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SOCIETÀ ENTOMOLOGICA ITALIANA via Brigata Liguria 9 Genova

Arnaldo BORDONI*

New data on the Xantholinini of Oriental Region. 57. New species of *Thyreocephalus* from the Philippines (Coleoptera, Staphylinidae)

Abstract: *Thyreocephalus bakeri* Bordonì, 2002 is redescribed; *Thyreocephalus mindanaoensis* sp. n., *Thyreocephalus davaoensis* sp. n., *Thyreocephalus wao* sp. n. are described and illustrated. (Coleoptera, Staphylinidae). *Thyreocephalus bakeri* is new record for Mindanao.

Riassunto: Nuovi dati sugli Xantholinini della regione Orientale. 57. Nuove specie di *Thyreocephalus* delle Filippine (Coleoptera, Staphylinidae). Viene ridescritto *Thyreocephalus bakeri* Bordonì, 2002. Vengono descritte e illustrate *Thyreocephalus mindanaoensis* sp. n., *Thyreocephalus davaoensis* sp. n. e *Thyreocephalus wao* sp. n. Viene segnalato per la prima volta *Thyreocephalus bakeri* a Mindanao.

Key words: Coleoptera, Staphylinidae, Xantholinini, *Thyreocephalus*, new species, Philippines.

To meet the requirements by the International Code of Zoological Nomenclature (ICZN), this article was registered at Zoo-Bank (23 April 2026) under the ZooBank Life Science Identifier (LSID): urn:lsid:zoobank.org:pub:28837A66-4145-4959-A52E-F7B14B568F2D
Published: 30 April 2026.

INTRODUCTION

After the publication of the Monograph on the Xantholinini of the Oriental Region (Bordonì, 2002), the author has always carefully taken care of the updating of this synthesis. This contribution is part of this activity.

MATERIALS AND METHODS

Whitin the specimens of Staphylinidae of Philippines, sent to me from a local collector, I have isolated some *Thyreocephalus* which are described on these pages. The examination of the specimens was done through a Wild M5A binocular and an Optika B-290 tri-ocular microscope.

TAXONOMY

Thyreocephalus bakeri Bordonì, 2002

Examined material: Philippines, Mindanao, Kidapawan, S Cotabato, loc. coll. I.2000, 1 ♀ (coll. Bordonì).

Redescription: length of body: 10 mm; length from anterior margin of head to posterior margin of elytra: 4.8 mm. Body black with elytra and abdomen reddish brown dark, posterior margin of 6° abdominal segment reddish (devoid of genital segment), antennae and legs brown (antennae devoid of article 3-11). Head and pronotum and related punctation as in Fig. 1. Labrum as in Fig. 2. Eyes small and flat. Immediately recognizable for the surface of head covered with deep, dense striations, also present on the lateral portion. Elytra large, dilated posteriad, with strictly rounded humeral angles. Surface with deep,

coarse punctation arranged in numerous series. Epiplura with the same punctation. Abdomen with traces of transverse micro-striation and fine punctation on each segment.

Distribution: Luzon (Bordonì, 2002). New record for Mindanao.

Thyreocephalus mindanaoensis sp. n.

urn:lsid:zoobank.org:act:

4E4636D8-F884-4EF9-9450-FD7EBF52F16C

Examined material: Holotypus ♂: Philippines, Mindanao, Magpet, Cotabato, X. 2021 loc. coll. (coll. Bordonì).

Description: length of body: 12 mm; length from anterior margin of head to posterior margin of elytra: 7 mm. Body shiny; head, pronotum, elytra and abdomen brown black; posterior margin of 6° abdominal segment and genital segment reddish; elytra with bronze reflexes; antennae and legs brown dark; antennae with the last 5 articles yellowish pale. Head and pronotum and related punctation as in Fig. 3. Labrum as in Fig. 4. Elytra large, sub-rectangular, with barely rounded sides and strictly rounded humeral angles. Surface with fine punctation, dense on the lateral portion. Epipleura with very fine and dense punctation. Abdomen with fine, dense punctation on each segment.

Tergite and sternite of male genital segment as in Figs. 5 and 6. Aedeagus (Fig. 7), 1.15 mm long, sub-ovoid, with convergent parameres; inner sac filiform, covered with fine scales.

Etymology: the specific epithet refers to Mindanao.

Distribution: Mindanao Island.

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Remark: the new species is closely related to *Thyrecephalus boettcheri* Bordoni, 2002, from Luzon and Mindanao, from which differs by the following characters: head not ovoid, surface of head with only one puncture under the eyes, structure of labrum, size of pronotum, not long as head, different tergite of male genital segment, different aedeagus.

***Thyrecephalus davaoensis* sp. n.**

urn:lsid:zoobank.org:act:

DC54DF5B-A0E2-48E9-858E-ED17266DA643

Examined material: Holotypus ♂: Philippines, Mindanao, Kapatagan, Davao del Sur, X. 2021, loc. coll. (coll. Bordoni).

Description: length of body: 11 mm; length from anterior margin of head to posterior margin of elytra: 6 mm. Head and pronotum black, elytra reddish, scutellum and abdomen black; antennae and legs brown. Head and pronotum and related punctuation as in Fig. 8. Labrum as in Fig. 9. Elytra large, with sub-rectilinear sides and strictly rounded humeral angles; surface of elytra with fine punctuation especially on the lateral portion; scutellum with some punctures; abdomen with deep punctuation, arranged in 4-5 series on each segment.

Tergite and sternite of male genital segment as in Figs. 10 and 11. Aedeagus (Fig. 12), 2 mm long, ovoid, with convergent parameres; inner sac filiform, covered with fine scales.

Etymology: the specific epithet refers to Davao region.

Distribution: Mindanao.

***Thyrecephalus wao* sp. n.**

urn:lsid:zoobank.org:act:

A7426FCC-0A6B-4328-AA71-E9C18B36CE4E

Examined material: Holotypus ♂: Philippines, Mindanao, Wao, X.2020 loc. coll. (coll. Bordoni).

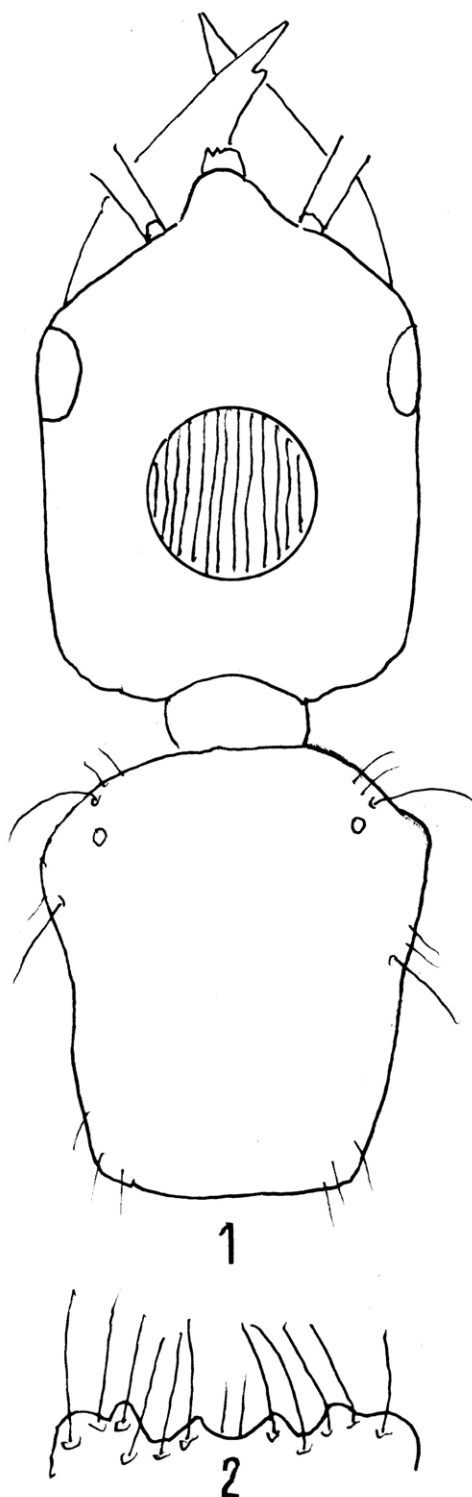
Description: length of body: 12 mm; length from anterior margin of head to posterior margin of elytra: 6.5 mm. Head and pronotum amaranth, elytra reddish, abdomen amaranth black, antennae and legs brown light; antennae with the last 5 articles yellowish pale. Head and pronotum and related punctuation as in Fig. 13. Labrum as in Fig. 14. Elytra longer and wider than pronotum, with strictly rounded humeral angles. Surface with numerous series of fine punctures, especially on the lateral portion. Abdomen with fine punctuation on the lateral portion of each segment.

Tergite and sternite of male genital segment as in Figs. 15 and 16. Aedeagus (Fig. 17) 2 mm long; basal bulb with peculiar size; parameres convergent; inner sac apparently not visible.

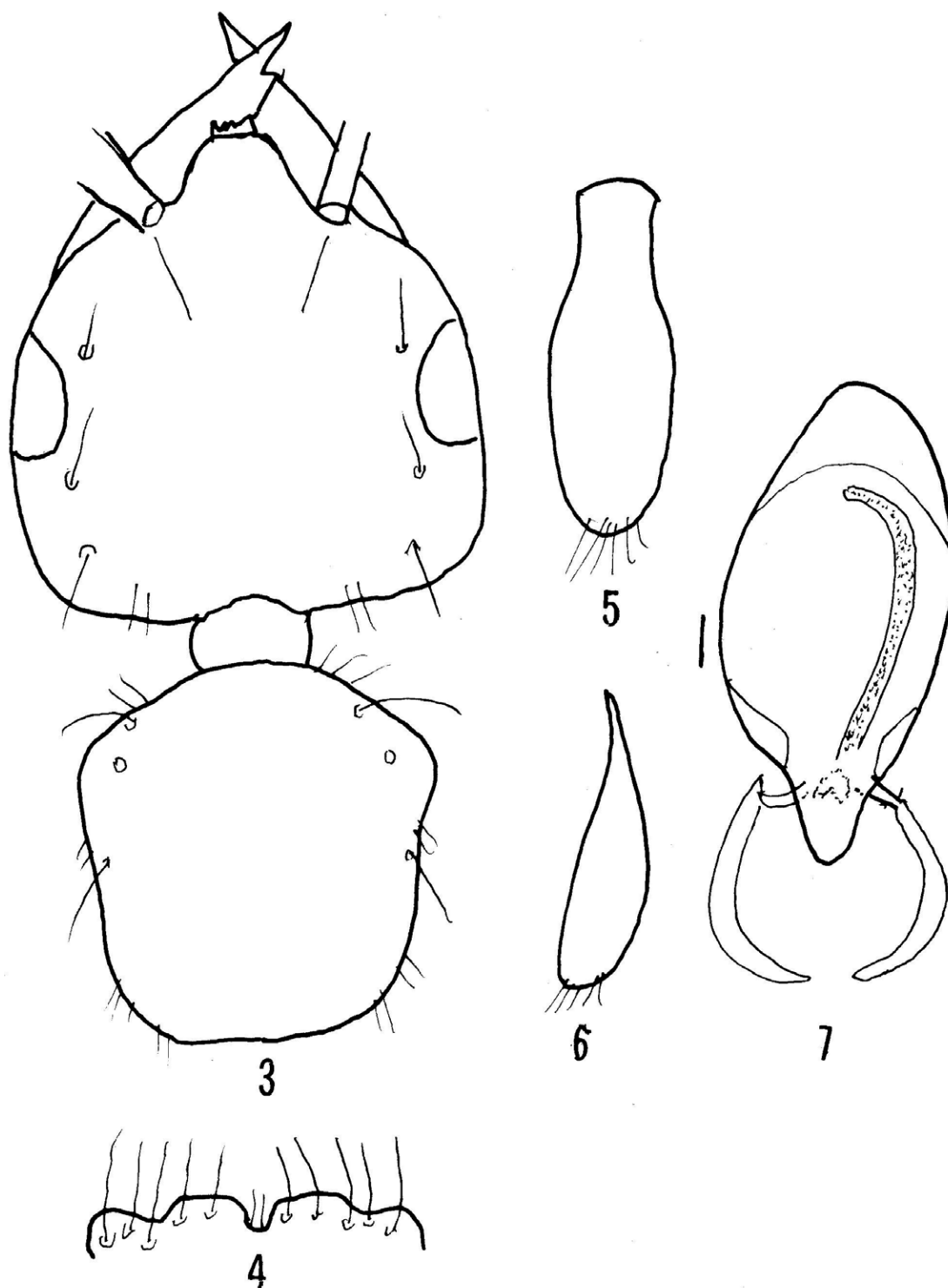
Etymology: the specific epithet refers to the type locality.

Distribution: Mindanao Island.

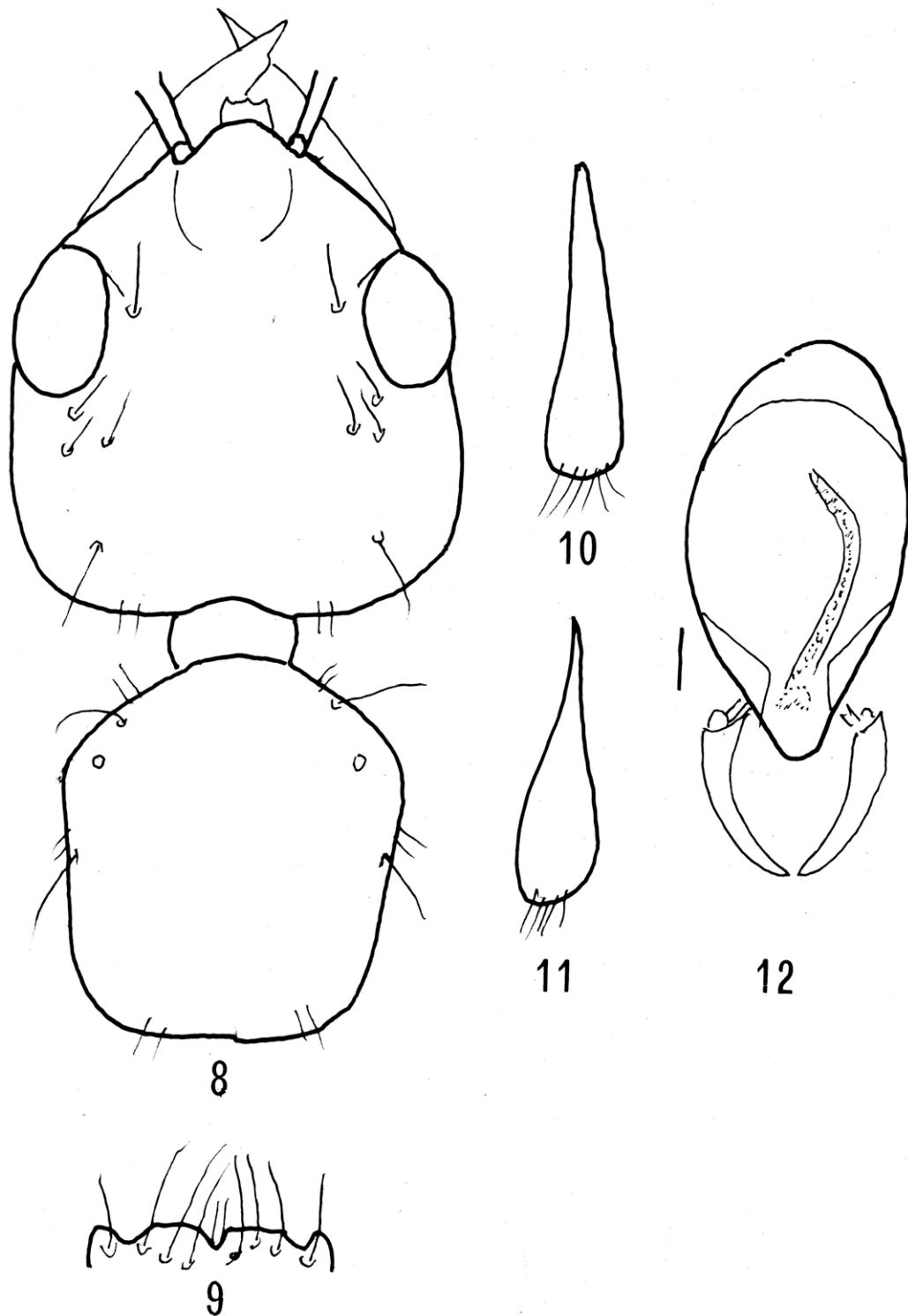
Remark: the species is closely related to *Thyrecephalus anacolus* Bordoni, 2002, from which differs by the following characters: head not sub-quadrangular, structure of labrum, punctuation of head not areolate; coarse, deep punctuation of elytra, not arranged in numerous series, different aedeagus.



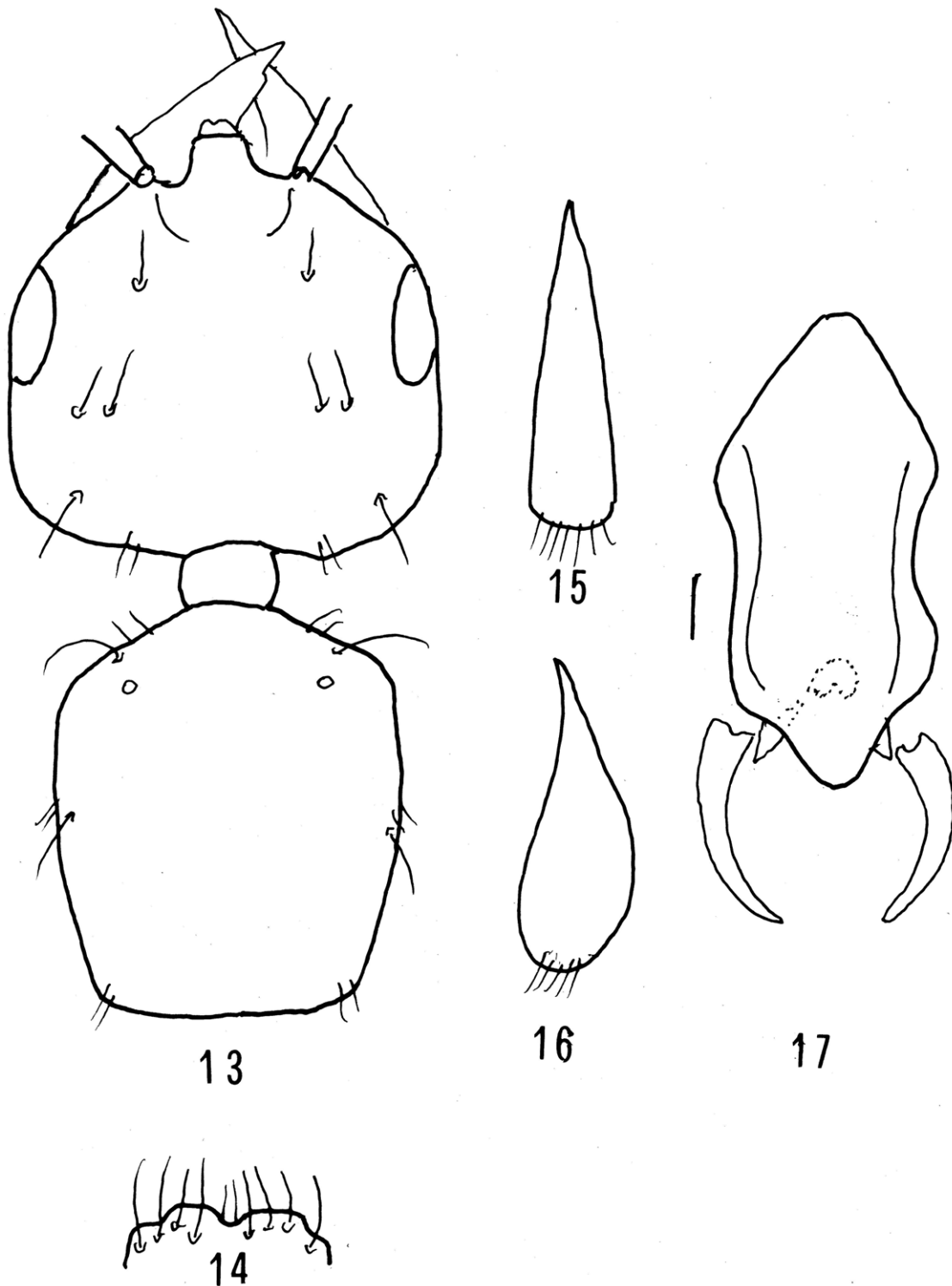
Figs. 1 and 2. *Thyrecephalus bakeri* Bord. 1) Head and pronotum (total length: 5 mm); 2) labrum.



Figs. 3-7. *Thyrecephalus mindanaoensis* sp. n. 3) Head and pronotum (total length: 5 mm); 4) labrum; 5,6) tergite and sternite of male genital segment; 7) aedeagus (bar scale: 0.1 mm).



Figs. 8-12. *Thyreocephalus davaoensis* sp. n. 8) Head and pronotum (total length: 4.5 mm); 9) labrum; 10,11) tergite and sternite of male genital segment; 12) aedeagus (bar scale: 0.1 mm).



Figs. 13-17. *Thyreocephalus wao* sp. n. 13) Head and pronotum (total length: 5 mm); 14) labrum; 15,16) tergite and sternite of male genital segment; 17) aedeagus (bar scale: 0.1 mm).

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Gennaro VIGGIANI*

Taxonomic and morphological notes on some Trichogrammatidae (Hymenoptera: Chalcidoidea)

Abstract: Typical material of species belonging to the genera *Brachyufens* Viggiani, *Burksiella* De Santis, *Oligosita* Walker, and *Pseudoligosita* Girault has been examined. The genus *Brachyufens*, according to the genitalia characters, is placed in the tribe Trichogrammatini (Trichogrammatidae, Trichogrammatinae). For the species *Haeckeliania brevimarginata* Viggiani, the holotype is indicated to validate the species (Viggiani, 2019). *Oligosita engelharti* Kryger, 1918, is proposed as a junior synonym of *Oligosita impudica* Kryger, 1918, **n.syn.**, and *Pseudoligosita obscura* Fursov (2007), synonym of *P. aceses* (Walker), **n. syn.**. The new name *Pintoana* is proposed to replace the genus *Pintoa* Viggiani (1989), a junior homonym of the mollusk *Pintoa* Bourguignat, 1890. For several species of *Oligosita* and *Pseudoligosita* some taxonomic and morphological notes are given.

Riassunto: Note tassonomiche e morfologiche su alcuni Trichogrammatidae (Hymenoptera: Chalcidoidea).

È stato esaminato il materiale tipico di specie dei generi *Brachyufens* Viggiani, *Burksiella* De Santis, *Oligosita* Walker, and *Pseudoligosita* Girault. Il genere *Brachyufens*, in base ai caratteri dell'organo copulatore, è stato assegnato alla tribù Trichogrammatini (Trichogrammatidae, Trichogrammatinae). È stato indicato il tipo di *Haeckeliania brevimarginata* Viggiani per validare la specie (Viggiani, 2019). *Oligosita engelharti* Kryger, 1918 è proposta quale sinonimo di *Oligosita impudica* Kryger, 1918, **n.syn.** e *Pseudoligosita obscura* Fursov (2007) sinonim of *P. aceses* (Walker), **n. syn.** Il nuovo nome *Pintoana* è proposto per sostituire *Pintoa* Viggiani (1989), omonimo del mollusco *Pintoa* Bourguignat, 1890. Sono infine fornite note tassonomiche e morfologiche per diverse specie di *Oligosita* e *Pseudoligosita*.

Key words: egg-parasitoids, synonymies, new names, figures.

The taxonomy of the Trichogrammatidae was improved a lot with the contribution of several authors (Pinto, 2006; Viggiani, 2024), but several genera and species remain uncertain. In the past years, the author had the opportunity to study, in several entomological institutions, typical specimens of Trichogrammatidae (*Ufens osborni* Dozier: United State natural Museum of Washington; *Ufens beneficus* Dozier, female holotype and male, United State natural Museum of Washington; *Ufens ormenidis* Dozier, type material, United State natural Museum of Washington; *Haeckeliania brevimarginata* Viggiani, holotype, Università degli Studi di Napoli "Federico II", Dipartimento di Agraria, Laboratorio di Lotta biologica, Portici; *Oligosita engelharti* Kryger, type, Zoological Museum, Copenhagen; *Oligosita subfasciata* Westwood, Kryger collection, Zoological Museum, Copenhagen; *Oligosita szelenyi* Nowicki, type, Nowicki collection, Università degli Studi di Napoli "Federico II", Dipartimento di Agraria, Laboratorio di Lotta biologica, Portici; *Pseudoligosita kusaiensis* Doult, type, United States National Museum, Washington; *Oligosita paphlagonica* Nowicki, type, Nowicki collection, Uni-

versità degli Studi di Napoli "Federico II", Dipartimento di Agraria, Laboratorio di Lotta biologica, Portici; *Oligosita schlicki* Kryger, specimens of Kryger collection, Museum of Zoology, Copenhagen) mounted on slide. In the present paper, some taxonomic and morphological notes, with original illustrations, are given that may help their correct identification.

Genus *Brachyufens* Viggiani, 1968

Brachyufens Viggiani, in Doult and Viggiani, 1968. Proc. Cal. Ac. Sc., 35 (fourth ser.): 487, 566.

Brachyufens osborni (Dozier)

Ufens osborni Dozier, 1932. Proc. Ent. Soc. Wash. 14: 36.

Brachyufens osborni (Dozier), Doult and Viggiani, 1968. Proc. Cal. Ac. Sc., 35 (fourth ser.): 566.

A new diagnosis of this monotypic genus, referred to as female and male of *B. osborni* (Dozier) was given by Pinto (2006). About the male genitalia the author wrote: "genitalia similar to *Haeckeliania*". Here, the illustration of the male genitalia of *B. os-*

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borni (Fig. 1), drawn on specimens received years ago from the United States Natural Museum of Washington, is added. Genitalia are of chalcidoid type, with phallobase elongate, 4.6× as long as wide, dorsally opened, with long parameres with a distal seta, as long as the distal width of aedeagus; volsellae about as long as parameres, with a terminal small digital spine; aedeagus body longer than its bacilliform apodemes (11:12). The described characters of the male genitalia place the genus *Brachyufens* in the subfamily Trichogrammatinae, tribe Trichogrammatini (Viggiani, 1971).

Genus *Burksiella* De Santis, 1957

Burksiella De Santis 1957. Notas del Museo de la Plata, Buenos Aires (Zoologia) 19 (166): 33-72.

Pinto (2006) renewed the status of the genus, previously synonymized under *Zagella* Girault by Doutt & Viggiani (1968), and gave the “easiest means of separation”: In *Burksiella*, the stigmal vein usually is constricted basally and always is projected apically beyond the end of the marginal vein. In *Zagella*, on the other end, the stigmal vein is not constricted and is perpendicular to the marginal vein rather than projecting apically. The genus includes 12 species (UCD Community, 2026), which show several variations in veins and male genitalia shape, suggesting a difficult use of Pinto’s characters for the discrimination between *Burksiella* and *Zagella*.

Burksiella benefica (Dozier)

Ufens beneficus Dozier 1932. Proc. Ent. Soc. Wash. 34: 33.

Burksiella benefica (Dozier), Pinto, 2006. J. Hym. Res. 15: 92.

The species was described with some details, but without illustrations. According to Pinto (2006), *B. beneficus* represents a group characterized by sexes that are highly dimorphic. I have examined the holotype (female) and the single male of the original material. Female maxillary palp (Fig. 2) distally with 2 setae and 1 setiform sensillum, antenna (Fig. 3) with 2 anelli, first funicular segment small and annular with a small seta and a peg sensillum (Fig. 4), second segment globular, large, with 5 transverse, placoid sensilla and on the distal margin some peg sensilla, club 3-segmented, not closely appressed to the preceding funicular segment. Male head below the antennal toruli (Fig. 5) with several short sensillar setae;

genitalia (Fig. 6) simple, a unique body, 3× as long as wide, with dorsal aperture 0.4× of total body length, same type as in *B. diana*e Pinto (2006), but shorter and wider.

Burksiella ormenidis (Dozier)

Ufens ormenidis Dozier 1932. Proc. Ent. Soc. Wash. 34: 35.

Burksiella ormenidis (Dozier), Pinto, 2006. J. Hym. Res. 15: 92.

Originally described with some details, but without illustrations. The type material was examined. Antenna of the female (Fig. 7) with the second funicular segment transverse with only 2 placoid sensilla and rather appressed to the 3-segmented club. Fore wing (Fig. 8) 1.6× as long as wide, stigmal vein not constrict at base, disc moderately setose with some setae arranged in rows, fringe very short. Male antenna (Fig. 9) with a club shorter and larger than in the female and fewer placoid sensilla on each segment. Genitalia (Fig. 10) trunk-conic, gradually narrowed to apex, with aedeagal apodemes.

Genus *Haeckeliana* Girault, 1912

Haeckeliana Girault, 1912. Mem. Queensland Museum 1: 97-98.

Haeckeliana brevimarginata Viggiani

Haeckeliana brevimarginata Viggiani. Fragmenta entomologica 2019, 58: 166.

The holotype, unfortunately, was not fixed in the original description (Viggiani, 2019), and as for art. 16 of the Code of Zoological Nomenclature, the name is unavailable. In the present corrigendum, the holotype is fixed as follows: holotype ♀ (slide), French Guyana: Kaw Mountains, Patawa, 4° 35.562’N, 52° 12.425’W, 20.xi-11.xii.2006, K. Sarv lgt.

Genus *Oligosita* Walker, 1851

Oligosita Walker, 1851. Ann. Mag. Nat. Hist. 7: 212-213.

The genus includes about 100 species worldwide, about 10 are recorded from Europe, some of them remain inadequately characterized.

Oligosita impudica Kryger

Oligosita impudica Kryger, 1918. Ent. Med. 12: 317, 323.

Oligosita engelharti Kryger, 1918. Ent. Med. 12: 317, 327. **n. syn.**

According to Kryger (1918), the two species differ for “forewing with a little substigmatal spot” in *O. engelharti* and “forewing with a larger substigmatal spot” in *O. impudica*. I have examined Kryger material of both species: the type female of *O. engelharti*, the only known specimen and 2 females and 2 males of *O. impudica*. In my opinion the differences between the two species reported by Kryger are untenable, consequently I propose *O. engelharti* as junior synonym of *O. impudica*. The following illustrations of female antenna, fore wing and male genitalia (Figs. 11-13) will clarify the identity of the species.

***Oligosita subfasciata* Westwood**

Oligosita subfasciata Westwood, 1879. Trans. Linn. Soc. London (Zool.) 2: 591.

Oligosita subfasciata, Kryger, 1918. Entom. Medd. 12 (2): 317, 320.

I have examined several specimens of the Kryger material and I can confirm that the species belongs to the genus *Oligosita* group *collina*. The genitalia of the species (Fig. 14), undescribed, are tubular, rather short, 4× as long as wide.

***Oligosita szelenyi* Nowicki**

Oligosita szelenyi Nowicki. 1940. Zeit. Angew. Ent., 26: 645.

The species was described in details, but without illustrations. I have examined the type of the species and here are reported the figures of the female antenna (Fig. 15) and fore wing (Fig. 16).

Genus *Pintoana* Viggiani, nom. nov.

Recently, I was kindly informed that the genus *Pintoa* Viggiani (Viggiani, 1989) was a junior homonym of a mollusk. In fact, Bourguignat (1890) designed *Pintoa* as a subgenus of *Achatina*. For this reason, I propose here *Pintoana* as a replacement name of *Pintoa* and consequently the new combination *Pintoananeartica* (Viggiani) **n. comb.**

Genus *Pseudoligosita* Girault, 1913

Pseudoligosita Girault, 1913. Mem. Queensland Museum 2: 104.

Pseudoligosita, Pinto and Viggiani, 2004. J. Hym. Res. 13(2): 288.

***Pseudoligosita acestes* (Walker), n. comb.**

Pteroptrix acestes Walker, 1839. Monogr. Chalcid. 1: 19.

Oligosita obscura Fursov, 2007. Family Trichogrammatidae. In book: Lelei A.S. (Eds.) “Identification Keys to insects of the Far East of Russia in VI volumes”. Vladivostok: 977. **N. syn.**

The first illustrations (female antenna and fore wing) concerning this species are reported by Douth and Viggiani (1968). The new species *O. obscura* Fursov (2007) shows the typical wing of *O. acestes* 1839 and here is proposed as junior synonym.

***Pseudoligosita kusaiensis* Douth**

Oligosita kusaiensis Douth, 1955. Insects of Micronesia 19: 5.

Pseudoligosita kusaiensis (Douth), Pinto and Viggiani, 2004. J. Hym. Res. 13: 289.

The type of the species was examined. The illustrations (Figs. 17 and 18) of the female antenna and fore wing clarify some specific characters.

***Pseudoligosita paphlagonica* (Nowicki)**

Oligosita paphlagonica Nowicki, 1935. Zeit. angew. Ent. 21: 590.

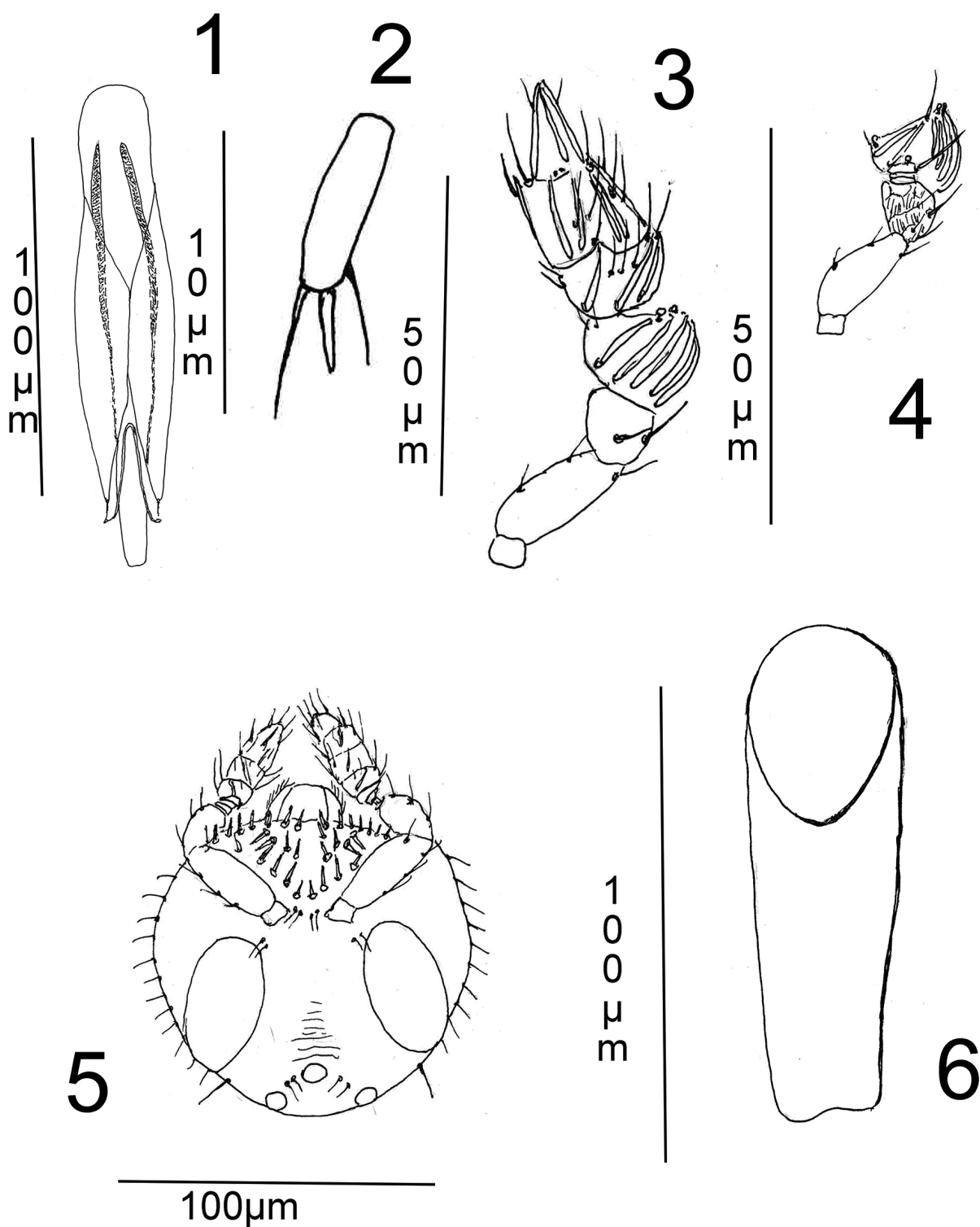
Pseudoligosita paphlagonica (Nowicki), Pinto and Viggiani, 2004. J. Hym. Res. 13: 289.

