined. MALTA: Zurrieq, 12.xii.1994, 2 exs., collected by beating branches of *Ceratonia siliqua* and *Pistacia lentiscus* at night, DM.

Notes. This species was recorded by MIFSUD & SCUPOLA (1998) as *Odocnemis exaratus* (Germar, 1817) but they clearly indicated that a number of morphological characteristics did not match those attributed to this species. ALIQUÒ & SOLDATI (2010) indicated that the material cited as *O. exaratus* from Malta (MIFSUD & SCUPOLA, 1998) could well belong to *O. clypeatus*, a species so far known only from Sicily. To verify such identification the authors tried to trace the type without success. However, we could compare the Maltese specimens with a male from Sicily identified as

O. clypeatus and we found significant differences: the specimens from Malta appear matt, whereas the one from Sicily is shiny. The punctures of the pronotum and the clypeus are much denser in the Maltese beetles, the clypeus slightly rounded (straight in *O. clypeatus*) and the eyes are smaller in the Maltese specimens. The pronotum is more convex and the elytra shorter in the specimens from Malta, the non-wrinkled part of the prosternum near the pronotal margin is smaller than in the Sicilian specimen. Considering all these morphological differences, it is likely that two distinct species are involved but a new species of *Odocnemis* is not being described here as more material needs to be examined.

***Cheirodes brevicollis* Wollaston, 1864**

Material examined. MALTA: Mellieha, Kortin, 8.vi.2006, 1 ex., UV light, HBB; Naxxar, Tas-Sghajtar, 11.-12.v.2006, 5 exs., Actinic Moth Trap, 108 m altitude, 35°54'35.3"N 14°26'29.4"E, AS.

Notes. This species was first reported from Malta by GRIMM (1986) on the basis of a single specimen collected from Armier Bay and it was not found by MIFSUD & SCUPOLA (1998). The above cited material extends the distribution of this species in Malta and it is worth emphasising that all material was collected by light traps.

***Opatrum melitense* Küster, 1849**

Notes. This enigmatic species presumably endemic to the Maltese Islands was described by KÜSTER (1849) on the basis of two specimens from Leach's collection. This material was handed over to Küster by Dr Sturm. WARING (1843) refers to a collection of beetles which in 1833 was being made in Malta by Dr Leach and *O. melitense* may have been described on material from this collection. If such an assumption is correct, this material was collected from Malta almost 180 years ago. The type material however seems to be lost (MIFSUD & SCUPOLA, 1998) and this taxon has never been collected again from the Maltese archipelago. CAMERON & CARUANA GATTO (1907) listed *O. melitense* in the list of Coleoptera of the Maltese Islands, but historical material upon which such a citation was made, proved to belong to *O. emarginatum* Lucas, 1846 (MIFSUD & SCUPOLA, 1998). It is beyond the scope of the present work to try and work out a diagnosis of this species from the original description and to clarify the status of this taxon.

***Sclerum multistriatum* (Forskål, 1775)**

Material examined. MALTA: 1 ex., [*S. abbreviatum* Reiche - handwritten], G.C. Champion Coll., B.M. 1927-409 (BMNH).

Notes. The above cited material was not available to MIFSUD & SCUPOLA (1998).

***Zophobas opacus* (Sahlberg, 1823)**

Material examined. MALTA: Qrendi, 12.xi.2002, 1 ex., near pet shop, DMA.

Notes. This Pan-American species distributed from USA to Argentina and introduced to St. Helena (FERRER, 2011) is found in pet shops in Malta where its larvae are used as food for aquarium fish and reptiles. Dead adults are often found in the vicinity of pet shops in Malta but there is no evidence to indicate that the species is established in the wild, although this is a highly likely scenario.

Lyphia tetrphylla (Fairmaire, 1856)

Material examined. MALTA: Wied tal-Isqof, 16.vii.2002, 1 ex., attracted to light, DM; Mellieha, Kortin, 29.vii.2004, 1 ex., UV light trap, HBB.

Notes. *Lyphia tetrphylla* represents a new record of Tenebrionidae for Malta. It is probably predatory or associated with Bostrichidae and is often found in dead branches of oaks (*Quercus* spp.) and fig trees (*Ficus carica*) as well as in old vine branches. It has a patchy distribution in Europe and is known to occur in North America.

Pseudoseriscius cameroni (Reitter, 1902)

Material examined. MALTA: Ramla Tat-Torri (White Tower Bay), 5.vi.2004, 3 exs., ML & DM; Marfa Ridge, Armier Bay, 11.vi.2004, 2 exs., ML.

