

REVIEW OF THE SPECIES GROUPS  
OF THE GENUS *CTENOCERATODA* VARGA, 1992  
WITH DESCRIPTION OF FOUR NEW SPECIES AND  
A NEW SUBSPECIES (LEPIDOPTERA, NOCTUIDAE)

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The taxonomic position of the genus *Ctenoceratoda* Varga, 1992 is discussed; the different species groups of it are reconsidered, their diagnoses and the revised taxonomic content of all species groups is given. Four new species and one new subspecies are described; their external morphology and genital structures are illustrated.

Key words: *Ctenoceratoda*, species groups, new species and subspecies, genital characters, allopatry.

## INTRODUCTION

The subtribe *Poliina* of the tribe *Hadenini* (subfamily *Noctuinae* sec. LAFONTAINE & SCHMIDT 2010) was originally defined as „*Polia* complex” by McCABE (1980) based on the genital characters of both sexes. Subsequently, this clade was first re-defined and separated from the closely related *Mamestrina* by BECK (1996), later by HACKER *et al.* (2002) and FIBIGER and HACKER (2005). The subtribe consists of, according to the re-description and interpretation provided in the latter work, the genera *Polia* Ochsenheimer, 1816 (incl. as synonyms: *Chera* Hübner, [1821]; *Polia* Boisduval, 1829, *Aplecta* Guenée, 1838, *Anartodes* Culot, 1915, *Bompolia* Beck, 1999, *Ripolia* Beck, 1999, *Antipolia* Beck, 1999), *Pachetra* Guenée, 1841, *Kollariana* Hacker, 1996, *Haderonia* Staudinger, 1896 (= *Lasiridia* Draudt, 1950), *Ctenoceratoda* Varga, 1992 and *Tricheurois* Hampson, 1905. From these genera, *Kollariana* should be excluded from the subtribe as it belongs to *Mamestrina*, being closely related to the *Sideridis* Hübner, 1821 generic complex (see VARGA *et al.* 2017).

The members of this subtribe have generally identical „ground plan” of genital structures including some lock-and-key mechanisms (e.g. VARGA 1992, VARGA & RONKAY 2013) with several shared apomorphies as the identical

structure of ampulla-harpe complex, the regularly asymmetrical saccular processes covered by specialised brushes, the long and tubular vesica (endophallus) without subbasal diverticulum and cornutus but with a long medio-subterminal field of fasciculate cornuti (males), the globular corpus bursae and in most cases the long, tubular appendix bursae (females). Paired abdominal brush-organs of males are usually present though may be reduced in certain lineages and the last abdominal segment of females regularly shows specific, often shield-shaped sclerotised structures.

The genus *Ctenoceratoda* Varga, 1992 was separated from *Haderonia* Staudinger, 1896 (type species: *Haderonia subarschanica* Staudinger, 1895 by monotypy) based on significant differences in genitalia of both sexes, different external look and very long, in male typically strongly bipectinate antennae (see the *derivatio nominis*). The very sophisticated lock-and-key apparatus of the vesica and the corpus/appendix bursae complex occurring in all species, in combination with certain simplifications of the completely symmetrical genital capsule were considered as main generic traits, which allow a clear differentiation both from the closest related genera, *Haderonia* and *Polia*.

Based on these characters, eleven *Haderonia* species (sensu BOURSIN 1964) were transferred to the newly erected genus (VARGA 1992) and additional four new species have been described. Some years later, VARGA and GYULAI (1999) defined ten basic characters of the genus, partly shared with *Polia* and *Haderonia* as tentative synapomorphies, and considered these genera as forming a larger monophyletic unit together with *Ctenoceratoda*. The species content of the genus has been remarkably increased in this work with the descriptions of seven new species.

Present paper is aimed to distinguish and characterise the major lineages of *Ctenoceratoda*, designate the lectotypes of taxonomically problematic species in order to define their taxonomic identity and to describe further five new taxa from Central Asia and the western Himalayas as well.

## TAXONOMIC REVIEW

The re-definition of the species groups of *Ctenoceratoda* is given below without any subgeneric subdivision, including also the recently described species, since all species have preserved the generic characters with only minor variations. We provide here a short diagnosis of each species group. Therefore, this phenetic grouping cannot be interpreted as a phylogenetic subdivision but as a pre-conception for the further, monographic treatment. For practical reasons we start this survey with the species group including the type-species of genus.

### The *sukharevae*-group

Diagnosis – Relatively large moths with robust body, very long, in male strongly (*sukharevae*, *oxyptera*, *juliannae*) or shortly (*longicornis*, *lukhtanovi*, *stenocera*) bipectinate antennae and elongate triangular forewings with colourful appearance. The noctuid forewing pattern is complete and regular, in some species sharply expressed (*sukharevae*, *oxyptera*, *juliannae*), in others rather faint (*lukhtanovi*, *stenocera*). Male brush organ reduced.

Male genitalia – uncus mostly short and acute triangular (exceptionally obtuse in *lukhtanovi*); valvae with normally developed rounded cucullus and corona without incision, short and broad ampulla (exception: *oxyptera*). Sacular processes symmetrical, short and obtuse. Species of this group can be mostly differentiated by the length of pectination of male antennae, by the shape and length of uncus and ampulla but also by the length of the field of fasciculate cornuti on the distal part of the tubular vesica.

### Checklist

- Ctenoceratoda longicornis* (Graeser, 1892, *Mamestra*), *Berliner Entomologische Zeitschrift* **37**: 306. Type-locality: [Kirghisia] Kysyl-Yart; [China, Xinjiang] Kashgar;
- Ctenoceratoda sukharevae* (Varga, 1974, *Haderonia*), *Annales historico-naturales Musei nationalis hungarici* **66**: 301, pl. 7, fig. 7. Type-locality: Mongolia, Bayankhongor aimak, Zhinst Mts;
- Haderonia sukharevae excellens* (Varga, 1974, *Haderonia*), *Annales historico-naturales Musei nationalis hungarici* **66**: 302, pl. 1, figs 7–8. Type-locality: Mongolia, Khövsgöl aimak, Delger Mörön River;
- Ctenoceratoda oxyptera* Varga, 1992, *Acta Zoologica Academiae Scientiarum Hungaricae* **38** (1–2): 99, pl. 3, figs 17–18, gen. figs 37–43. Type-locality: Mongolia, Govi Altai aimak, Govi Altai Mts;
- Ctenoceratoda juliannae* Varga, 1992, *Acta Zoologica Academiae Scientiarum Hungaricae* **38** (1–2): 99, pl. 3, fig. 19, gen. figs 33–36. Type-locality: Mongolia, Khovd aimak, Dzhungar Govi, Bulgan sum;
- Ctenoceratoda lukhtanovi* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* **45**(2): 172, figs 1–2, 23, 41, 50–52, 82. Type-locality: Tadjikistan, Pamir Mts, Muzkol Mts, Ak-Baital Pass;
- Ctenoceratoda stenocera* Varga et Gyulai, 2002, *Esperiana* **9**: 230, pl. 20, fig. 16. Type-locality: China, Kunlun Mts, 60 km NW of Xaidullah village.

Bionomics and distribution – A mostly Inner Asiatic species group, typical for extreme cold-continental semi-desert or rupicolous habitats in medium or high altitudes.

### The *khorgossi*-group

Diagnosis – This species-group is most similar in its external and genital characters to the *sukharevae*-group. They are medium-sized moths with robust body, very long and strongly bipectinated male antennae and relatively narrow triangular, apically acute forewings with brownish-bluish-ochreous or silvery grey variegated colouration. Orbicular and reniform stigmata conspicuous, reniform stigma often with acute “pipe-shaped” extension in basal direction, orbicular stigma narrow and oblique. Male brush organ reduced.

In the male genitalia, the uncus is relatively short, triangular, pointed apically, the cucullus is rounded triangular or slightly inflated with narrow neck and regular corona; the ampulla is mostly elongate, acute or obtuse. In male vesica the stripe of fasciculate cornuti and in females the sausage-shaped appendix bursae are relatively short.

### Checklist

*Ctenoceratoda khorgossi* (Alphéraky, 1882, *Mamestra*), *Horae Societatis Entomologicae Rossicae* 17: 65, pl. 2, fig. 49. Type-locality: [China, Xinjiang] Kuldja district; Khorgoss;

*Ctenoceratoda argyrea* Varga, 1992, *Acta Zoologica Academiae Scientiarum Hungaricae* 38(1-2): 98, pl. 2, figs 9–10, gen. figs 5–10, 16–17. Type-locality: Mongolia, Govi Altai aimak, Govi Altai Mts;

*Ctenoceratoda persephone* **sp. n.**

*Ctenoceratoda scotosparsa* **sp. n.**

Bionomics and distribution – One species of the group is widely distributed in Central Asia, the range of three others seems to be confined to western Mongolia with some phenological and vertical differentiation.

### The *tancrei*-group

Diagnosis – Medium-sized or large moths with robust body, very long and strongly bipectinated male antennae and elongated-triangular forewings. Colouration of forewings mostly greyish-ochreous-brownish, rarely rufous with regular but often faint maculation. Reniform stigma often shows an acute whitish stripe basally. Male brush organ regularly present.

In the male genitalia, the uncus is relatively long, the cucullus is rounded triangular, often slightly inflated or with small incision; the ampulla is elongate, more or less curved. Vesica tubular, extremely long with long stripe of fasciculate cornuti.