The species was described in detail, but without illustrations, on a single male. I have remounted this specimen in the Nowicki collection, preserved in special card slide (Viggiani, 2011), on normal slide and taken the figures of antenna, fore wing and genitalia (Figs. 19-21). Clearly the species should be assigned to the genus *Pseudoligosita*. Genitalia (Fig. 21) are simple, curved, and basally with apodemes.

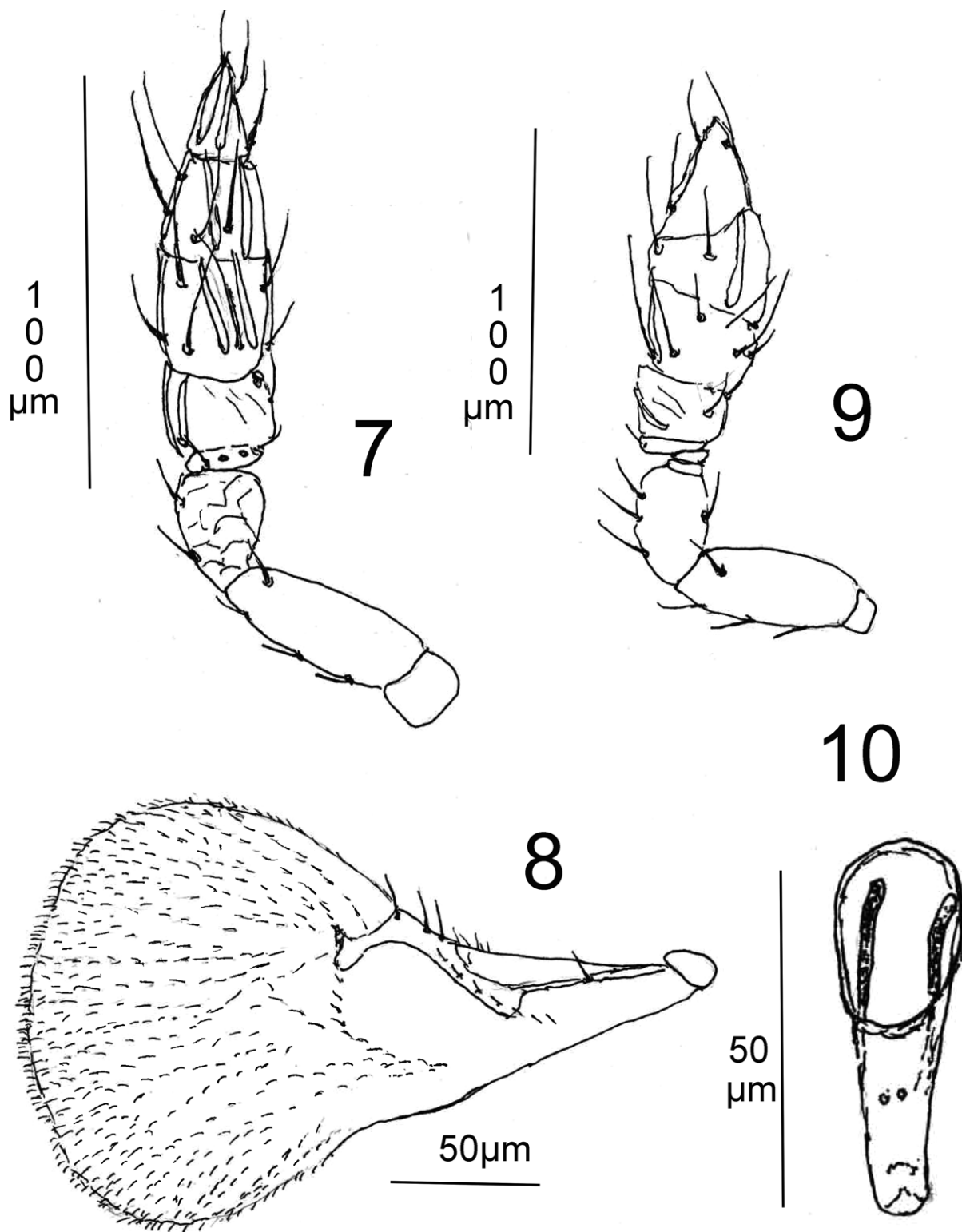
***Pseudoligosita schlicki* (Kryger)**

Oligosita schlicki Kryger, 1918. Ent. Medd. 12: 305, 307.

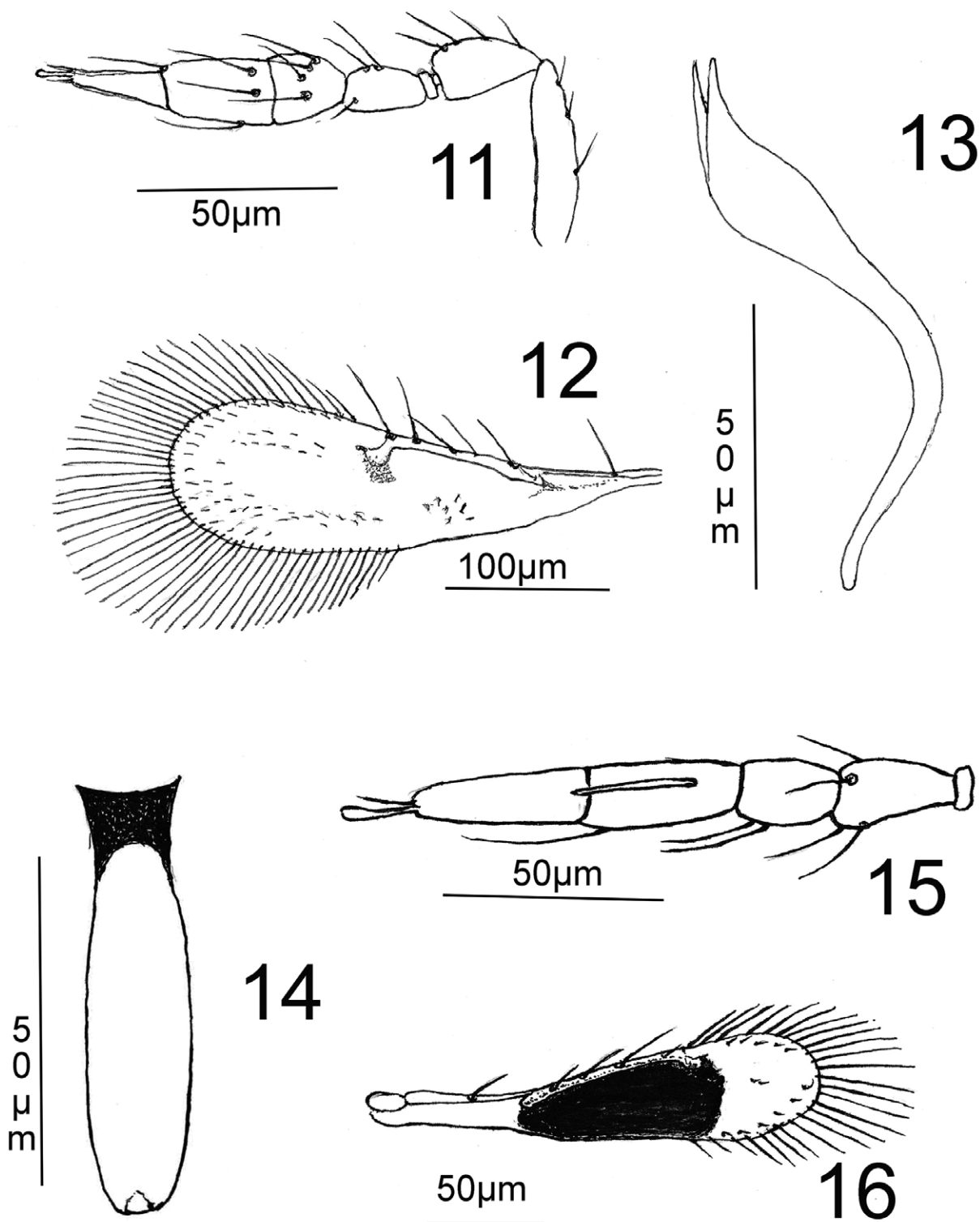
The species was described and illustrated in detail by the author. I have examined 3 females and 1 male of the Kryger's collection and taken the following illustrations of female fore wing, and male genitalia (Figs. 22 and 23). The last (Fig. 23) is particularly long, 15x as long as wide, basally with a semicircular sclerification and without apodemes.



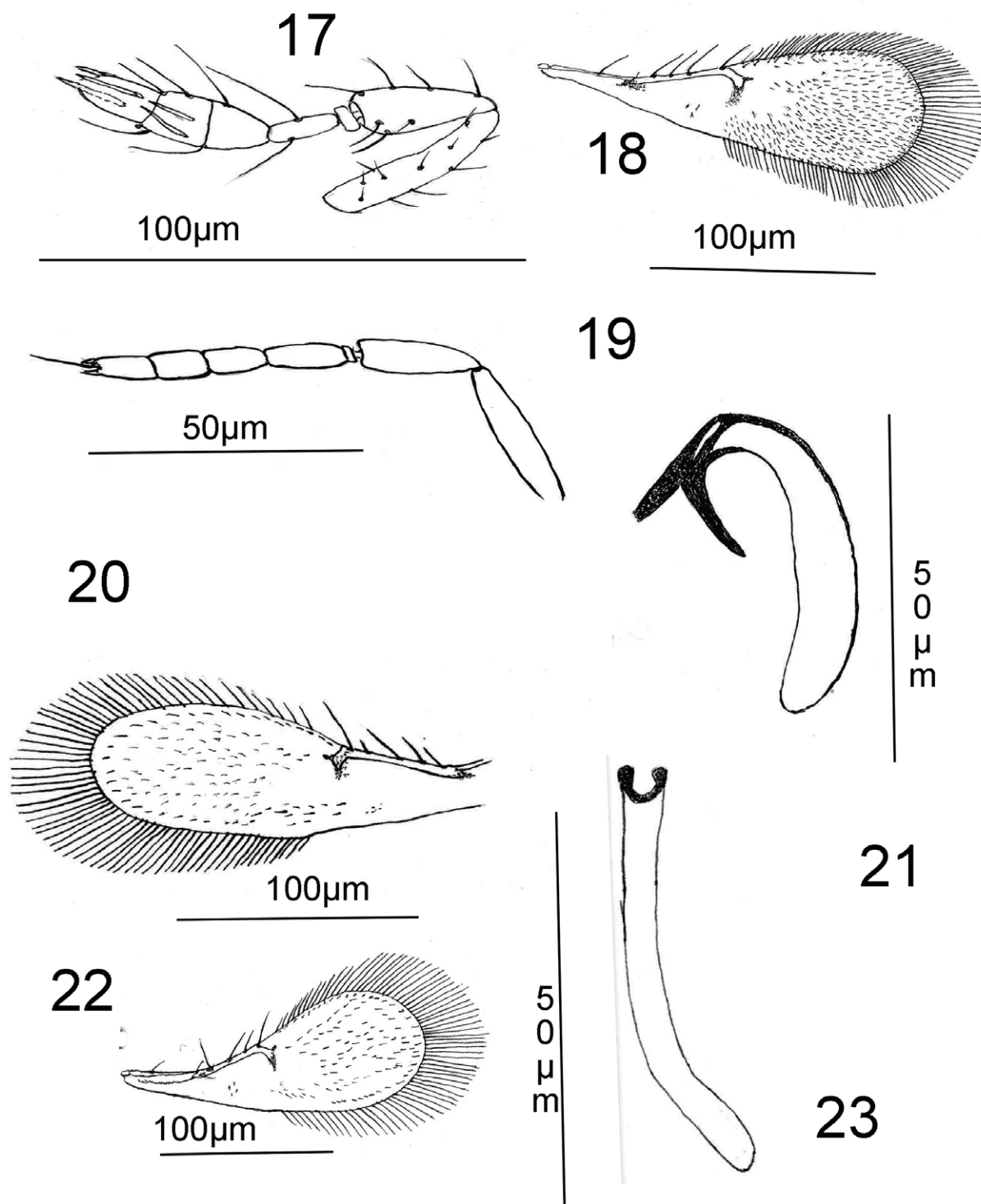
Figs. 1-6. 1) *Brachyufens osborni* (Dozier), male genitalia; 2) *Burksiella benefica* (Dozier), maxillary palpus; 3) female antenna; 4) particular, from scape to funicular segments; 5) male head; 6) male genitalia.



Figs. 7-10. 7) *Burksiella ormenidis* (Dozier), female antenna; 8) fore wing; 9) male antenna; 10) male genitalia.



Figs. 11-16. 11) *Oligosita impudica* Kryger, female antenna; 12) fore wing; 13) male genitalia; 14) *Oligosita subfasciata* Westwood, male genitalia; 15) *Oligosita szelenyi* Nowicki, female antenna; 16) fore wing.



Figs. 17-23. 17) *Pseudoligosita kusaiensis* (Doutt), Female antenna; 18) fore wing; 19) *Pseudoligosita paphlagonica* (Nowicki), female antenna; 20) fore wing; 21) male genitalia; 22) *Pseudoligosita schlicki* (Kryger), fore wing; 23) male genitalia.

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Gianni ALLEGRO*, Pier Mauro GIACHINO**

Three new *Zuphioides* species from South America (Coleoptera, Carabidae, Zuphiini)

Abstract: *Zuphioides walterrossii* n. sp. and *Zuphioides olaffaegeri* n. sp. are described from Ecuador, *Zuphioides visinonii* n. sp. from Bolivia. Additionally, the holotypes of *Zuphioides columbianum* (Chaudoir, 1872) and *Z. brasiliense* (Chaudoir, 1872), both deposited in MNHN, are illustrated. Finally, an updated key to all *Zuphioides* species so far recorded from South America is provided.

Riassunto: *Tre nuovi Zuphioides del Sud America (Coleoptera, Carabidae, Zuphiini).*

Vengono descritti *Zuphioides walterrossii* n. sp. e *Zuphioides olaffaegeri* n. sp. dell'Ecuador, nonché *Zuphioides visinonii* n. sp. della Bolivia. Vengono inoltre illustrati gli ologotipi di *Zuphioides columbianum* (Chaudoir, 1872) e di *Z. brasiliense* (Chaudoir, 1872), entrambi conservati presso MNHN. Infine, viene fornita una chiave aggiornata per l'identificazione di tutte le specie di *Zuphioides* conosciute fino a oggi in Sudamerica.

Key words: taxonomy, *Zuphioides visinonii* n. sp., *Zuphioides walterrossii* n. sp., *Zuphioides olaffaegeri* n. sp., Dryptinae, identification key.

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INTRODUCTION

The first review of the American species of the genus *Zuphium* was published by Liebke (1933), who added 10 new species to the 11 already known, at that time, from this continent. Almost half a century later, Mateu planned an updated review of the American *Zuphium*: he published a first note concerning the North American species, including Mexico (Mateu, 1981), but the expected second and third notes dealing with the Central and South American species never followed. After this note, Mateu only published an article of taxonomic concern regarding three species described by Liebke (Mateu, 1985), and a second one describing a new species from Argentina (Mateu, 1995).

More recently, a new taxonomic arrangement of the genus *Zuphium* was proposed by Ball & Shpeley (2013), who transferred 23 American *Zuphium* species to *Zuphioides* Ball & Shpeley, 2013, a new genus (type species *Zuphium mexicanum* Chaudoir, 1863), a new genus grouping all the *Zuphium* of authors so far recorded from the Western Hemisphere, based on a morphological gap between the taxa of the New World and the ones of the Eastern Hemisphere. This paper also contains phylogenetic considerations

on the genera *Zuphioides* and *Coarazuphium*, which were considered as adelphotaxa, as well as in-depth details on their morphology.

Later on, *Zuphium juengeri* Mateu, 1995 was also recognized as belonging to the genus *Zuphioides* (Lemaire & Jourdan, 2022; Allegro, 2025), and a further species, *Zuphioides grandisterrae* Lemaire & Jourdan, 2022, was recently described. The genus *Zuphioides* thus currently includes 25 American species, 11 of them recorded from South America (Anichtchenko, 2025). It is worth noting that many species are rare and scarcely represented in collections, and their type series are frequently composed of a single or a few specimens, the oldest ones sometimes lost or damaged.

Our interest in this genus began when we received three specimens collected in Ecuador (Manabí) by Walter Rossi. We provisionally attributed these specimens to *Zuphioides columbianum* (Chaudoir, 1872), based on the key by Liebke (1933), due to their superficial morphological correspondence with this species, in particular with regard to body size and color. Moreover, the only record of *Zuphioides* for Ecuador was that of *Z. columbianum*, based on 8 specimens from

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Guayaquil, doubtfully attributed by Liebke (1933) to this species, originally described from Colombia.

When we examined an excellent photograph of the holotype of *Z. columbianum* by Olivier Montreuil (Muséum National d'Histoire Naturelle) (Fig. 1), despite the poor conservation state of this specimen, a female without head, we realized that the specimens from Manabí actually belong to a different species, which is described herein as *Zuphioides walterrossii* n. sp.

Successively, we could check, thanks to Olaf Jäger (Senckenberg Naturmuseum, Dresden, Germany), 6 specimens from Guayaquil of the series of 8 doubtfully attributed by Liebke (1933) to *Z. columbianum*, and we realized that they undoubtedly belong to a further different species, distinct from *Z. walterrossii* n. sp. too, which is described herein as *Zuphioides olafjaegeri* n. sp. The two remaining specimens of this series were retained by Liebke and successively borrowed by Mateu: they probably went lost, as they were not found either in the Liebke Collection (Warsaw) or in the Mateu Collection (Turin).

Furthermore, we had the opportunity to study three specimens from Bolivia collected by Andrea Visinoni: they also proved to belong to a new species, which is here described as *Zuphioides visinonii* n. sp.

Finally, an updated key to all *Zuphioides* species so far recorded from South America is provided, also including *Z. brasiliense* (Chaudoir, 1872), which was not considered in the key by Liebke (1933), based on the characters of the holotype deposited in MNHN (Fig. 2).

MATERIALS AND METHODS

The specimens studied or mentioned in the text are deposited in the following museums and private working collections:

CAI = Gianni Allegro working Collection (Moncalvo, Asti, Italy).

CGi = Pier Mauro Giachino working Collection (San Martino Canavese, Torino, Italy).

MNHN = Muséum National d'Histoire Naturelle, Paris, France.

MIZ = Museum and Institute of Zoology of the Polish Academy of Sciences, Warsaw, Poland.

SNG = Senckenberg Naturmuseum, Dresden, Germany.

The abbreviations used for the type material are:

HT = holotype.

PT(T) = paratype(s).

The type locality is quoted in the original label form.

Apparent body length (ABL) is measured from apex of labrum to apex of longer elytron; total length (TL) is measured from the apex of mandibles to apex of abdomen. PL: pronotum length from apical to basal margin along midline; PW: pronotum width at the widest point; EL: elytral length from humerus to apex of longer elytron; EW: elytron width at the widest point; HW=head width at eye level.

Digital images of *Z. walterrossii* n. sp., *Z. olafjaegeri* n. sp. and *Z. visinonii* n. sp. were taken by a Leica DFC295 camera mounted on a Leica M205 C stereomicroscope, using Leica Application System V4.0 software. The digital images of the holotypes of *Z. columbianum* and *Z. brasiliense* were taken by Olivier Montreuil (MNHN).

The annexed key to the *Zuphioides* species recorded to-date from South America is mainly based on the one published by Liebke (1933), including the newly described species as well as *Z. brasiliense* (Chaudoir, 1972). As we were not able to examine type material of all *Zuphioides* species currently known, the key has been compiled, when necessary, using characters taken from the original descriptions of authors. Character states of *Z. columbianum* and *Z. brasiliense* were checked on the holotype.

Zuphioides walterrossii n. sp.

LSIDurn:lsid:zoobank.org:act:

CAD6372C-DEE7-4980-8C69-FB58811533BA

TYPE LOCALITY. Ecuador, Manabí, swamp near S. Antonio. [Humedal 'La Segua'] [80°10'15.4"W - 00°43'22.4"S]

TYPE SERIES. Holotype ♂: Ecuador, Manabí, swamp near S. Antonio, 14.VII.2008, W. Rossi legit (CAI). Paratypes: 2 ♂♂: same data as HT (CAI, CGi).

DIFFERENTIAL DIAGNOSIS. A small sized fully winged zuphiine species belonging to the genus *Zuphioides*, pubescent throughout with a short yellowish pubescence. Pronotum and elytra reddish-brown; head a little darker; legs, mouth parts and antennae yellowish-brown, a little paler than upper body; eye diameter about 1/2 of temple length; pronotum about as long as wide, with posterior angles right or sub-acute and laterally scarcely prominent; elytra slender, with striae superficially impressed and intervals scarcely convex, transversally rugulose; elytra obliquely sub-truncate at apex, with apical margin delicately sinuate.

It is distinguished from all other South American *Zuphioides* species by its peculiar character set of body size and color, antennal length, shape of pronotum and elytra (see identification key). In particular, it is distinguished from *Z. columbianum* by shape of pronotum (as long as wide vs. distinctly transverse) (Figs. 3 and 4) and shape of elytra (slender vs. moderately slender). Despite the few specimens available for comparison (and despite the lack of comparison of male genitalia), the striking morphological differences of pronotum and elytra of the new species respect to the holotype of *Z. columbianum* are, in our opinion, highly significant so as to justify the description of a separate species. Moreover, *Z. walterrossii* n. sp. differs from *Z. olafjaegeri* n. sp., the most similar species, mainly by longer antennomeres 5-8 (2.4 times vs. 2 times longer than wide), shape of pronotum (Figs. 4 and 5) and shape of male genitalia.

DESCRIPTION. A small sized *Zuphioides* species: TL: 4.37-4.61 (HT ♂ 4.61 mm); ABL: 4.04-4.26 mm (HT ♂ 4.26 mm).

Habitus and color (Fig. 6): body moderately slender, pubescent throughout with a short reclined yellowish pubescence; elytra delicately dilated backwards; body color reddish-brown, with head a little darker and with mouth parts, antennae and legs yellowish-brown, paler.

Head (Fig. 7): brownish in color (paler anteriorly), sub-triangular, scarcely narrower than pronotum (HW/PW=0.94), dorsally distinctly punctate, but less densely than pronotum; dilated behind eyes and abruptly restricted in a thin neck impunctate, less than 1/3 as wide as head; eyes moderately small, scarcely convex, oval but posteriorly obliquely truncate, with diameter nearly 1/2 of temple length; one pair of supra-orbital setae above eyes; one pair of occipital setae posteriorly; microsculpture superficial, in polygonal meshes; frontal impressions superficial, broad and very short, ending before the anterior edge of eye; temples convex and evenly rounded, densely pubescent with short bristles and almost long two times the diameter of eye; a distinct, narrow supraorbital carina above antennal insertion. Labrum rectangular, with six setigerous punctures on anterior margin, the lateral ones longer than others. Clypeus transverse, trapezoid, reddish, paler than head; a couple of central setae at anterior margin of clypeus and two further setae at each side; a pair of long bristles at sides near base. Antennae yellowish-brown, moderately long and slender, surpassing

elytral base when stretched backwards, densely pubescent; the first antennomere longer than antennomeres 2-4 together, the fifth to eighth ones about 2.4 times longer than wide; the first antennomere with a single long pre-apical seta. Mandibles moderately long, pointed and abruptly curved at apex. Mentum distinctly broader than long, sparsely pubescent, deeply emarginate at anterior margin, with a large, blunt mentum tooth; epilobes rather broad, laterally broad and anteriorly pointed; suture between mentum and submentum present. Maxillary and labial palpi of about equal size and form, with apical margin obliquely truncate; penultimate labial palpomere multisetose.

Thorax (Fig. 8): PL: 0.85-0.89 mm (HT ♂ 0.87 mm); PW: 0.87-0.89 mm (HT ♂ 0.88 mm); PL/PW: 0.98-1.00 (HT ♂ 0.99). Pronotum densely and moderately coarsely punctate throughout (the distance among punctures is longer than their diameter), without any distinct microsculpture, pubescent with moderately long, yellow, semi-erect setae; form about as long as wide, widest at anterior fourth; side margins almost parallel at anterior half and then markedly sinuate backwards up to the basal angles, which are right or sub-acute, moderately sharp at apex and laterally scarcely prominent; post-angular seta present; posterior margin distinctly pedunculate at middle; latero-basal impressions wide and markedly impressed, flattened towards rear angles; front angles broadly rounded; a marginal seta at anterior eighth on each side; lateral margin narrowly darkened, with marginal bead narrow on overall length, at base joining with the basal impressions; anterior and posterior margins unbordered; medial longitudinal sulcus deep, ending before apex and base.

Elytra: EL: 2.40-2.50 mm (HT ♂ 2.46 mm); EW: 0.73-0.76 mm (HT ♂ 0.74 mm); EL/EW: 3.29-3.32 (HT ♂ 3.32). Sub-parallel sided, moderately convex, slightly narrower at base and widest towards apex, with shoulders rounded and moderately prominent forwards; apex obliquely sub-truncate and moderately prominent; apical margin delicately sinuate. Surface punctate, shiny, without any distinct microsculpture, pubescent throughout with short, reclined, yellow setae. Epipleura without distinct external plicae ('uncrossed epipleura'). Intervals scarcely convex, densely punctate and somewhat transversally striated; striae superficially impressed for overall length, distinctly punctate and rugulose. Parascutellar stria absent; scutellar setigerous pore present between striae 1 and 2, adjacent to the second

stria. Basal margin nearly indistinct; apical margin with a translucent border. Each elytron with rounded sutural apex; the outer posterior angle rounded. Discal setigerous punctures absent; punctures of the umbilicate series widely spaced at middle. Hind wings fully developed.

Ventral surface (thorax and abdomen): prosternum punctate and pubescent; proepisterna mostly glabrous. Mesosternum glabrous, rugose. Metepisterna very long, punctate and pubescent, narrowed backwards and nearly four times longer than wide at anterior margin. Prosternal intercoxal process apically rounded and setose. Sterna densely pubescent.

Legs: moderately long and pubescent throughout, solid yellowish-brown. Metatrochanters moderately long, about as long as 1/3 of metafemora. Protibial antennal cleaning organ well developed, with two clip setae. Protibiae and mesotibiae moderately short and robust; metatibiae slender, about as long as tarsi, without spines except the apical ones, with an apical crown of brush-like setae. Tarsomeres dorsally convex; protarsomeres short, the 1st-3rd markedly and symmetrically dilated in males, nearly as long as wide, ventrally with an adhesive vestiture in form of a spongy pad; the 4th antennomere slightly concave at apex; metatarsomeres slender, the first one more than 2 times longer than 2nd and nearly 3 times longer than 3rd; claws smooth.

Male genitalia (Figs. 9-11): median lobe of aedeagus in lateral view stout and thickened at mid-length, moderately bent downwards at apex (Fig. 9); in dorsal view slightly sinuate at the left side and progressively narrowed from base to apex; apical blade short and sub-triangular, blunt at apex (Fig. 10). Ostium long, placed in dorsal position, nearly as long as 2/3 of median lobe, not reaching basal bulb. Right paramere small and narrow, elongate. Male gonosomite (IX invaginated abdominal segment) sub-triangular with proximal apophysis broadly rounded at apex (Fig. 11). **REMARKS.** At the present status of knowledge, any phylogenetic assumption is premature: anyway, the closest relative of *Z. walterrossii* n. sp. seems to be represented by *Z. olaffaegeri* n. sp., which is also geographically close, due to their morphological similarity, even in male genitalia, that makes probable a relatively recent differentiation of the two species.

DISTRIBUTION AND ECOLOGY. Geographical distribution: *Zuphioides walterrossii* n. sp. is currently recorded only from one site of the province of Manabí, Western Ecuador (Fig. 12). It is suspected to have a wider dis-

tribution than the one here reported, as it is fully winged and probably provided with good dispersal abilities. Life habits: the specimens of the type series were captured near a swamp, attracted to artificial light at night, which could lead to hypothesize a preference for low-land hygrophilic habitats.

ETYMOLOGY. This species is dedicated to its collector, Walter Rossi, a world-renowned specialist in entomoparasitic fungi, as a token of our esteem and as a sign of gratitude for the gift to the authors of the specimens of the new species.

***Zuphioides olaffaegeri* n. sp.**

*LSID*urn:lsid:zoobank.org:act:

9006CB8D-844E-4508-815A-A8F91D8A09F7

TYPE LOCALITY. Ecuador, Guayaquil.

TYPE SERIES. Holotype ♂: Ecuador, Guayaquil, Gehr. W. Müller Vermächt, 1909 (SNG). Paratypes: 2 ♂♂, 3 ♀♀: same data as HT (SNG, CAI, CGi).

DIFFERENTIAL DIAGNOSIS. A small sized fully winged zuphiine species belonging to the genus *Zuphioides*, pubescent throughout with a short yellowish pubescence. Pronotum and elytra light brown; head a little darker; legs, mouth parts and antennae yellowish-brown, a little paler than upper body; eye diameter about 1/2 of temple length; pronotum a little wider than long, with posterior angles right and blunt, laterally scarcely prominent; elytra moderately slender, with striae superficially impressed and intervals scarcely convex, transversally rugulose; elytra obliquely sub-truncate at apex, with apical margin almost linear.

It is distinguished from all other South American *Zuphioides* species by its peculiar character set of body size and color, antennal length, shape of pronotum and elytra (see identification key). In particular, it is distinguished from *Z. columbianum* by the shape of pronotum (scarcely transverse vs. markedly transverse) (Figs. 3 and 5). Moreover, *Z. olaffaegeri* n. sp. differs from *Z. walterrossii* n. sp., the most similar species, mainly by shorter antennomeres 5-8 (2 times vs. 2.4 times longer than wide), shape of pronotum (Figs. 4 and 5) and shape of male genitalia.

DESCRIPTION. A small sized *Zuphioides* species: TL: 3.98-4.54 (HT ♂ 3.98 mm); ABL: 3.65-4.18 mm (HT ♂ 3.65 mm).

Habitus and colour (Fig. 13): body moderately slender, pubescent throughout with a short re-

clined yellowish pubescence; elytra delicately dilated backwards; body color light brown, with head a little darker and with mouth parts, antennae and legs yellowish-brown, paler.

Head (Fig. 14): brownish in color, sub-triangular, narrower than pronotum ($HW/PW=0.86$), dorsally distinctly punctate, but less densely than pronotum; dilated behind eyes and abruptly restricted in a thin neck impunctate, less than $1/3$ as wide as head; eyes moderately small, scarcely convex, oval but posteriorly obliquely truncate, with diameter nearly $1/2$ of temple length; one pair of supraorbital setae above eyes; one pair of occipital setae posteriorly; microsculpture superficial, in polygonal meshes; frontal impressions superficial, broad and very short, ending before the anterior edge of eye; temples convex and evenly rounded, densely pubescent with short bristles and almost long two times the diameter of eye; a distinct, narrow supraorbital carina above antennal insertion. Labrum rectangular, with six setigerous punctures on anterior margin, the lateral ones longer than others. Clypeus transverse, trapezoid, brownish, a little paler than head; a couple of central setae at anterior margin of clypeus and two further setae at each side; a pair of long bristles at sides near base. Antennae yellowish-brown, moderately long and slender, surpassing elytral base when stretched backwards, densely pubescent; the first antennomere longer than antennomeres 2-4 together, the fifth to eighth ones about 2.0 times longer than wide; the first antennomere with a single long pre-apical seta. Mandibles moderately long, pointed and abruptly curved at apex. Mentum distinctly broader than long, sparsely pubescent, deeply emarginate at anterior margin, with a large, blunt mentum tooth; epilobes rather broad, laterally broad and anteriorly pointed; suture between mentum and submentum present. Maxillary and labial palpi of about equal size and form, with apical margin obliquely truncate; penultimate labial palpomere multisetose.

Thorax (Fig. 15): PL: 0.76-0.86 mm (HT ♂ 0.76 mm); PW: 0.80-0.93 mm (HT ♂ 0.80 mm); PL/PW: 0.92-0.96 (HT ♂ 0.95). Pronotum densely and moderately coarsely punctate throughout (the distance among punctures is longer than their diameter), without any distinct microsculpture, pubescent with moderately long, yellow, semi-erect setae; form slightly transverse, widest at anterior fourth; side margins very weakly rounded at anterior half and then markedly sinuate backwards up to the basal angles, which are right, blunt

at apex and laterally scarcely prominent; post-angular seta present; posterior margin distinctly pedunculate at middle; latero-basal impressions wide and markedly impressed, flattened towards rear angles; front angles broadly rounded; a marginal seta at anterior eighth on each side; lateral margin narrowly darkened, with marginal bead narrow on overall length, at base joining with the basal impressions; anterior and posterior margins unborded; medial longitudinal sulcus deep, ending before apex and base.

Elytra: EL: 2.10-2.40 mm (HT ♂ 2.10 mm); EW: 0.66-0.81 mm (HT ♂ 0.66 mm); EL/EW: 2.95-3.28 (HT ♂ 3.18). Sub-parallel sided, moderately convex, slightly narrower at base and widest towards apex, with shoulders evenly rounded and almost not prominent forwards; apex obliquely sub-truncate and moderately prominent; apical margin almost rectilinear. Surface punctate, shiny, without any distinct microsculpture, pubescent throughout with short, reclined, yellow setae. Epipleura without distinct external plicae ('uncrossed epipleura'). Intervals scarcely convex, densely punctate and somewhat transversally striated; striae superficially impressed for overall length, distinctly punctate and rugulose. Parascutellar stria absent; scutellar setigerous pore present between striae 1 and 2, adjacent to the second stria. Basal margin nearly indistinct; apical margin without any distinct border. Each elytron with rounded sutural apex; the outer posterior angle rounded. Discal setigerous punctures absent; punctures of the umbilicate series widely spaced at middle. Hind wings fully developed.

Ventral surface (thorax and abdomen): prosternum punctate and pubescent; proepisterna mostly glabrous. Mesosternum glabrous, rugose. Metepisterna very long, punctate and pubescent, narrowed backwards and nearly four times longer than wide at anterior margin. Prosternal intercoxal process apically rounded and setose. Sterna densely pubescent.

Legs: moderately long and pubescent throughout, solid yellowish-brown. Metatrochanters moderately long, about as long as $1/3$ of metafemora. Protibial antennal cleaning organ well developed, with two clip setae. Protibiae and mesotibiae moderately short and robust; metatibiae slender, about as long as tarsi, without spines except the apical ones, with an apical crown of brush-like setae. Tarsomeres dorsally convex; protarsomeres short, the 1st-3rd markedly and symmetrically dilated in males, nearly as long as wide, ventrally with an adhesive vestiture in form of a spongy pad; the 4th

antennomere slightly concave at apex; metatarsomeres slender, the first one more than 2 times longer than 2nd and nearly 3 times longer than 3rd; claws smooth.

Male genitalia (Figs. 16-18): median lobe of aedeagus in lateral view moderately slender and evenly curved throughout length, only scarcely bent downwards at apex (Fig. 16); in dorsal view slightly sinuate at the left side and progressively narrowed from base to apex; apical blade short and sub-triangular, blunt at apex (Fig. 17). Ostium long, placed in dorsal position, nearly as long as 2/3 of median lobe, not reaching basal bulb. Right paramere small and narrow, elongate. Male gonosomite (IX invaginated abdominal segment) sub-triangular with proximal apophysis broadly rounded at apex (Fig. 18).