Notes. *Pseudoseriscius cameroni* is endemic to the Maltese Islands. CAMERON & CARUANA GATTO (1907) recorded the species from Mellieha from where it appears to be extinct. However, MIFSUD & SCUPOLA (1998) rediscovered the species in Ramla (Gozo). Despite repeated searches in similar habitats, the species was found nowhere else except in Ramla up to 1999 (MIFSUD, 1999). The above records indicate that the species was now found again on mainland Malta but we are not sure if these populations represent original stock or whether it was accidentally or deliberately introduced from Gozo to become established in other sand-dune habitats in Malta. This species is strictly associated with coastal sand-dunes, a rare and threatened habitat in the Maltese Islands and it is for this reason that this species is listed in Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 related to the conservation of natural habitats and of wild fauna and flora.

Corticeus bicolor (A.G. Olivier, 1790)

Material examined. MALTA: 1 ex., G.C. Champion Coll., B.M. 1927-409 (BMNH).

Notes. This species is widely distributed in Europe and is also recorded from North Africa (Algeria) and Asia (Eastern and Western Siberia and Far Eastern Russia). Its presence in Malta was not reported in the catalogue of Palaearctic Coleoptera (LÖBL & SMETANA, 2008).

Myrmexixenus picinus (Aubé, 1850)

Material examined. MALTA: vi.1902, MC, 3 exs., 7335 [= June 1902, *Myrmexixenus picinus*, ER (probably referring to material being identified by Edmund Reitter), St. Paul's Bay], M. Cameron Coll., B.M. 1936-555 (BMNH); Buskett, 24.vi.2003, 14 exs., attracted to light, DM; Bidnija, 20.ii.1998, 1 ex., DM; Wied tal-Isqof, 16.vii./2.viii.2002, 9 exs., attracted to light, DM.

Notes. No material of this species was available for study by MIFSUD & SCUPOLA (1998) and the only datum available was that of CAMERON & CARUANA GATTO (1907). The above data confirms the occurrence of this species in Malta and extends its local distribution range.

Isomira melanophthalma (Lucas, 1846)

Material examined. MALTA: vi.1902, 6 exs., MC, 7463 [= June 1902, *Cistela nitidula*, ER (probably referring to material being identified by Edmund Reitter), Ta' Baldu], M.

Cameron Coll., B.M. 1936-555 (BMNH); Bahrija, 12.v.1996, 6 exs., DM, 2 exs., same data but 20.iv.2002; Bahrija Valley, 11.v.1990, 1 ex., DM; Wied Has-Sabtan, 14.iv.1990, 2 exs., DM, 1 ex., same data but 4.iv.1996; Buskett, 20.v.2003, 2 exs., DM; Buskett gardens, 28.-31.iii.2002, 1 ex., Schuh & Lang; Rabat, 4.vi.1999/27.iv./19.v.2003, 5 exs., attracted to light, PS; Birkirkara, 22.iii.1990, 1 ex., DM; Mistra, 16.vi.1994, 1 ex., DM; L'Andrijiet, 9.v.2004, 2 exs., HBB; Mellieha, Mellieha Hill, 3./17.iv.2004, 2 exs., HBB; Mellieha, Mellieha Bay, 15.v.2004, HBB; Mellieha, Kortin 19./27.iv./3.vi.2005, 3 exs., UV Light traps, HBB. **GOZO:** Mgar ix-Xini Valley, 19.iv.1990, 1 ex., DM.

Notes. Based on the examination of the above mentioned historical material, whose data corresponds to that found in CAMERON & CARUANA GATTO (1907), we concluded that the record of *Gonodera nitidula* Kiesw. [sic] (= *Isomira nitidula* (Kiesenwetter, 1861)) is incorrect and should refer to *I. melanophthalma*. This western Mediterranean species is reported to occur in the following European countries: Bosnia Herzegovina, Croatia, France, Italy, Malta, Portugal as well as in Algeria and Morocco in North Africa. *Isomira melanophthalma* is a relatively common species in the Maltese Islands.