The species of this group can be recognised externally by the greyish or rufous-brownish colouration, the presence or absence of whitish marking at

the basal part of the reniform stigma. The group features of the male genitalia are the characteristic shape of the “head” of cucullus, and configuration of the ampulla and the length of the fascia of cornuti in the vesica.

### Checklist

- Ctenoceratoda tancrei* (Graeser, 1892, *Mamestra*), *Berliner Entomologische Zeitschrift* **37**: 305.  
Type-locality: [Kirghisia] Alexander Mts;
- Ctenoceratoda graeseri* (Püngeler, 1898, *Haderonia, tancrei* var.), *Societas Entomologica* **13**: 58.  
Type-locality: [Kazakhstan or China] Ili region;
- Ctenoceratoda thermolimna* (Boursin, 1964, *Haderonia*), *Zeitschrift der Wiener Entomologischen Gesellschaft* **49**: 174, pl. 22, figs 1, 4. Type-locality: Kirghisia, Issyk-Kul;
- Ctenoceratoda anthracina* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* **45** (2): 180, figs 12–13. Type-locality: Kirghisia, Naryn region, Maly Naryn;
- Ctenoceratoda naryna* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* **45** (2): 189, figs 15–16, 33, 47, 66–67, 87. Type-locality: Kirghisia, Naryn region, Maly Naryn;
- Ctenoceratoda transalaica* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* **45** (2): 189, figs 17, 34, 48, 68–69, 88. Type-locality: Kirghisia, Transalai, Aram-Kungei.
- Ctenoceratoda cyanochrea* **sp. n.**

Bionomics and distribution – Almost all species are confined to the Tien-Shan mountain system where they are mostly typical for the semi-desert like habitats of low or moderate altitudes (contrasting to the next group!). Two species are relatively widely distributed in Central Asia (*tancrei*, *graeseri*), the other species seem to be rather localised and infrequent.

### The *turpis*-group

Diagnosis – Large or medium-sized moths with not extremely long and moderately or strongly bipectinated male antennae, moderately elongate, apically acute forewings. Colouration simple, nearly concolorous grey or brownish, markings regular, often faint. Male brush organ present.

In the male genitalia, uncus long and narrow; cucullus rounded triangular with moderately elongate “neck”; ampulla elongate, often slightly falcate. Since the genital capsule of the different members of the group is very similar, the pectination of antennae appears as important specific character.

### Checklist

- Ctenoceratoda turpis* (Staudinger, 1900, *Phoebophilus*), *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **12**: 341, pl. 7, fig. 8. Type-locality: [China, Xinjiang] Korla;

- Ctenoceratoda brassicina* (Draudt, 1934, *Scotogramma*), in A. Seitz, *Die Gross-Schmetterlinge der Erde* 3: 98, pl. 14, row c. Type-locality: [Russia or Kazakhstan] "Altai occ.";
- Ctenoceratoda gandhara* (Hacker et Varga, 1990, *Haderonia*), *Esperiana* 1: 340, pl. E, fig. 16. Type-locality: Pakistan, Karakoram Mts, Kunjerab pass;
- Ctenoceratoda weigerti* (Hacker et Varga, 1990, *Haderonia*), *Esperiana* 1: 340, pl. E, fig. 17. Type-locality: Pakistan, Karakoram Mts, Kunjerab pass;
- Ctenoceratoda peregovitsi* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* 45(2): 174, figs 4–5, 25–26. Type-locality: Mongolia, Ömnögovi aimak, Tost Mts;
- Ctenoceratoda psychrogena* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* 45(2): 175, figs 6–8, 27–29, 42–44, 58–62, 84. Type-locality: Tadjikistan, Pamir Mts, Vakhanskiy Mts;
- Ctenoceratoda aksakal* Varga et Gyulai, 1999, *Acta Zoologica Academiae Scientiarum Hungaricae* 45(2): 179, figs 11, 41, 57, 85. Type-locality: Tadjikistan, E Pamir Mts, Sarykolskiy Mts.

Bionomics and distribution – All species are confined to the high mountains of Central and Inner Asia, they regularly occur in high altitudes.

### The *lupa*-group

Diagnosis – Large moths with robust body, very long and strongly bipectinated male antennae, elongate and apically acute but relatively broad forewings. Patterns of fore wing are regular, contrasting, reniform and claviform stigmata and the subterminal line are strongly expressed, basal part of reniform stigma usually defined with blackish-brown scales. Abdominal brush organ well-developed.

Female abdomen bears characteristic "lanuginose" terminal tuft, analogous with some Lymantriinae spp., possibly having role in the defence of eggs (see the etymology of the new species).

In the male genitalia, the uncus is short, acute triangular; the valvae have slightly elongate saccular process and very long „neck“ of the relatively small, rounded cucullus. Ampulla relatively long with some specific variations, acute or obtuse; aedeagus and vesica very long, with long and relatively narrow field of fasciculate cornuti. In female genitalia the appendix bursae is extremely elongate, slightly saccate terminally.

### Checklist

- Ctenoceratoda lupa* (Christoph, 1893, *Mamestra*), *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* 6: 91. Type-locality: [Iran] Hyrcania, Shahkuh;
- Ctenoceratoda contempta* (Püngeler, 1914, *Hadula*), *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* 28: 39, pl. 2, fig. 14. Type-locality: [China, Xinjiang] "Ost-Turkestan, Aksu";
- Ctenoceratoda septemlacustris* Gaal-Haszler, Lödl, Ronkay, Ronkay et Varga, 2012, *Fibigeriana* 1: 125, pl. 112, figs 19–20, gen. figs 12–13. Type-locality: Afghanistan, Koh-i-Baba Mts, Band-i-Amir;

*Ctenoceratoda mallopyga* **sp. n.**

*Ctenoceratoda mallopyga dyschroa* **ssp. n.**

Bionomics and distribution – Rather widely distributed species group, with its range extending from North Iran to the south-western part of the Himalayas. The moths inhabit a variety of habitat types in medium and high altitudes.

### The *nefasta*-group

Diagnosis – A relatively poorly known species group since we have almost exclusively old, “classic” material from two (*nefasta* and *optima*) of the three species. Externally, the members of this lineage resemble the species of the *sukharevae*-group, but the structure of the male genitalia displays the closer relationship with the *tancrei*-group.

Medium-sized (*nefasta* and *optima*) or large (*leucostigma*) moths with robust body, long and strongly bipectinated male antennae, relatively broad forewings with ochreous-greyish ground colour and regular maculation.

In the male genitalia, the uncus is relatively short and acute, the ampulla is long and slightly falcate with acute or obtuse tip, the “neck” of cucullus is relatively long and the “head” is rounded, relatively small, without incision.

### Checklist

*Ctenoceratoda nefasta* (Püngeler, 1907, *Hadula*), *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **19**: 221, pl. 8, fig. 2. Type-locality: [China, Xinjiang] Lob-Noor;

*Ctenoceratoda optima* (Alphéraky, 1897, *Haderonia*), in Romanoff, *Mémoires sur les Lépidoptères* **9**: 236, pl. 12, fig. 7. Type-locality: [China] “Oulan-boulak, Nan-chan”;

*Ctenoceratoda leucostigma* Gyulai et Varga, 2010, *Folia entomologica hungarica* **70**: 182, figs 1-3, gen. figs 9–13. Type-locality: China, Qinghai [Kuku-Noor region], 20 km N of Da Qaidam city.

Bionomics and distribution – All species are confined to some extremely cold-continental parts of Inner Asia.

### The *zetina*-group

Diagnosis – Large, robust moths, slightly resembling certain large *Apamea* species, with long and only shortly pectinate male antennae and elongate-triangular forewings with regular but often faint maculation and crenulate crosslines. Abdominal brush organ well-developed, having “pockets”.

Male genitalia with strong, acute uncus, relatively short, falcate ampulla and inflated cucullus with deep incision above the terminal seta. Vesica is large, broad with long and broad stripe of fasciculate cornuti.

## Checklist

*Ctenoceratoda zetina zetina* (Staudinger, 1900, *Hadena* "zeta var."), *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **12**: 342. Type-locality: [China or Kirghisia, Tien Shan region] "Thian or";

*Ctenoceratoda zetina rhodoptera* Varga, 1992, *Acta Zoologica Academiae Scientiarum Hungaricae* **38** (1–2): 100, pl. 1, fig. 7. Type-locality: Afghanistan central, Band-i-Amir;

*Ctenoceratoda gyulaii* Volynkin, 2012, *Proceedings of the Tigirek State Natural Reserve* **5**: 205, pl. 3, figs 5–6; pl. 15, figs 18–23; pl. 28, figs 3–4; pl. 33, fig. 3. Type-locality: Russia, Altai Republic, Kosh-Agach district.

Bionomics and distribution – *Ctenoceratoda zetina* is one of the most widely distributed species of the genus, known from the nearly entire Tien-Shan system, the Pamirs, the Karakoram and the western Himalayas. Its sister species occurs in the Russian and the Mongolian parts of the Altai Mts. The possible overlap and/or hybridisation between them are unknown.

## LECTOTYPE DESIGNATIONS

### *Ctenoceratoda graeseri* (Püngeler, 1898) (Fig. 16)

*Haderonia tancrei* var. *graeseri* Püngeler, 1898, *Societas Entomologica* **13**: 58. Type-locality: [Kazakhstan or China] Ili region. Lectotype: male, here designated, in coll. MNHU.

Lectotype designation. Lectotype: male, "Ili 1897 M Juli". The lectotype was dissected by Boursin (slide MB, without number). Paralectotype: female, with the same locality and date.