REMARKS. At the present state of knowledge, any phylogenetic assumption is premature: anyway, the closest relative of *Z. olaffjaegeri* n. sp. seems to be *Z. walterrossii* n. sp., which is also geographically close, due to their morphological similarity, even in male genitalia, which makes probable a relatively recent differentiation of the two species.

DISTRIBUTION AND ECOLOGY. Geographical distribution: *Zuphioides olaffjaegeri* n. sp. is currently recorded only from Guayaquil, Central-Western Ecuador (Fig. 12). It could have a wider distribution than the one here reported, as it is fully winged and probably provided with good dispersal abilities. Life habits: no information is given in the collection labels regarding the life habitat; as the area of Guayaquil is rich in humid habitats and ponds formed by the river Guayas flowing into the Pacific Ocean through the Gulf of Guayaquil, a preference for hygrophilic habitats could be hypothesized.

ETYMOLOGY. This species is dedicated to Olaf Jäger, a world-renowned specialist in Coleoptera and Collection Manager of the Senckenberg Naturmuseum in Dresden, as a token of our esteem and as a sign of gratitude for allowing us to check the type specimens deposited in SNG and describe this new species.

Zuphioides visinonii n. sp.

LSIDurn:lsid:zoobank.org:act:

84A9B9C1-5CA9-46E8-92A4-997EE576AF44

TYPE LOCALITY. Bolivia, Dip. Santa Cruz, Prov. Ichilo, munic. Buena Vista, Rio Surutú, Cruce Bella Unión. [17°28'53.64"S - 63°43'31.93"W]

TYPE SERIES. Holotype ♂: Bolivia, Dip. Santa Cruz,

Prov. Ichilo, munic. Buena Vista, Rio Surutú, Cruce Bella Unión, 17.IX.2024, A. Visinoni legit (CAI). Paratypes: 2 ♂♂: same data as HT (Museum of Natural History 'Noel Kempff Mercado' in Santa Cruz de la Sierra Bolivia, CGi).

DIFFERENTIAL DIAGNOSIS. A medium-small sized fully winged zuphiine species belonging to the genus *Zuphioides*, pubescent throughout with a short yellowish pubescence. Head, pronotum and elytra dark brown; legs, mouth parts and antennae light brown, distinctly paler than upper body; eye diameter almost equal to temple length; pronotum wider than long, with posterior angles acute and laterally prominent; elytral striae markedly impressed for overall length, rugulose, with intervals convex and densely punctate; elytra obliquely sub-truncate at apex, with apical margin delicately sinuate.

It is distinguished from all other South American *Zuphioides* species by its peculiar character set of body size and color, antennal length and shape of pronotum (see identification key); referring to the species already known from Bolivia, it is easily distinguished from *Z. batesii* (Chaudoir, 1862) by smaller size (5.1-5.5 vs. 8 mm), and from *Z. lizeri* (Liebke, 1933) mainly by body colour (solid dark brown vs. reddish-brown with head black and elytra partly darkened) and shape of posterior angles of pronotum (acute and markedly laterally prominent vs. right and moderately prominent).

DESCRIPTION. A medium-small sized *Zuphioides* species: TL: 5.08-5.53 (HT ♂ 5.36 mm); ABL: 4.83-5.20 mm (HT ♂ 4.97 mm).

Habitus and colour (Fig. 19): body moderately short, pubescent throughout with a short reclined yellowish pubescence, longer and sparser on pronotum; elytra delicately dilated backwards; body colour solid dark brown, with mouth parts, antennae and legs light brown, paler.

Head (Fig. 20): dark brown in color, sub-triangular, distinctly narrower than pronotum (HW/PW=0.86), dorsally distinctly punctate, but less densely and less coarsely than pronotum; dilated behind eyes and abruptly restricted in a thin neck punctate only at sides, nearly 1/3 as wide as head; eyes large, convex, oval but posteriorly obliquely truncate, nearly as long as temples; one pair of supraorbital setae above eyes; one pair of occipital setae posteriorly; microsculpture very superficial, nearly indistinct; frontal impressions superficial, broad and very short, ending before the an-

terior edge of eye; temples convex and evenly rounded, densely pubescent with short bristles and nearly as long as diameter of eye; a distinct, narrow supraorbital carina above antennal insertion. Labrum rectangular, with six setigerous punctures on anterior margin, the lateral ones longer than others. Clypeus transverse, trapezoid, reddish, paler than head; a couple of central setae at anterior margin of clypeus and two further setae at each side; a pair of long bristles at sides near base. Antennae yellowish-brown, moderately long and slender, surpassing elytral base when stretched backwards, densely pubescent; the first antennomere longer than antennomeres 2-4 together, the fifth to eight ones about 2.4 times longer than wide; the first antennomere with a single long pre-apical seta. Mandibles moderately long, pointed and abruptly curved at apex. Mentum distinctly broader than long, sparsely pubescent, deeply emarginate at anterior margin, with a large, blunt mentum tooth; epilobes rather broad, laterally broad and anteriorly pointed; suture between mentum and submentum present. Maxillary and labial palpi of about equal size and form, with apical margin obliquely truncate; penultimate labial palpomere multisetose.

Thorax (Fig. 21): PL: 1.02-1.10 mm (HT ♂ 1.02 mm); PW: 1.15-1.20 mm (HT ♂ 1.15 mm); PL/PW: 0.89-0.92 (HT ♂ 0.89). Pronotum very densely and coarsely punctate throughout (the distance among punctures is shorter than their diameter), without any distinct microsculpture, pubescent with moderately long, yellow, semi-erect setae; form transverse, slightly wider than long, widest at anterior fourth; side margins gently curved at anterior third and then markedly sinuate backwards up to the basal angles, which are acute and laterally distinctly prominent; post-angular seta present; posterior margin distinctly pedunculate at middle; latero-basal impressions wide and markedly impressed, flattened towards rear angles; front angles broadly rounded; a marginal seta at anterior fourth on each side; lateral margin narrowly darkened, with marginal bead narrow on overall length, at base joining with the basal impressions; anterior and posterior margins unbordered; medial longitudinal sulcus deep, ending before apex and base.

Elytra: EL: 2.90-3.02 mm (HT ♂ 2.99 mm); EW: 0.93-0.97 mm (HT ♂ 0.97 mm); EL/EW: 3.05-3.25 (HT ♂ 3.13). Sub-parallel sided, moderately convex, slightly narrower at base and widest towards apex, with shoulders rounded and moderately prominent forwards; apex obliquely sub-truncate and moderately

prominent; apical margin delicately sinuate. Surface punctate, shiny, without any distinct microsculpture, pubescent throughout with short, reclined, yellow setae. Epipleura without distinct external plicae ('uncrossed epipleura'). Intervals convex, densely punctate and somewhat transversally striated; striae markedly impressed for overall length, distinctly punctate and rugulose. Parascutellar stria absent; scutellar setigerous pore present between striae 1 and 2, adjacent to the second stria. Basal margin nearly indistinct; apical margin distinctly bordered. Each elytron with rounded sutural apex; the outer posterior angle rounded. Discal setigerous punctures absent; punctures of the umbilicate series widely spaced at middle. Hind wings fully developed.

Ventral surface (thorax and abdomen): prosternum punctate and pubescent; proepisterna mostly glabrous. Mesosternum glabrous, rugose. Metepisterna very long, punctate and pubescent, narrowed backwards and nearly four times longer than wide at anterior margin. Prosternal intercoxal process apically rounded and setose. Sterna densely pubescent.

Legs: moderately long and pubescent throughout, solid yellowish-brown. Metatrochanters short, as long as 1/4 of metafemora. Protibial antennal cleaning organ well developed, with two clip setae. Protibiae and mesotibiae moderately short and robust; metatibiae slender, about as long as tarsi, without spines except the apical ones, with an apical crown of brush-like setae. Tarsomeres dorsally convex; protarsomeres short, the 1st-3rd markedly and symmetrically dilated in males, nearly as long as wide, ventrally with an adhesive vestiture in form of a spongy pad; the 4th antennomere slightly concave at apex; metatarsomeres slender, the first one more than 2 times longer than 2nd and nearly 3 times longer than 3rd; claws smooth.

Male genitalia (Figs. 22-24): median lobe of aedeagus in lateral view stout and thickened at mid-length, markedly bent downwards at apex (Fig. 22); in dorsal view slightly sinuate at the right side and delicately narrowed from base to apex; apical blade short and sub-triangular, blunt at apex (Fig. 23). Ostium long, placed in dorsal position, nearly as long as 2/3 of median lobe, not reaching basal bulb. Right paramere small and narrow, elongate. Male gonosomite (IX invaginated abdominal segment) sub-triangular with proximal apophysis broadly rounded at apex (Fig. 24). **DISTRIBUTION AND ECOLOGY.** Geographical distribution: *Zuphioides visinonii* n. sp. is currently recorded only from a single site of the province of Ichilo, Cen-

tral Bolivia (Fig. 25), a lowland area (about 330 m a.s.l.) crossed by Surutú river. It is suspected to have a wider distribution, as it is fully winged and probably provided with good dispersal abilities. Life habits: the specimens of the type series were captured along the Surutú river, attracted to artificial light at night, which could lead to hypothesize a preference for lowland hygrophilic habitats.

ETYMOLOGY. This species is dedicated to its collector, Andrea Visinoni, a researcher specialist in biodiversity at the Museum of Natural History 'Noel Kempff Mercado', University UAGRM in Santa Cruz de la Sierra, Bolivia.

CONCLUSIONS

With the three new species here described, 28 species of the genus *Zuphioides* are currently recorded from the New World and 14 from South America. Due to rarity of findings and their scarce presence in collections, the knowledge of this fauna is still limited, and it is likely that future research in the field, as well as in private or museum collections, will lead to the discovery of further new species.

At the present state of knowledge, *Z. columbianum* has to be excluded from the fauna of Ecuador, where only *Z. walterrossii* n. sp. and *Z. olaffjaegeri* n. sp. are currently recorded from. A third *Zuphioides* species (*Z. visinonii* n. sp.), in addition to the already known *Z. batesii* (Chaudoir, 1862) and *Z. lizeri* (Liebke, 1933), is now recorded from Bolivia.

The following key only concerns the species recorded to-date from South America; it has been compiled in the simplest possible way in order to make it, hopefully, easy to use; it is intended to facilitate and make possible future studies on this genus.

Key to the species of *Zuphioides* from South America (modified from Liebke, 1933)

1. Total length (TL) not exceeding 5 mm > **2**
 - Total length (TL) exceeding 5 mm > **7**
2. Smaller body size (TL 3.5 mm). Entirely rufo-testaceous. Colombia > *Z. exiguum* (Putzeys, 1878)
 - Larger body size (TL at least 4 mm) > **3**
3. TL not exceeding 4.3 mm. Brown with elytral base and suture reddish. Brazil (Amazonas) > *Z. pusillum* (Chaudoir, 1863)
 - TL at least equal to 4.5 mm > **4**

4. Antennal segments 5-8 at most 1.5 times longer than wide. Head black, elytra predominantly blackish, with base and suture lighter. TL 4.8 mm. Argentina > *Z. bruchi* (Liebke, 1933)
 - Antennal segments 5-8 at least 2 times longer than wide. Body entirely reddish-brown with head slightly darker. TL 4.5 mm > **5**
5. Pronotum markedly transverse (PL/PW=0.85). Colombia > *Z. columbianum* (Chaudoir, 1872)
 - Pronotum at most slightly transverse (PL/PW > 0.95) or almost as wide as long. Species from Ecuador > **6**
6. Antennal segments 2.4 times longer than wide. Pronotum almost as wide as long. TL 4.4-4.6 mm > *Z. walterrossii* n. sp.
 - Antennal segments only 2 times longer than wide. Pronotum slightly wider than long (PL/PW=0.95). TL 4.0-4.5 mm > *Z. olaffjaegeri* n. sp.
7. Antennae longer, segments 5-8 about 3 times longer than wide. Pronotum markedly narrower towards base. TL 6-7 mm. Venezuela > *Z. salivanum* (Liebke, 1933)
 - Antennae shorter, segments 5-8 only 2.0-2.5 times longer than wide > **8**
8. Larger body size (TL 8 mm). Dorsum entirely dark brown to black. Brazil, Bolivia > *Z. batesii* (Chaudoir, 1862)
 - Smaller body size (TL at most 7 mm). Dorsum yellow-brown to dark brown, with or without darker spots or bands > **9**
9. Pronotum not or scarcely transverse, as wide as head. TL 6-7 mm > **10**
 - Pronotum more transverse, distinctly wider than head. TL 5.3-6.0 mm > **12**
10. Dorsum yellow-brown to reddish, elytra with a vague blackish spot near apex; head only a little darker. TL 6.2-6.5 mm. Argentina > *Z. argentinicum* (Liebke, 1933)
 - Dorsum solid brown-black; head black > **11**
11. Larger body size (TL 7 mm). Colombia > *Z. capitum* (Liebke, 1933)
 - Smaller body size (TL 6 mm). Brazil (Santa Catarina) > *Z. brasiliense* (Chaudoir, 1872)

12. Dorsum solid dark brown. Rear angles of pronotum acute and laterally prominent. TL 5.1-5.6. Bolivia > *Z. visinonii* n. sp.
- Dorsum reddish-brown with pronotum and elytra partly darkened. Rear angles of pronotum right, not or scarcely prominent > **13**
13. Pronotum strongly transverse, coarsely punctate, with sides very scarcely sinuate backwards. TL 5.8-6.0 mm. Brazil (Amazonas) > *Z. aequinoctiale* (Chaudoir, 1862)
- Pronotum less transverse, more finely punctate, with sides markedly sinuate backwards. TL 5.3-5.6 mm. Bolivia > *Z. lizeri* (Liebke, 1933)

ACKNOWLEDGEMENTS

We are indebted with Walter Rossi and Andrea Visinoni (Museum of Natural History 'Noel Kempff Mercado', University UAGRM in Santa Cruz de la Sierra, Bolivia), who collected the type specimens of two new species and generously donated them to the authors, as well as with Olaf Jäger (SNG), who allowed us to check the type specimens of the third new species. A special thanks also to Olivier Montreuil (MNHN), for the photograph of the holotypes of *Zuphioides columbianum* and *Z. brasiliense*; to David Schimrosczyk (MIZ), for the research in the MIZ collection and the photographs of many *Zuphioides* holotypes; to the anonymous referees for revision and suggestions; to Elena Vergnasco (Alessandria) for linguistic revision.

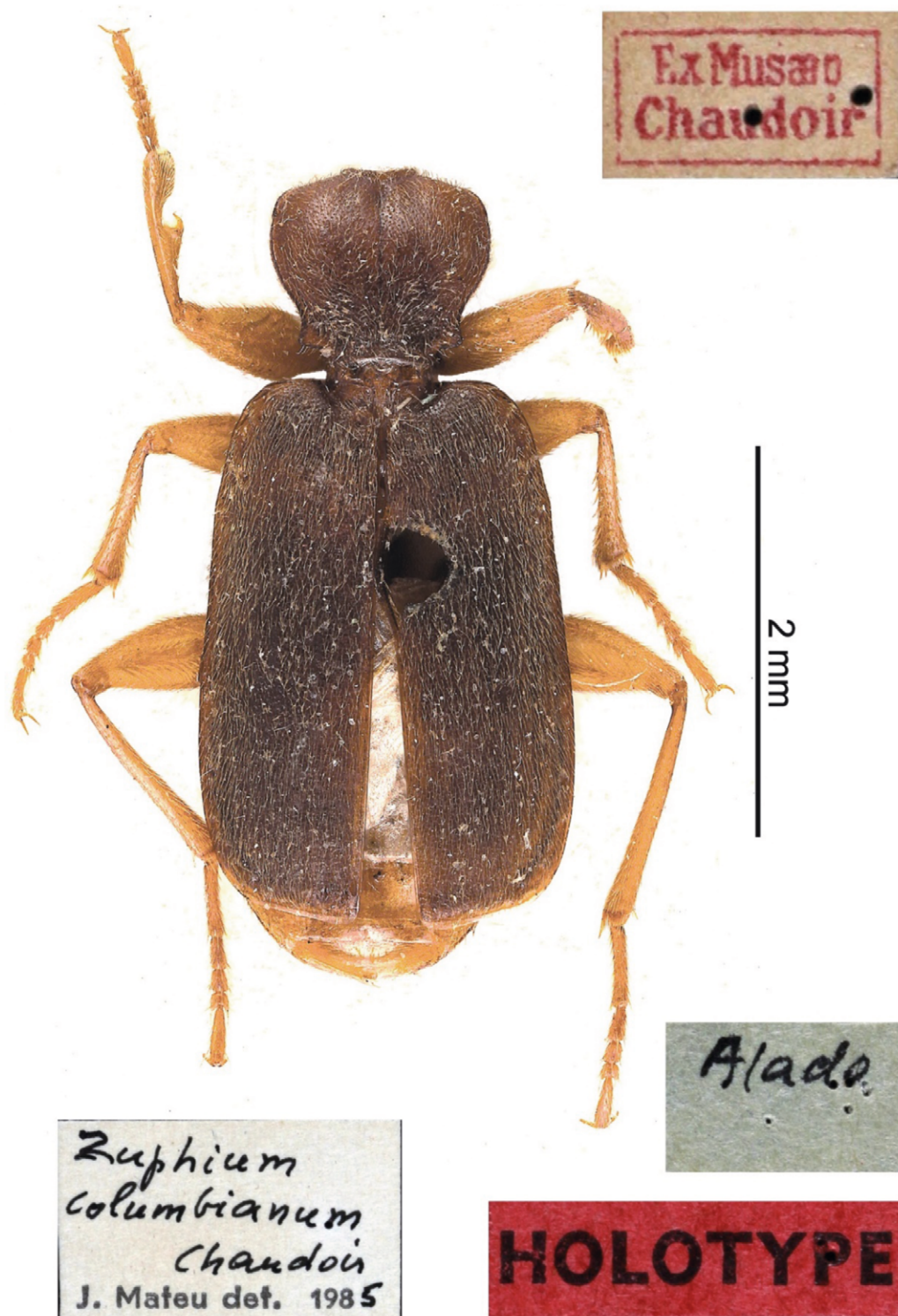
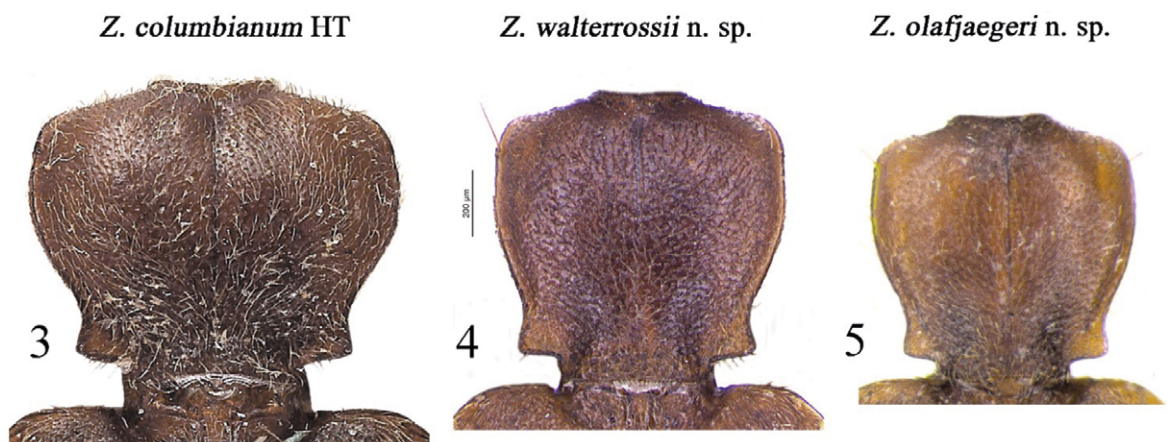


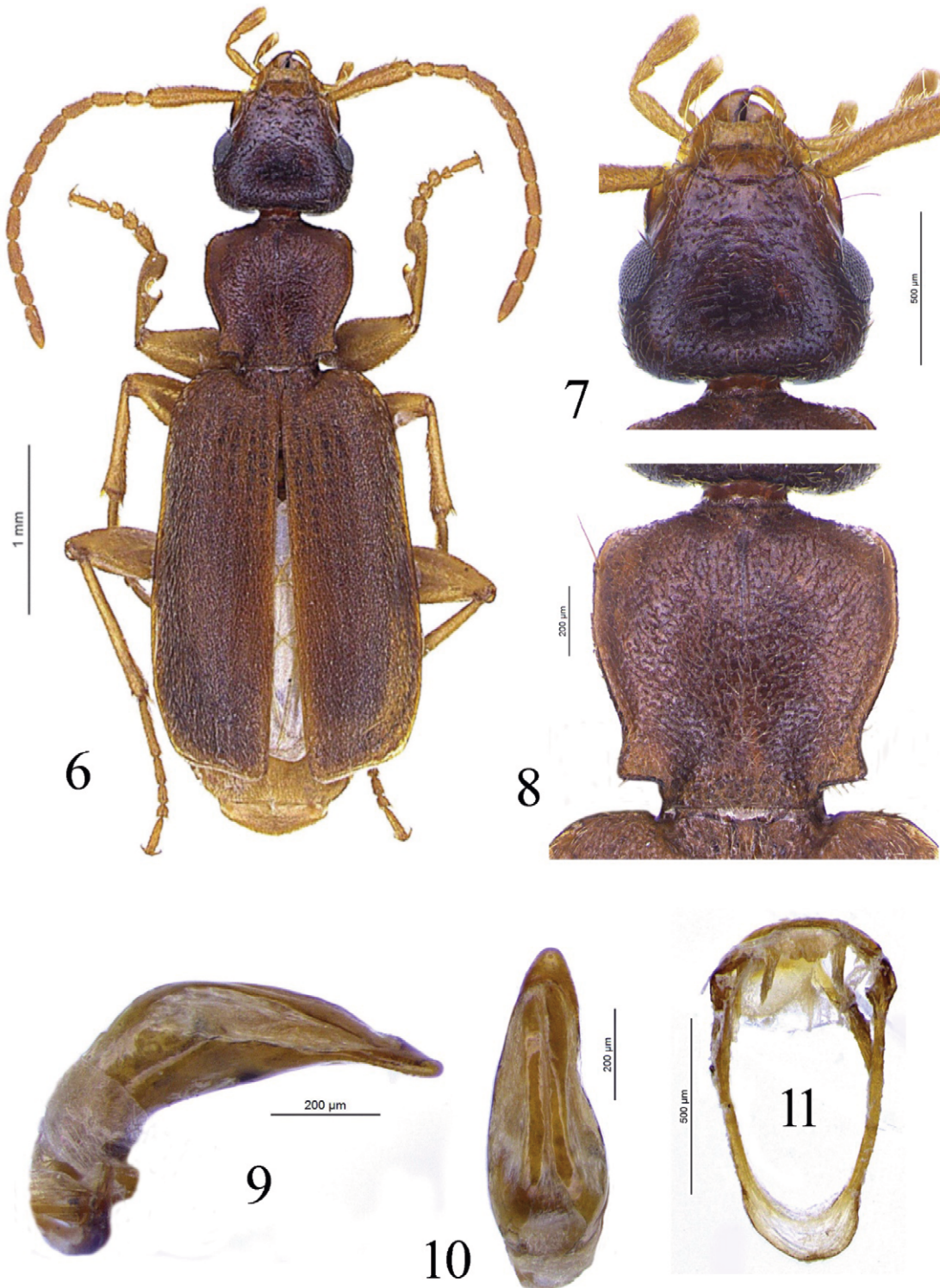
Fig. 1. *Zuphioides columbianum* (Chaudoir): holotype habitus with labels from Chaudoir Collection (MHNH) (photo Olivier Montreuil).



Fig. 2. *Zuphioides brasiliense* (Chaudoir): holotype habitus with labels from Chaudoir Collection (MHNH) (photo Olivier Montreuil).



Figs. 3-5. Pronota of: *Zuphioides columbianum* HT (3); *Z. walterrossii* n. sp. HT (4); *Z. olafjaegeri* n. sp. HT (5).



Figs. 6-11. *Zuphioides walterrossii* n. sp.: holotype habitus (6); head in dorsal view (7); pronotum (8); median lobe of aedeagus in lateral view (9); median lobe of aedeagus in dorsal view (10); male gonosomite (IX invaginated abdominal segment) (11).

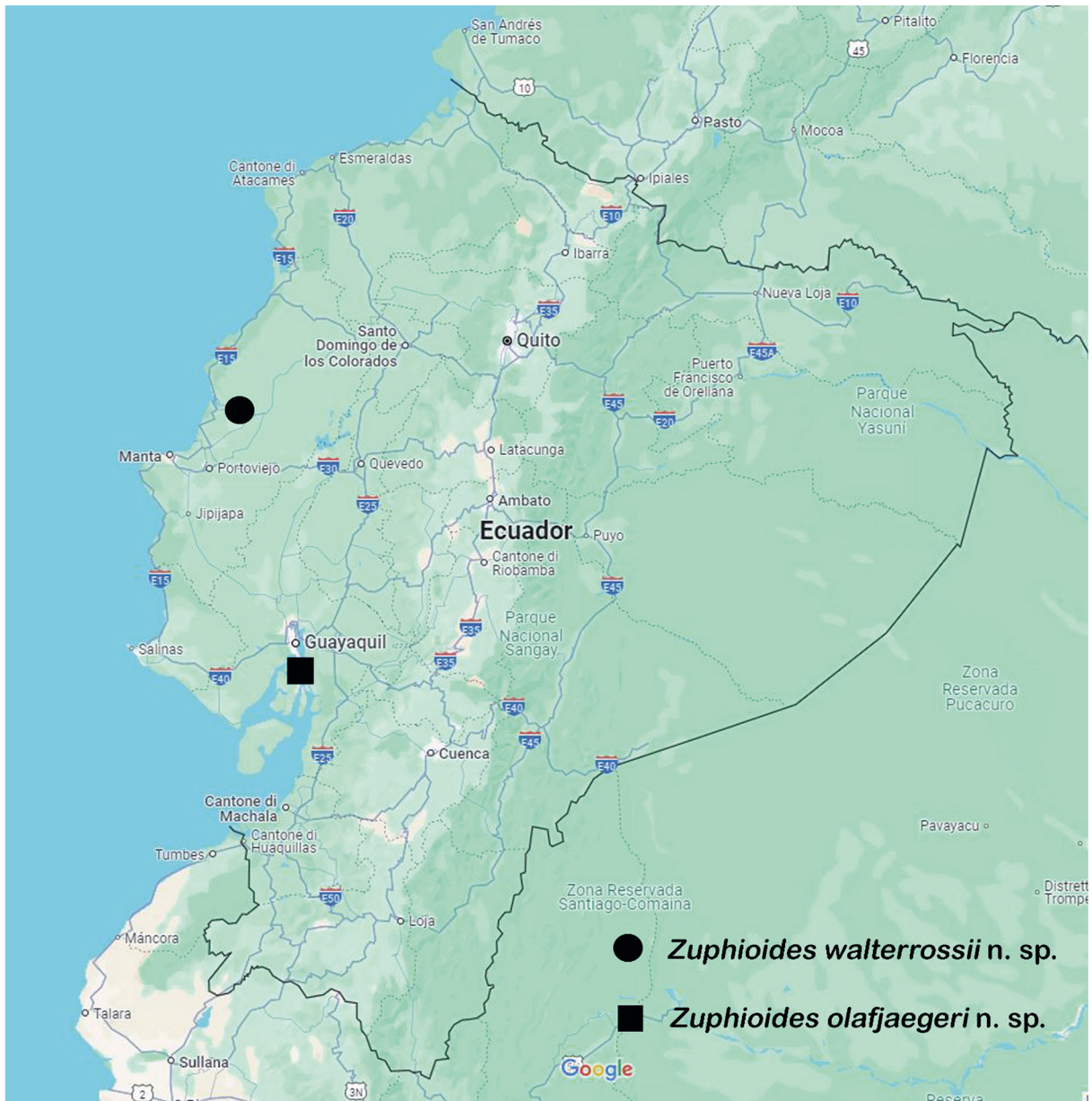
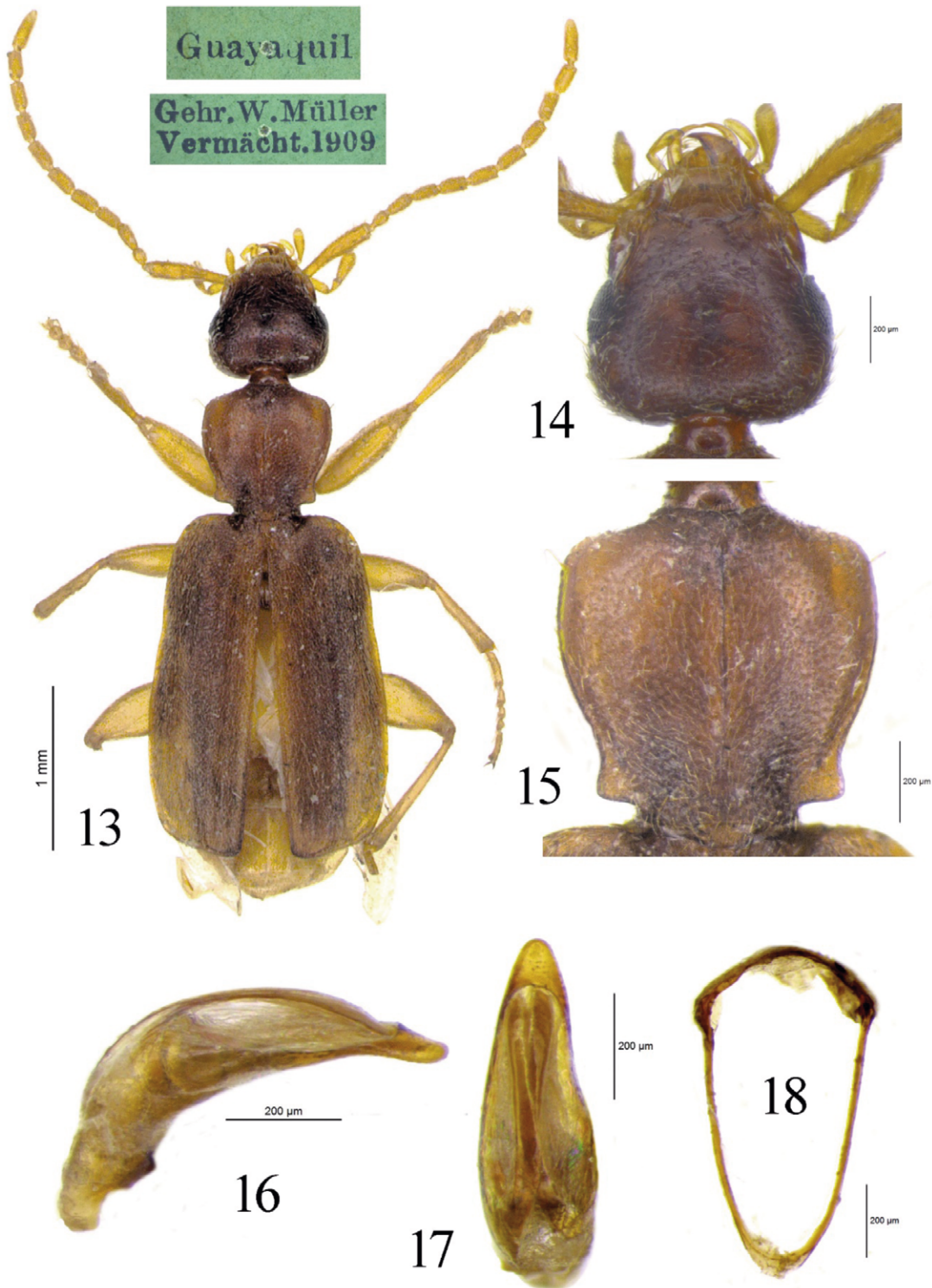
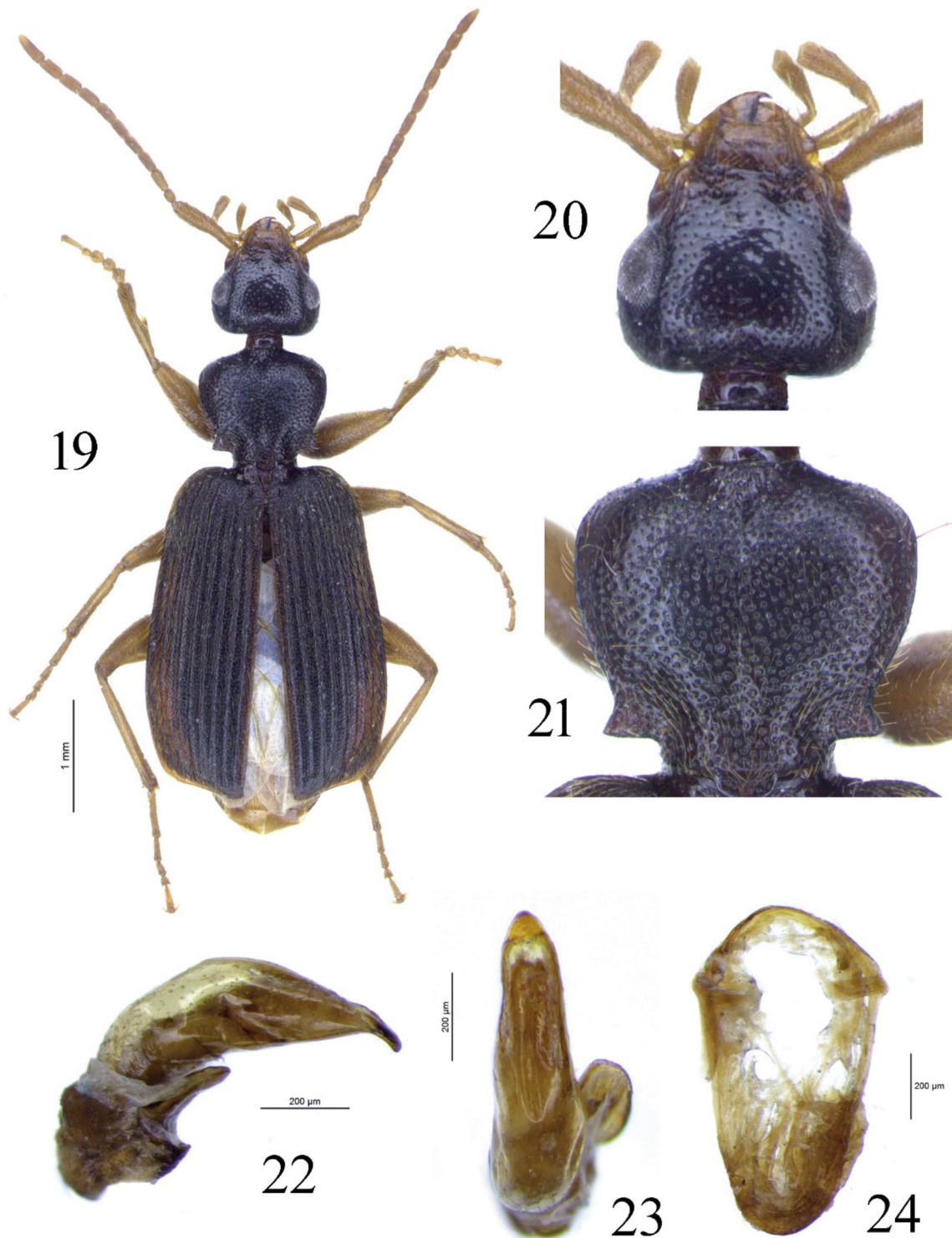


Fig. 12. Distribution map of *Zuphioides walterrossii* n. sp. and *Z. olafjaegeri* n. sp. in Ecuador (from Google Maps).



Figs. 13-18. *Zuphioides olaffaegeri* n. sp.: holotype habitus (13); head in dorsal view (14); pronotum (15); median lobe of aedeagus in lateral view (16); median lobe of aedeagus in dorsal view (17); male gonosome (IX invaginated abdominal segment) (18).