Omophlus melitensis (Baudi di Selve, 1877)

Material examined. MALTA: v.1904, MC, 1 ex., M. Cameron Coll., B.M. 1936-555 (BMNH); 14.iv.1902, 1 ex., 7383 [= *Omophlus*, Malta, Caruana Gatto], M. Cameron Coll., B.M. 1936-555 (BMNH); v.1903, 2 exs., 7561 /7562 [= 25 July 1902, *Omophlus melitensis*, ER (probably referring to material being identified by Edmund Reitter), In Coll. Gatto], M. Cameron Coll., B.M. 1936-555 (BMNH); Dingli Cliffs, 31.iii.2002, 1 ex., Schuh & Lang; Delimara, Tas-Silg, 31.iii.1989, 1 ex., DM; Rabat, 3.v.2003, 1 ex., PS; St. Thomas Bay, Tal-Munxar, 13.iv.2003, 2 exs., DM; Zejtun, 28.iii.2002, 1 ex., DM; Mellieha, Kortin, 3.v.2003/3.iv.2004, 6 exs., HBB; Mellieha; Imgiebah Valley, 8.iv.2004, 3 exs., HBB; Mellieha, Mellieha Hill, 17.iv.2004, 3 exs., HBB; Mellieha, Selmun, 23.iv.2005, 1 ex., HBB; Mellieha, L'Ahrax ta' Gewwa, 14.iv.2005, 1 ex., HBB. **GOZO:** Dwejra, 25.iv.2003, 3 exs., DM; Mgar ix-Xini Valley, 19.iv.1990, 1 ex., DM; Wied tax-Xlendi, 17.iv.1990, 1 ex., DM.

Notes. When Cameron and Caruana Gatto published their list of Coleoptera of the Maltese Islands in 1907 they were not yet aware of the synonymy proposed by REITTER (1906) of *Omophlus championi* with *O. melitensis* and both names were included in their work. CILIA (1989) in the Red Data Book for the Maltese Islands again listed both species of *Omophlus* as occurring in Malta and stated that both were apparently endemic. *Omophlus melitensis* is endemic to the Maltese Islands and is commonly found between April and May in diverse habitat types.

TENEBRIONIDAE INCORRECTLY RECORDED FOR THE MALTESE FAUNA

Clamoris crenatus (Mulsant, 1854)

Notes. MIFSUD & SCUPOLA (1998) provided valid arguments that previous records of this species should refer to *Phtora crenata* Germar, 1836. In fact, even the relatively recent record of *Cataphronetis crenata* (Germar) from Malta by GRIMM (1986) is to refer to *Phtora crenata*. However, despite all this, the species was erroneously reported again as occurring in Malta in the recent catalogue of Palaearctic Coleoptera (LÖBL & SMETANA, 2008).

***Stenosis elongata* (Solier, 1838)**

Notes. This species was already excluded from the tenebrionid fauna of Malta by MIFSUD & SCUPOLA (1998).

***Stenosis sardoa* (Küster, 1848)**

Notes. We are excluding the occurrence of this species in Malta since it was never identified neither in historical, nor in recently collected material of *Stenosis* sp. (over 550 specimens). Furthermore, it was not included from Malta in the recently published Catalogue of Palaearctic Coleoptera (LÖBL & SMETANA, 2008).

DISCUSSION

With the present contribution, the tenebrionid fauna of Malta is now composed of 61 species (Appendix I). Of these, *Zophobas opacus* represents an alien species whose establishment cannot yet be confirmed. All other alien species such as *Alphitobius diaperinus*, *A. laevigatus*, *Gnathocerus cornutus*, *Palorus subdepressus* and *Tribolium castaneum* (DENUX & ZAGATTI, 2010) are well established species in the Maltese Islands. Based on historical material, we could confirm the identity of *Myrmexixenus picinus*, *Sclerum multistriatum* and *Corticeus bicolor* for which material from Malta was not available to MIFSUD & SCUPOLA (1998). Of these however, only *Myrmexixenus picinus* was substantiated with recent material. In fact, it is worth highlighting that four species of Tenebrionidae (*Dichillus pertusus*, *Sclerum multistriatum*, *Corticeus bicolor* and *C. unicolor*) recorded by CAMERON & CARUANA GATTO (1907), whose determinations were verified either by us and/or by MIFSUD & SCUPOLA (1998), were never again collected from Malta. We believe that this may well reflect a true decline in diversity of the fauna as a whole as there has been extensive anthropogenic influence on the Maltese environment in the last 40 years with wholesale habitat destruction, burning of vegetation, exploitation of natural land for agriculture, pesticide usage, a high population density and the negative effects of the tourist industry. These factors have had a negative impact on the flora and fauna of these islands.