### *Ctenoceratoda lupa* (Christoph, 1893) (Figs 21, 55, 56)

*Mamestra lupa* Christoph, 1893, *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **6**: 91. Type-locality: [Iran] Hyrcania, Shahkuh. Lectotype: male, here designated; in coll. BMNH.

Lectotype designation. Lectotype: male, "Schahkuh", "Coll. Christoph [580]", "Ex Coll. H.J. Elwes, 1920." "Joicey Bequest. Brit. Mus. 1934-120.", "(NHMUK010354058)"; slide No. RL11751m (coll. BMNH).

### *Ctenoceratoda contempta* (Püngeler, 1914) (Figs 20, 51, 52)

*Hadula* (*Mamestra*) *contempta* Püngeler, 1914, *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **28**: 39, pl. 2, fig. 14. Type-locality: [China, Xinjiang] "Ost-Turkestan, Aksu". Lectotype: male, here designated; in coll. MNHU.



Lectotype designation. Lectotype: male, "O-Turkestan, Aksu", "910 R[ue]ckb[eil]". The specimen was dissected by Boursin (slide No. MB 810), in coll. MNHU.

## DESCRIPTION OF THE NEW SPECIES

### *Ctenoceratoda persephone* sp. n.

(Figs 1–4, 25, 33, 34, 39)

Holotype: male, Mongolia, Khovd aimak, 60 km E of Altay somon centre, 1600 m, 45°48'N, 92°50'N, 19.V.1990. leg. Gy. Fábián, M. Hreblay, L. Peregovits & G. Ronkay (coll. HNHM).

Paratypes. Mongolia. 14 males, 5 females, from the same locality and date (coll. Gy. Fábián, P. Gyulai, G. Ronkay & HNHM); 7 males, Ömnögovi aimak, Mts Noyon, 22 km SE of Gurvantös, 1800 m, N43°14', E101°47', 13.V.1990, leg. Gy. Fábián, M. Hreblay, L. Peregovits & G. Ronkay (coll. Gy. Fábián, G. Ronkay & HNHM); 3 males, Govi Altay aimak, Mts Adz Bogd, valley of Ih-gol, 2100 m, N44°45', E95°00', 17.V.1990, leg. Gy. Fábián, M. Hreblay, L. Peregovits & G. Ronkay (coll. G. Ronkay, Z. Varga & HNHM); 1 female, Govi Altai aimak, 1880 m, 7.VI.2004, leg. Saldaitis (coll. P. Gyulai); 3 males, Govi Altay aimak, N slopes of Adz Bogd Mts, 1880 m, 8.VI.2004, leg. Saldaitis (coll. P. Gyulai); 1 male, 1 female, Govi Altai, 20 km NWW of Bidzh village, Hundlengijn-Shin place, 1650 m, 5.VI.2011, leg. R. Yakovlev (coll. NHM Wien); 1 male, 1 female, Mongolian Altai Mts, S slope Mongoljn-Gol valley, 1800 m, 31.V.2011, leg. R. Yakovlev (coll. NHM Wien), 1 male, Govi Altay Aimak, S. of Mongolian Altay, Mogoin gol river, 1920 m, 8–9.VII.2004, leg. Saldaitis (coll. P. Gyulai).

Slide Nos: VZ5931m, VZ5932m, VZ9489m, VZ9502m (males), VZ9510f (female).

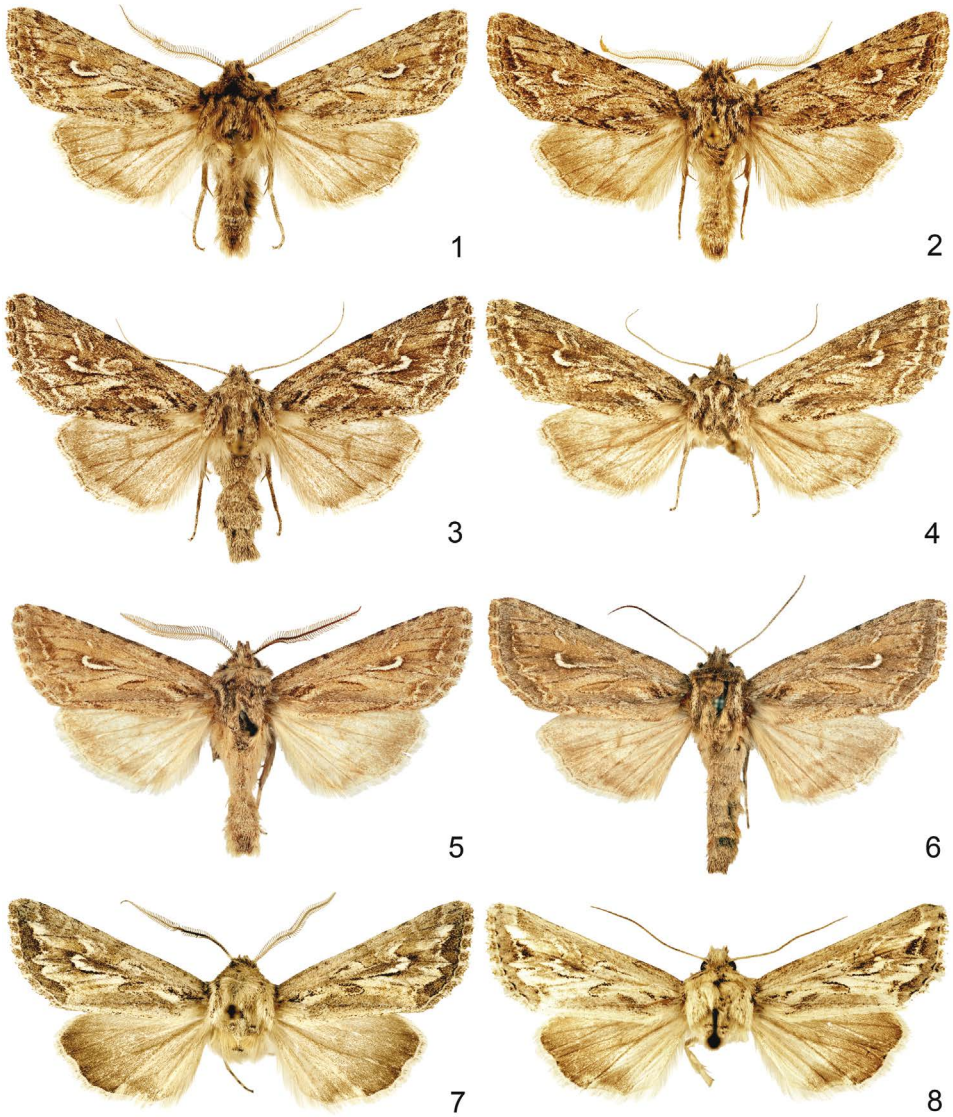
Diagnosis – *Ctenoceratoda persephone* is on average the largest species of the *khorgossi*-group (with its wingspan 38–42 mm) and is externally also most similar to *C. khorgossi* (Figs 5–6) but the whole appearance is more robust, the colouration is grey, in fresh specimens often with some light bluish hue but never ochreous-brown as in *C. khorgossi*. The dark markings are blackish graphite-grey; the lighter parts of the wing are whitish-grey. Reniform stigma slightly curved, with a pipe-shaped acute whitish stripe at lower extremity; claviform stigma very short, with whitish-grey "wish" terminally. Brush organ of the male reduced.

The most important specific differences in the male genitalia of *C. persephone* (Figs 33, 34) are as follows: ampulla elongate and slightly falcate, not acute and plate-shaped as in *C. khorgossi* (Figs 35, 36); head of cucullus relatively large and not inflated terminally as in *C. argyrea* (Figs 37, 38).