Figs. 19-24. *Zuphioides visinonii* n. sp.: holotype habitus (19); head in dorsal view (20); pronotum (21); median lobe of aedeagus in lateral view (22); median lobe of aedeagus in dorsal view (23); male gonosome (IX invaginated abdominal segment) (24).



Fig. 25. Distribution map of *Zuphioides visinonii* n. sp. in Bolivia (from Google Maps).

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Pasquale TREMATERRA*

Two new species of the genus *Pammene* Hübner, 1875 from Jordan (Lepidoptera Tortricidae)

Abstract: Two new species of *Pammene* Hubner, 1875 (Lepidoptera Tortricidae) are described based on the specimens collected in Jordan. They are *P. calliprinosa* Trematerra sp.n. and *P. massai* Trematerra sp.n. Diagnostic characters of each new species are given, and photos of adults and male and female genitalia are provided.

Riassunto: Due nuove specie del genere *Pammene* Hübner, 1875 dalla Giordania (Lepidoptera Tortricidae).

Sono descritte due nuove specie di Lepidoptera Tortricidae appartenenti al genere *Pammene* Hübner, 1875, sulla base di esemplari raccolti in Giordania. Le nuove specie sono *P. calliprimosa* Trematerra sp.n. e *P. massai* Trematerra sp.n. Vengono forniti i caratteri morfologici ed ecologici, le foto degli adulti e dei genitali maschili e femminili.

Key words: new species, *Pammene*, Lepidoptera Tortricidae, Jordan.

To meet the requirements by the International Code of Zoological nomenclature (ICZn), this article was registered at Zoobank (25 April 2026) under the Zoobank life Science Identifier (ISID): urn:lsid:zoobank.org:pub:F95865E5-BC05-4CCB-B34B-6A91C2D89FC6. Published: 30 April 2026.

INTRODUCTION

Nieves-Aldrey & Massa (2006) reported the results of a survey of the *Hymenoptera Cynipidae* of Jordan, a country not previously investigated. During 1999-2000, Professor Bruno Massa visited Jordan three times (during the following periods: 22.V-3.VI.1999; 23.X-4.XI.1999; 23.IV-3.V.2000) and collected galls induced by cynipid wasps. The collecting areas for galls lie mainly in the highlands of Jordan, where large variations in climate, geology, and vegetation occur (Albert *et al.*, 2004). Forests of *Pinus halepensis* Miller and evergreen oak *Quercus calliprinos* Webb. (= *Quercus coccifera* L.) occur on different soils at altitudes up to 1200 m. Two other deciduous oaks occur in Jordan, namely *Q. ithaburensis* (Decne.) Boiss. at lower altitudes, and *Q. boissieri* Reut. (= *Q. infectoria* subsp. *veneris* (Schn.) Meikle), which has scattered stands at over 700 m altitude, particularly near Ajlun.

Collected galls were stored in bags, transferred to Italy, and reared in small boxes in the climatic conditions of Palermo (Sicily) for 3 years after collection in order to obtain gall-inducers, parasitoids, and inquiline. Specimens that emerged were mounted and labelled for identification (Nieves-Aldrey and Massa, 2006). Among other inquiline insects, some specimens

of *Lepidoptera Tortricidae* belonging to the genus *Pammene* Hübner, 1875 occurred. In particular, one specimen belongs to *Pammene gallicolana* (Lienig & Zeller, 1846), while other specimens are unknown and belong to two different new taxa, which are described below: *P. calliprinosa* Trematerra sp.n. and *P. massai* Trematerra sp.n.

Pammene gallicolana (Lienig & Zeller, 1846)

MATERIAL EXAMINED. 1 male, Giordania (Jordan), Juddayta, (Ajlun), 29.IV.2000, ex *Q. ithaburensis*, ex galle (galls) of *A. grossulariae* – sf. (emerged) XI.2000.

DIAGNOSIS. Externally *P. gallicolana* is similar to *P. albuginana* (Guenée) and *P. ignorata* Kuznetsov. The male genitalia are comparable to those in *Pammene argyrana* Hübner, but with shorter, more convex ventral edge of sacculus and longer cucullus broadest near middle.

BIOLOGY. Larva feeds (IX-X) on *Quercus* in dry hymenopteran galls. In autumn, a full-grown larva spins a cocoon in which it hibernates and then pupates next spring (Razowski, 2003). After Danilevsky & Kuznetsov (1968), this species utilizes galls of *Biorhiza pallida*

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(Olivier), *B. terminalis* (Fabricius) and *Cynips quercus* (Geoffroy). Moth flies: V-VI; in Moldavia in VI and X what concerns probably two generations a year (Razowski, 2001, 2003).

Our *P. gallicolana* was obtained on late November from galls of *Andricus grossulariae* Giraud (Hymenoptera Cynipidae) on *Quercus ithaburensis* (Decne.).

DISTRIBUTION. European species whose repartition area is included in that of *Quercus robur* Linnaeus. Eastwards it reaches Ukraine and Moldavia.

***Pammene calliprinosa* Trematerra sp.n.**

LSIDurn:lsid:zoobank.org:act:

E33BAB1C-A67C-417F-8117-559A4E10C9A2

MATERIAL EXAMINED. Holotype, 1 male, Giordania (Jordan), Judayta, (Ajlun), 29.IV.2000, *Q. calliprinos*, leg. B. Massa; 1 male, Giordania (Jordan), Judayta, (Ajlun), 29.IV.2000, *Q. calliprinos*, leg. B. Massa; 1 female, Giordania (Jordan), Judayta, (Ajlun), 29.IV.2000, *Q. calliprinos*, ex *Andricus kollari*.

Deposited in the Trematerra Collection, Campobasso, Italy.

DESCRIPTION. Adult (Fig. 1a). Wingspan 12-14 mm. Head, thorax and abdomen light brown. Palps yellowish, brown in apical part. Ground color of forewing yellowish suffused with pale brown; distal and costal areas slightly mixed hazel. All parts distinctly strigulated with brown, apex and termen pinkish creamy; costal strigulae whitish-creamy; dividings dark brown. Speculum with inner and outer lines and 4 inner black streaks. Group of larger strigulae in median part of wing. Postbasal fascia weak, preserved at dorsum; median fascia noncontinuous. Subterminal blotch black. Cilia creamy brown. Hindwing greyish-brown, paler basally; cilia yellowish with medial line brown.

Variation: Shade of ground color and presence of yellowish dorsal patch.

Unfortunately, part of specimens studied has been tagged with entomological glue and are partially damaged.

Male genitalia (Fig. 1b). Top part of tegumen subtriangular, apical prominence distinct, hairy; valva elongated, slender, with rather weak densely bristled neck; caudal angle of sacculus small, cucullus long, spined, with very weak ventral prominence; ventral incision shallow; basal cavity roundish; aedeagus devel-

oped, long, distally narrowed, with minute cornuti, lanceolate and spiny. Vinculum and saccus robust.

Female genitalia (Fig. 1c and d). Papilla analis developed; apophysis anterior and apophysis posterior of the same length; sterigma large, robust, expanded anteriorly, sclerotized, cup-shaped; subgenital sternite with lateral sharp corners; ductus bursae short; cingulum elongated, like tubular in shape; corpus bursae large, subpiriform, signa two evident spines; proximal part of corpus bursae sclerotized.

DIAGNOSIS. The adult of *P. calliprinosa* is externally similar to *P. amygdalana* (Duponchel). The male genitalia of *P. calliprinosa* are distinguished by valvae conformation more elongated and thinner. The female genitalia differ in their larger, anteriorly expanded, sclerotized and cup-shaped sterigma; the cingulum is longer.

BIOLOGY. Adults of *P. calliprinosa* were obtained on late April from galls of *Andricus kollari* Giraud (Hymenoptera Cynipidae) on *Quercus calliprinos* Webb. (= *Quercus coccifera* L.).

ETYMOLOGY. The name of the new species, *Pammene calliprinosa*, refers to the host plant *Quercus calliprinos*.

***Pammene massai* Trematerra sp. n.**

LSIDurn:lsid:zoobank.org:act:

3AE23A2F-8F38-4E13-ACDD-D8F3FBBE85A3

MATERIAL EXAMINED. Holotype, 1 male, Giordania (Jordan), Dair Abi Said, 30.IV.2000, ex galle (galls) *H. levantina*, ex *Salvia* sp. – sf. XI.2001. leg. B. Massa.

Deposited in the Trematerra Collection, Campobasso, Italy.

DESCRIPTION. Adult (Fig. 2a). Wingspan 11 mm. Head, palps, and thorax dark grey sprinkled with grey; abdomen dark brown. Ground color of forewing greyish dark brown, pale ferruginous, in basal and partially costal areas of wing ochre mixed brown; creamy suffusions intermixed with blackish scales in the basal third of wing; in the apical half of the anterior margin of the wing five distinct double whitish costal streaks. The space between the streaks is dark brown; speculum differentiated by presence of refractive markings. Markings rudimentary: basal blotch and tornal portion of median fascia diffuse. Cilia dark brown blackish. Hindwing greyish-brown paler basally; cilia greyish or with brownish parts.

Unfortunately, the specimen studied has been tagged with entomological glue and is partially damaged.

Male genitalia (Fig. 2b-e). Tegumen large, simple, distal part with long bristles; caudal angle of sacculus broadly rounded; basal cavity subrectangular; neck of valva very slender, incision broad, subcircular; cucullus elongate, densely bristled, with distinct subtriangular process ventrally; the length of the cucullus is approximately two times larger than the width. Aedeagus developed characteristic shape swollen basally and significantly narrowing distally; longer than the cucullus; the cornuti form two groups, one group aligned and spiny, the other cornuti are lanceolate in shape.

Female genitalia. Unknown.

DIAGNOSIS. Externally *P. massai* is similar to *P. subsalvana* Kuznetsov. It can be included in *Pammene splendidulanae* group, with *P. griseomaculana* Kuznetsov, *P. salvana* Staudinger, and *P. insolentana* Kuznetsov, and *P. subsalvana* Kuznetsov (Danilevsky &

Kuznetsov, 1968; Kuznetsov, 1987, 2005). The male genitalia of *P. massai* are similar to a few allied species, it can be distinguished by shapes of cucullus and the aedeagus, and by cornuti grouped in two clusters, one aligned and spiny, the other of lanceolate in shape.

BIOLOGY. Our adult of *P. massa* were obtained on late April from galls of *Hedickiana levantina* (Hedicke) (*Hymenoptera Cynipidae*) on plants of *Salvia* sp.

ETYMOLOGY. The name of the new species *Pammene massai* refers to the colleague prof. Bruno Massa (University of Palermo, Italy).

ACKNOWLEDGEMENTS

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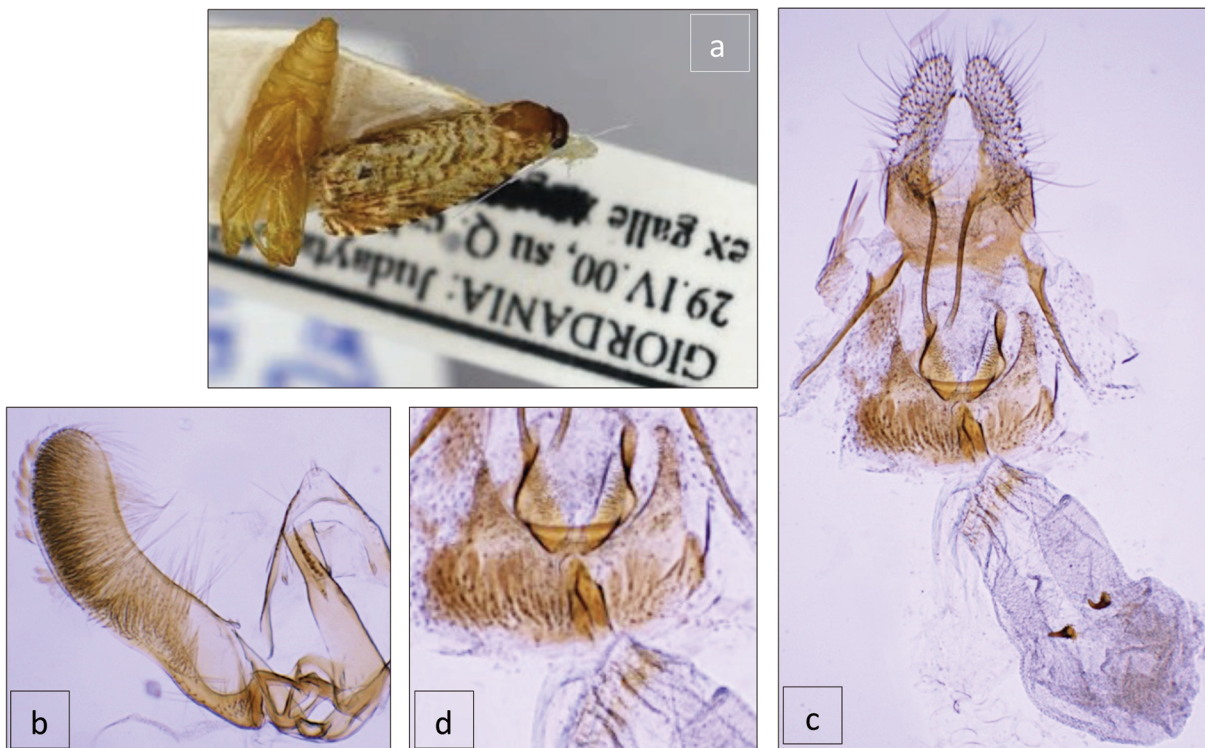


Fig. 1. *Pammene calliprinosa* Trematerra sp. n.: adult male (a), male genitalia (b), female genitalia (c), antrum, colliculum and proximal part of corpus bursae (d).

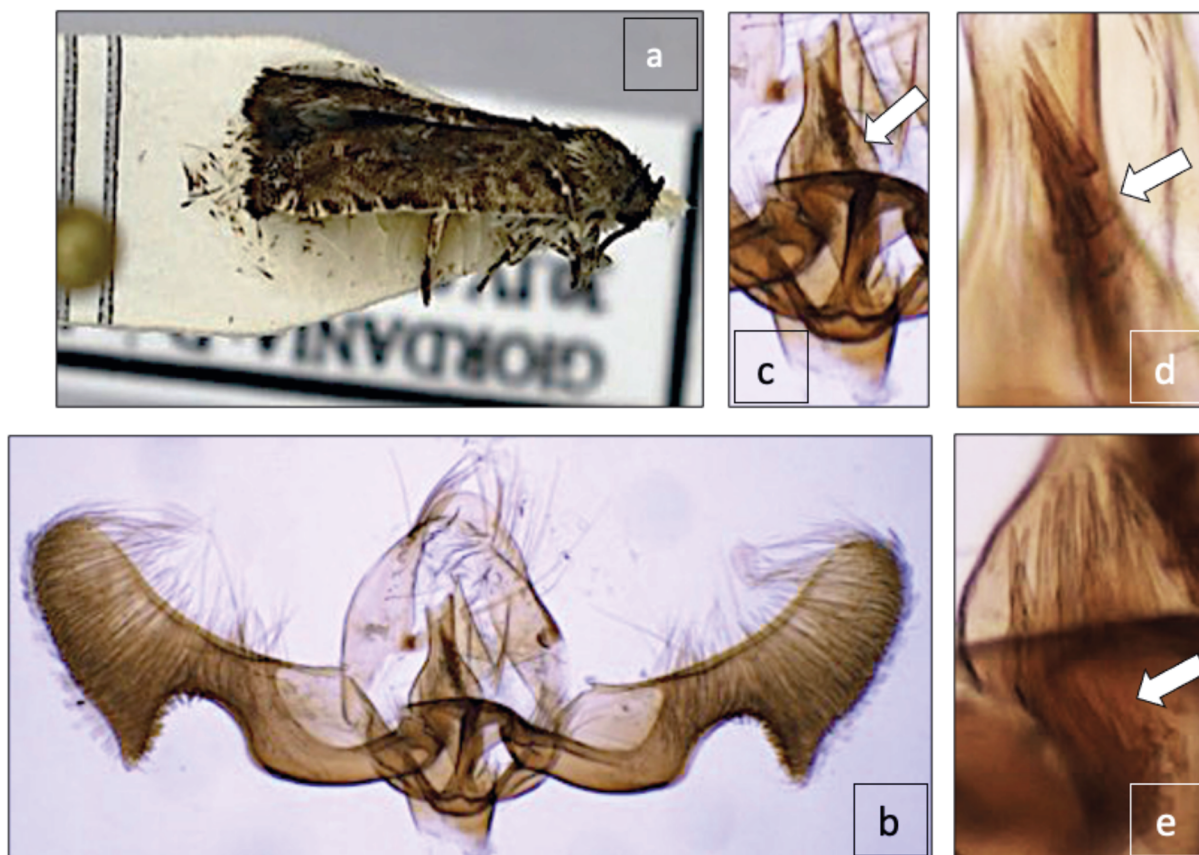


Fig. 2. *Pammene massai* Trematerra sp. n.: adult male (a), male genitalia (b), aedeagus (c); spined cornuti (d), lanceolate cornuti (e).

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Pasquale TREMATERRA*

Description of *Clepsis lesinana* sp. nov. and the female of *Clepsis semiana* (Chrétien, 1915) (Lepidoptera Tortricidae)

Abstract: In this paper, *Clepsis lesinana* Trematerra sp. nov., collected in a location of Lesina Lake (Apulia Region, Italy), and the female of *Clepsis semiana* found in Pantelleria Island (Sicily, Italy) are described. In the family Tortricidae *C. lesinana* belongs to the group of *rogana*, while *C. semiana* is included in the *neglectana* group.

Riassunto: Descrizione di *Clepsis lesinana* sp. nov. e della femmina di *Clepsis semiana* (Chrétien, 1915) (Lepidoptera Tortricidae). Sono descritte *Clepsis lesinana* Trematerra sp. nov. e la femmina di *Clepsis semiana* (Chrétien) (Lepidoptera Tortricidae), la prima trovata in Puglia in prossimità del lago di Lesina, la seconda raccolta sull'isola di Pantelleria. Tra i Tortricidae *C. lesinana* appartiene al gruppo *rogana*, mentre *C. semiana* è inclusa nel gruppo *neglectana*. Delle due specie vengono forniti i principali caratteri morfologici ed ecologici, le foto degli adulti e dei genitali maschili e femminili.

Key words: *Clepsis lesinana*, *Clepsis semiana*, Lepidoptera Tortricidae.

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INTRODUCTION

Clepsis is a large genus in the tribe Archipini with 36 species present in Europe (Aarvik, 2013; Lepiforum, 2026) and 17 species present in Italy (Trematerra unpubl.data).

In this paper, the new species *Clepsis lesinana* Trematerra sp. nov. is described, collected in a location of Lesina Lake, Apulia Region, Italy. Moreover, *Clepsis semiana* (Chrétien) female, collected in Pantelleria Island, Sicily, Italy, is described.

In accordance with Razowski (1979), the new species belongs to the group of *rogana* and in some characters *C. lesinana* is similar to *Clepsis balcanica* (Rebel), *Clepsis aerosana* (Lederer) (Guenée), *Clepsis clemensiana* (Fernald), and *Clepsis pallidana* (F.).

Following Zlatkov and Huemer (2019), *C. semiana* is similar to *C. consimilana* (Hübner) and is included in the *neglectana* group by the absence of large, modified setae on the median surface of the valvae. *C. semiana* is a little-known species known only through the male holotype collected in Tunisia, named *Cacoecia unifasciana* var. *semiana* Chrétien, deposited at the Muséum National d'Histoire Naturelle, Paris, France.

Clepsis lesinana Trematerra sp. nov.

LSIDurn:lsid:zoobank.org:act:

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MATERIALS EXAMINED. Holotype, 1 male, Italia, Puglia, Lesina (FG), 2 m/a.s.l., 18.VI.2020, Leg. Goglia e Palmieri; 2 females, Italia, Puglia, Lesina (FG), 2 m, 17.VI.2020, Leg. Goglia e Palmieri.

Deposited in the Trematerra Collection, Campobasso, Italy.

DESCRIPTION. Adults (Fig. 1) - wingspan 16-17 mm, forewing broad with termen oblique. Labial palpus, front and scape of antenna yellowish speckled with light-brown scales, remaining parts of head yellowish-cream; thorax and abdomen olive-brown, mixed rust-cream. Ground color of forewings almost unicolorous cream with golden hue, speckled of light brownish scales; light brownish median fascia; cilia paler yellowish. Basal part of costa brownish. Hindwings whitish, slightly darker in basal part; cilia pale cream whitish. Female is slightly smaller than male. Ground color of forewings almost unicolorous light hazelnut with golden hue; cilia paler. Hindwings light brown; cilia pale brown with whitish basal line.

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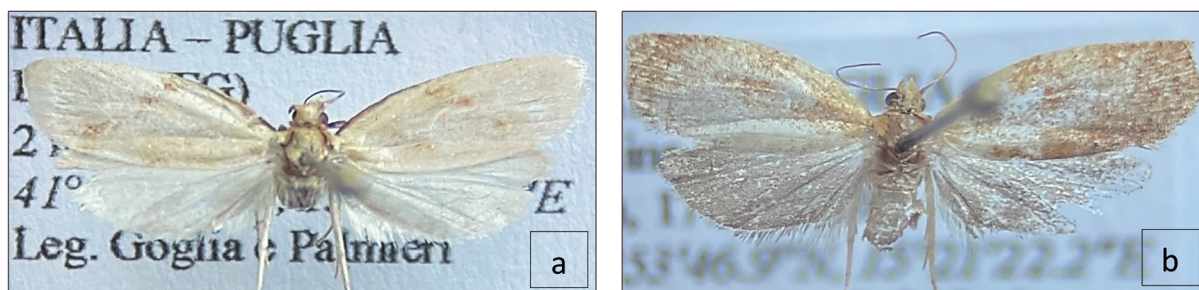


Fig. 1. *Clepsia lesinana* adults: male (a) and female (n).

Male genitalia (Fig. 2a and b). Uncus strong, rather uniformly, slightly broadening near base, distinctly rounded apically. Socius short, less developed. Terminal part of gnathos arms pointed. Tegumen developed, broad. Valva rather broad, subtriangular, with hairs; labis broad and densely dentate marginally; sac-

culus broad light convex before middle ventrally; aedeagus developed bent, with long strong ventral termination and several minute thorns.

Female genitalia (Fig. 2c-e). Papilla analis developed. Sterigma short with rounded proximal corners. Colliculum moderately long, tapering proximally. Duc-

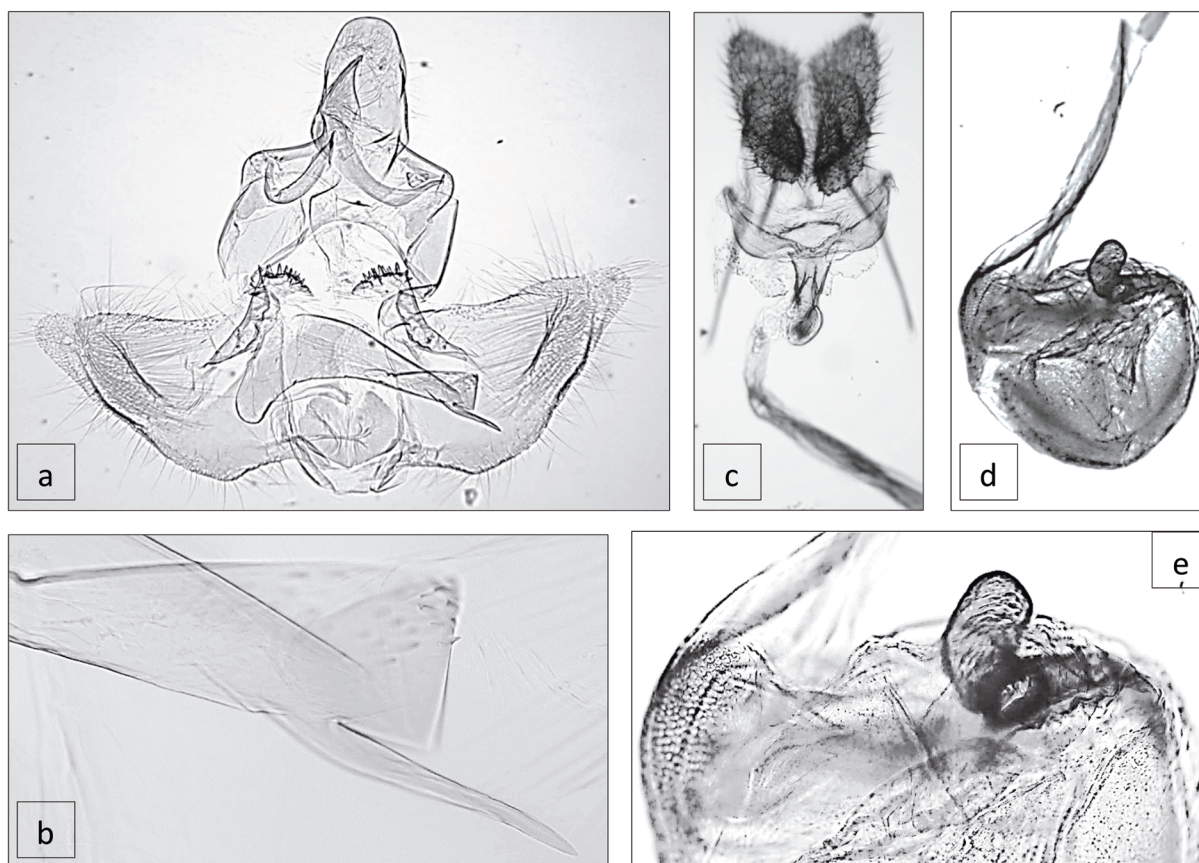


Fig. 2. *Clepsia lesinana*: male genitalia (a), terminal part of aedeagus (b); female genitalia, antrum (c), bursa copulatrix (d), capitulum and signum (e).

tus bursae elongate, cestum long and sclerotized; proximal part of cestum elongated situated in corpus bursae; capitulum of signum developed; signum strong long blade dentate-shaped.

DIAGNOSIS (Fig. 3c-f). *Clepsis lesinana* sp. nov. externally is close to *Clepsis unicolorana* (Duponchel) and *Clepsis pallidana*. In the male genitalia *C. lesinana* differs from the other two species in the conformation

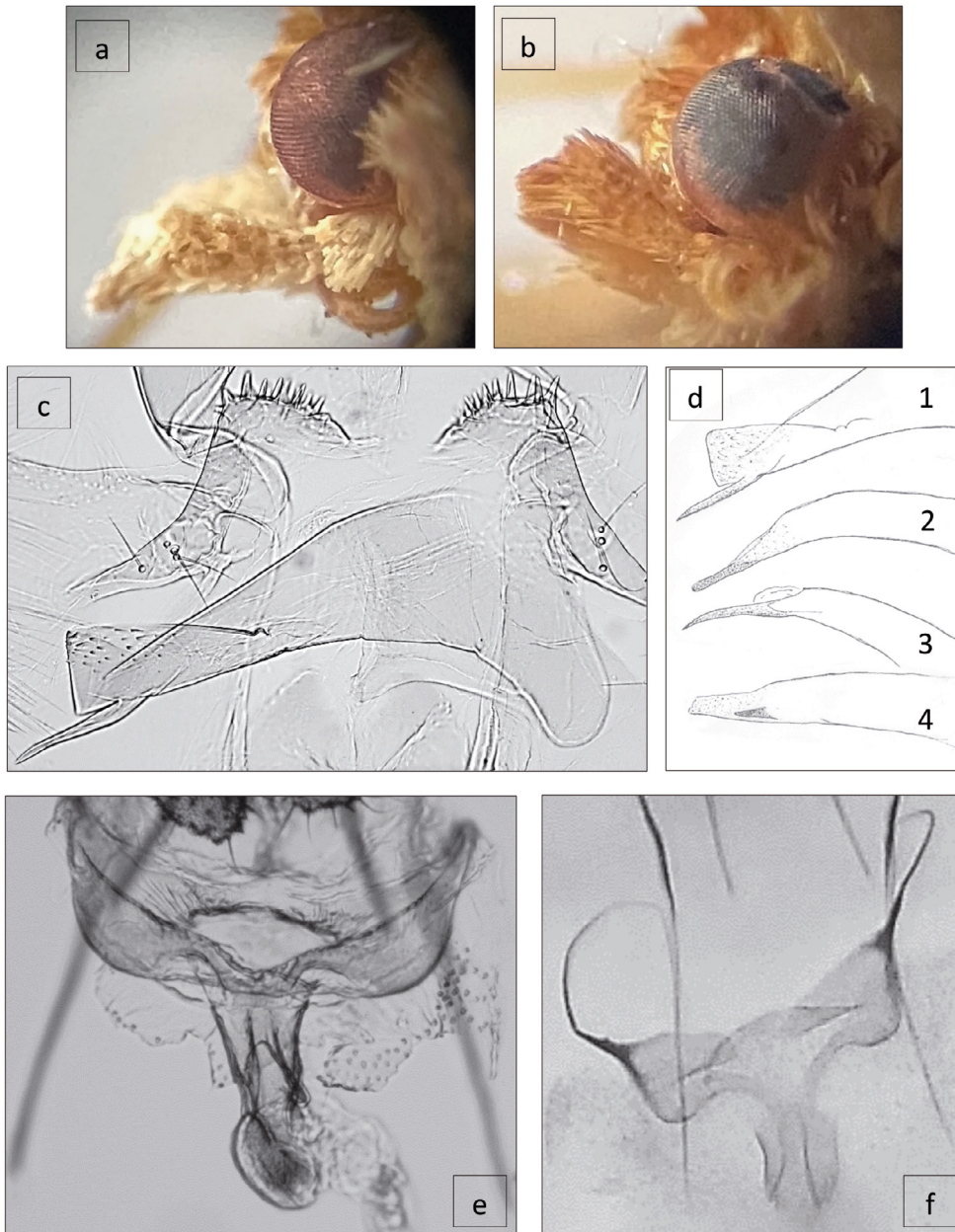


Fig. 3. *Clepsis lesinana* palps (a), *Clepsis consimilana* palps (b). *Clepsis lesinana* aedeagus and labis (c); terminal parts of aedeagus of *Clepsis lesinana* (d1), *Clepsis clemensiana* (d2), *Clepsis aerosana* (d3), and *Clepsis pallidana* (d4); *Clepsis lesinana* female genitalia, antrum and colliculum (e); *Clepsis consimilana* female genitalia, antrum and colliculum (f).

of valvae and the long terminal part of aedeagus that is resembling to *Clepsis aerosana* and *Clepsis clemensiana*. In the female genitalia, the differences are evident above all in the conformation of colliculum and signum, which are more developed.

BIOLOGY. *Clepsis lesinana* flies in mid-June. In the same locality of Lesina Lake, adults of *Clepsis consimilana* were also captured (Fig. 3a and b). The flora of Lesina, a brackish coastal lagoon in Apulia, Italy, is characterized by a mix of aquatic, halophytic, and Mediterranean species adapted to its variable salinity and nutrient-rich waters.

ETYMOLOGY. The new species *Clepsis lesinana* refers to the Lesina Lake.

***Clepsis semiana* (Chrétien, 1915)**

LSIDurn:lsid:zoobank.org:act:

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MATERIALS EXAMINED. 1 male and 1 female, Pantelleria Island, Trapani, Sicily, Italy, 60 m/a.s.l., 25.IX.2024, lux, leg. P. Trematerra.

Deposited in the Trematerra Collection, Campobasso, Italy.

DESCRIPTION. Adults (Fig. 4a and b) - wing span in male 13 mm, in female 12 mm. Male is slightly damaged, but some poorly defined markings can be detected, female is better preserved.

Male. Ground color yellow-brownish with mixture of ochre, rust or cream. Markings browner than ground color. Basal blotch near dorsum, medial fascia slender, indistinct posteriorly, more brownish at dorsum, subapical spot brownish. Cilia cream than ground color browner proximally. Hind wing is greyish, the cilia are pale, darker at the base. Female is unicolor, head with vertex fulvous olive green, frons, palps with ferruginous scales. Thorax dorsally dark fulvous, abdomen pale grey brownish, tegulae fulvous. Forewing fulvous spotted with lighter scales, costa basally convex, apically straight. Markings poorly defined, evident dorsobasal blotch dark brown. Cilia concolorous with background with lighter distal part. Hindwings pale grayish-brown, browner on the periphery, cilia concolorous.

Male genitalia (Fig. 4c and d). Uncus wide, less round apically, with convergent lateral margins, gnathos with relatively large median part and angled arms, socius membranous. Tegumen developed. Valvae pointed

laterally. Costal sclerite wide, with elongated labis covered with large spines. Apical part of sacculus longer than basal part, saccular process pointed, relatively small. Membranous part of valva with developed medial protuberance and long fine tuft of setae, terminal part with small dorsal and large ventral curvature, brachiola prominent, pointed dorsally. Aedeagus thin and long provided by one slender long apical cornutus. Anterior and posterior part of phallus curved.

Female genitalia (Fig. 4e and f). The papillae anales and the apophyses are not specialized. The sterigma is more or less funnel-shaped, flattened dorsal-ventrally, sclerotized, with a large excavation on the dorsal wall. It terminates into a narrow, funnel-shaped colliculum comprising areas of sclerotized tanned plicate and developed thickened transparent cuticle protrusion. The ductus seminalis is inserted at the transition between the colliculus and the ductus bursae. The ductus bursae is long, with a smooth elongate cestum extending on most of its length and expanding onto the corpus bursae as well. The corpus bursae have a signa as a plate located near end of cestum, and a long falcate signum, slightly curved, with some denticles at the base with prominent large capitulum.

DIAGNOSIS. The male genitalia of *C. semiana* are similar to those of *C. striolana*. However, there is a clear difference in the wing pattern, though the male of *C. semiana* some poorly defined markings can be detected. In male genitalia, there are differences in sacculus process, gnathos, and labis; in female genitalia, differences are in colliculum, cuticle protrusion and in long falcate signum, slightly curved, with some denticles at the base, with prominent large capitulum. The differences with *C. consimilana* are above all in the conformation of antrum and colliculum, and the signum, which is longer.

BIOLOGY. Moths are on the wing in late September in shrubby habitats. From a phytosociological point of view, the main community of the Pantelleria Island is represented by the Mediterranean scrub and by holm oak woods of *Quercus ilex*. Along the most arid and south-facing stretches of coast prevails *Pinus halepensis*. Most of the territory is occupied by the low bushy scrubland, dominated by *Erica*, *Pistacia*, *Calycotome*, *Cistus*, *Arbutus unedo*, etc.

DISTRIBUTION. *C. semiana* seems to be limited to west south Mediterranean: Tunisia and Pantelleria Island (this is a new report for Italian and European fauna).