Apart from *Opatrum melitense*, only two tenebrionid species recorded from Malta require validation and include *Sepidium tricuspidatum tomentosum* and *Gunarus parvulus*. The former was recorded from Malta on the bases of 5 specimens housed in the Natural History Museum of Berlin (KWIETON, 1980). This is a relatively large beetle and the fact that neither CAMERON & CARUANA GATTO (1907), nor any of the recent workers who studied the Tenebrionidae of Malta have ever collected this species from Malta may presumably indicate that the locality datum of these specimens may be incorrect. *Gunarus parvulus* was recorded on the basis of a single specimen by GRIMM (1986), however, this specimen seems to be lost and could not be re-evaluated. However, pending further evidence to the contrary, the occurrence of these two species in Malta is not currently being excluded.

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Appendix I - Check-list of Maltese Tenebrionidae listed systematically according to LÖBL & SMETANA (2008).

Family TENEBRIONIDAE Latreille, 1802

Subfamily LAGRIINAE Latreille, 1825

- Centorus elongatus ecalcaratus* (Seidlitz, 1896)
Cossyphus moniliferus moniliferus Chevrolat, 1833

Subfamily PIMELIINAE Latreille, 1802

- Akis subterranea* Solier, 1837
Alphasida grossa melitana (Reitter, 1894)
Cnemeplatia atropos A. Costa, 1847
Leptoderis collaris (Linnaeus, 1767)
Erodium siculus melitensis Reitter, 1914
Pimelia rugulosa melitana Reitter, 1915
Trachyderma lima (L. Petagna, 1819)
Sepidium tricuspdatum tomentosum Erichson, 1841
Dichillus pertusus (Kiesenwetter, 1861)
Stenosis freyi Koch, 1940
Stenosis melitana Reitter, 1894
Stenosis schembrii Canzoneri, 1979
Tentyria grossa grossa Besser, 1832
Tentyria laevigata leachii Baudi di Selve, 1875

Subfamily TENEBRIONINAE Latreille, 1825

- Alphitobius diaperinus* (Panzer, 1796)
Alphitobius laevigatus (Fabricius, 1781)
Blaps gigas (Linnaeus, 1767)
Blaps mucronata Latreille, 1804
Eledona agricola (Herbst, 1783)
Nalassus aemulus aemulus (Küster, 1850)
Odocnemis sp.
Xanthomus pallidus (Curtis, 1830)
Catomus rotundicollis (Guérin-Méneville, 1825)
Gunarus parvulus (Lucas, 1846)
Helops rossii Germar, 1817
Cheirodes brevicollis Wollaston, 1864
Ammobius rufus (Lucas, 1846)
Clitobius ovatus ovatus (Erichson, 1843)
Gonocephalum rusticum (A.G. Olivier, 1811)
Gonocephalum setulosum setulosum (Faldermann, 1837)
Opatroides punctulatus punctulatus Brullé, 1832
Opatrum emarginatum Lucas, 1846
Opatrum melitense Küster 1849
Sclerum multistriatum (Forskål, 1775)
Palorus subdepressus (Wollaston, 1864)
Dendarus lugens (Mulsant & Rey, 1854)
Heliopathes avarus dwejrensis Scupola & Mifsud, 2001

Allophylax picipes melitensis (Baudi di Selve, 1876)
Scaurus aegyptiacus Solier, 1838
Scaurus striatus Fabricius, 1792
Scaurus tristis A.G. Olivier, 1795
Tenebrio molitor Linnaeus, 1758
Tenebrio obscurus Fabricius, 1792
Zophobas opacus (Sahlberg, 1823)¹
Lyphia tetraphylla (Fairmaire, 1856)
Tribolium castaneum (Herbst, 1797)

Subfamily DIAPERINAE Latreille, 1802

Crypticus gibbulus (Quensel, 1806)
Pseudoseriscius cameroni (Reitter, 1902)
Gnatocerus cornutus (Fabricius, 1798)
Pentaphyllus testaceus (Hellwig, 1792)
Corticeus bicolor (A.G. Olivier, 1790)
Corticeus unicolor Piller & Mitterpacher, 1783
Myrmechixenus picinus (Aubé, 1850)
Phaleria acuminata acuminata Küster, 1852
Phaleria bimaculata bimaculata (Linnaeus, 1767)
Phtora crenata Germar, 1836
Trachyscelis aphodioides Latreille, 1809

Subfamily ALLECULINAE Laporte, 1840

Isomira melanophthalma (Lucas, 1846)
Omophilus melitensis Baudi di Selve, 1877

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¹ Pan-American species which is being reared and sold alive from pet shops as fish food. Its establishment in the wild cannot be confirmed.