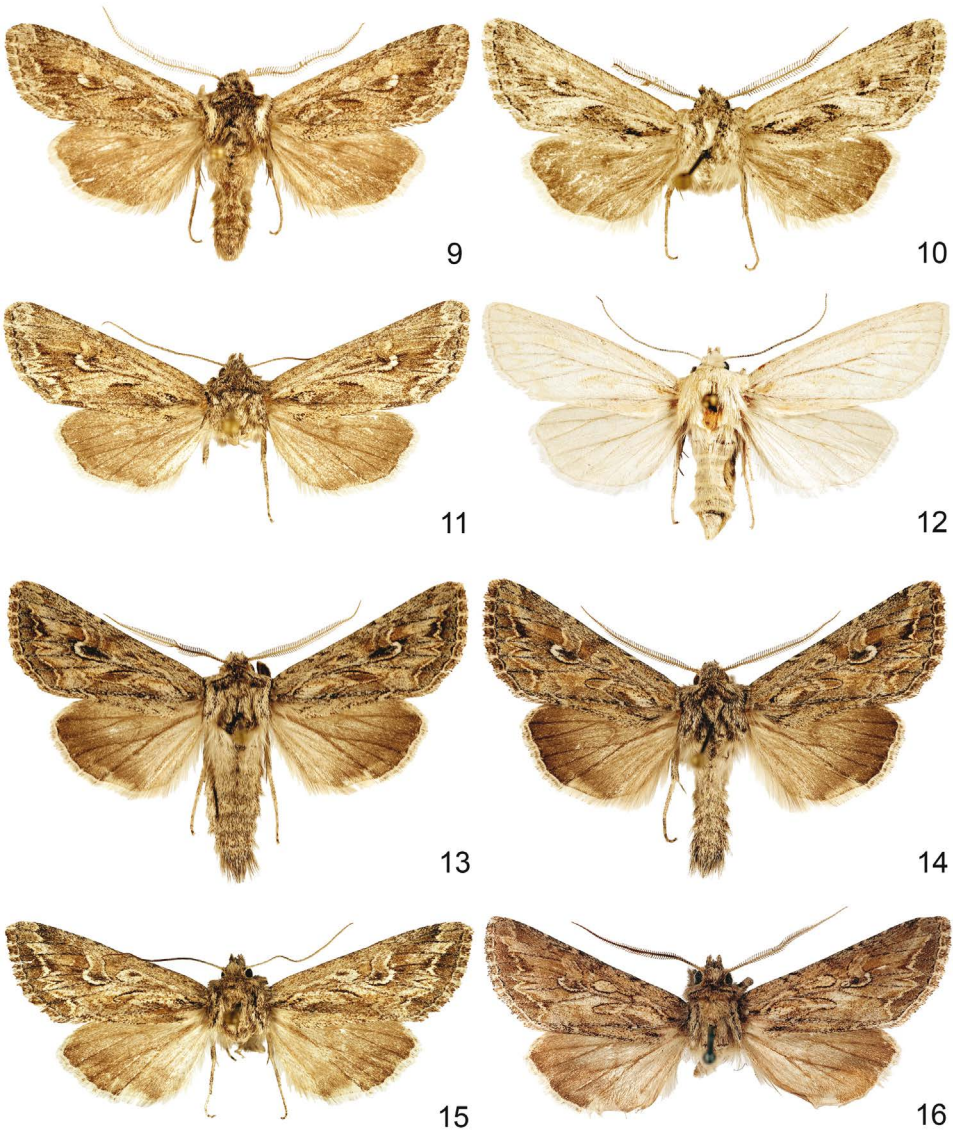
In the female genitalia, the appendix bursae is larger and longer than in the related species (Figs 39–42).

Bionomics and distribution – Mostly unknown. The type-series was collected at medium-high altitude of the Mongolian Altai (Mongol and Govi Altai) Mts. The species has an early appearance in the year, the flight period is the late spring, in most parts of Mongolia it is in May–early June.

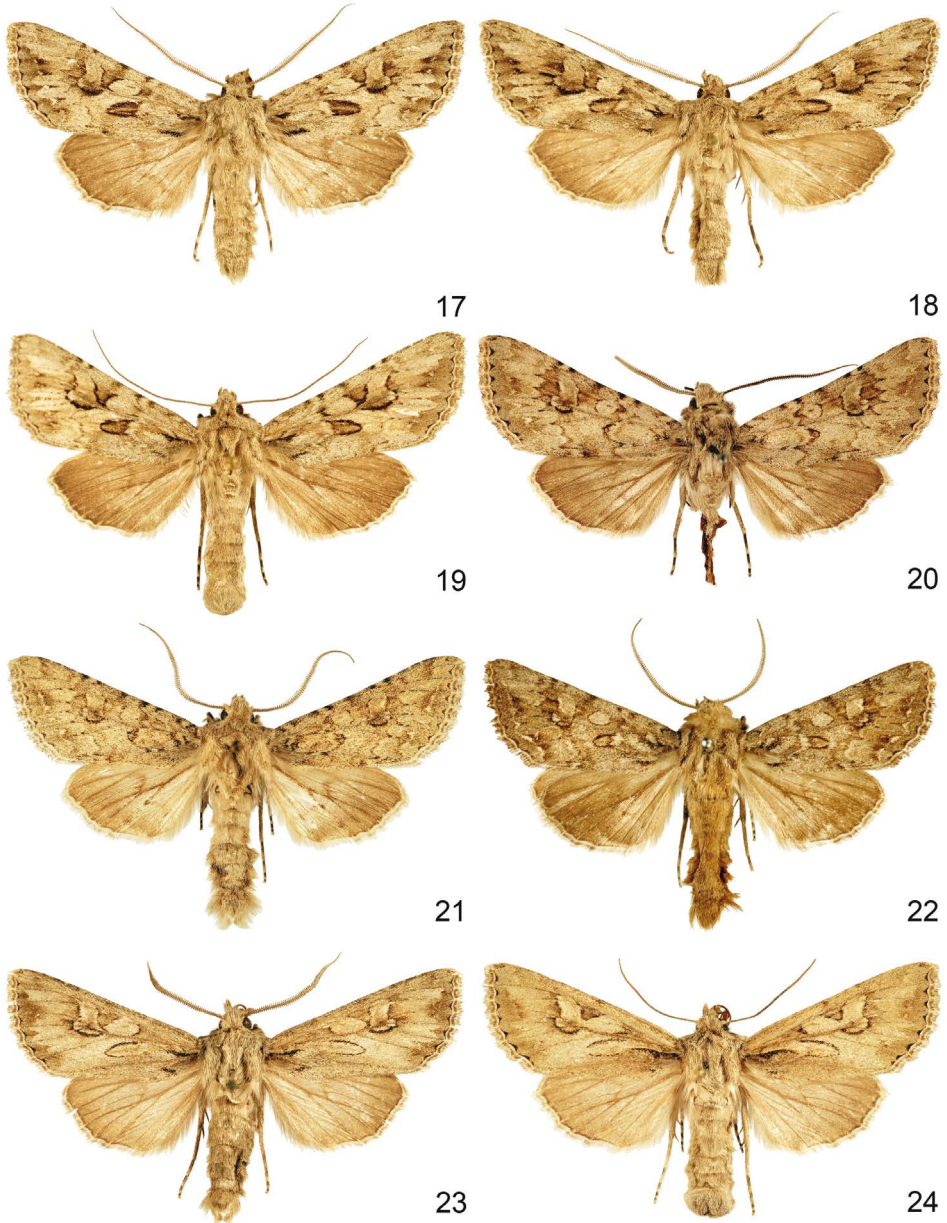
Etymology. Persephone is a spirit of the spring in Greek mythology.



**Figs 1–8.** *Ctenoceratoda* spp. 1–4 = *C. persephone* sp. n., Mongolia: 1 = paratype, male, Khovd aimak, 2 = holotype, male, Govi Altay aimak, 3 = paratype female, Khovd aimak, 4 = paratype, female, Khovd aimak; 5–6 = *C. khorgossi* (Alphéraky, 1882), Kirghisia, Issyk-Kul: 5 = male, 6 = female; 7–8 = *C. argyrea* (Varga, 1992), Mongolia, Govi Altay aimak: 7 = holotype, male, 8 = paratype female



**Figs 9–16.** *Ctenoceratoda* spp. 9–12 = *C. scotosparsa*, sp. n., Mongolia, Govi Altay aimak: 9–10 = paratype, male, 11–12 = paratype, female; 13–15 = *C. cyanochrea* sp. n., Mongolia, Khovd aimak: 13 = holotype, male, 14 = paratype, male, 15 = paratype, female; 16 = *C. graeseri* (Püngeler, 1898), lectotype, male, "Asia centr. Ili geb."



**Figs 17–24.** *Ctenoceratoda* spp. 17–19 = *Ctenoceratoda mallopyga mallopyga* sp. n., 17–18 = paratype, male, Pakistan, 19 = paratype, female, Pakistan, Hindukush Mts; 20 = *C. contempta* (Püngeler, 1914), lectotypel male, [China, Xinjiang] “Ost-Turkestan, Aksu”; 21 = *C. septemlacustris* Gaal-Haszler, Lödl, Ronkay, Ronkay & Varga, 2012, holotype, male, Afghanistan, Koh-i-Baba Mts; 22 = *C. lupa* (Christoph, 1893), lectotype, male, [Iran] Hyrcania, Shahkuh; 23–24 = *C. mallopyga dyschroa* sp. n., India, Himachal Pradesh: 23 = holotype, male, 24 = paratype, female

***Ctenoceratoda scotosparsa* sp. n.**  
(Figs 9–12, 27, 42–46)

Holotype: male, Mongolia, Govi Altai aimak, Mongolian Altay Mts, Sutay uul, 16 km SE of Dzuyul, 46°11'N, 94°01'E; 2070 m, 28.VI.2005, leg. T. Csővári (coll. P. Gyulai, Miskolc).

Paratypes. Mongolia. 17 males, 2 females, from the same locality as the holotype, 28.VI. and 4.VII.2005, leg. T. Csővári (coll. T. Csővári, P. Gyulai, G. Ronkay, Z. Varga and HNHM); 3 males, Govi Altai aimak, 45 km SE Biger, 1850 m, 5.VI.2004, leg. Saldaitis (coll. P. Gyulai), 2 males, Govi Altai aimak, N slope of Adz Bogd Mts, 1880 m, 8.VI.2004, leg. Saldaitis (coll. M. Dvořák, Smrcna, Czech Republic).

Slide Nos: GYP1739m; RL8644m, VZ7678m, VZ9491m, VZ9492m, VZ9521m (males), VZ9508f, VZ9509 (females).

Diagnosis – *Ctenoceratoda scotosparsa* is on average the smallest species of the *khorgossi*-group with its wingspan 33–38 mm. It is most closely related to *C. argyrea* (Figs 7–8) but is smaller in size and more narrow-winged, the light ochreous-grey ground colour of the forewing is irrorated with whitish and blackish-brown scales, and the entire wing is less shiny than in *C. argyrea*. The maculation is also different: reniform stigma finely blackish defined, with blackish-brown filling and an L-shaped whitish spot basally, without “pipe-shaped” elongate whitish stripe like in *C. argyrea* and *C. khorgossi*. The clavi-form stigma is unicolorous blackish-brown, being very different from those of all other species of the species-group (and the whole genus). The inner side of the subterminal line is followed by sharp black arrowheads. The hindwings are more unicolorous and darker than in all related species.