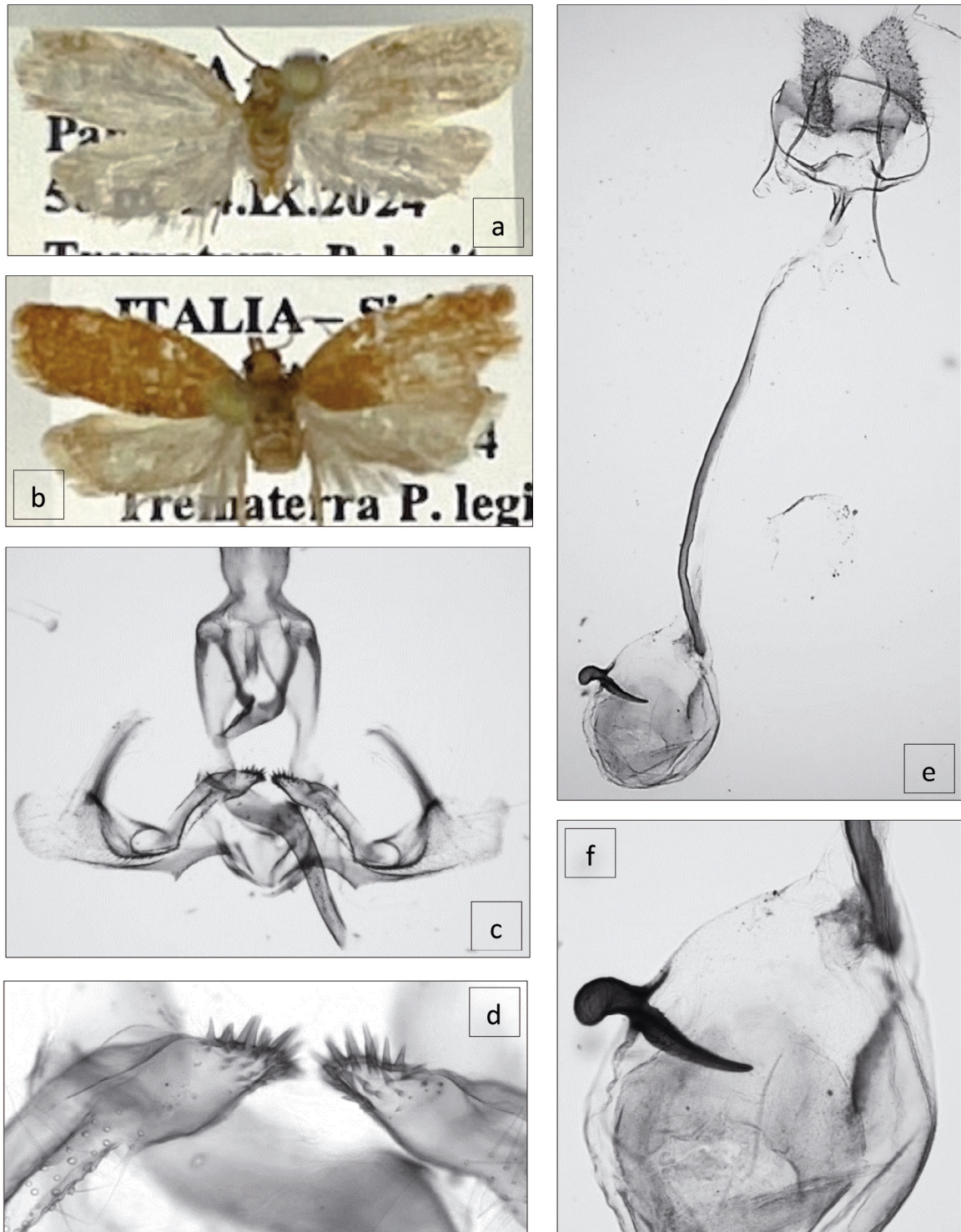


Fig. 4. *Clepsis semiana* adults male (a) and female (b); male genitalia (c), labis (d); female genitalia (e), bursa copulatrix with caputum and signum (f).

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A review of the European genera of Trichogrammatidae (Hymenoptera: Chalcidoidea)

Abstract: After the presentation of the general characters of the family and the nomenclature used in its taxonomy, the author reviewed the 31 genera of Trichogrammatidae recorded in Europe and provided a key for their identification. For each genus, a short diagnosis is given with illustrations and notes on distribution, diversity, and hosts. The classification of the family is discussed.

Riassunto: Una revisione dei generi europei di Trichogrammatidae (Hymenoptera: Chalcidoidea).

Dopo la presentazione dei caratteri generali della famiglia e della nomenclatura utilizzata per la sua tassonomia, l'autore rivede i 31 generi di Trichogrammatidae segnalati in Europa e propone una chiave per la loro identificazione. Per ogni genere è data una breve diagnosi, con illustrazioni e note sulla distribuzione, diversità e ospiti. È discussa la classificazione della famiglia.

Key words: general morphology, nomenclature, taxonomy, classification, insect-egg parasitoid.

INTRODUCTION

The Family Trichogrammatidae (Hymenoptera: Chalcidoidea) includes internal egg parasitoids of several orders of insects, mostly Hemiptera, Coleoptera, Lepidoptera, and Diptera. Although widely distributed, their small size (from about 0.2 mm to 1.5 mm) and fragility make their collecting and study difficult. At present, about 100 genera are recognized, including more than 1000 valid species (Viggiani, 2019). Morphologically, the members of this group are distinguished by having 3-segmented tarsi in both sexes and antennae with a maximum of a 2-segmented funicle. Molecular evidence places Trichogrammatidae as a monophyletic group of the Chalcidoidea (Owen *et al.*, 2007). Pioneers of the study of Trichogrammatidae in Europe were Westwood (1833), Haliday (1833), and Förster (1856). The first monograph of this group was published by Kryger (1918), who recorded 11 genera and 30 species. Subsequently, important contributions were made by Nowicki (1935, 1936, 1940) as reported by Viggiani (2011). Trichogrammatidae, with a few exceptions (Viggiani, 2002), are endophagous egg parasitoids of insects of several orders, mostly Hemiptera Auchenorrhyncha, Lepidoptera and Coleoptera. Host records are known mainly for *Trichogramma*, a genus including species used in biological control projects. Most species are solitary parasitoids, monovoltine or polyvoltine, but some are gregarious (as a few *Tri-*

chogramma species, *Lathromeris cecidomyiiae*, *Pseudoligosita servadeii*).

The knowledge of the Trichogrammatidae increased worldwide since last century. The aim of the present paper is to revise the genera recorded in European countries, providing a key for their identification and, in addition, a short diagnosis of each genus, with notes on distribution, diversity, and associated hosts.

MATERIALS AND METHODS

Specimens of Trichogrammatidae, collected using several methods (mostly by yellow pan traps and Malaise traps), were received in the past decades, since 1960, for identification from several regions of the world. The collections of the family preserved in several museums, mostly at the Natural History Museum (London), the Canadian National Collection of Insects (Ottawa), the Muséum d'Histoire naturelle (Genève), the Queensland Museum (Brisbane), the National Museum of Natural History (Washington), and the Zoological Museum (Copenhagen), were studied. The collection of Trichogrammatidae preserved at present at the Dipartimento di Agraria, Università di Napoli Federico II (previously *Dipartimento di Entomologia e Zoologia Agraria*, Portici, Napoli), including many specimens accumulated by the present author since 1960, some reared from known hosts, has been of pri-

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mary importance for the preparation of this review. All material has been studied on specimens mounted on permanent slides, using Canadian balsam as the final medium. Most of the illustrations included in the paper, line drawings, have been taken from papers previously published by the present author.

GENERAL MORPHOLOGY OF TRICHOGRAMMATIDAE AND NOMENCLATURE

The body of the Trichogrammatidae is divided into head, mesosoma, and metasoma (Fig. 1). The head capsule, because of its minimal size, is analyzed only for a few characters, namely the presence of malar sulci (Fig. 2, msl), the position of the antennal toruli (Fig. 2, tor) in reference to the ventral margin of the eyes (Fig. 2, ey), and a distinct clypeus (Fig. 2, cly). The mouth parts, mostly mandibles (Figs. 2, m and 3) and maxillary palpi (Fig. 4, mp) (lacking in the genus *Sinepalpigramma*), show variations in taxonomic value; in particular, the number of one or 2-segmented maxillary palpi is important for the classification of the genera. The labial palpi are all 1-segmented, small or vestigial in the members of the family. Primary importance in the characterization of genera and species have the antennae (Fig. 5). They show a first segment, the scape (Fig. 5, s), varying in shape in some species, followed by the pedicel (Fig. 5, p) with limited variations concerning the sculpture, the anelli (1-3) (Fig. 5, a), ring-like segments, the postannellar segments, partitioned into 1- or 2-segmented funicle (Fig. 5, f) or arranged in 1-4-segmented club (Figs. 5, c; 120), or without funicle (Fig. 15). On the funicle and club segments, different types of sensilla can be found (Pinto, 2006). The most important for taxonomic use are mainly the placoid sensilla (pls), the basiconic peg sensilla (bps) and the flagelliform setae (Fig. 18).

In the mesosoma (Fig. 1), the main characters of taxonomic interest concern the mid lobe of the mesoscutum (Fig. 6, mlm) (shape, sculpture, number of setae), the scutellum (Fig. 6, sct), the metanotum (Fig. 1) (shape and relative length) (Fig. 6, mt) and the propodeum (Fig. 6, p).

The fore wing (Fig. 7) shows important variations of primary value for the identification of genera and species. They concern the blade shape, the venations, and the discal setation. The blade may have a wide disk, around $\frac{1}{2}$ of the wing length, or narrower, $\frac{1}{5}$ or more. The venation may reach half of the wing

length or may be longer. Variations may be found in the ratio and shape between the premarginal vein (Fig. 7, pm), the marginal vein (Fig. 7, mv), and the stigmal vein (Fig. 7, sv). The premarginal is straight, confluent with the marginal vein or not; in the last case, the costal cell (Fig. 7, cc) is markedly wider at the level of the conjunction between the premarginal vein and the subcostal vein (Fig. 7, sc). A radial process (Fig. 7, rp) is or is not developed at the base of the premarginal vein. The density and arrangement of the setae on the disk are variable and offer important characters for the characterization of genera and species. Several setal tracks may be distinct on disk, and, of them, the RS_1 (Fig. 7), a setal track starting from the end of the stigmal vein and running posteriorly below the marginal vein; its presence or absence is considered of primary value in the taxonomy of genera. The length of the setae running along the distal margin of the disk, the fringe (Fig. 7, f), shows variations to be considered in the characterization of species. The hind wing (Figs. 8 and 9) has limited characters of taxonomic value; these are mainly the disk shape, the arrangement of setae in a few tracks or not, and the length of the fringe.

The characters of the legs concern the presence or absence of thorn-like spines on the dorsal surface of the fore tibia (Fig. 10, tls), the ratio of the length of the basitarsus (Fig. 10, bt)/length of the spur (Fig. 10, bt) of the middle leg, and the length of the hind tibia (Fig. 10, t)/length of the ovipositor (Fig. 13, o).

Several metasomal characters need to be examined and described: the ratio of length mesosoma/length metasoma (Fig. 1), shape, sculpture, and setae of metasomal tergal and sternal segments, extension of the last sternal segment, the hypogynium (Fig. 13, h), the extension of the entire ovipositor (Fig. 13, o), and, if extruded, the length of this part.

The male taxonomic characters not genitalic follow those of the female and show important variations concerning mainly the antenna and some metasomal features, but the fundamental importance in the identification and classification of the Trichogrammatidae have male genitalia. The basic structure of the male genitalia of Trichogrammatidae (Fig. 14), as found in several families of Chalcidoidea (here named chalcidoid type) is represented by a protective structure of the aedeagus (Fig. 14, aed), frequently with bacilliform apodemes (Fig. 14, aap), the phallobase (Fig. 14, ph) distally with some lateral (parameres) (Fig. 14, par) and ventral appendices (volsellae) (Fig. 14, vs). The phal-

lobase may be completely opened dorsally (Fig. 14, da) or partially, only at the base (Fig. 110, ada). In some types of male genitalia, an intervalsellar process is developed (Figs. 28; 110, ivp), and other structures are present as a dorsal lamina in the species of the genus *Trichogramma* (Fig. 110, adl). However, in several groups of genera, remarkable and gradual variations are observed in the basic male genitalia structure, toward a simple, tubular complex, in which the aforementioned structures of the basic genitalia type are not identifiable. The taxonomic importance of these variations, previously overlooked in Chalcidoidea, was pointed out by the present author (Viggiani, 1971a) in a presentation to the XIII International Congress of Entomology, Moscow, 2-9 August 1968.

KEY TO THE IDENTIFICATION OF THE GENERA OF TRICHOGRAMMATIDAE RECORDED IN EUROPEAN COUNTRIES

- | | | | |
|-------|---|--|--------------------------|
| 1(2) | - Antenna of female (Figs. 5, 22) with funicle 1-2-segmented2 | | |
| | - Antenna of female without funicle (Fig. 52) .. | | |
| |27 | | |
| 2(1) | - Antenna with 2-segmented funicle3 | | |
| | - Antenna with 1-segmented funicle14 | | |
| 3(2) | - Antennal club 2-3-segmented (Figs. 5, 69) .. | | |
| |4 | | |
| | - Antennal club 1-segmented (Fig. 34)15 | | |
| 4(3) | - Marginal vein of the fore wing not reaching the anterior margin of the blade or male antenna with a short terminal c ₄ (Fig. 82) ..5 | | |
| | - Marginal vein of the fore wing reaching the anterior margin of the blade6 | | |
| 5(4) | - Fore wing broad (Fig. 82), with a strongly sigmoid venation, disk sparsely to moderately setose, with RS ₁ present and linear setal tracks distinct. Ovipositor long and exerted. Male as the female, but the funicle and club not markedly distinct, without flagellar long setae, but also with other variations in some species. Male genitalia (Fig. 84) of chalcidoidea type | | |
| | <i>Poropoea</i> | | |
| | - Fore wing (Fig. 19) not wider distally, with long venation, disk densely setose, RS ₁ absent, a few linear setal tracks. Gaster ovate or oblong-ovate, with ovipositor exerted or not. Male as female, but antenna with funicle | | |
| | 2-segmented and distinct club 3-segmented, each segment with long setae. Male genitalia (Fig. 21) of chalcidoid type | | <i>Asynacta</i> |
| 6(4) | - Maxillary palps 2-segmented (Fig. 102).....7 | | |
| | - Maxillary palps 1-segmented11 | | |
| 7(5) | - Female antenna with 3 anelli8 | | |
| | - Female antenna with 2 anelli9 | | |
| 8(7) | - Female and male antenna similar (Figs. 25 and 27) with 3 anelli, fore wing (Fig. 26) venation reaching the half of the blade. Male genitalia (Fig. 28) of chalcidoid type, with a well-developed intervalsellar process..... | | |
| | <i>Ceratogramma</i> | | |
| | - Female and male antenna different.....9 | | |
| 9(6) | - Female antenna with at most 2 anelli, 2-segmented funicle and 3-segmented club, but male antenna with a short terminal c ₄ segment and with flagellar segments with long setae; front tibia (Fig. 10) with some denticles. Male genitalia of chalcidoid type (Fig. 66)..... | | <i>Mirufens</i> |
| | - Female and male antenna similar.....10 | | |
| 10(7) | - Fore wing broad (Fig. 104), disk 0.6× the wing length, very short marginal vein with very angular junction to premarginal vein as the latter to subcostal vein; disk densely setose without setal tracks, except r and RS ₁ with a few setae. Male similar to female. Male genitalia (Fig. 106) with rather broad phallobase entirely opened dorsally, parameres, volsellae; aedeagus with long apodemes..... | | <i>Szelenyia</i> |
| | - Fore wing (Fig. 94) with disk 0.5× as the wing vein, short marginal vein, shorter than premarginal vein, without very angular junction to premarginal vein as the latter to subcostal vein, disk densely setose without setal tracks. Male similar the female, but premarginal and marginal veins fused (Fig. 96) and widely inflated, forming an oval complex extending in almost entire basal wing. Male genitalia (Fig. 97) of chalcidoid type | | <i>Pterandrophysalis</i> |
| 11(6) | - Female and male antenna different.....12 | | |
| | - Female and male antenna similar.....13 | | |
| 12(6) | - Female antenna with 2-segmented funicle and 3-segmented club, but male antenna (Fig. 65) with a short terminal c ₄ segment and flagellar with long setae arranged in whorls. | | |

- Male genitalia (Fig. 121) of chalcidoid type *Ufens*
- As *Ufens* but male genitalia (Figs. 122 and 123) not of chalcidoid type *Ufensia*
- 13(11) - Funicle ovate-shaped, segments (Fig. 67) transverse; male antennal club 2-3- segments segmented; fore wing densely setose, without vein tracks, except RS₂. Male genitalia (Fig. 70) of chalcidoid type *Monorthochaeta*
- Funicle not ovate-shaped (Fig. 30), with the last segment subcylindrical and other characters different 14
- 14 - Fore tibia with a spine on the dorsal surface; female antenna (Fig. 30) with the first funicular segment shorter than the second one; fore wing moderately setose, with several setal tracks, RS₁ present. Male genitalia (Fig. 32) tubular, simple, without parameres and volsellae *Chaetostricha*
- Fore tibia without spine on the dorsal surface or other different characters 15
- 15(10) - Female antenna (Fig. 49) with the first funicular segments longer than wide. Male genitalia (Fig. 51) with trunk-conic phallobase, widest at base, distally with parameres and volsella *Ittys*
- Female antenna (Fig. 78) with the first funicular segments not longer than wide. Male genitalia (Fig. 80) without parameres and volsellae *Paracentrobia*
- 16(3) - Female antenna (Fig. 128) with 2 funicular segments and club conic-ovate, 1-segmented. Male antenna as the female. Fore wing (Fig. 130) with short venation, not reaching the half of the length, disk densely setose without or with a few setal tracks. Ovipositor (Fig. 129) very long, with sabre-like valvulae, extruded from the end of metasoma *Xiphogramma*
- Female antenna (Fig. 107) with 2 funicular segments and 1-segmented club, but rather flat, apico-ventrally trunked 16
- 17(13) - Fore wing (Fig. 108) with marginal and stigmal veins forming an arch. Male antenna (Fig. 109) with one postanellar segment with several long setae. Male genitalia (Fig. 110). Variations are present in the subgenera *Trichogrammanza* Carver (male antenna with 2 funicular segment, 1 club segment), and *Vanlisus* Pinto (male with 2 funicular segment and club 3-segmented). Venation of fore wing with marginal vein and stigmal vein forming an arch; RS₁ present. Genitalia with phallobase showing a dorsal lamina, laterally parameres, ventrally volsella with digiti and an intervallosellar process *Trichogramma*
- As in *Trichogramma* but fore wing (Fig. 112) without RS₁ *Trichogrammatoidea*
- 18(2) - Fore wing (Figs. 61 and 86) very narrow, at least 5× as long as wide 18
- Fore wing wider 19
- 19(3) - Female antenna (Fig. 85) with funicular segment appressed to the 3-segmented club. Fore wing disk moderately setose, not arranged in linear tracks *Prestwichia*
- Female antenna with funicle present or not, and not appressed to the 2-3-segmented club, Fore wing (Fig. 61) disk glabrous with a 1-2 rows of a few seta and long fringe *Megaphragma*
- 20(2) - Female antenna (Fig. 90) with 1-segmented funicle and 3-segmented club 23
- Female antenna (Fig. 40) with 1-segmented funicle and 1-2-segmented club 20
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- 31(29) - Fore wing (Fig. 15) with disk densely setose without or with a few linear setal tracks, RS₁ absent. Gaster of different shape, mostly oblong-ovate, with ovipositor extruded or not. Male genitalia (Fig. 17) not of chalcidoid type, but with trunk-conic phallobase, basally wider, distally not distinct from the aedeagus, without or reduced parameres and volsellar digiti, aedeagus with or without short bacilliform apodemes *Aphelinoidea*
- Female antenna (Fig. 115) with suboval club 2-3-segmented, with a terminal stick-like sensillum. Male genitalia (Fig. 117) of different types, but in *T. bimaculata* of chalcidoid type, with phallobase without distinct short parameres and volsellae, aedeagus with long, bacilliform apodemes... *Tumidiclava*

REVIEW OF THE GENERA

***Aphelinoidea* Girault**

Aphelinoidea Girault, 1911. Trans. Am. Ent. Soc. 37: 2.
Type species: *Aphelinoidea semifuscipennis* Girault
(Trichogrammatidae: Trichogrammatinae, Paracentrobiini)

Diagnosis. Female (Fig. 133). Maxillary palpus 1-segmented. Antenna (Fig. 15) with 2 anelli, without funicle and elongate club 2-3-segmented, frequently incompletely divided. Fore wing (Figs. 16 and 134) with short venation, stigmal vein without or very short neck, disk densely setose without or with a few linear setal tracks, RS₁ absent. Gaster of different shape, mostly oblong-ovipositor extruded or not. Male. Antenna as the female. Genitalia (Fig. 17) with trunk-conic phallobase, basally wider, distally not distinct from the aedeagus, without or with reduced parameres and volsellae, with ventral 2 setae at level of volsellar area, aedeagus with or without short bacilliform apodemes.

Distribution and diversity. Worldwide, including 39

species with several diversities. 6 species are recorded from Europe. At present, the genus is partitioned into the following subgenera: *Aphelinoidea* Girault, *Lathromeroides* Girault, *Encyrtogramma* De Santis. In the subgenus *Aphelinoidea* the *A. semifuscipennis* (fore wing disk conspicuously setose, without hyaline path beyond venation) and *A. plutella* (fore wing disk with hyaline path) species groups are recognized (Triapitsyn, 2018).

Hosts. Hemiptera Cicadellidae.

***Asynacta* Foerster**

Asynacta Foerster 1856. Hymenopterologische Studien 2: 87, 89.

Type species: *Eulophus exiguus* Nees, 1834.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 18) with 1 anellus, funicle 2-segmented and 3-segmented club; segments of funicle and club with rather long setae. Fore wing (Figs. 19 and 20) with long venation, marginal vein not reaching the margin of the blade, disk densely setose, RS_1 absent, a few linear setal tracks. Gaster ovate or oblong-ovate, with ovipositor exerted or not. Male. Antenna with funicle 2-segmented and club 3-segmented, each segment with long setae. Genitalia (Fig. 21) of chalcidoid type with elongate, boat-shaped phallobase with complete dorsal aperture, distally long parameres and volsellae, and intervolsellar process, aedeagus long, narrow and with bacilliform apodemes.

Distribution and diversity. Europe and China. The genus includes 3 species, 1 European.

Hosts. Coleoptera Chrysomelidae (Naiquan, 1994).

***Bloodiella* Nowicki**

Bloodiella Nowicki, 1935. Zeit. angew. Ent. Berlin 21: 579.

Type species: *Bloodiella andalusica* Nowicki.

(Trichogrammatidae: Trichogrammatinae: Chaetostrichini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 22) rather short, with 1 anellus, 1-segmented funicle and club 3-segmented. Fore wing (Fig. 23) rather large, with marginal and premarginal veins subequal, RS_1 present, and stigmal vein with a short neck, disk densely setose with several linear setal tracks. Gaster ovate, with ovipositor not extruded. Male. Antenna as in the female. Genitalia (Fig. 24) not of chalcidoid type, with phallobase distinct and wider basally, with basal margin ventrally concave, without parameres and volsellae, aedeagus fused with distal phallobase and without apodemes.

Distribution and diversity. Europe, South Africa, ? South America. The only European species *B. andalusica* has been recorded in Spain, Turkey, Poland, Corsica, France, Yugoslavia, Italy.

Hosts. Coleoptera Chrysomelidae. Biological notes on *B. andalusica* are given by Viggiani *et al.* (2021).

***Ceratogramma* De Santis**

Ceratogramma De Santis, 1957. Notas Mus. La Plata 19: 130.

Type species: *Ceratogramma schachovskoyi* De Santis.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 2-segmented. Antenna (Fig. 25) with 3 anelli, 2 funicular and 3 club segments. Fore wing (Fig. 26) rather wide, marginal vein as long or longer than stigmal vein, with a large costal cell, disk moderately setose, without or a few setal tracks, RS_1 absent. Male as the female, but antennal club (Fig. 27) 3-4-segmented. Genitalia (Fig. 28) of chalcidoid type, with elongate, boat-shaped phallobase, with parameres, volsellae, developed intervolsellar process, and eedeagus with long bacilliform apodemes.

Distribution and diversity. About 10 species are recorded, mostly in the New World. In Europe, *C. tatianae* Fursov (as *Szelenyia*) (Fursov, 1995) has been recorded. This species, known only from the female holotype, shows the antenna as in other species of the genus, but the marginal vein of the fore wing is shorter of the stigmal vein. The present inclusion of *C. tatianae* in the genus *Ceratogramma* will be better evaluated when the male is discovered.

Hosts. *C. etiennei* Delvare is known as egg parasitoid of *Diaprepes abbreviatus* (L.) (Coleoptera Curculionidae) (Delvare, 1988). No other host records are known for the genus.

***Chaetostricha* Walker**

Chaetostricha Walker, 1851. Ann. Mag. Nat. Hist. 7: 210.

Type species: *Chaetostricha dimidiata* Walker.

(Trichogrammatidae: Trichogrammatinae: Chaetostrichini)

Diagnosis. Female (Fig. 29). Maxillary palpus 1-seg-

mented. Antenna (Fig. 30) with 2 anelli, 2 funicular segments and cub 3-segmented. Fore wing (Figs. 30, 31 and 135) with marginal vein rather long, RS_1 present, discal moderately setose, with distinct setal tracks. Front tibia normally with one or more spines at middle of dorsal surface. Ovipositor extruded or not beyond metasoma. Male. Antenna similar to female. Genitalia (Fig. 32) long, tubular, without parameres and volsellae, with antero-dorsal aperture short, subovate.

Distribution and diversity. Widespread, except in Central and South America. The genus includes 24 species, 10 recorded in Europe. In Italy, *C. similis* (Silvestri) and *C. walkeri* (Foerster) have been recorded (Silvestri, 1918).

Hosts. Hemiptera (Membracidae and Miridae).

***Chaetostrichella* Girault**

Chaetostrichella Girault, 1914. Mitt. Zool. Mus. Berl. 7: 147.

Type species: *Chaetostrichella platoni* Girault.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female (Fig. 33). Similar to *Pseudoligosita*, but with antennal club 1-segmented (Fig. 34), fore wing (Fig. 35) with disk densely setose, without vein tracks, ovipositor long. Male. Antenna as the female. Genitalia (Fig. 36) tubular, without distinct phallobase, parameres and volsellae.

Distribution and diversity. Europe, India. Four species are known, 3 are Palearctic. The genus is recorded from Italy (Pinto and Viggiani, 2004).

Hosts. Unknown.

***Doirania* Waterston**

Doirania Waterston, 1928. Ann. Mag. Nat. Hist. 2 (ser.10): 386.

Type species: *Doirania leefmansi* Waterston.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 37) with 1 transverse or cup-shaped funicular segment, club 1-segmented. Fore wing (Fig. 38) with disk moderately setose. Male. As the females, but metasoma with a medio-ventral projection on the antepenultimate sternite. Genitalia tubular, simple (Fig. 39).

Distribution and diversity. Japan, New Guinea, Indonesia, North America. The genus includes 3 species and 2 of them *D. leefmansi* Waterston and *D. longiclavata* Yashiro, recorded also in Europe.

Hosts. Orthoptera Tettigoniidae.

***Epoligosita* Girault**

Epoligosita Girault, 1916. Mem. Queensland Mus. 5: 206.

Type species: *Paroligosita biclavata* Girault and Dodd. (Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 40) with funicular segment present or absent, club 1-3-segmented. Fore wing almond-shaped (Figs. 42 and 138) large, widest at level of the stigmal vein, disk glabrous, at most with 1-2 setae. Propodeal disk (Fig. 41 6B) with a subtriangular lobe. Male. Antenna as in female. Genitalia (Fig. 43) tubular, without distinct phallobase and distal appendices.

Distribution and diversity. Widespread. The genus includes 25 species and 2 of them, *E. nudipennis* (Kryger) and *E. vera* Viggiani, are European.

Hosts. Cicadellidae. *E. vera* has been recorded in southern Italy as egg parasitoid of the Cicadellidae *Lindbergina aurovittata* (Douglas) on *Quercus* spp. (Viggiani, 1969; 1985).

***Hayatia* Viggiani**

Hayatia Viggiani, 1982. Boll. Lab. Ent. Agr. "Filippo Silvestri" 39: 27.

Type species: *Hayatia indica* Viggiani, 1982. Boll. Lab. Ent. Agr. "Filippo Silvestri" 39: 28.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 44) with 1 anellus, 1 funicular segment, usually longer than wide, club 3-segmented; fore wing (Fig. 45) with normal disk rather densely or sparsely setose, RS_1 absent as some other setal tracks. Gaster conic-ovate with ovipositor (46) not extruded, with third valvula very narrow, lancet-shaped. Male. As the female, but antenna (Fig. 47) with funicular segment annuliform or cup-shaped and club segments with several linear sensilla; genitalia (Fig. 48) with complex and tubular body.

Distribution and diversity. India, Africa, Europe, Cape Verde Island. 10 species are included in the genus.

Hosts. Unknown.

***Ittys* Girault**

Ittys Girault, 1911. Trans. Amer. Ent. Soc. 37: 25.

Type species: *Trichogramma cerasarum* Ashmead.

(Trichogrammatidae: Trichogrammatinae: Paracentrobiini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 49) with 2 anelli, 2 funicular segments, the

first usually longer than wide, club 3-segmented; fore wing (Fig. 50) with normal disk rather densely setose, RS_1 and some other setal tracks are present. Gaster-conic-ovate with robust ovipositor, but not much extruded. Male. As the female; genitalia (fig. 51) with trunk-conic phallobase, widest at base, distally with parameres, volsellae, intervolsellar process, aedeagus with apodemes.

Distribution and diversity. Widespread, 9 species recorded, including only 1 European species, *I. annae* (Karpinski), firstly recorded in Poland, but here from Belgium and Italy. New records: 2 females, Belgium, Treignes, 12.vi.1992, from eggs of *Cicadetta montana*, 8 females, Italy, Piedimonte d'Alife, 22-28.vi.1920, ex eggs of *Cicada orni*, leg. F. Silvestri. 5 females, same data, 30.vi.1921.

Hosts. Hemiptera (Membracidae, Cicadidae). *I. annae* is recorded as egg parasitoid of *Cicadetta montana* Scop., developing one generation in a year's course, synchronized with the emerging and egg-laying season of the host (June, beginning of July) (Karpinski, 1954).

Comments. The *Ittys* species of North America were revised by George (2007). The author confirms also in the new 4 described species the same type of the male genitalia illustrated by Viggiani (1971b, 1984) for the genotype, *I. ceresarum* (Ashmead) and *I. annae* (Karpinski). George (2007) proposed a key to the identification of the USA species based on male. In the family classification of Trichogrammatidae based on molecular results (Owen *et al.*, 2007) the genus *Ittys* is included in the tribe Paracentrobiini (subfamily Oligositinae).

***Lathromeris* Foerster**

Lathromeris Foerster, 1856. Hymenopterologische Studien 2: 87.

Type species: *Lathromeris scutellaris* Foerster.

(Trichogrammatidae: Trichogrammatinae: Paracentrobiini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 52) with 2 anelli, club 5-segmented and c5 ending in a stick-like process; fore wing (Fig. 53) with elongate marginal vein, RS_1 absent in several species; hypopygium often prolonged beneath ovipositor. Male. Antenna (Fig. 54) without the prolonged process on c5. Genitalia (Fig. 55) not of chalcidoid type, with phallobase rather subcylindrical or ovate, distally pointed, with parameres present or not, volsellae absent and aedeagus with long, bacilliform apodemes present.

Distribution and diversity. Wide distribution in the world. Includes 27 species, but several species seem misplaced in this genus. In Europe, 7 species are recorded, 2 of which are in Italy (*L. scutellaris* Förster and *L. cecidomyiiae* Viggiani & Laudonia).

Hosts. Several species attack eggs of Lepidoptera (Noctuidae, Pyralidae). An exception, not only for the genus *Lathromeris*, but in the Trichogrammatidae, is *L. cecidomyiiae*, gregarious larval parasitoid of *Lasiopoda* sp. (Diptera, Cecidomyiidae) (Viggiani & Laudonia, 1994; Jesu & Laudonia, 1994).

***Lathromeroidea* Girault**

Lathromeroidea Girault 1912. Mem. Queensland Mus. 1: 94.

Type species: *Lathromeroidea nigra* Girault.

(Trichogrammatidae: Oligositinae: Chaetostichinae)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 56) with 2 anelli and 5-segmented club, c5 without stick-like process. Fore wing (Fig. 57) moderately to densely setose, with veins tracks converging to the straight RS_1 . Genitalia (Fig. 58) rather tubular, and wider basally, body with 2 ventral setae, without parameres, volsellae and aedeagal apodemes. According to Pinto (2006), *Lathromeroidea* is a very complex genus with high diversity. He divided the genus into three informal species groups, A, B, and C, based only on the forewing structure. All species described before Pinto (2006) are included in the species group A.

Distribution and diversity. Wide distribution. The genus includes 16 species, only *L. silvarum* occurring in Europe.

Hosts. For most species unknown. *L. gerriphaga* Pinto is recorded as egg parasitoid of Hemiptera Gerridae (Pinto, 2006).

***Megaphragma* Timberlake**

Megaphragma Timberlake, 1923. Proc. Hawaiian Ent. Soc. 5: 412.

Type species: *Megaphragma mymaripenne* Timberlake. (Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female (Figs. 59, 144 and 146). Maxillary palpus 1-segmented. Antenna (Fig. 60) with 1 anellus, 1 funicular segment (not present in some species) and club 1-2- or 3-segmented. Fore wing (Fig. 61) very narrow, 5.3-10x, with long marginal vein, disc with one seta or with a few setae in one or two rows or glabrous. Gaster with tergite 7 without spiracles and tergite 8 without cerci. Male as female, but antenna (Fig. 62)

often postanellar segments of different shape. Genitalia simple, tubular, very small.

Distribution and diversity. Cosmopolitan. The genus, revised by Polaszek *et al.* (2022), includes 32 valid species, assigned to the following species group: *M. mymaripenne*-group, *M. longiciliatum*-group, *M. polychaetum*-group, *M. ghesquierei*-group, *M. stenopterum*-group, *M. antecessor*-group, *macrostigmum*-group. The recorded European species are *M. longiciliatum* Subba Rao, *M. noyesi* Polaszek & Fusu, *M. polilovi* Polaszek, Fusu & Viggiani (as *M. mymaripenne* in Viggiani & Bernardo, 1997), and *M. rivelloi* Viggiani. *M. polilovi*, a common parasitoid of *Heliothrips haemorrhoidalis* in Italy, reproduces normally by thelitoxy, males are very rare. The same host is parasitized by *M. longiciliatum* (as *M. amalphantum* Viggiani in Viggiani & Bernardo, 1997). Biological data on the latter two species are given by Bernardo & Viggiani (2003).

Hosts. Thysanoptera (Figs. 145 and 146).

***Mirufens* Girault**

Mirufens Girault, 1915. Mem. Queensland Mus. 3: 147. Type species: *Mirufens dentipes* Girault.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 2-segmented. Antenna (Fig. 63) with 2 anelli, 2 funicular and 3 club segments; pedicel transversely ridged. Fore wing (Fig. 64) rather broad, venation with stigmal vein elongate, subequal to marginal vein; disk with RS₁ curved and rows of setal tracks. Fore tibia with a row of thorn-like spines (Fig. 10, tls). Ovipositor usually long. Male as the female, but antenna (Fig. 65) with 4-segmented club and c4 very short; funicular and club segments with long flagelliform setae. Genitalia (Fig. 66) of chalcidoid type, with phallobase dorsally opened, parameres, volsellae and aedeagal bacilliform apodemes present.

Distribution and diversity. Widespread. The genus, revised by Neto & Pintureau (1997), includes 16 species. In Europe 2 species are recorded, *M. gundlachi* (Nowicki) and *M. longicauda* (Blood).

Hosts. Hemiptera (Membracidae, Cicadellidae).

***Monorthochaeta* Blood**

Monorthochaeta Blood, 1923. Ann. Rept. Proc. Bristol Nat. Soc. 5: 254.

Type species: *Monorthochaeta nigra* Blood.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 67) with 2 anelli, funicle with 2 transverse segments and 3-segmented club. Fore wing (Fig. 68) with long radial process, densely setose, RS₁ absent and only linear setal track, RS₂ present. Male as the female, but club 2-3-segmented (Fig. 69). Genitalia (Fig. 70), with boat-shaped phallobase, distally with two asymmetrical and sclerotized volsellar sclerites; parameres not present; aedeagus with long bacilliform apodemes.

Distribution and diversity. The genus includes 3 described species, all from the Palearctic Region. The type of the genus, *M. nigra*, was recorded from Italy (Viggiani, 1971). Additional material was reared from *Cassida* sp. in Campania (Capua) and in Sicily (Palermo).

Hosts. Coleoptera Chrysomelidae (*Cassida* spp.).

***Oligosita* Walker**

Oligosita Walker, 1851. Ann. Mag. Nat. Hist. 7: 212.