The male genitalia (Figs 43–46) are also proportionally smaller than in the related species, the “head” of the cucullus is not inflated than in *C. argyrea* and more rounded than in *C. cyanochrea* (Figs 47–48). The ampulla is relatively broad, slightly curved and rounded terminally; the fascia of cornuti in vesica is shorter than in the related species, as well as the appendix bursae in the female genitalia (Fig. 42).

Distribution and bionomics. Mostly unknown. The type-series was collected at medium-high altitude of the Mongolian Altai Mts; the flight period is the early summer.

***Ctenoceratoda cyanochrea* sp. n.**  
(Figs 13–15, 29, 47, 48, 59)

Holotype: male, Mongolia, Khovd aimak, Mongolian Altay Mts, 1430 m, Mönkh Khayrkhan uul, 41 km N of Bulgan; N46°28', E91°24'; 30.VI.2005, leg. T. Csővári (coll. G. Ronkay).

Paratypes. Mongolia. 4 males, with the same data (coll. T. Csővári, P. Gyulai, G. Ronkay & Z. Varga); 7 males, Khovd aimak, Dzhungarian Gobi, 81 km SW of Dzuyul, N45°45', E93°15', 29.VI.2005, leg. T. Csővári (coll. T. Csővári, G. Ronkay & HNHM); 4 specimens, Govi Altai aimak, Mongolian Altay Mts, Sutay uul, 16 km SE of Dzuyul, 46°11'N, 94°01'E;

2070 m, 28.VI.2005, leg. T. Csővári (coll. T. Csővári); 1 male, 1 female, Govi Altai aimak, Mogoin gol river, 1920 m, 15–18.VI.2004, leg. Saldaitis (coll. P. Gyulai & M. Dvořák); 3 males, Govi Altai Aimak, S. of Mongolian Altai, Mogoin gol river, 1920 m, 8–9.VII.2004, leg. Saldaitis (coll. P. Gyulai); 1 male, 1 female, Govi Altai aimak, Mongol Altai Mts, 16 km SE of Tonhil, N46°11,348, E94°00,955, 2032 m, 29.VII.2006, leg. leg. J. Babics, B. Benedek & A. Kun (colls P. Gyulai & G. Ronkay).

Slide Nos: RL8645m, VZ7439m, VZ9490m (males), VZ9507f (female).

**Diagnosis** – The new species resembles externally certain members of the *tancrei*-group but has more vivid bluish-grey colouration and complete pattern. It appears as on average much larger than the former species (wingspan 39–42 mm) and usually somewhat larger than the externally also similar *C. argyrea*, occurring with them sympatrically.

*Ctenoceratoda cyanochrea* can be distinguished from *C. argyrea* by its less curved reniform stigma having relatively shorter acute whitish spot basally; stronger defined, ochreous orbicular stigma (it is obsolescent in *C. argyrea*); longer, terminally acute claviform stigma; and the light ochreous, finely brownish defined (not whitish and diffuse) subterminal line.

The new species differs from the related *C. tancrei* and *C. graeseri* (Fig. 16) by its smaller size and the bluish shaded grey ground colour while the larger relatives usually have ochreous-brownish forewings without any bluish hue.

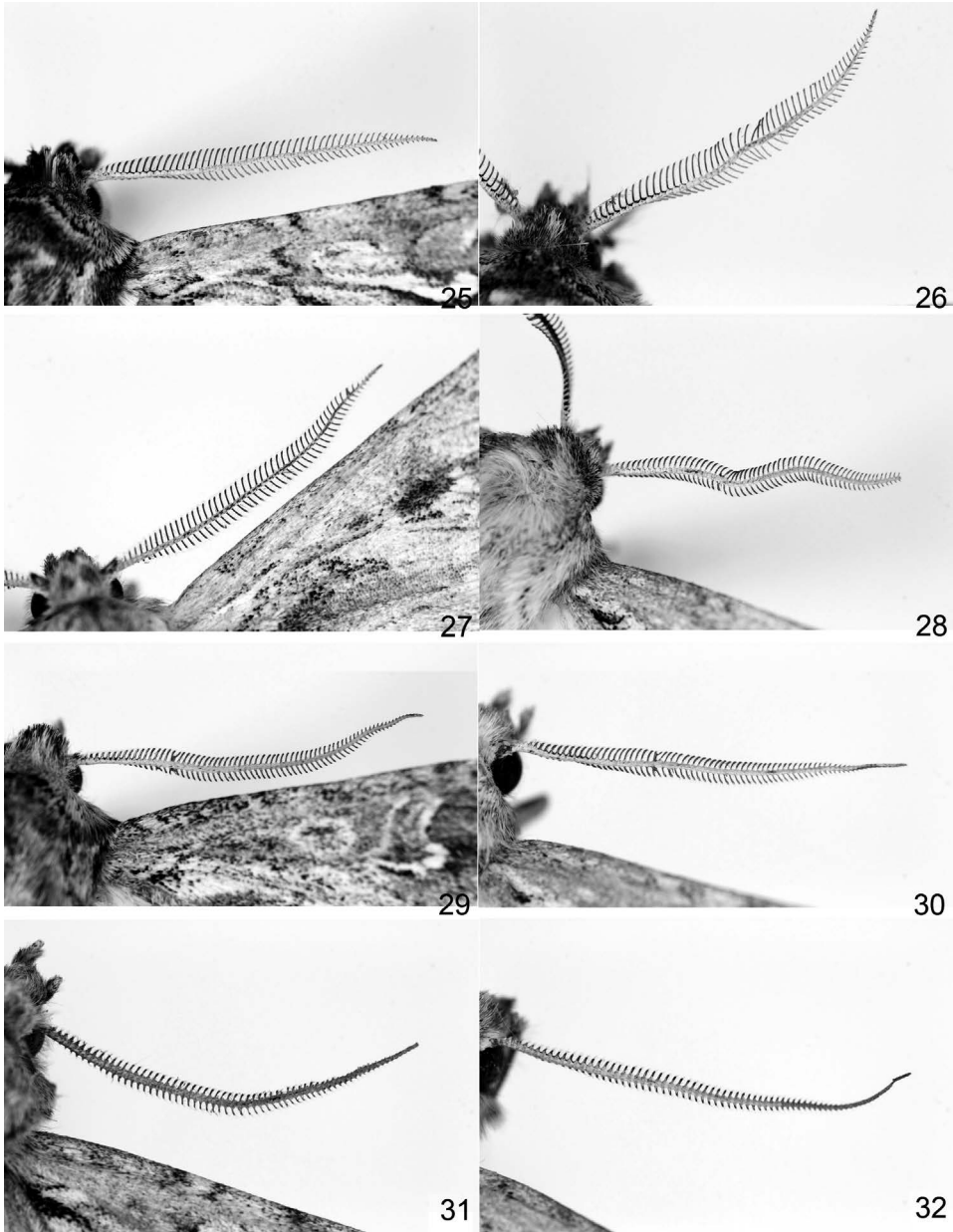
In male genitalia, the most conspicuous character is the relatively large, not inflated rounded triangular “head” of the cucullus (Figs 47, 48). Aedeagus and vesica is much larger than in the former species. Brush organ is well developed, opposed to the externally similar species of the *C. khorgossi*-group, e.g. *C. scotosparsa* and *C. argyrea*. Based on this character, this species cannot be mixed with either species of the *C. sukharevae*-group since latter never have any brush organ.

**Distribution and bionomics.** The type series of the new species was collected at lower altitudes of the Mongolian Altai Mts. Its flight period is the mid-summer.

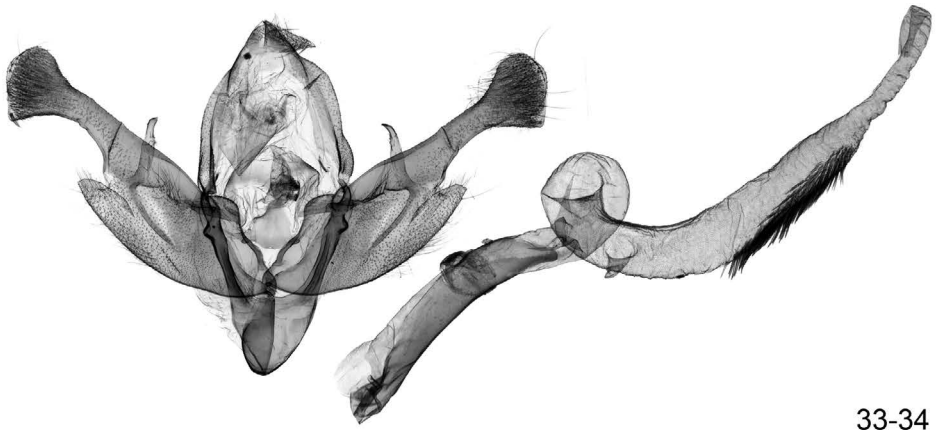
### ***Ctenoceratoda mallopyga* sp. n.** (Figs 17–20, 31, 49, 50, 60)

**Holotype:** male, Pakistan, Karakoram Mts, Naltar valley, 2800 m, 36°09'N, 74°12'E, 30.VI.2000, leg. Z. Varga et G. Ronkay (coll. Z. Varga, Debrecen).

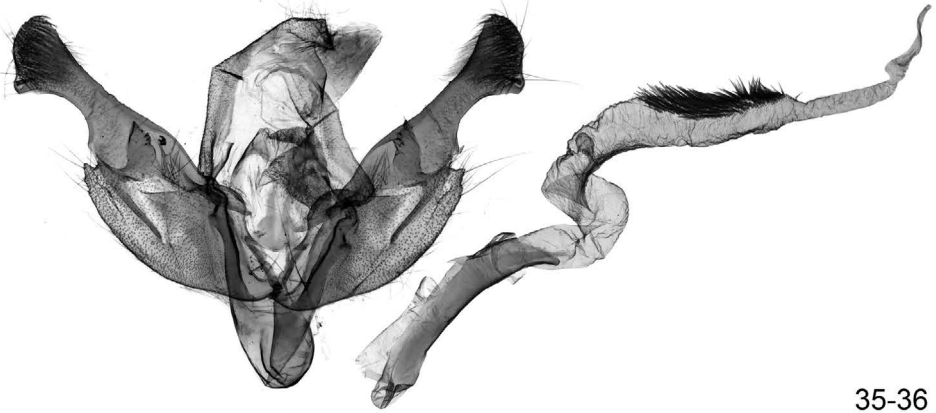
**Paratypes.** Pakistan. 8 males, 3 females, with the same data as the holotype; 1 female, from the same locality, 7.VII.2000, leg. Z. Varga & G. Ronkay; 1 female, from the same locality, 14.VIII.1998, leg. Z. Varga & G. Ronkay; 1 male, from the same locality, 15.VI.1998, leg. Gy. Fábrián & B. Herczig; 1 female, from the same locality, 14.VIII.1998, leg. Z. Varga & G. Ronkay; 5 males, 4 females, from the same locality, 18.VII.1998, leg. G. Csorba & L. Ronkay; 2 males, Karakoram Mts, Naltar valley, 2000 m, N36°09', E74°10', 16.VII.1994, leg. B. Herczig, Gy.M. László & G. Ronkay; 21 males, 27 females, Karakoram Mts, Hispar valley, Huru,



**Figs 25–32.** *Ctenoceratoda* spp. antennae. 25 = *C. persephone* sp. n., paratype, male, Mongolia, 26 = *C. khorghossi* (Alphéraky, 1882), male, Kazakhstan, 27 = *C. scotosparsa* sp. n., paratype, male, Mongolia, 28 = *C. argyrea* (Varga, 1992) holotype, male, Mongolia, 29 = *C. cyanochrea* sp. n., paratype, male, Mongolia, 30 = *C. tancrei* (Graeser, 1892), male, Kazakhstan, 31 = *C. mallopyga mallopyga* sp. n., paratype, male, Pakistan, 32 = *C. contempta* (Püngeler, 1914), male, Kirghisia



33-34



35-36

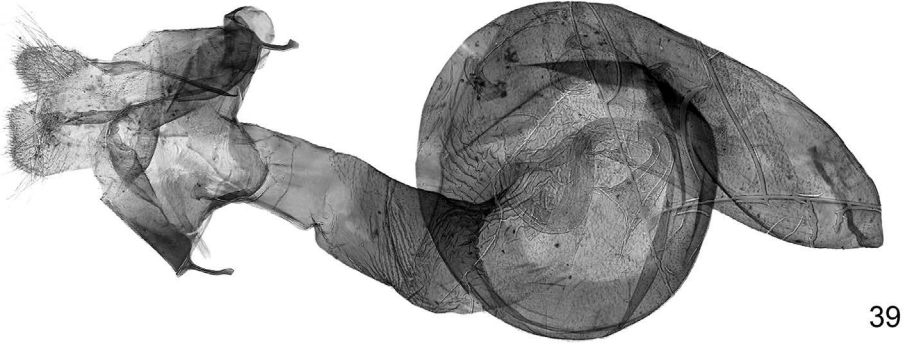


37-38

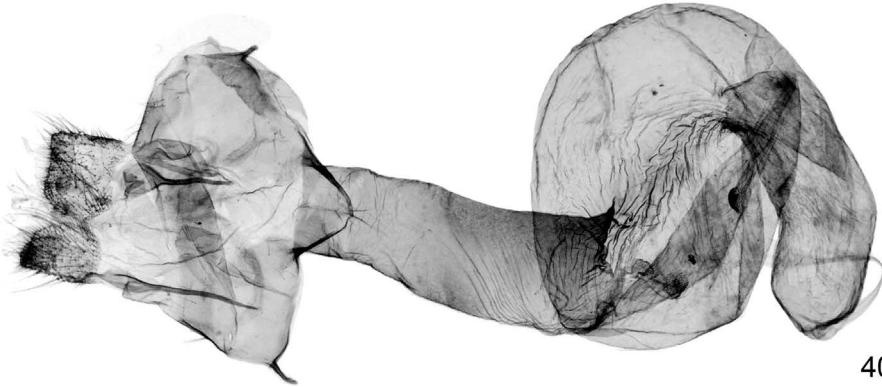
**Figs 33–38.** *Ctenoceratoda* spp. male genitalia. 33–34 = *C. persephone* sp. n., paratype, Mongolia, slide No.: VZ9489; 35–36 = *C. khorgossi* (Alphéraky, 1882), Kirghisia, slide No.: VZ9488; 37–38 = *C. argyrea* (Varga, 1992), paratype, Mongolia, slide No.: VZ5109



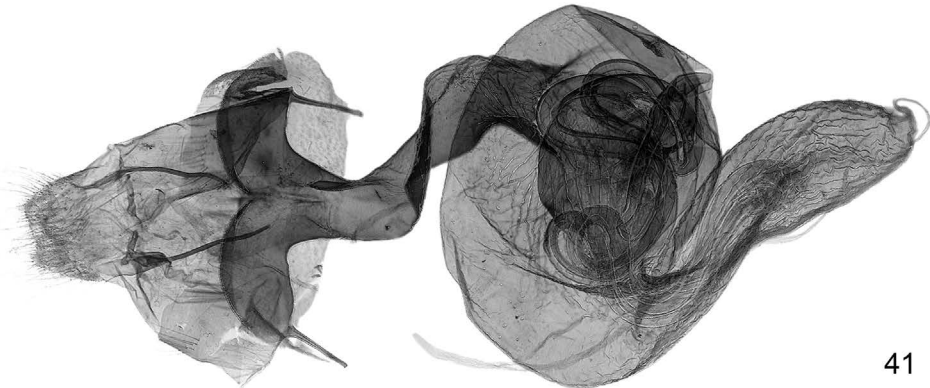
N36°15', E74°42', 23.VII.1994, leg. B. Herczig, Gy.M. László & G. Ronkay; 1 female, Darkot, 10.VIII.1998, leg. Z. Varga & G. Ronkay; 1 male, 1 female, Teru, 14.VII.1994, leg. B. Herczig, Gy.M. László & G. Ronkay (coll. P. Gyulai, G. Ronkay, Z. Varga and HNHM); 4 females,



39

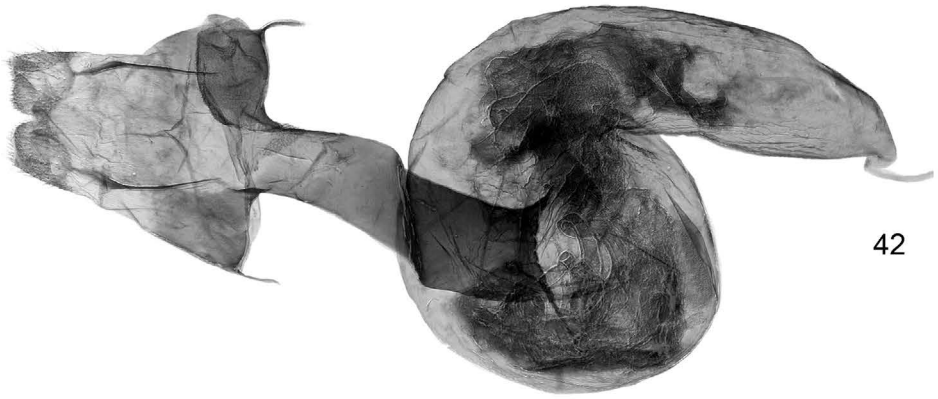


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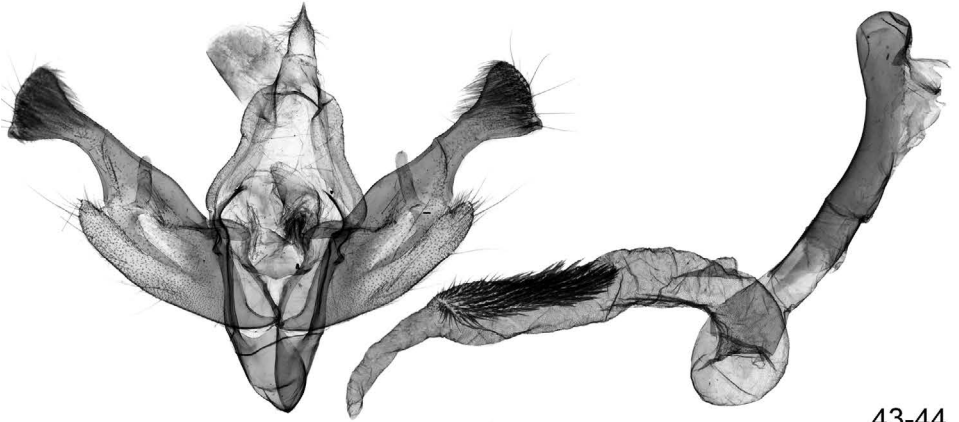


41

**Figs 39–41.** *Ctenoceratoda* spp. female genitalia. 39 = *C. persephone* sp. n., paratype, Mongolia, slide No.: VZ5942; 40 = *C. khorgossi* (Alphéraky, 1882), Kazakhstan, slide No.: VZ9506; 41 = *C. argyrea* (Varga, 1992), paratype, Mongolia, slide No.: VZ5153



42



43-44



45-46

**Figs 42–46.** *Ctenoceratoda scotosparsa* sp. n., genitalia, paratype, Mongolia. 42 = female, slide No.: VZ9508; 43–44 = male, slide No.: VZ9492, 45–46 = male, slide No.: RL8644

Karakoram Mts, Juglot valley, 2550 m, 26.VII.2011; 20 males, Karakoram Mts, Chaprot village, 2400 m, 29.VI.2014 (coll. P. Gyulai).