Type species: *Oligosita collina* Walker.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 71) with 1 anellus, 1 funicular segment, 3-segmented club, c3 distally with a distal stick-like process or clavate apical placoid sensillum. Fore wing (Fig. 72) with a few setae or moderately setose. Metasomal terga uniformly sclerotized. Male as the female, but antennal club without a terminal stick-like process. Genitalia (Fig. 73) tubular, simple, without appendices, with specific variations in shape, basally without bacilliform aedeagal apodemes.

Distribution and diversity. Worldwide. The genus includes about 100 species, of which about 10 are recorded from Europe.

Hosts. Hemiptera, mostly Cicadellidae (Viggiani, 1982).

***Ophioneurus* Ratzeburg**

Ophioneurus Ratzeburg, 1852. Ichneumon der Forstinsekten 3: 196.

Type species: *Ophioneurus signatus* Ratzeburg.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female (Fig. 74). Maxillary palpus 2-segmented. Antenna (Fig. 75) with 2 anelli, without funicle and 5-segmented club. Fore wing (Fig. 76) with short marginal vein and broad stigmal vein, disk wide, moderately setose with RS₁ and several vein tracks. Ovipos-

itor long and exerted. Male as the female. Genitalia (Fig. 77) of chalcidoid type, with long, boat-shaped phallobase, parameres, volsellae, and aedeagus with long bacilliform apodemes.

Distribution and diversity. The genus includes 10 species, some not well-defined, distributed in the Palearctic Region and Australia. In Europe, 4 species are recorded.

Hosts. Coleoptera Attelabidae. *O. longiclavatus* Viggiani is recorded as egg parasitoid of *Rhynchites auratus* (Scop.) in Italy (Viggiani, 1974).

Paracentrobia Howard

Paracentrobia Howard, 1897. Jour. Linn. Soc. London Zool. 26: 178.

Type species: *Paracentrobia punctata* Howard.

(Trichogrammatidae: Trichogrammatinae: Paracentrobiini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 78) with 2 anelli, 2 funicular and 3 club segments. Fore wing (Fig. 79) usually rather narrow, with long marginal vein, disk with some or without vein tracks, frequently with a black spot on the stigmal vein. Ovipositor not extruded. Male as the female. Genitalia (Fig. 80) not of chalcidoid type, but a trunk-conic phallobase, wider at base, with transverse and short anterodorsal aperture, without parameres and volsellae, aedeagus with long bacilliform apodemes.

Distribution and diversity. Worldwide. 46 species are assigned to the genus *Paracentrobia*. In Europe the following 6 species are recorded: *P. fimbriata* Fursov, *P. masovica* (Nowicki), *P. monotricha* (Nowicki), *P. pulchella* (Claridge), *P. tenuinervis* (Nowicki) and *P. zabinskii* (Nowicki) (UCD, 2023).

Hosts. Hemiptera (Heteroptera, mostly Auchenorrhyncha). *P. pulchella* has been reared from eggs of *Capsus ater* (L) (Miridae) in England (Claridge, 1959).

Poropoea Förster

Poropoea Förster, 1851. Verh. Naturh. Ver. preuss. Rheinl. 1: 28.

Type species: *Poropoea stollwerkii* Förster.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female (Fig. 141). Maxillary palpus 2-segmented. Antenna (Fig. 81) with 2 anelli, 2 funicular segments, each longer than wide, and 3-segmented club. Fore wing (Fig. 82) broad, with a strongly sigmoid venation not reaching the anterior margin of the wing, disk

sparsely to moderately setose, with RS₁ present and linear setal tracks distinct. Ovipositor long and exerted. Male as the female, but funicle and club not distinct (Fig. 83), without flagellar long setae, and other variations in some species. Genitalia (Fig. 84) of chalcidoid type, phallobase completely opened dorsally with parameres, volsellae, intervolsellar process, and aedeagus with long bacilliform apodemes.

Distribution and diversity. Widespread. The genus includes 21 species, of which 4 are recorded from Europe. *P. stollwerkii* Förster and *P. defilippii* Silvestri, respectively as egg parasitoids of *Attelabus nitens* (Scopoli) and *Byctiscus betulae* L. (Coleoptera Attelabidae), were studied in Italy by Silvestri (1916), who gave the adult redescription, morphological details of egg and young stages, with biological notes of both species.

Hosts. Coleoptera Attelabidae.

Prestwichia Lubbock

Prestwichia Lubbock, 1894. Trans. Linn. Soc. London 24: 140.

Type species: *Prestwichia aquatica* Lubbock.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 85) with 1 anellus, 1 funicular segment rather appressed to the 3-segmented club. Fore wing (Fig. 86) very narrow, at least 5× as long as wide in normal specimens, with long marginal vein, disk moderately setose, with setae not arranged in regular linear tracks. Legs with spiny middle and hind tibiae. Body with long setae on head and mesosoma. Male usually wingless. Genitalia (Fig. 87) simple, long, tubular, without appendices and a basal sclerification.

Distribution and diversity. Genus widely distributed with 6 described species. The species *P. aquatica* Lubbock and *P. solitaria* Ruscka are recorded from Europe.

Hosts. Aquatic insects (Coleoptera, Hemiptera, Odonata).

Pseudoligosita Girault

Pseudoligosita Girault, 1913. Mem. Queensland Mus. 2: 104.

Type species: *Pseudoligosita arnoldi* Girault.

(Trichogrammatidae: Oligositinae: Oligositini)

Diagnosis. Female (Fig. 88). Maxillary palpus 1-segmented. Antenna (Figs. 90 and 139) with 1 anellus, 1 funicular segment and 3-segmented club, c3 without clavate apical process. Fore wing (Figs. 91 and 140) premarginal and marginal veins in straight connection,

costal cell narrow, disk moderately to densely setose. At least some metasomal terga with the posterior part longitudinally striate (Fig. 88). Male as the female. Genitalia (Figs. 89 and 92) simple, tubular, without appendices, but with specific variations in shape and basal traits.

Distribution and diversity. Worldwide. The genus includes about 50 species. In Europe, 9 species are recorded.

Hosts. Hemiptera, Orthoptera and Coleoptera (Viggiani, 1982). Hosts and biological traits are known only for a few species. *P. phaneropterae* Viggiani has been recorded from Italy as a gregarious egg parasitoids of *Phaneroptera nana* Fieber (Viggiani, 2021).

***Pterandrophysalis* Nowicki**

Pterandrophysalis Nowicki, 1935. Zeit. angew. Ent. Berlin 21: 575.

Type species: *Pterandrophysalis levantina* Nowicki. (Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 2-segmented. Antenna (Fig. 93) with 2 anelli, 2 funicular, and 3 club segments. Fore wing (Fig. 94) around 2× as long as wide, with short marginal vein, shorter than premarginal vein, disk densely setose without setal tracks, RS₁ absent. Male. Antenna as in female (Fig. 95) but premarginal and marginal veins fused and widely inflated (Fig. 96), forming an oval complex extending in almost the entire basal wing. Genitalia (Fig. 97) of chalcidoid type, phallobase with parameres and well-developed volsellae; aedeagus with long bacilliform apodemes.

Distribution and diversity. Europe and North America. Two species are described *P. levantina* Nowicki and *P. plamana* Burks, Pinto and Heraty (fossil) (Burks *et al.*, 2015).

Hosts. *P. levantina* has been collected from eggs of *Bangasternus orientalis* (Capiomont) (Coleoptera Curculionidae) in Greece (Pinto, 2006).

***Soikiella* Novicki**

Soikiella Nowicki, 1934. Polsk. Pismo Ent. 12: 1.

Type species: *Soikiella mongibelli* Nowicki. (Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 98) with 1 anellus, 1 funicular and 3 club segments, c3 with a terminal process. Fore wing

(Fig. 99) with short venation, disk moderately setose with linear setal tracks, but without RS₁. Male antenna with 2 funicular and 3 club segments, c3 without a terminal process. Genitalia (Fig. 100) of chalcidoid type, with broad phallobase dorsally opened, parameres well developed and reduced volsellae; aedeagus basally with short and transverse apodemes (Fig. 101). *Distribution and diversity.* North America, Asia, Europe. The genus includes 4 species, 2 of them recorded from Europe (Italy): *S. mongibelli* Nowicki and *S. italica* Viggiani. A key to their identification is provided by Bernardo *et al.* (2017).

Hosts. Eggs of Diptera (Asilidae).

***Szelenyia* Nowicki**

Szelenyia Nowicki, 1940. Zeit. angew. Ent. Berlin 26: 633.

Type species: *Szelenyia tamaricis* Nowicki.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 2-segmented (Fig. 102). Antenna (Fig. 103) with 2-segmented funicle and 3-segmented club. Fore wing (Fig. 104) broad, disk width 0.6× the wing length, marginal vein very short, with marked angular junction to premarginal vein as the latter to subcostal vein; disk densely setose without setal tracks, except r and RS₁ with a few setae. Male antenna (Fig. 105) as female. Genitalia (Fig. 106) of chalcidoid type, with wide boat-shaped phallobase, opened with long parameres and volsellae, aedeagus with long, bacilliform apodemes.

Distribution and diversity. Europe (France, Corsica). Known only as *S. tamaricis*, a type of genus.

Hosts. Not known, probably Coleoptera.

***Trichogramma* Westwood**

Trichogramma Westwood, 1833. Phil. Mag. 2: 444.

Type species: *Trichogramma evanescens* Westwood.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female (Fig. 142). Maxillary palpus 1-segmented. Antenna (Fig. 107) with 2 anelli, 2 funicular segments, and 1-segmented club, rather flat, apico-ventrally trunked. Venation of fore wing (Fig. 108) with marginal vein and stigmal vein forming an arch; disk moderately setose with several setal tracks, RS₁ present. Male antenna (Fig. 109) with one postanellar segment covered with several long setae. Genitalia (Fig. 110) with phallobase showing an ovate antero-

dorsal aperture (ada), a dorsal lamina (dla), parameres (par), volsellae (vs), and an intervalsellar process (ivp); aedeagus with long bacilliform apodemes. Variations are present in the subgenera *Trichogrammanza* Carver (male antenna with 2 funicular segment, 1 club segment), and *Vanlisus* Pinto (male with 2 funicular segment and club 3-segmented).

Distribution and diversity. Worldwide. *Trichogramma* is the largest genus of Trichogrammatidae with 241 species listed (UCD, 2023). The recorded European species are about 40, but several of them need to be revised. Several species of *Trichogramma* have been used in a biological control program.

Hosts. Lepidoptera, Diptera, Hymenoptera and Neuroptera.

***Trichogrammatoidea* Girault**

Trichogrammatoidea Girault, 1911. Trans. Amer. Ent. Soc. 37: 13.

Type species: *Chaetostricha nana* Zehntner.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 111) with 2 anelli, 2 funicular segments, and 1-segmented club. Fore wing (Fig. 112) without RS₁. Male antenna (Fig. 113) with 2 funicular segments and club 3-segmented. Genitalia (Fig. 114) as in *Trichogramma*, but without dorsal lamina.

Distribution and diversity. Most species of the 31 listed species are recorded from Asia. Only one species, *T. stammeri* Nowicki, is recorded from Europe.

Hosts. Lepidoptera.

***Tumidiclava* Girault**

Tumidiclava Girault, 1911. Trans. Amer. Ent. Soc. 17: 6.

Type species: *Tumidiclava pulchrinotum* Girault.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Figs. 115 and 143) with 2 anelli and suboval club 2-3-segmented with a terminal long stick-like sensillum. Fore wing (Fig. 116) moderately wide, around twice as long as wide, with short venation not reaching half of the blade, disk moderately or densely setose, RS₁ absent and a few linear setal tracks. Ovipositor not extruded. Male as the female, but antenna without terminal stick-like sensillum. Metasomal tergite VII with a pair of lateral lobes. Genitalia (Fig. 117) with elongate

phallobase, wider in the middle, without or reduced parameres, volsellae; aedeagus with long, bacilliform apodemes.

Distribution and diversity. Worldwide. The genus includes 20 species. In Europe, the species *T. bimaculata* (Blood), *T. minuscola* Nowicki, and *T. subcaudata* Nowicki are recorded (Aishan *et al.*, 2015).

Hosts. Coleoptera and Lepidoptera (Pinto, 2006).

***Ufens* Girault**

Ufens Girault, 1911. Trans. Amer. Ent. Soc. 37: 32.

Type species: *Trichogramma nigrum* Ashmead.

(Trichogrammatidae: Trichogrammatinae: Trichogrammatini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 118) with 2 anelli, 2 funicular segments, and 3-segmented club. Fore wing (Fig. 119) broad, often rather trunked distally, with marginal vein and stigma vein more or less subequal, disk with regular setal tracks. Male antennal club (Fig. 120) with a small 4th segment; flagellar segments with long setae arranged in whorls. Genitalia (Fig. 121) with a distinct phallobase at least basally not fused with the aedeagus, with wide antero-dorsal aperture oblong or ovate and distal appendices of different shape.

Notes. The genus was revised by Owen (2011). The author listed 53 species (31 new species, 9 species described by previous authors, and 13 species not associated with males and considered *nomina dubia*). He provided a key to the identification of the world species based on the genitalia characters of the males. According to a morphological and molecular analysis, the genus was included in the subfamily Oligositinae. In all species studied by Owen, with the exception of 6 species, the genitalia have a distinct phallobase oblong or transverse ovate with distal appendices. In the present author classification of the family Trichogrammatidae (Viggiani, 1971b) the genus, including only the species with distinct phallobase, are assigned to the subfamily Trichogrammatinae. The species with genitalia without a distinct phallobase, tubular-like, are included in the genus *Ufensia* Girault (Viggiani, 1971, 1989b) assigned to the subfamily Oligositinae.

Distribution and diversity. Worldwide. Rather wide genus including 48 species (Owen, 2011). Only two species, *U. dilativena* Nowicki and *U. similis* (Kryger), are recorded in Europe.

Hosts. Hemiptera (Cicadellidae) and Orthoptera.

***Ufensia* Girault**

Ufensia Girault, 1913. Mem. Queensland Mus. 2: 101.
Type species: *Ufensia pretiosa* Girault.

(Trichogrammatidae: Oligositinae: Chaetostichini)

Diagnosis. Female as *Ufens*, but male genitalia (Figs. 122 and 123) simplified, without phallobase distinct from the aedeagus and genitalic body with some appendice.

Distribution and diversity. Europe, South America, Indo-Malaysia, Australia. At present, the following 5 species are assigned to this genus: *U. dolichopenis* Owen, *U. foersteri* (Kryger), *U. rimatus* Lin, *U. simplipenus*, *U. spicifer* Owen. The only European species is *U. foersteri*.

Hosts. Hemiptera (Miridae) One of the few species with documented records is *Ufens minuta* Viggiani (= *foersteri* Kryger), egg parasitoids of *Reuteria marqueti* Puton (Miridae) in Italy (Viggiani, 1989b).

***Uscana* Girault**

Uscana Girault, 1911. Trans. Amer. Ent. Soc. 37: 22.

Type species: *Uscana semifumipennis* Girault.

(Trichogrammatidae: Trichogrammatinae: Chaetostichini)

Diagnosis. Female (Fig. 124). Maxillary palpus 1-segmented. Antenna (Fig. 125) with 2 anelli and club 4-segmented. Mid lobe of mesoscutum and scutellum both with 2 pairs of setae. Fore wing (Fig. 126) around twice longer than wide, disk densely or moderately setose with linear setal tracks not always distinguished. Legs with hind femur broader. Ovipositor rarely extruded. Male similar the female. Genitalia (Fig. 127) short, rather tubular, without distinct phallobase and aedeagus, having a short, round or oval antero-dorsal aperture.

Distribution and diversity. Worldwide. The genus includes 33 species, some of which probably need another generic placement. In Europe, 7 species are recorded.

Hosts. Coleoptera Bruchidae. Other recorded host (Tingidae) (Livingstone & Yacoub, 1988) should be confirmed. For a few species, the specific host is known. *U. spermophagi* Viggiani is recorded as parasitoid of the *Spermophagus sericeus* Geoffr. (Col. Bruchidae) (Viggiani, 1979).

***Xiphogramma* Nowicki**

Xiphogramma Nowicki, 1940. Zeit. angew. Ent. Berlin 26: 640.

Type species: *Xiphogramma holorhoptra* Nowicki.

(Trichogrammatidae: Oligositinae: Chaetostichini)

Diagnosis. Female. Maxillary palpus 1-segmented. Antenna (Fig. 128) with 2 anelli, 2 funicular, and 1 club segment. Fore wing (Fig. 130) with short venation, not reaching half of the fore wing length, stigmal vein very short, sessile, disk densely setose without or a few setal tracks, with reduced or lacking RS₁. Ovipositor (Fig. 129) sword-like, very long, extruded from the end of the metasoma. Male as the female. Genitalia (Figs. 131 and 132) simple, tubular, with short antero-dorsal aperture, basally very narrow, without distal appendices.

Distribution and diversity. Europe, Asia, Saudi Arabia, Africa, North America. 6 species are known. *P. levantina* Nowicki is the only European species.

Hosts. Unknown.

BIO-ECOLOGICAL TRAITS

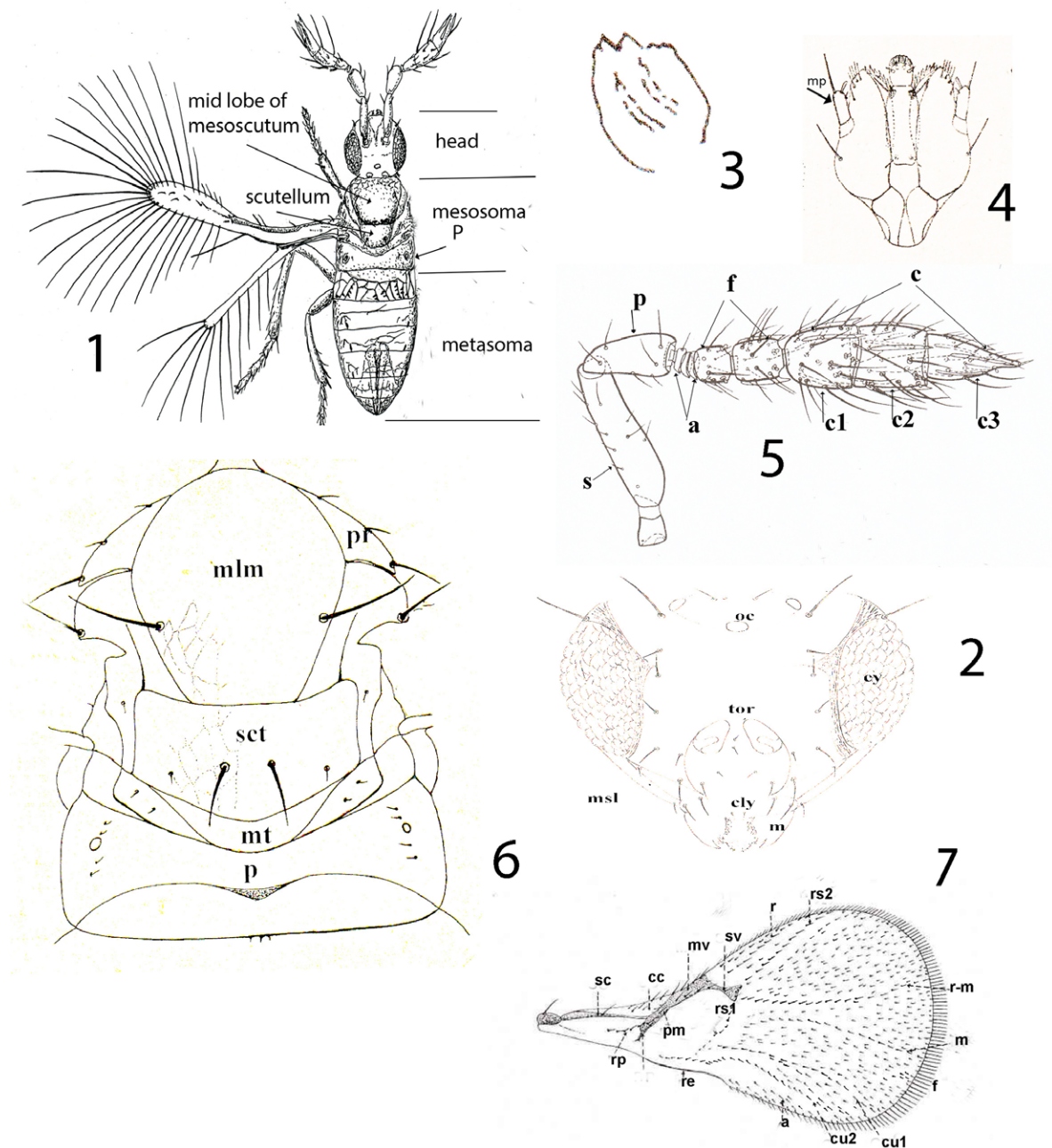
The knowledge of the bio-ecological traits of the Trichogrammatidae is very poor. For most of the species, any host is known, except for *Trichogramma*, in some countries, even mass-reared and used in biological control against insect pests. Normally, the species of Trichogrammatidae are solitary endo-egg parasitoids of insects (mostly Coleoptera, Lepidoptera, Hemiptera Auchenorrhyncha, Diptera, Odonata, some associated with aquatic plants). Documented exception is represented by *Lathromeris cecidomyiiae* Viggiani & Laudonia (Viggiani & Laudonia, 1994; Jesu & Laudonia, 1994), a larval parasitoid of *Lasioptera* sp. (Diptera Cecidomyiidae) on *Arundo donax* L. According to Owen *et al.* (2007), the molecular data suggest that Trichogrammatidae primitively parasitized Coleoptera. The following genera include species recorded as egg parasitoids of Coleoptera (*Asynacta*, *Bloodiella*, *Ceratogramma*, *Monorthochaeta*, *Ophioneurus*, *Poropoea*, *Prestwichia*, *Pterandrophysalis*, *Tumidiclava*, *Uscana*). Polivoltine species are normally associated with the same type of host. On the contrary, some species are monovoltine, and their life cycle is synchronized with that of the host. *Pseudoligosita phaneropterae* Viggiani is a gregarious egg parasitoid of *Phaneroptera nana* Fieber (Orthoptera Tettigoniidae); the adults emerge in autumn when the host oviposits new, fresh eggs. The parasitoid starts a new generation, which ends in the autumn of the next year; the synchronization of the host-parasitoid life cycle is regulated by a process of diapause involving the parasitoid larvae and pupae

(Viggiani, 2021). The same synchronization of the host-parasitoid life cycle has been reported for *Ittys annae* Karpinski (1954). Some genera of Trichogrammatidae have species associated prevalently with Lepidoptera (*Trichogramma* spp.), Hemiptera Auchmorrhyncha (*Oligosita* spp., *Pseudoligosita* spp.), or only with Thysanoptera (Polaszek *et al.*, 2022). Gregarious species, associated with relatively large insect eggs, are recorded in the genus *Trichogramma* and *Pseudoligosita*.

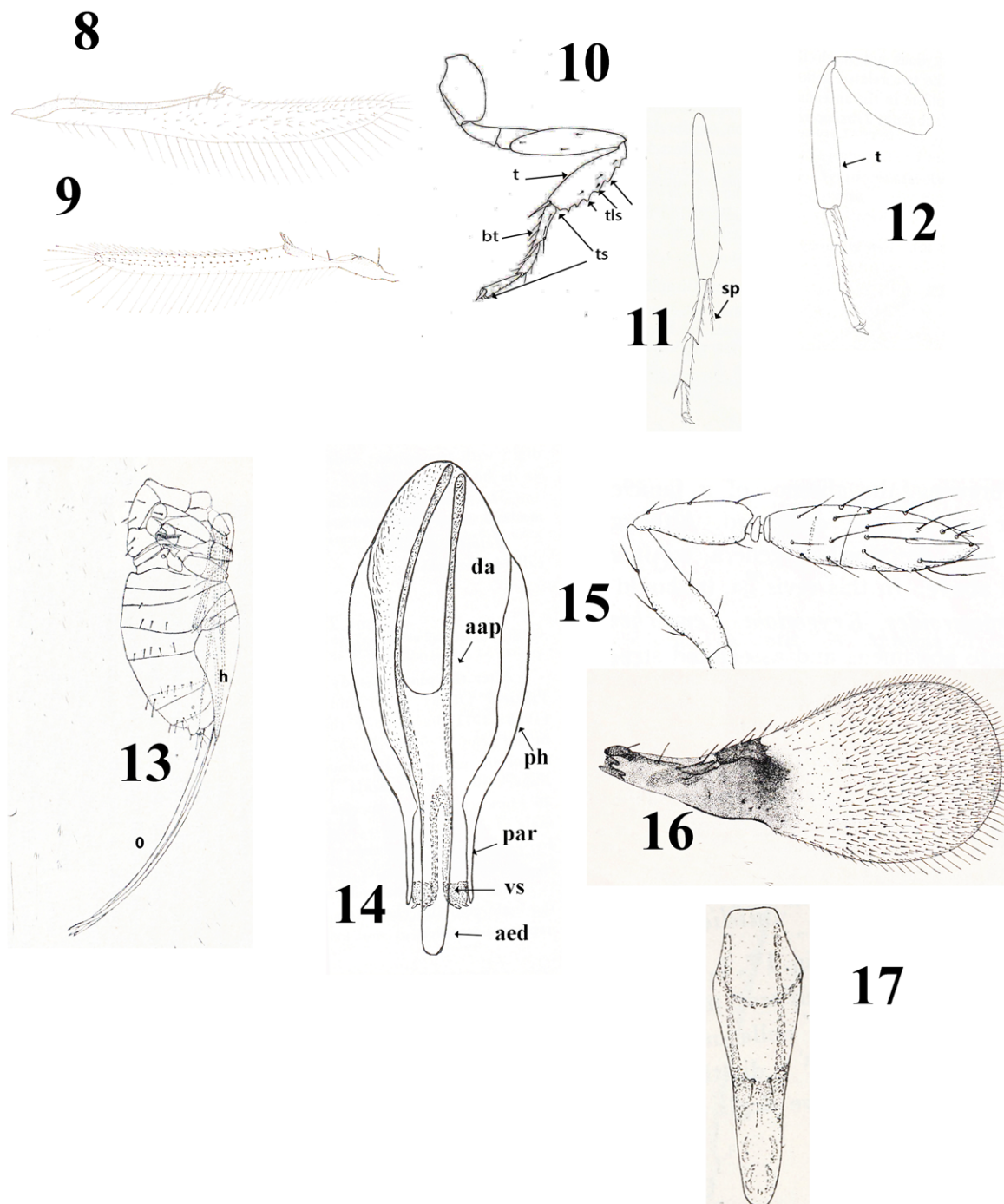
CLASSIFICATION

The history of the classification of Trichogrammatidae until the end of the 20th century was presented in a previous paper (Viggiani, 2002). The first modern revision of the family was presented by Doutt & Viggiani (1968). After the remarkable variations shown by Viggiani (1971b, 1984) in the shape and structure of the male genitalia in Trichogrammatidae, as in any other family of Chalcidoidea, except Mymaridae (Viggiani, 1989, 2004), the same author proposed a classification of the family. In the family Trichogrammatidae, the subfamilies Trichogrammatinae [including genera with species having male genitalia provided with a protective structure of the aedeagus, the phallobase, distally with some lateral (parameres) and ventral appendices (volsellae)] and the Oligositinae with male genitalia simplified without a distinct phallobase, were recognized. In the subfamily Trichogrammatinae, the tribes Trichogrammatini (species with phallobase boat-shaped or, rather, tubu-

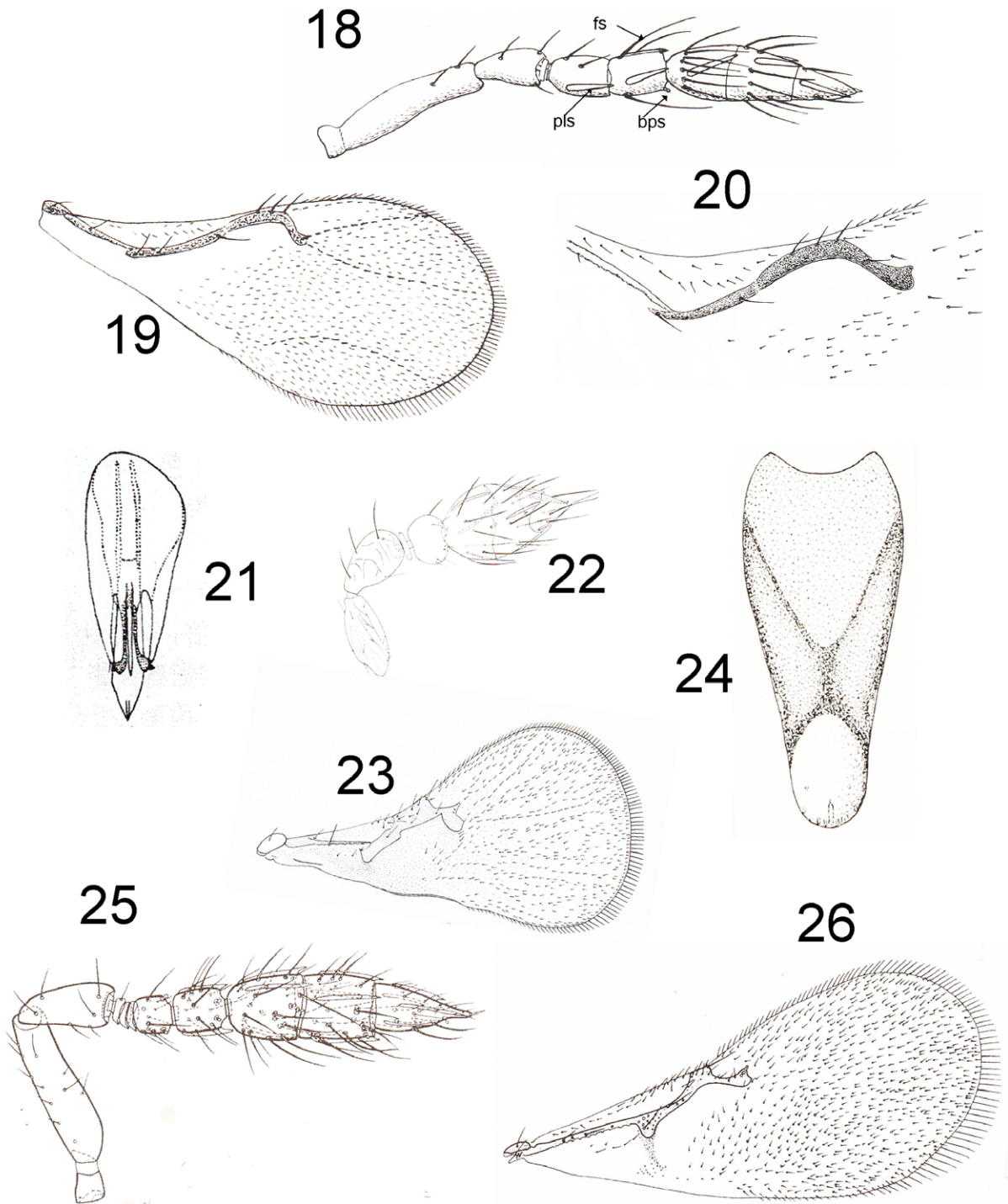
lar with antero-dorsal aperture of different shape and extension) and Paracentrobiini (phallobase subtrunc-conic, basally wider, and with antero-dorsal aperture transverse or subovate). In the subfamily Oligositinae, the tribes Chaetostrichini (male genitalia with a distinct antero-dorsal aperture, in some cases delimited by an annular sclerite) and Oligositini (male genitalia with antero-dorsal aperture not clearly distinct). After 35 years (Owen *et al.*, 2007), an evaluation of the utility of the male genitalia for higher-level classification of the Trichogrammatidae, using molecular methods, was carried out. Utilizing 121 taxa, included in 52 genera of the 84 genera that were recognized at that time, the authors proposed a new classification of the Trichogrammatidae. In the subfamily Trichogrammatinae, only the tribe Trichogrammatini was included, and in the Oligositinae, the tribe Paracentrobiini was transferred from Trichogrammatinae and added to the tribes Chaetostrichini and Oligositini recognized by Viggiani (1971). Nevertheless, Owen *et al.* (2007) included in the tribe Trichogrammatini only the genera *Thanatogramma* Pinto, *Trichogramma* Westwood, *Trichogrammatoidea* Girault, and *Xenufens* Girault; the other 33 genera were considered *incertae sedis* within Trichogrammatinae. In the subfamily Oligositinae, the same authors included 11 genera in the tribe Chaetostrichini, 12 in Oligositini, 4 in the Paracentrobiini, and 24 genera in *incertae sedis* within Oligositinae. Substantially, the molecular classification proposed by Owen *et al.* (2007) confirms the bulk of that of Viggiani, based on the features of the male genitalia. Further studies will clarify controversial points.



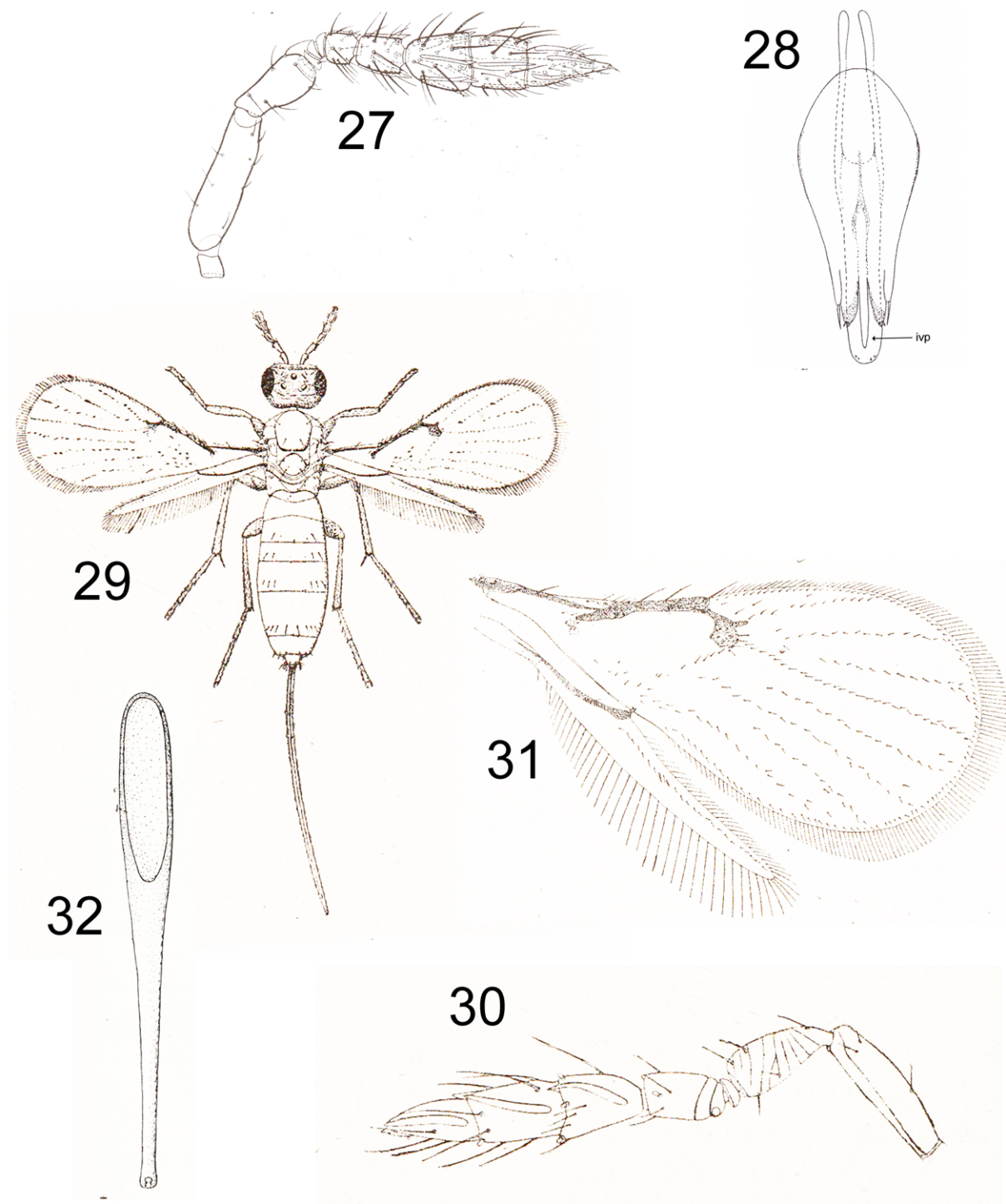
Figs. 1-7. 1.) *Megaphragma mymaripenne*, female, habitus, p = propodeum. 2) *Pintoa nearctica*, head front view, cly = clypeus, ey = eye, m = mandible, msl = malar sulcus line, oc = ocellus, tor = torulus. 3) *Megaphragma* sp., mandible. 4) *Chaetistricha walkeri*, maxillae and labium, mp = maxillary palpus. 5) *Ceratogramma tatianae*, female antenna, a = anelli, c = club, c1 = first club segment, c2 = second club segment, c3 = third club segment, f = funicle, p = pedicel, s = scape. 6) *Pintoa* sp., mesoscutum and propodeum, mlm = mid lobe of mesoscutum, mt = metanotum, pr = pronotum. 7) *Ufens niger*, fore wing, a = anal vein track, b = basal vein track, cc = costal cell, cu₁ = first branch of cubital vein track, cu₂ = second branch of cubital vein track, m = median vein track, mv = marginal vein, pm = premarginal vein, r = radius, re = retinaculum, r-m = r-m cross vein track, rp = radial process, RS₁ = radial sector (vein track 1_{st} Abscissa), RS₂ = radial sector (vein track 2_{nd} Abscissa), sc = subcostal vein.



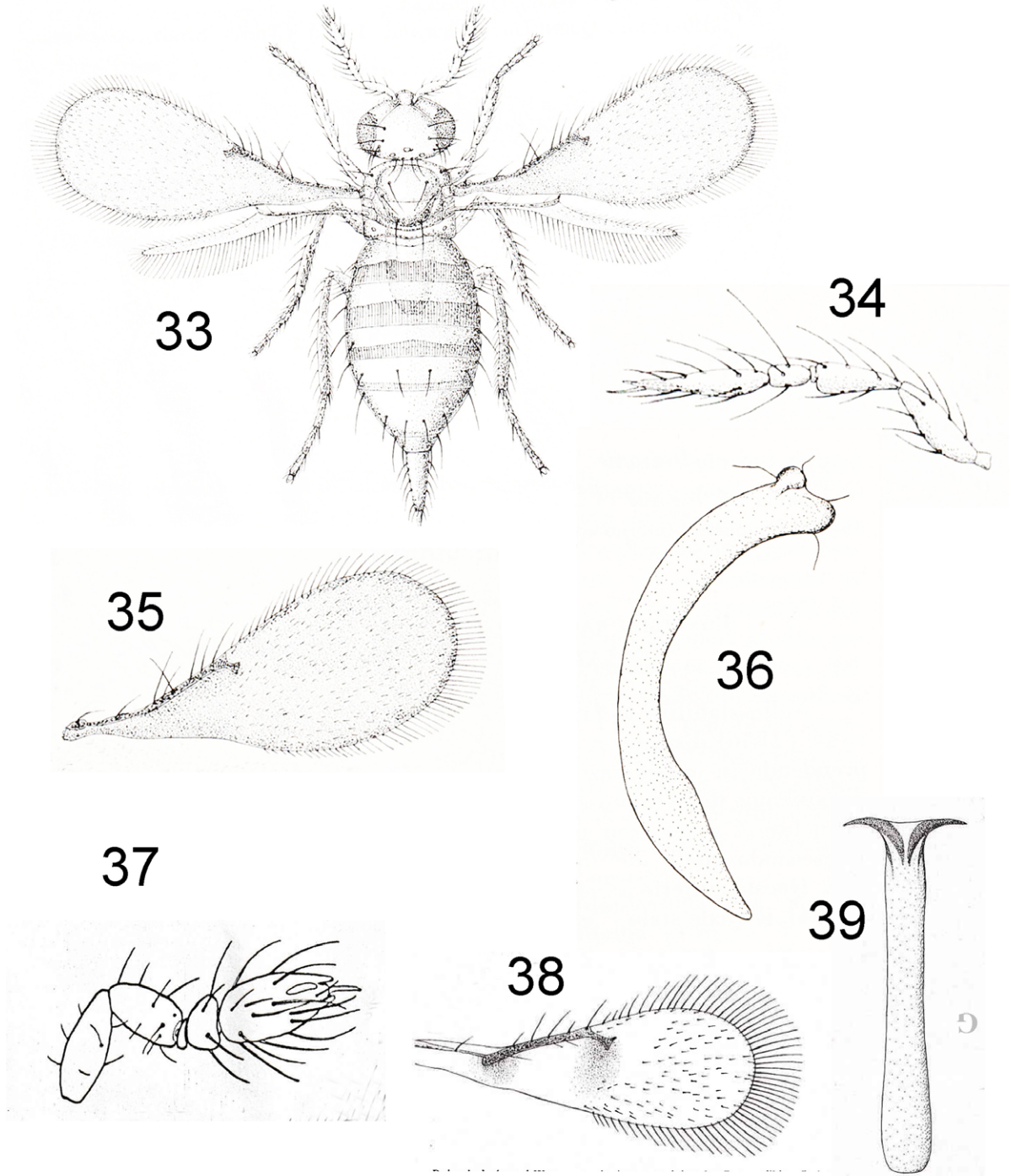
Figs. 8-17. 8) *Ceratogramma tatianae*, hind wing. 9) *Paracentrobia zabinski*, hind wing. 10) *Mirufens dentipes*, fore leg, bt = basitarsus, tls = thorn-like spine, ts = tarsus, t = tibia. 11) *Mirufens dentipes*, mid leg, s = spur. 12) *Mirufens dentipes*, hind leg, t = tibia. 13) *Chaetostricha walkeri*, mesosoma and metasoma, side view, h = hypopygium, o = ovipositor. 14) *Szelenya tamaricis*, male genitalia, aap = aedeagal apodem, da = dorsal aperture, aed = aedeagus, par = paramere, ph = phallobase, vs = volsella. 15) *Aphelinoidea xiphias*, female antenna. 16) *Aphelinoidea deserticola*, fore wing. 17) *Aphelinoidea* sp., male genitalia.



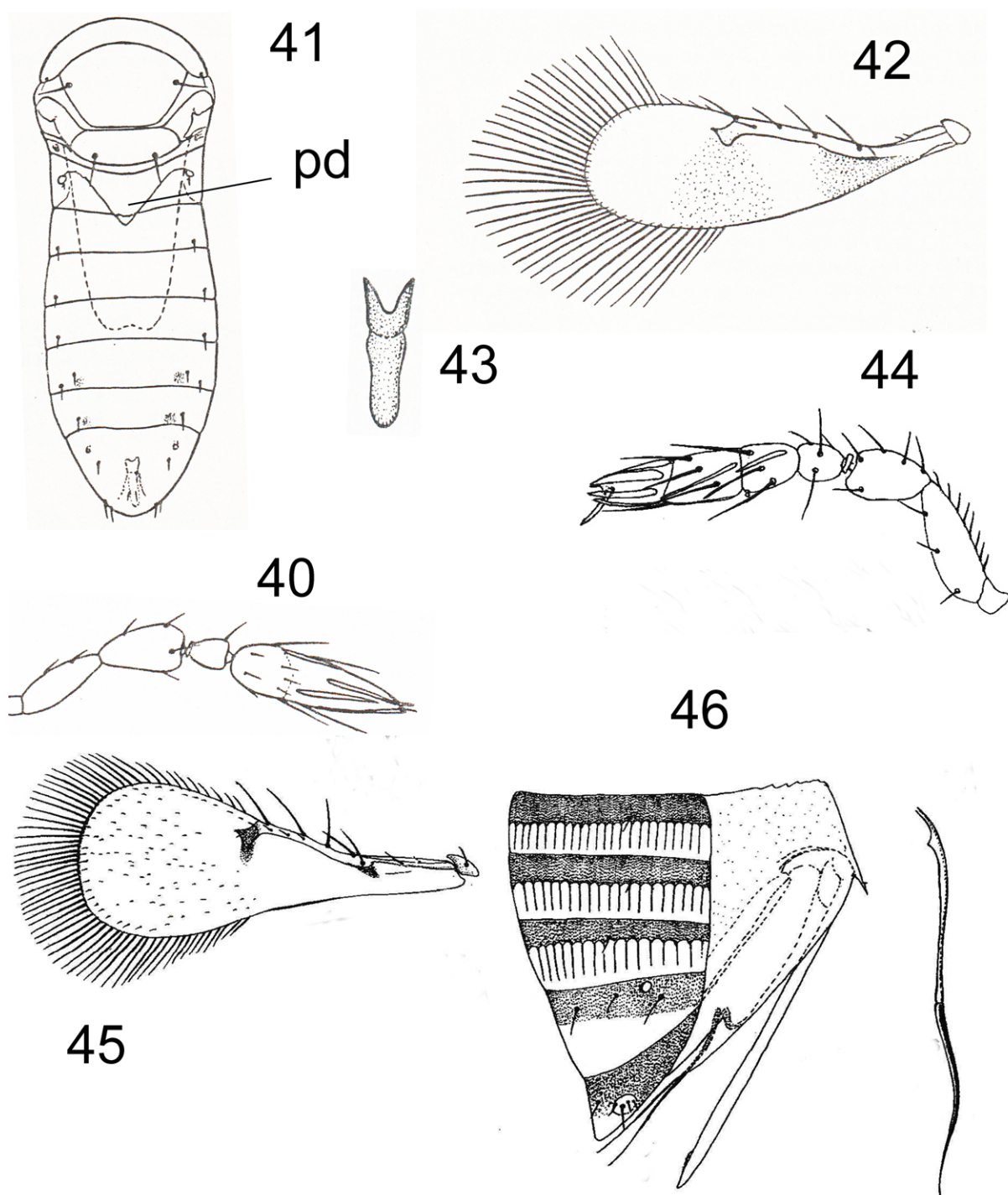
Figs. 18-26. 18) *Asynacta exigua*, female antenna, bps = basiconic peg sensillum, fs = flagellar setae, pls = placoid sensillum. 19) *Asynacta exigua*, fore wing. 20) *Asynacta exigua*, particular of the venation. 21) *Asynacta ambrostomae*, male genitalia. 22) *Bloodiella andalusica*, female antenna. 23) *Bloodiella andalusica*, fore wing. 24) *Bloodiella gynandrophthalmae*, male genitalia. 25) *Ceratogramma tatianae*, female antenna. 26) *Ceratogramma tatianae*, fore wing.



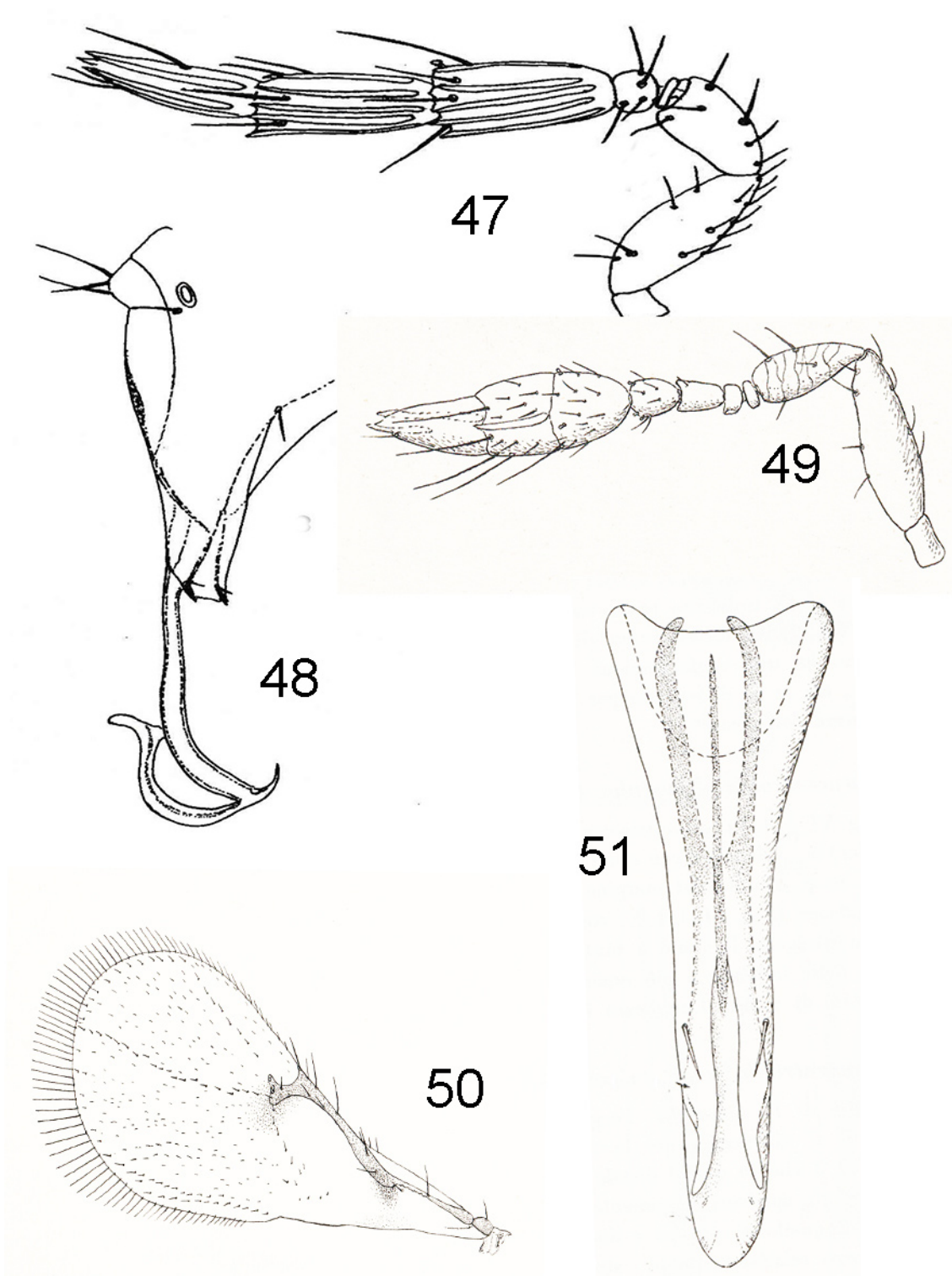
Figs. 27-32. 27) *Ceratogramma tatianae*, male antenna. 28) *Ceratogramma brasiliense*, male genitalia. 29) *Chaetostricha walkeri*, habitus female. 30) *Chaetostricha walkeri*, female antenna. 31) *Chaetostricha walkeri*, fore and hind wings. 32) *Chaetostricha silvestrii*, male genitalia.



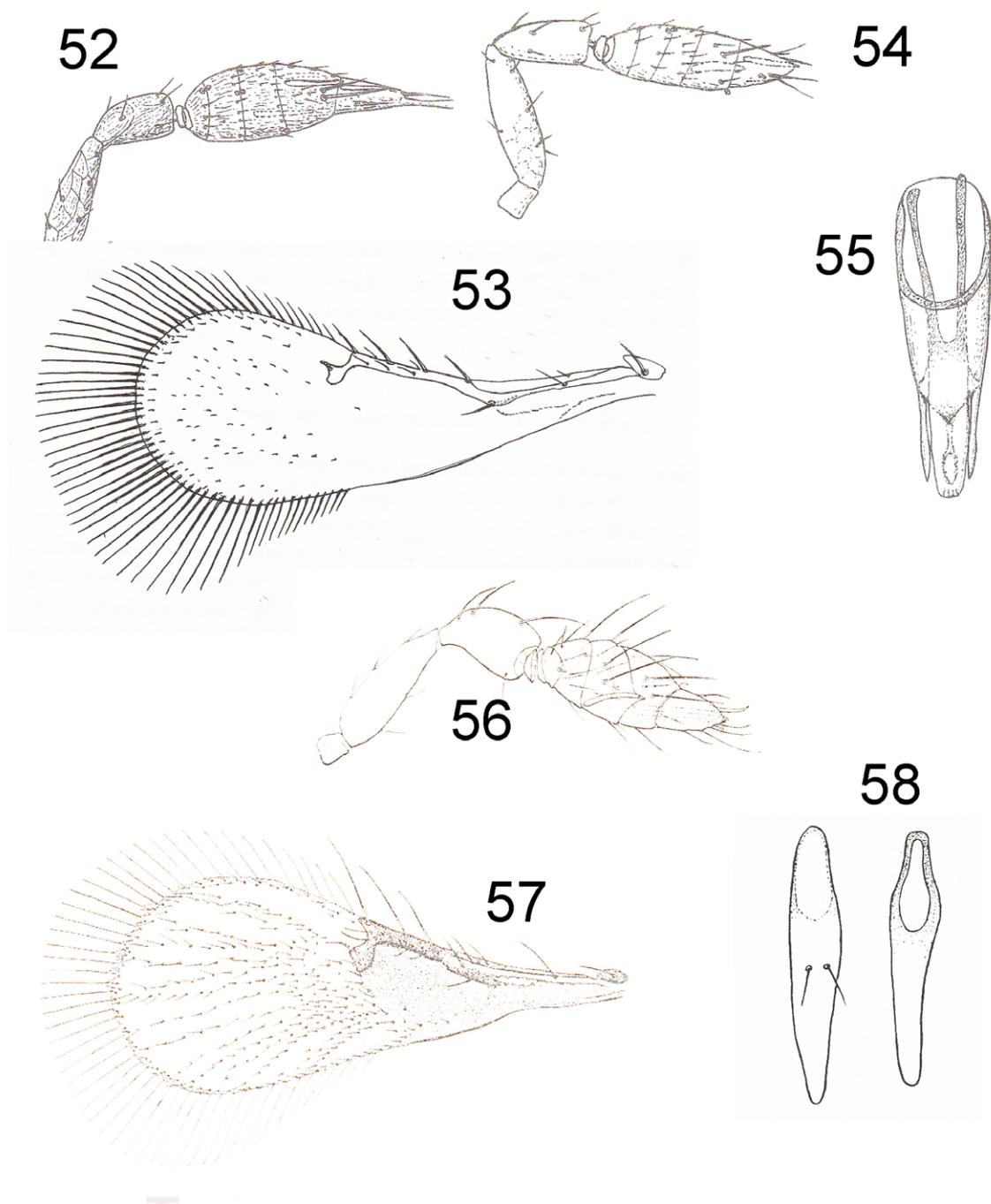
Figs. 33-39. 33) *Chaetostrichella pungens*, female, habitus. 34) *Chaetostrichella pungens*, female antenna. 35) *Chaetostrichella pungens*, fore wing. 36) *Chaetostrichella pungens*, male genitalia. 37) *Doirania leefmansi*, female antenna. 38) *Doirania leefmansi*, fore wing. 39) *Doirania leefmansi*, male genitalia.



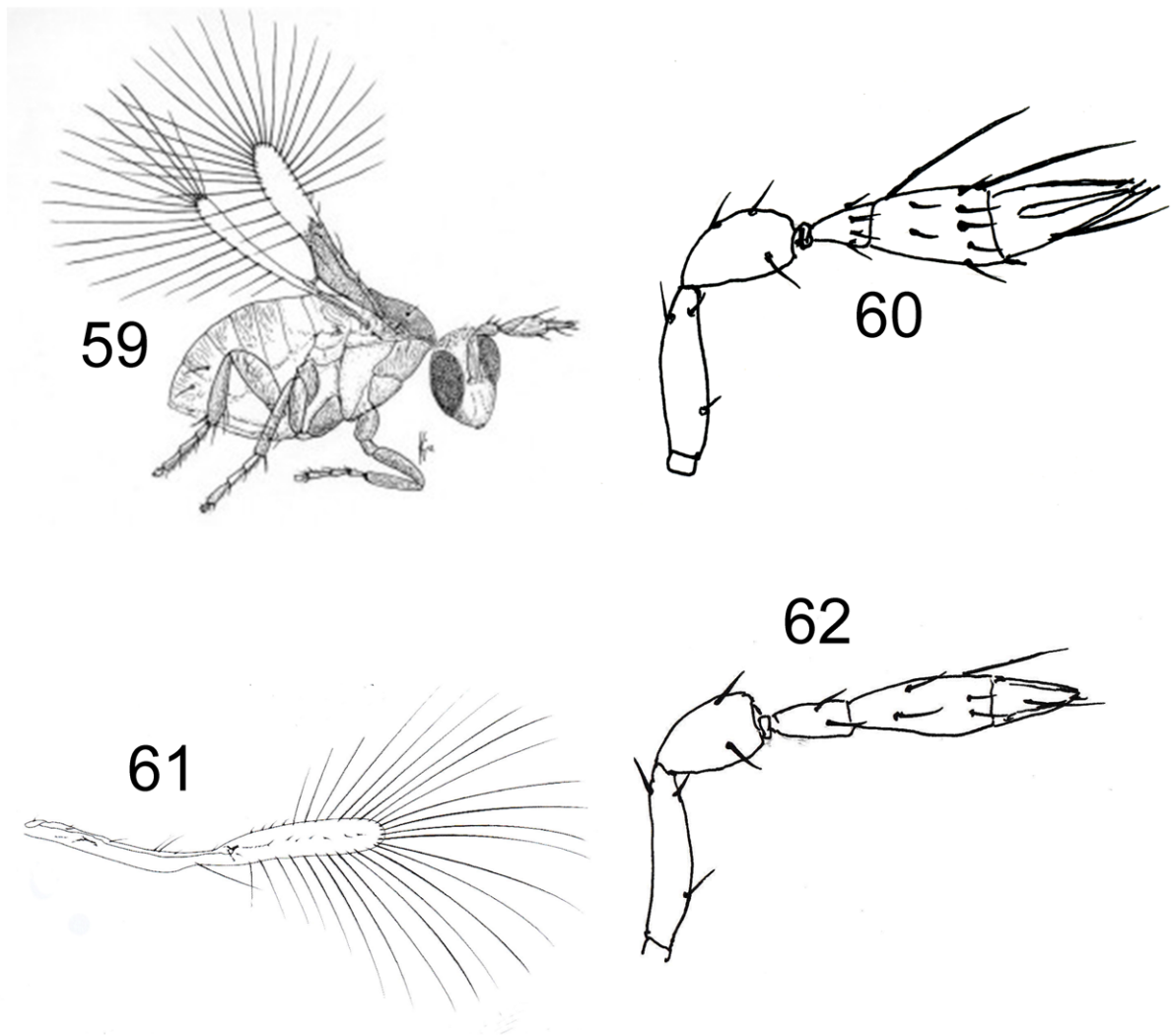
Figs. 40-46. 40) *Epoligosita mexicana*, female antenna. 41) *Epoligosita mexicana*, mesosoma and metasoma, pd = propodeal disk. 42) *Epoligosita mexicana*, fore wing. 43) *Epoligosita mexicana*, male genitalia. 44) *Hayatia procypriota*, female antenna. 45) *Hayatia procypriota*, fore wing. 46) *Hayatia procypriota*, part of the distal abdomen with ovipositor and particular of the lacet-shaped third valvula.



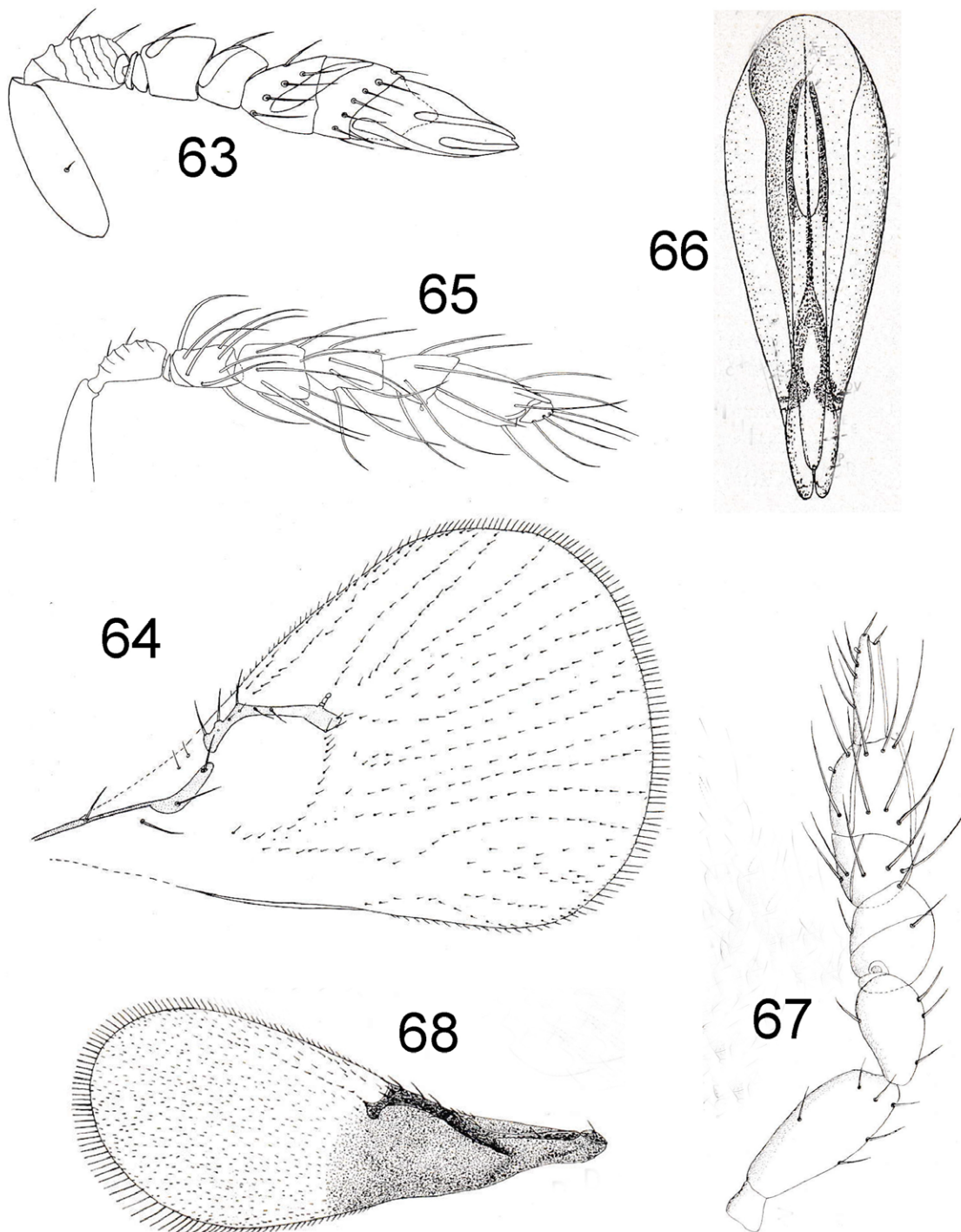
Figs. 47-51. 47) *Hayatia procyptota*, male antenna. 48) *Hayatia procyptota*, male genitalia. 49) *Ittys annae*, female antenna. 50) *Ittys annae*, fore wing. 51) *Ittys annae*, male genitalia.



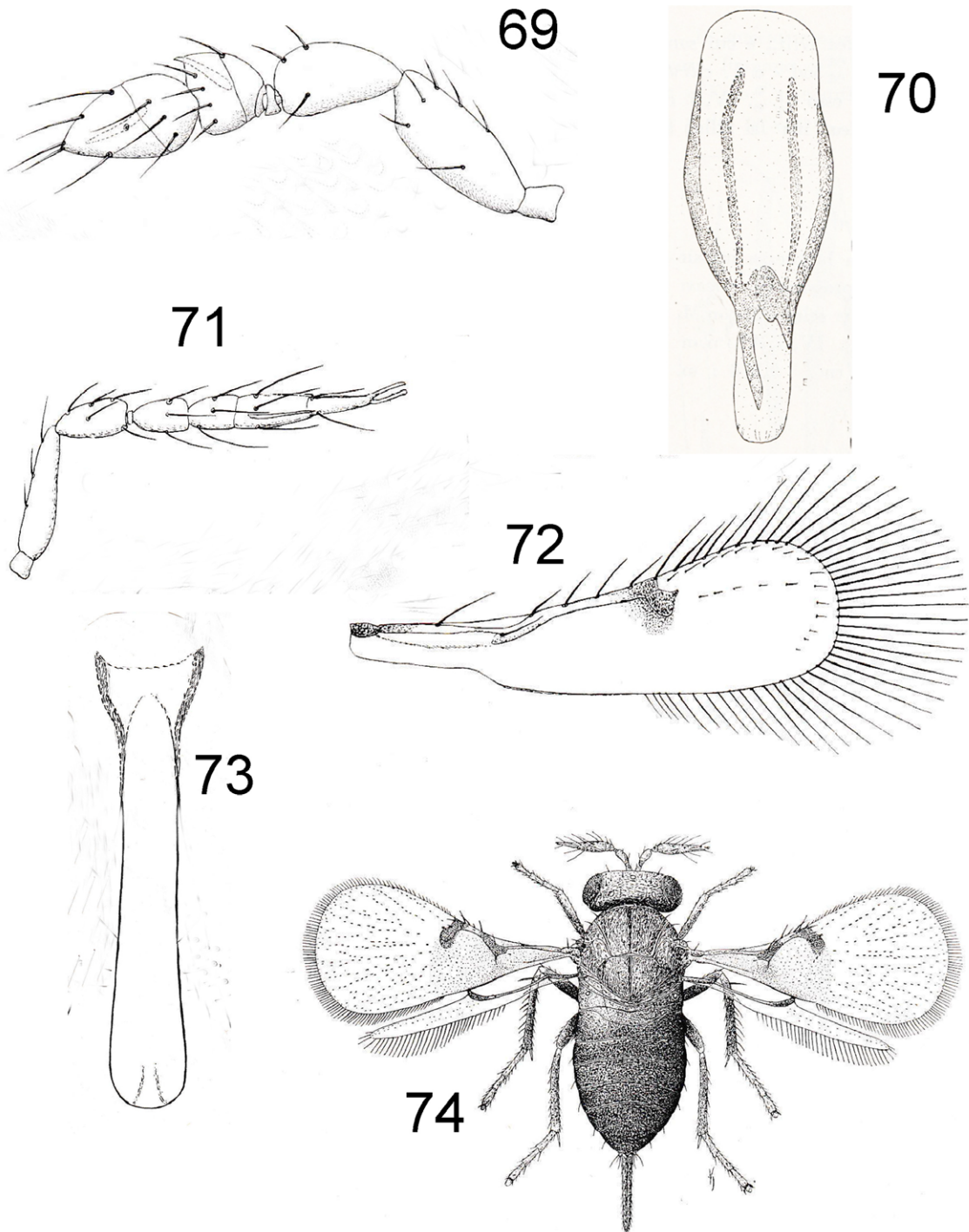
Figs. 52-58. 52) *Lathromeris cecidomyiiae*, female antenna. 53) *Lathromeris cecidomyiiae*, fore wing. 54) *Lathromeris cecidomyiiae*, male antenna. 55) *Lathromeris cecidomyiiae*, male genitalia. 56) *Lathromeroidea silvarum*, female antenna. 57) *Lathromeroidea silvarum*, fore wing. 58) *Lathromeroidea* sp., male genitalia, ventral and dorsal view.



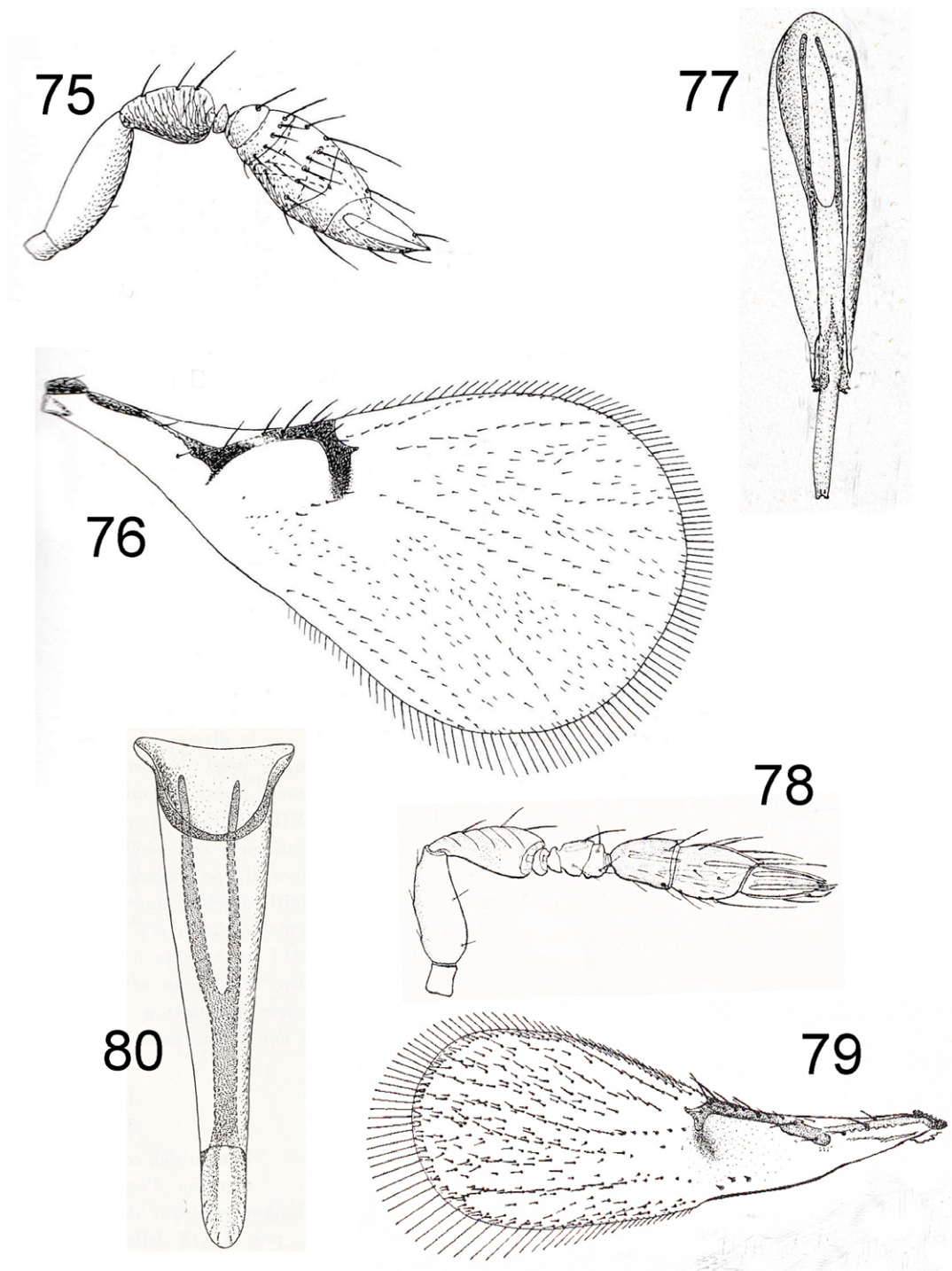
Figs. 59-62. 59) *Megaphragma rivelloi*, female, habitus. 60) *Megaphragma mymaripenne*, female antenna. 61) *Megaphragma mymaripenne*, fore wing. 62) *Megaphragma mymaripenne*, male antenna.