Slide Nos: VZ7435m, VZ7494m, VZ9173m, VZ9238m, VZ9245m, VZ9823m (males), VZ7487f (female).

Diagnosis – *Ctenoceratoda mallopyga* is on average the largest and the most colourful member of the *C. lupa*-group (wingspan 43–51 mm) having broad forewing and robust body. Ground colour of body and forewings variably dark whitish-grey, the lighter parts have some bluish shade while the darker parts of the thorax and the forewing are covered with darker graphite-grey scales. The forewing pattern is rather similar throughout the members of the *lupa*-group but the colouration is not brownish or ochreous as in the closely related *C. contempta* (Fig. 20), *C. lupa* (Fig. 21) and *C. septemlacustris* (Fig. 22) but more bluish or (in worn specimens) slate-grey. The basal part of reniform stigma is more prominently marked with blackish scales than in the related taxa while the claviform stigma is longer and stronger defined with blackish. The crosslines are reduced; the postmedial line is distinctly marked with black arrowheads. Hindwings light grey with darker terminal band.

The male genitalia (Figs 49, 50) are basically similar to those of the related species, but the “head” of the cucullus is relatively larger than in *C. contempta*, *C. septemlacustris* and *C. lupa* (Figs 51–56) and the ampulla is longer and not acute as in the three allied taxa but slightly curved and obtuse terminally.

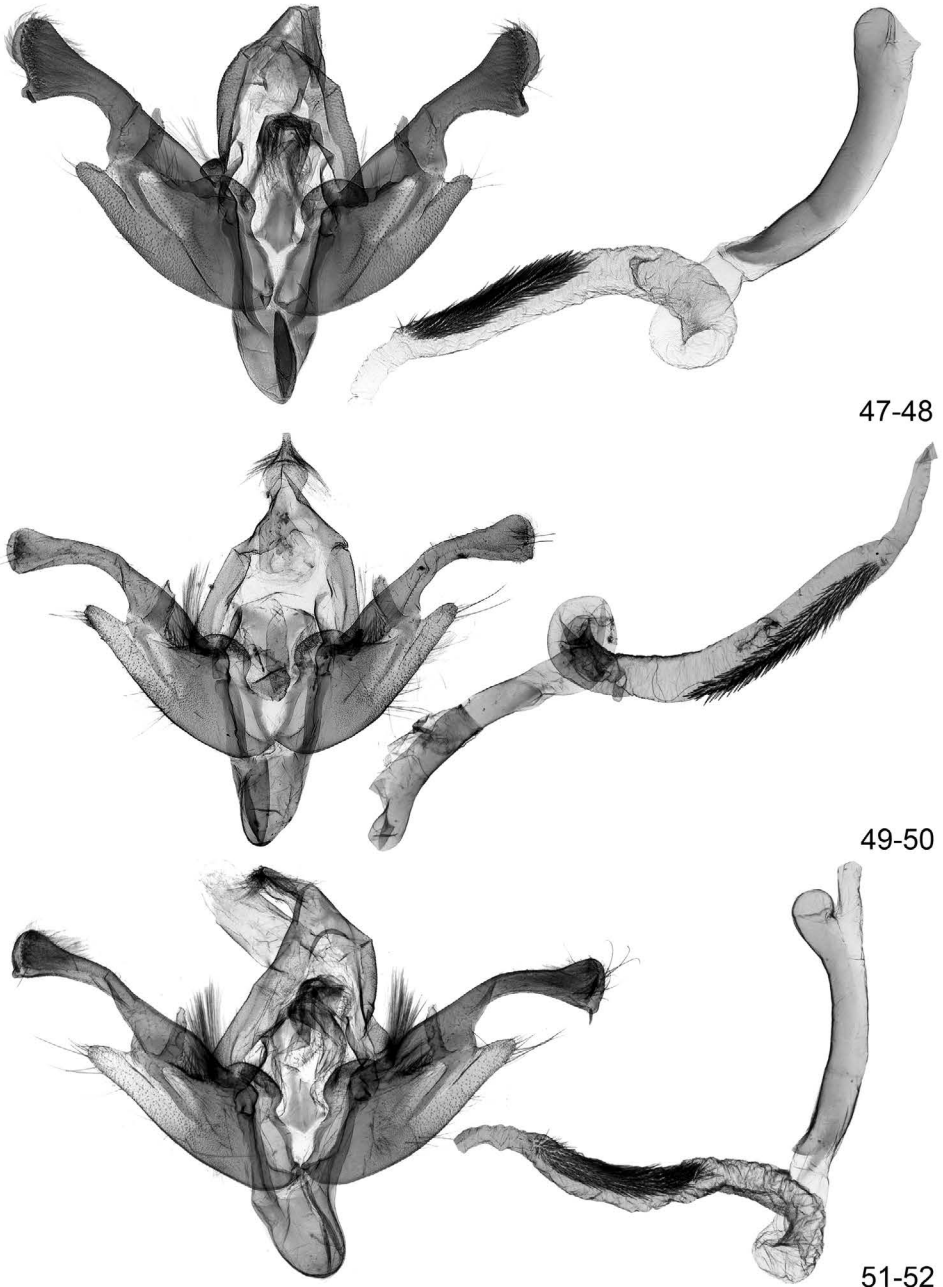
Distribution and bionomics. The new species occurs in the southern Pamirs (Wakhan valley), the eastern Hindukush (east of the Shandur pass), the Karakoram Mts (type locality) and the western Himalayas. It inhabits the medium-high and higher altitudes (between 2000–2800 m), the moths are local but rather frequent in their habitats.

### ***Ctenoceratoda mallopyga dyschroa* ssp. n.**

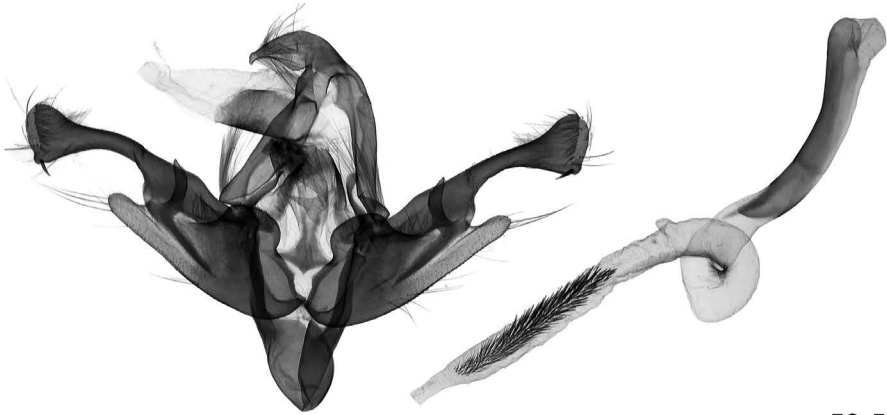
(Figs 23, 24, 57, 58, 61)

Holotype: male, India Himachal Pradesh, Spiti, Spiti valley, 6 km SE Kaza, 4100 m, 1.VII.1994, No. 21, leg. P. Kautt & V. Weisz (coll. G. Ronkay).

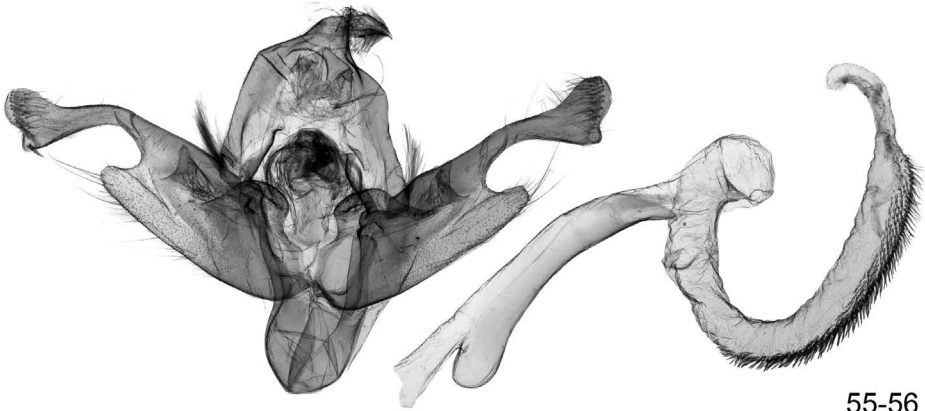
Paratypes. India, Himachal Pradesh. Spiti, Spiti valley: 4 males, 3 females, with the same data as the holotype; 1 male, Kaza, 3600 m, 19.VI.1994 (No. 4); 1 female, Kaza, 3600 m, 29.VI.1994 (No. 19); 1 male, 2 females, 3 km SE Kaza, 3900 m, 30.VI.1994 (No 20); 1 male, 2 females, Kaza, 3600 m, 32°13'N, 78°05'E, 4.VII.1994 (No. 25); 5 males, 1 female, Kaza, 3600 m, 32°13'N, 78°05'E, 5.VII.1994 (No. 27); 1 male, Kaza, 3600 m, 6.VII.1994 (No. 29); 1 male, 5 km WNW Kaza, 4350 m, 10.VII.1994 (No. 33); 1 male, 1 km SW Komik, 4400 m, 11.VII.1994 (No. 34); 1 male, Kaza, 3600 m, 12.VII.1994 No. 35); 3 males, 2 females, Kaza, 3600 m, 32°13'N, 78°05'E, 13.VII.1994 (No. 36); 1 male, Kaza, 3600 m, 32°13'N, 78°05'E, 14.VII.1994 (No. 38); 2 females, 1 km NW Kaza, 3550 m, 15.VII.1994 (No. 39); 1 female, Kaza, 3600 m, 32°13'N, 78°05'E, 15.VII.1994 (No. 40); 6 males, 2 females, 6 km SE Kaza, 4100



**Figs 47–52.** *Ctenoceratoda* spp. male genitalia. 47–48 = *C. cyanochrea* sp. n., paratype, Mongolia, slide No.: RL8644; 49–50 = *C. mallopyga mallopyga* sp. n., paratype, Pakistan, slide No.: VZ9238; 51–52 = *C. contempta* (Püngeler, 1914), Semiretshye, slide No.: RL11754



53-54



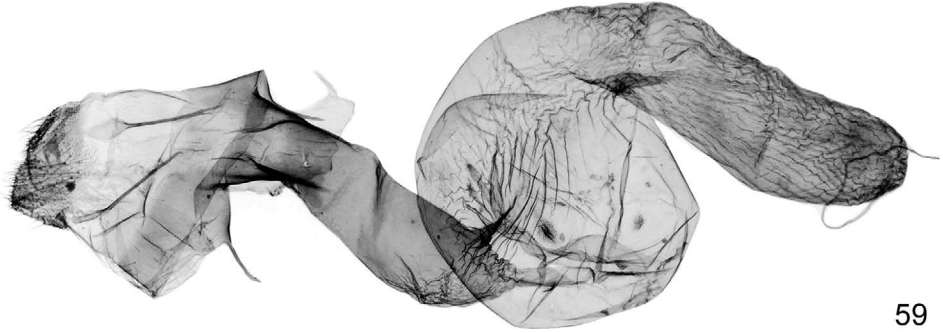
55-56



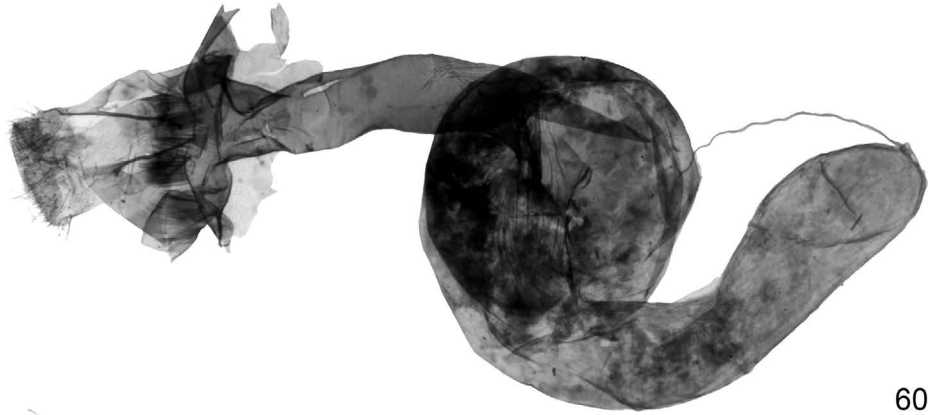
57-58

**Figs 53–58.** *Ctenoceratoda* spp. male genitalia. 53–54 = *C. septemlacustris* Gaal-Haszler, Lödl, Ronkay, Ronkay et Varga, 2012, paratype, Afghanistan, slide No.: RL10476; 55–56 = *C. lupa* (Christoph, 1893), Iran, slide No.: RL11753; 57–58 = *C. mallopyga dyschroa* sp. n., paratype, India Himachal Pradesh, slide No.: VZ9530

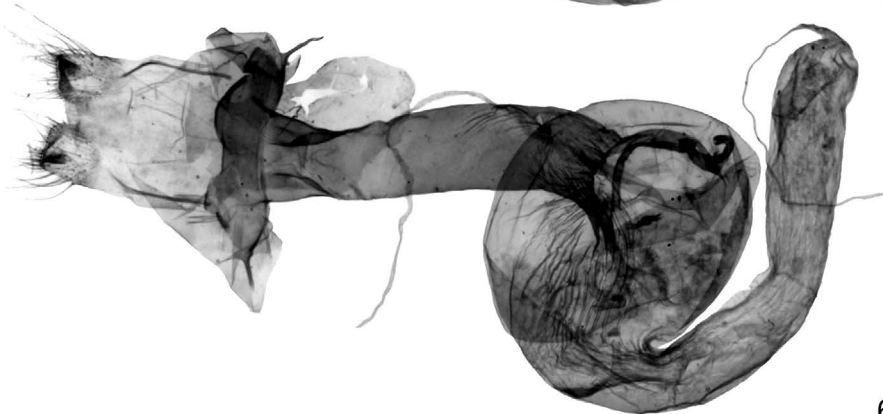
m, 17.VII.1994 (No. 41); 2 males, 7 km SE Kaza, 4150 m, 18.VII.1994 (No. 42); 1 female, Kaza, 3600 m, 32°13'N, 78°05'E, 6.VIII.1994 (No. 50), 1 female, Kaza, 3600 m, 32°13'N, 78°05'E,



59



60



61

**Figs 59–61.** *Ctenoceratoda* spp. female genitalia. 59 = *C. cyanochrea* sp. n., paratype, Mongolia, slide No.: VZ9507; 60 = *C. mallopyga mallopyga* sp. n., paratype, Pakistan, slide No.: VZ7487; 61 = *C. mallopyga dyschroa* sp. n., paratype, India Himachal Pradesh, slide No.: VZ7485

7.VIII.1994 (No. 52) (coll. P. Gyulai, G. Ronkay and HNHM); altogether 45 specimens from the above-mentioned localities, in coll. H. Hacker.

Slide Nos: VZ7681m, VZ8008m, VZ9530m (males), VZ7485f (female).

Diagnosis – The subspecies has the same appearance and regular pattern as the nominotypical subspecies but is essentially smaller in size (wing-span 42–46 mm) and lacks the bluish-grey colouration of body and forewings which is typical of the ssp. *mallopyga*. The body and the wings are unicolorous clay-grey, thorax with scattered blackish-brownish hairs, abdomen slightly lighter, somewhat more ochreous. Pattern of forewing regular, maculation finely defined with black scales, basal part of reniform stigma and the entire claviform stigma stronger defined; basal dash black, root-shaped.

*Ctenoceratoda mallopyga dyschroa* can be distinguished from the other members of the *lupa*-group by the rather unicolorous forewings with complete and regular pattern.

The male genitalia (Figs 57, 58) are proportionally smaller than those of the ssp. *mallopyga*, displaying no mentionable differences between the two subspecies.

Distribution and bionomics. The new subspecies is confined to a relatively small, semi-arid area in the south-western Himalaya Mts in India (Himachal Pradesh). It seems to be locally frequent at the high altitude regions (between 3500–4200 m a.s.l.).

\*

Acknowledgements – The present survey was financially supported by the Grant No. K116694 of the National Foundation of Research, Development and Innovation (NKFI-OTKA). The studies were partly supported by the SYNTHESYS Project which is financed by European Community Research Infrastructure Action under the FP6 „Structuring the European Research Area” Programme; Grants Nos GB-TAF-2644, DE-TAF-3514 and AT-TAF-5609 (G. Ronkay); GB-TAF-2656, GB-TAF-5870 and FR-TAF-562 (L. Ronkay).

The authors are indebted to Martin Honey and Alberto Zilli (London), Robert Trusch, Günter Ebert and Michael Falkenberg (Karlsruhe), Wolfram Mey (Berlin), Matthias Nuss (Dresden), Thomas Schmitt (Müncheberg), Hermann-Heinrich Hacker (Staffelstein), Axel Hausmann and Ulf Buchsbaum (Munich), Dieter Stüning and the late Clas Naumann (Bonn), Erik von Nieuwerkerken and Rob de Vos (Leiden), Ole Karsholt (Copenhagen), the late Michael Fibiger (Sorø), Bernard Landry (Geneva), Marek Dvořák (Smrcna, Czech Republic), Martin Lödl and Sabine Gaal-Haszler (Vienna), Alexej Matov and the late Irina Leonidovna Sukhareva (St. Petersburg) and Anton Volynkin (Barnaul) for all their kind help during the revisional work of the genus *Ctenoceratoda*.

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Received April 29, 2017, accepted October 17, 2017, published March 30, 2018