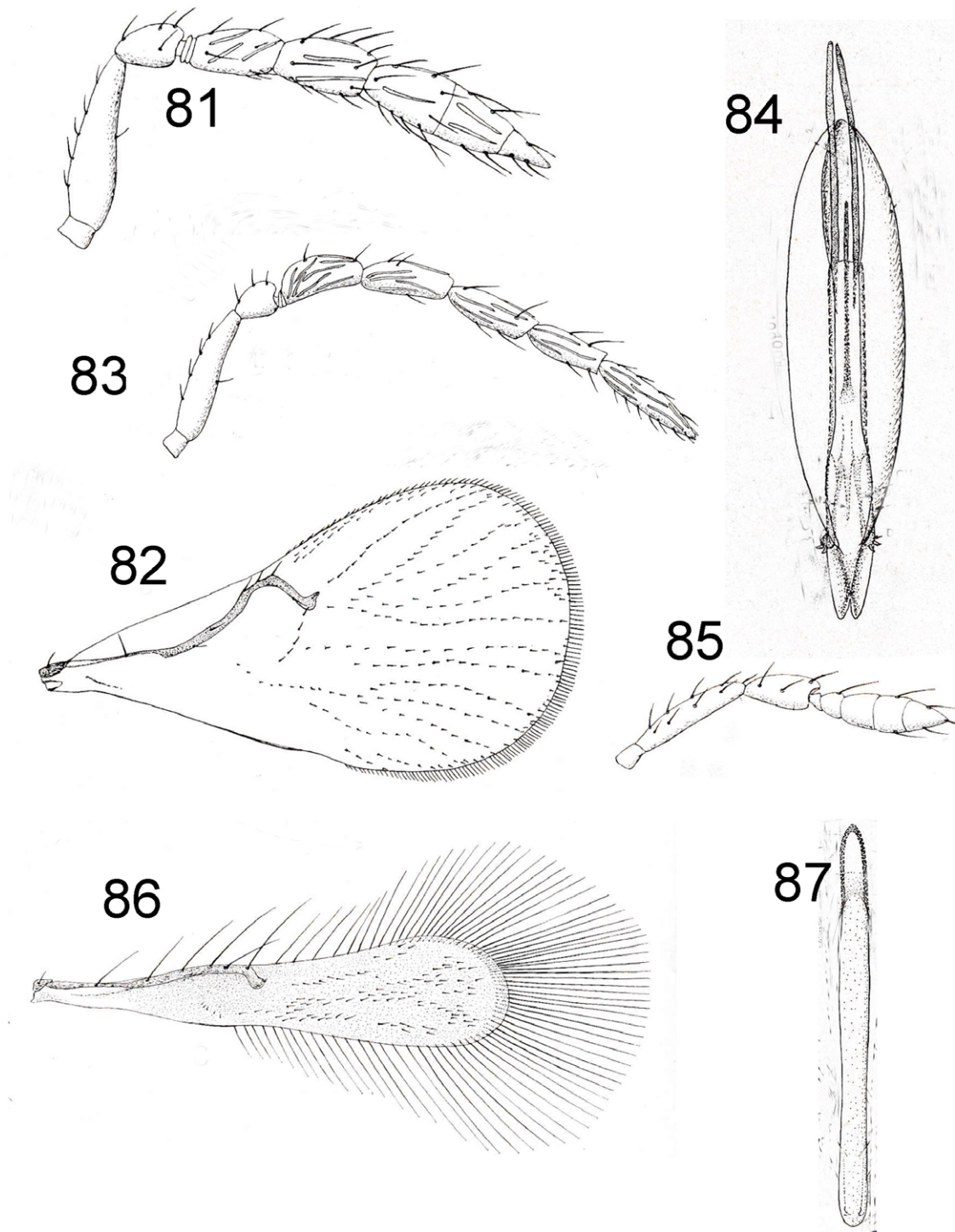
Figs. 63-68. 63) *Mirufens dentipes*, female antenna. 64) *Mirufens dentipes*, fore wing. 65) *Mirufens dentipes*, male antenna. 66) *Mirufens* sp., male genitalia. 67) *Monortochoaeta nigra*, female antenna. 68) *Monortochoaeta nigra*, fore wing.



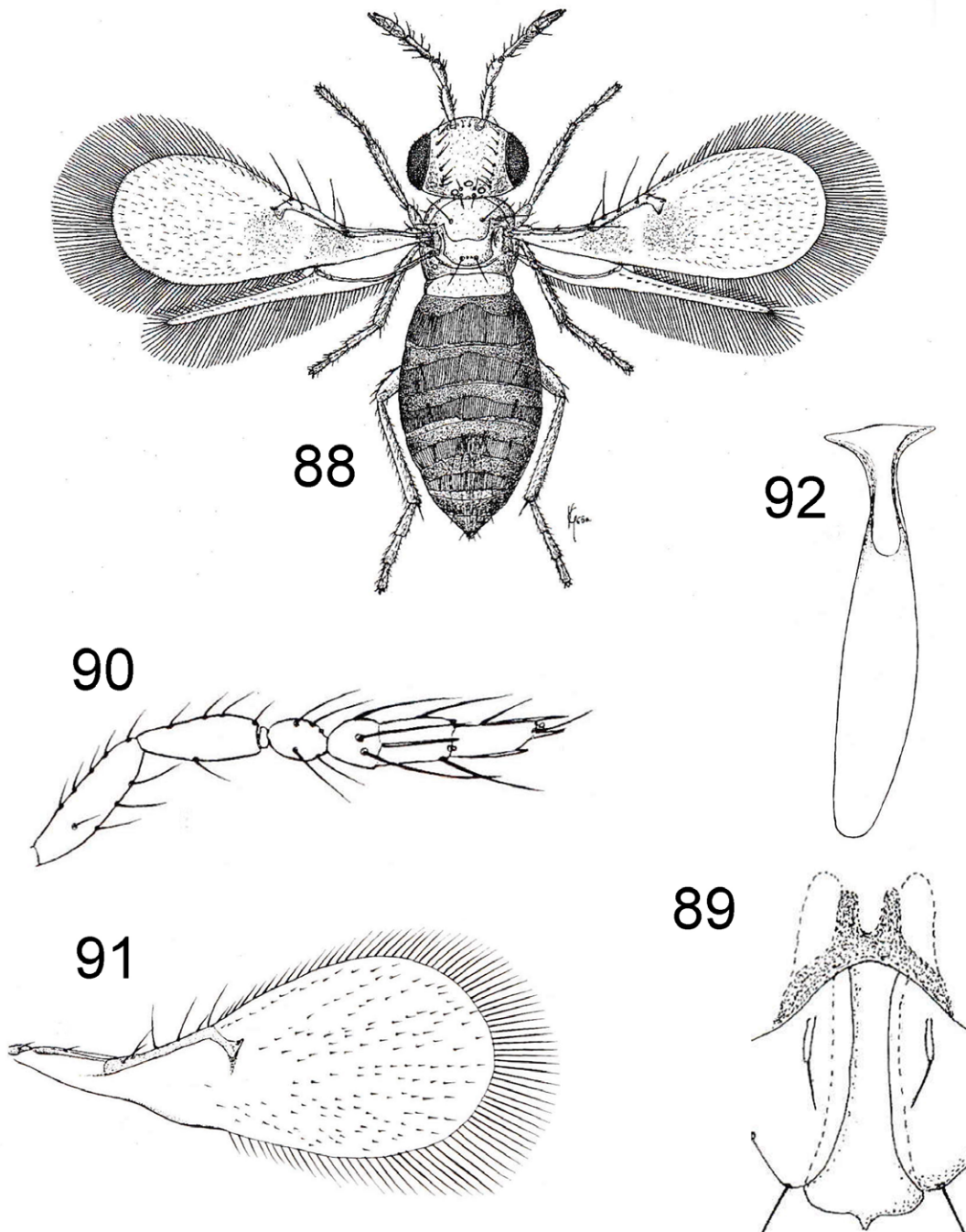
Figs. 69-74. 69) *Monortochaeta nigra*, male antenna. 70) *Monortochaeta nigra*, male genitalia. 71) *Oligosita sanguinea*, female antenna. 72) *Oligosita sanguinea*, fore wing. 73) *Oligosita anomala*, male genitalia. 74) *Ophioneurus longiclavatus*, female, habitus.



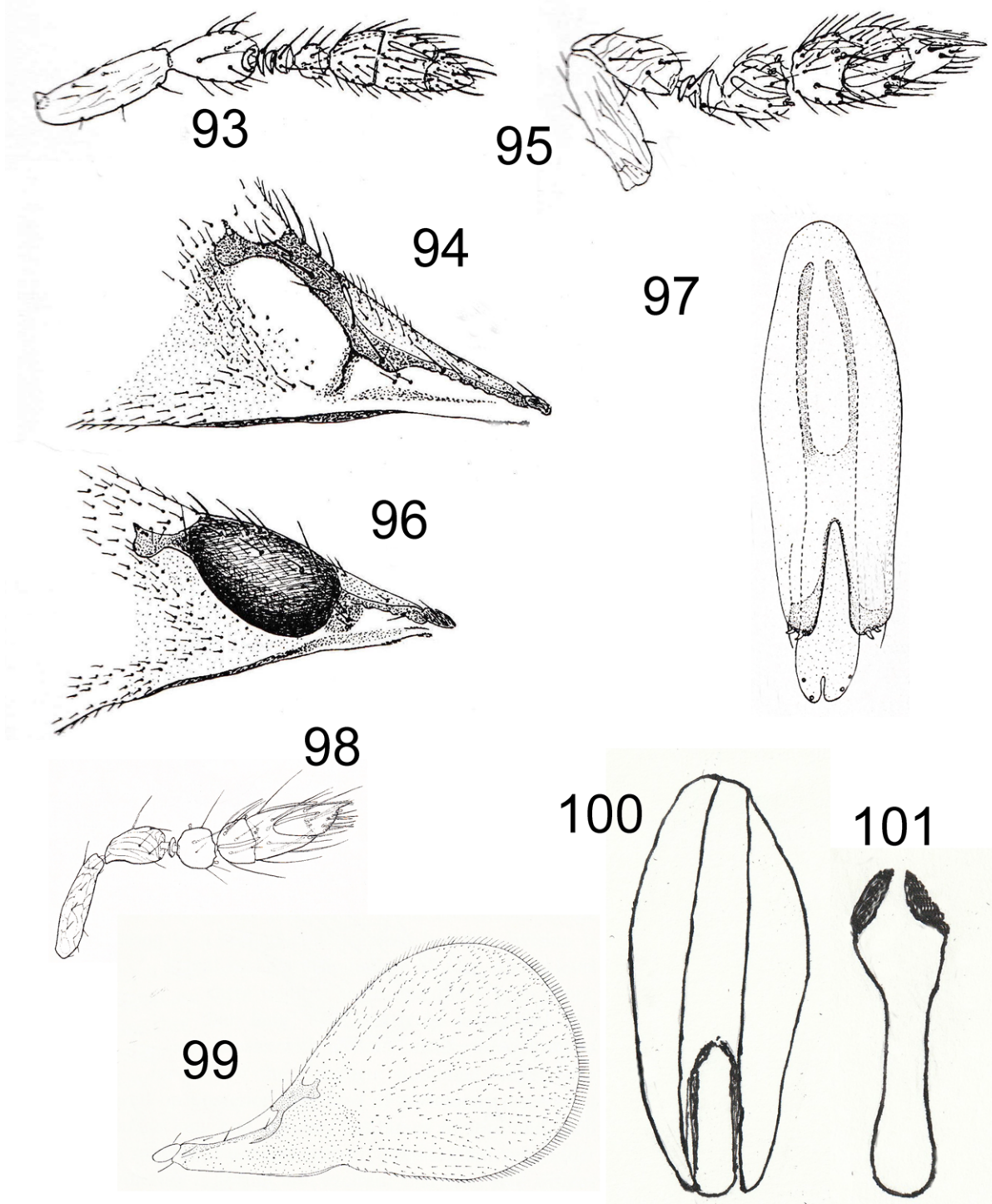
Figs. 75-80. 75) *Ophioneurus signatus*, female antenna. 76) *Ophioneurus signatus*, fore wing. 77) *Ophioneurus signatus*, male genitalia. 78) *Paracentrobia zabinskii*, female antenna. 79) *Paracentrobia zabinskii*, fore wing. 80) *Paracentrobia dimorpha*, male genitalia.



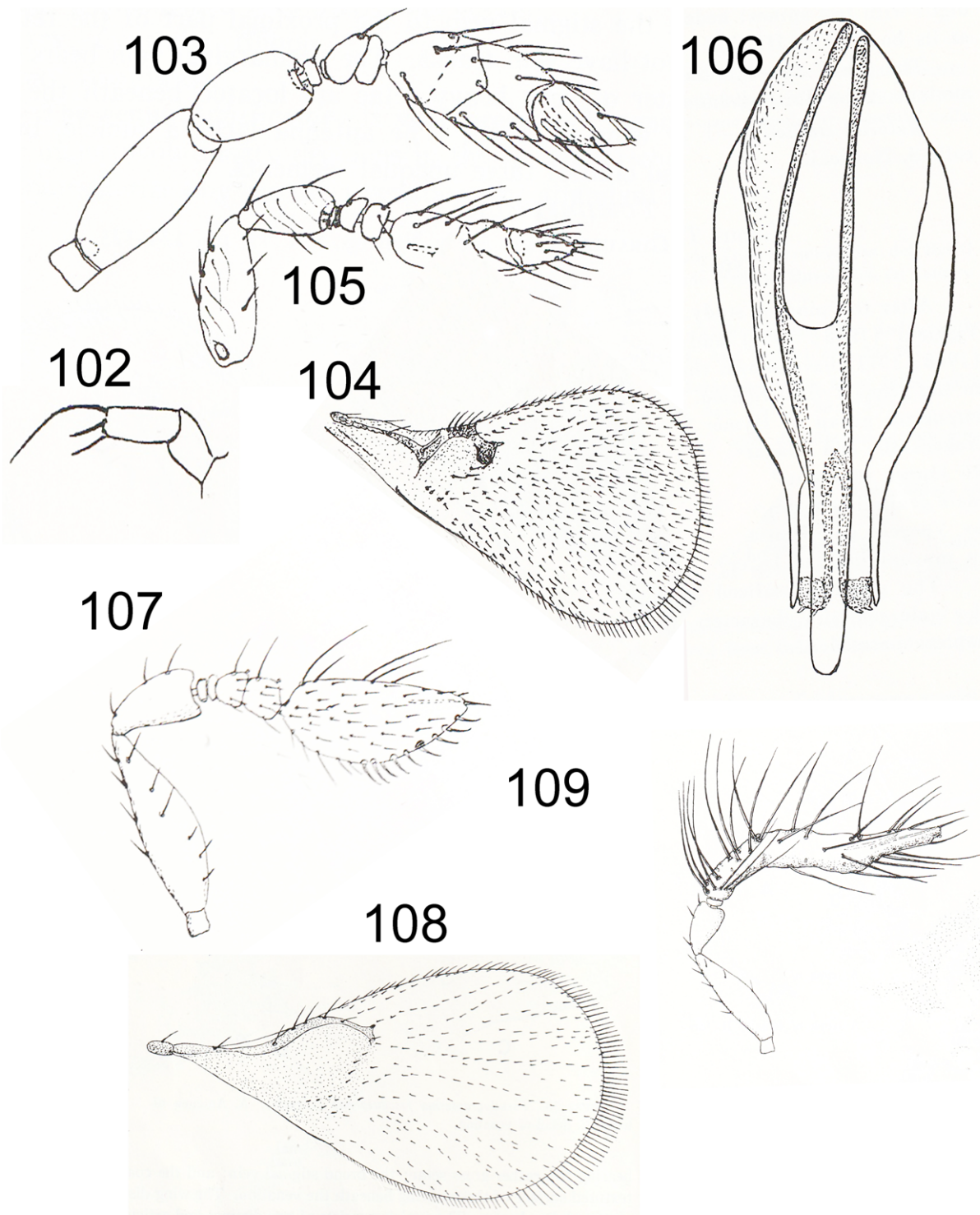
Figs. 81-87. 81) *Poropoea stollwercki*, female antenna. 82) *Poropoea stollwercki*, fore wing. 83) *Poropoea stollwercki*, male antenna. 84) *Poropoea stollwercki*, male genitalia. 85) *Prestwichia aquatica*, female antenna. 86) *Prestwichia aquatica*, fore wing. 87) *Prestwichia aquatica*, male genitalia.



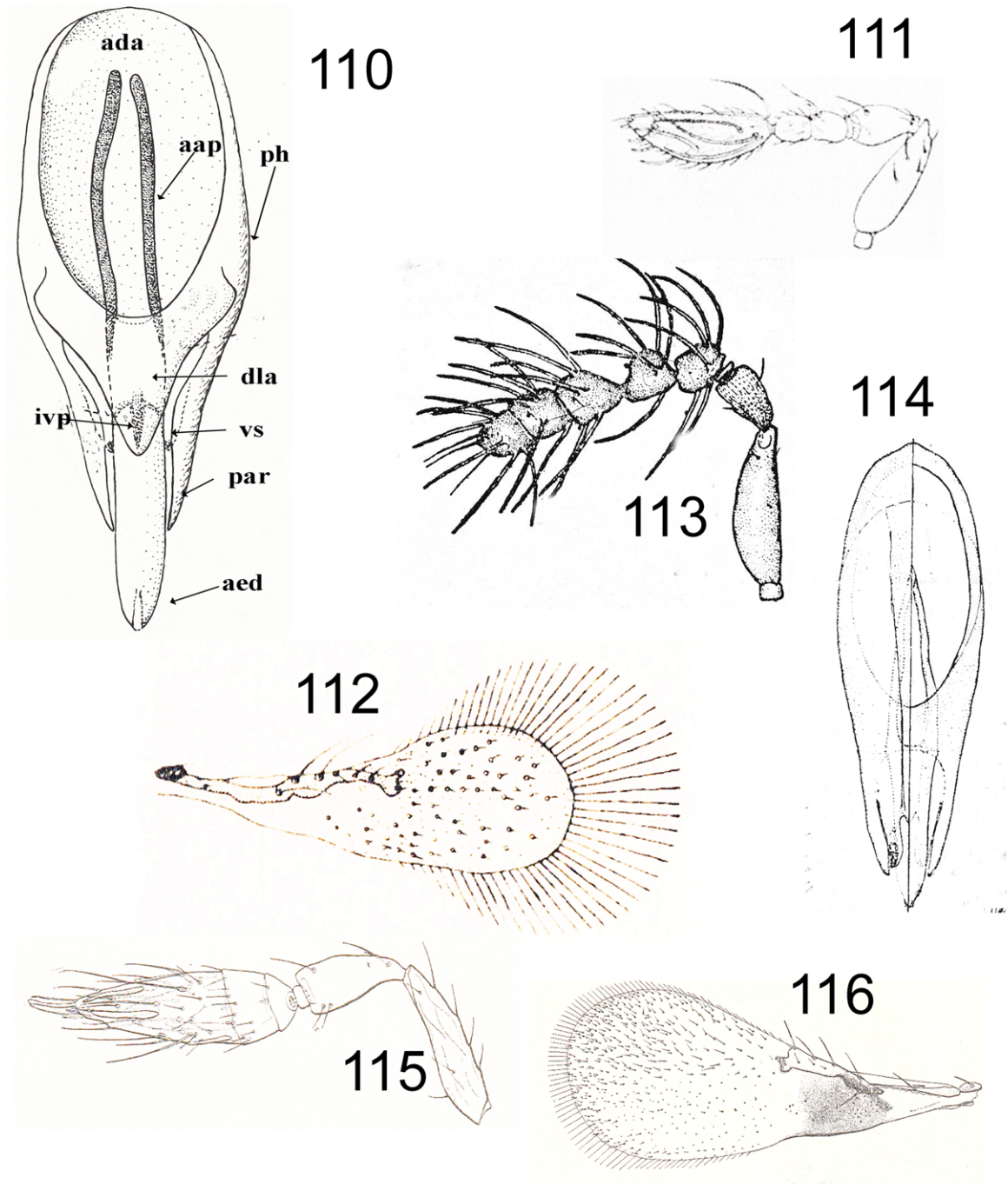
Figs. 88-92. 88) *Pseudoligosita masneri*, female, habitus. 89) *Pseudoligosita masneri*, male genitalia. 90) *Pseudoligosita phaneropterae*, female antenna. 91) *Pseudoligosita phaneropterae*, fore wing. 92) *Pseudoligosita phaneropterae*, male genitalia.



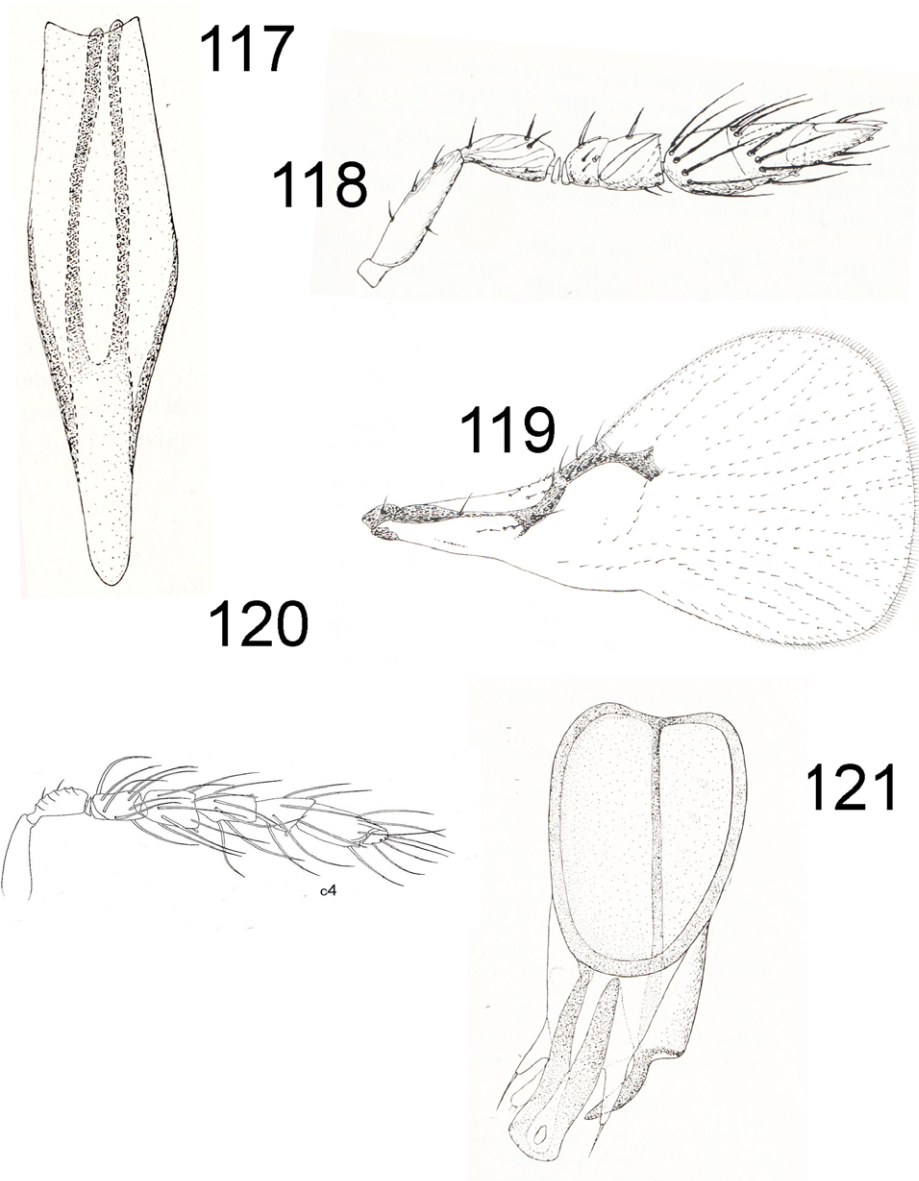
Figs. 93-101. 93) *Pterandrophysalis levantina*, female antenna. 94) *Pterandrophysalis levantina*, female fore wing venation. 95) *Pterandrophysalis levantina*, male antenna. 96) *Pterandrophysalis levantina*, male fore wing. 97) *Pterandrophysalis levantina*, male genitalia. 98) *Soikiella mongibelli*, female antenna. 99) *Soikiella mongibelli*, fore wing. 100) *Soikiella italica*, male genitalia. 101) *Soikiella italica*, aedeagus.



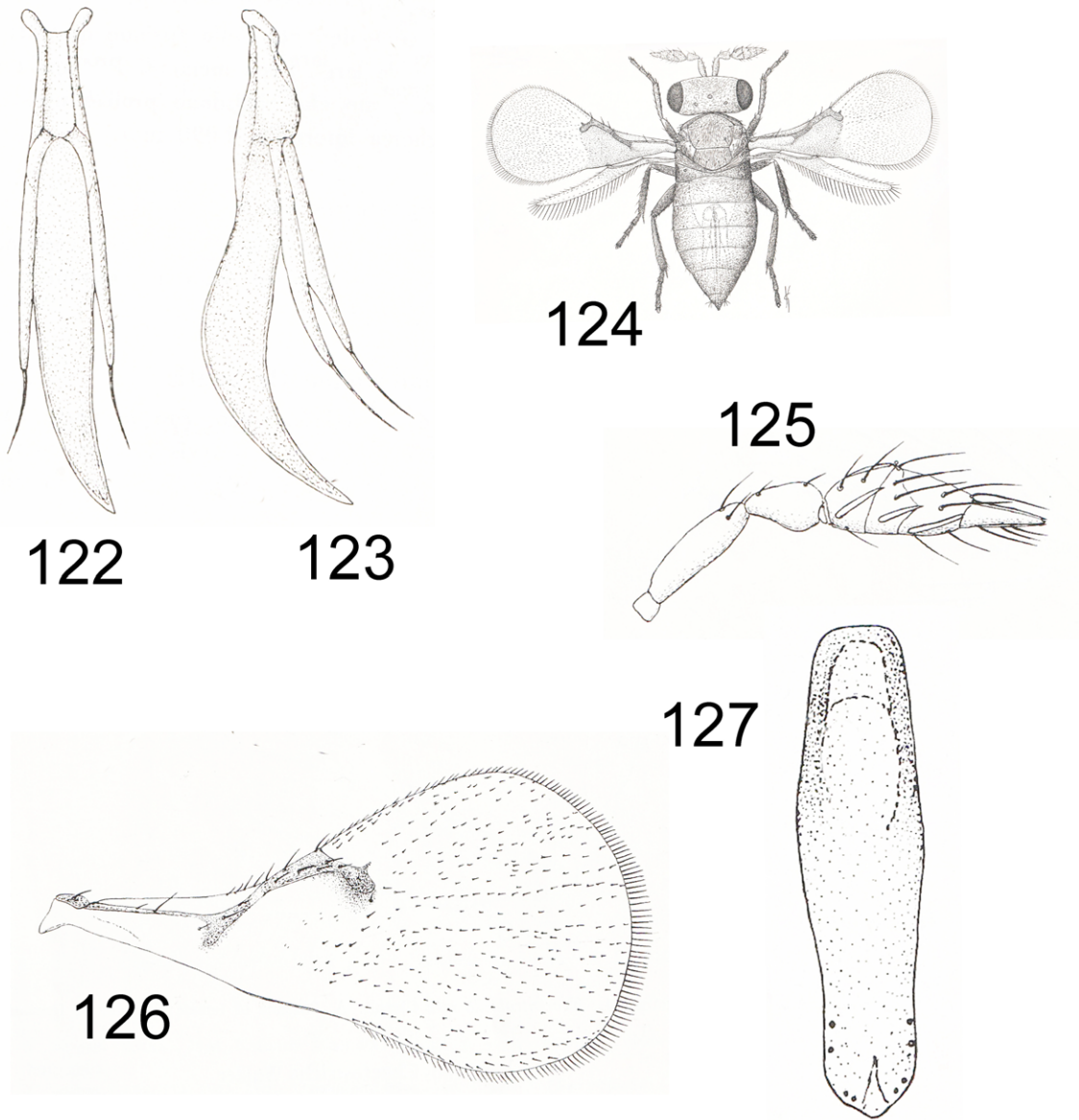
Figs. 102-109. 102) *Szelelya tamaricis*, maxillary palpus. 103) *Szelelya tamaricis*, female antenna. 104) *Szelelya tamaricis*, fore wing. 105) *Szelelya tamaricis*, male antenna. 106) *Szelelya tamaricis*, male genitalia. 107) *Trichogramma evanescens*, female antenna. 108) *Trichogramma evanescens*, fore wing. 109) *Trichogramma evanescens*, male antenna.



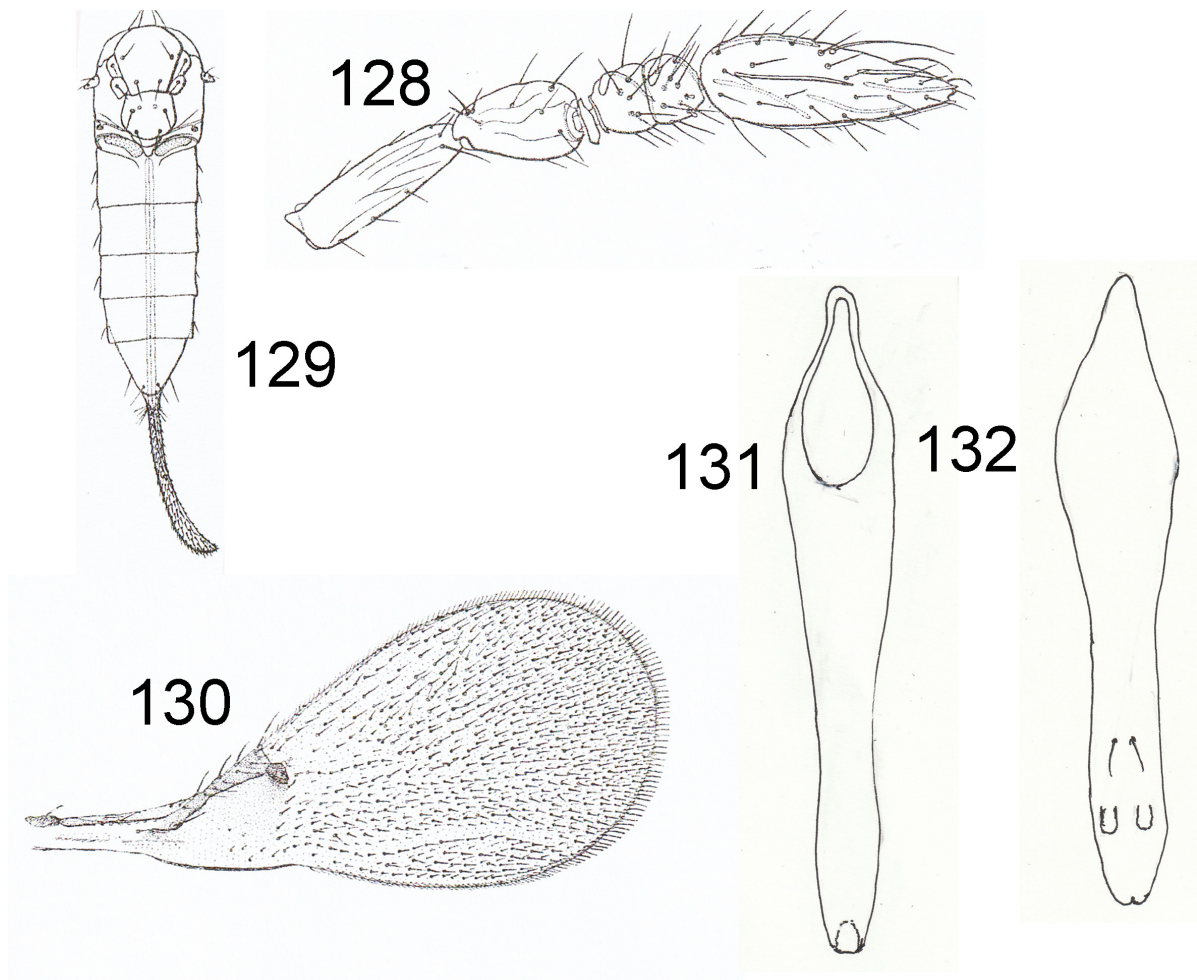
Figs. 110-116. 110) *Trichogramma evanescens*, male genitalia, aap = aedeagus apodeme, ada = antero-dorsal aperture, aed = aedeagus, dla = dorsal lamina, ivp = intervolsellar process, par = paramere, ph = phallobase, vs = volsella. 111) *Trichogrammatoidea stammeri*, female antenna. 112) *Trichogrammatoidea stammeri*, fore wing. 113) *Trichogramma prabhakeri*, ale antenna. 114) *Trichogrammatoidea lutea*, male genitalia. 115) *Tumidiclava subcaudata*, female antenna. 116) *Tumidiclava subcaudata*, fore wing.



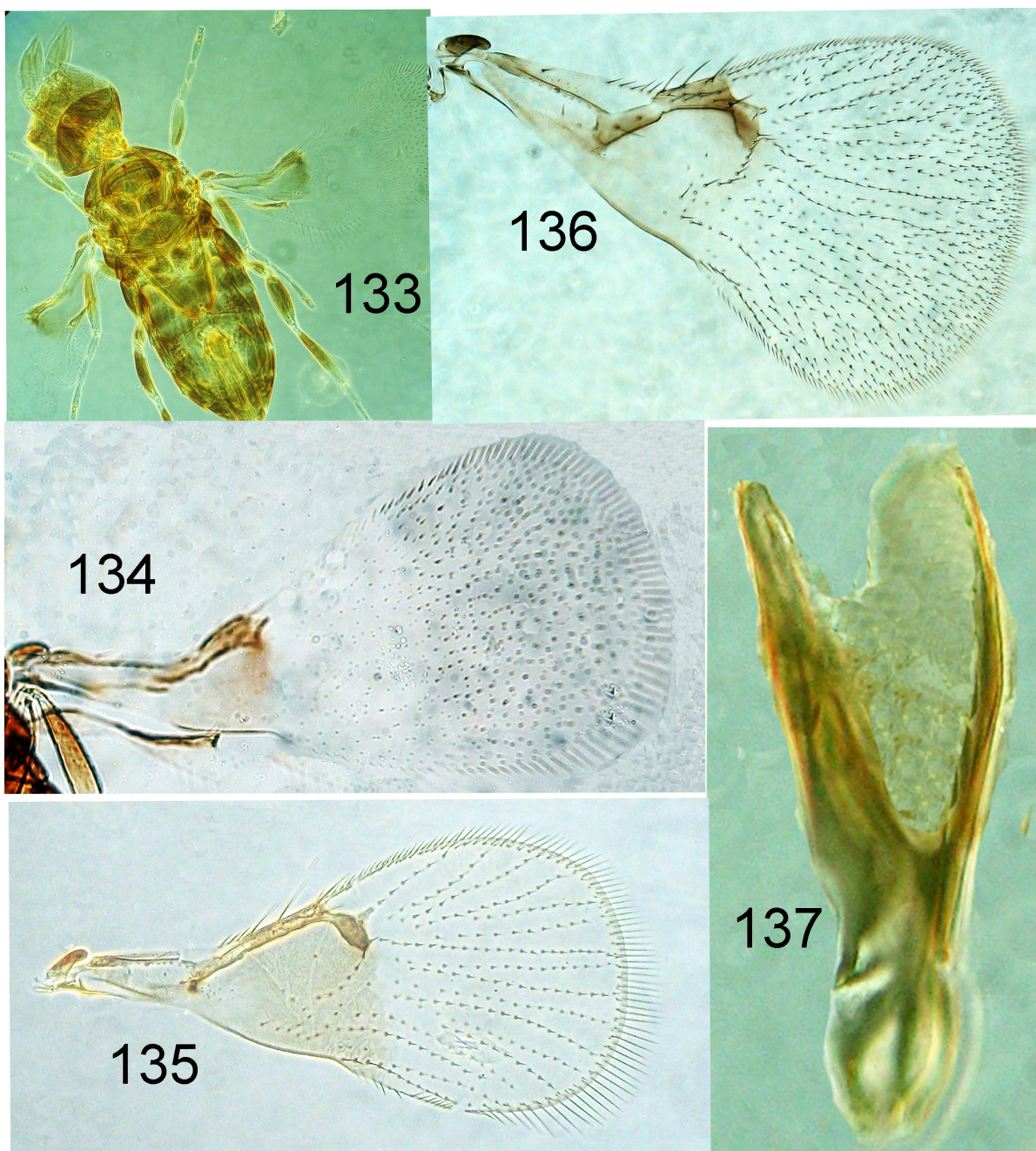
Figs. 117-121. 117) *Tumidiclava bimaculata*, male genitalia. 118) *Ufens* sp., female antenna. 119) *Ufens* sp., fore wing. 120) *Ufens* sp., male antenna. 121) *Ufens similis*, male genitalia.



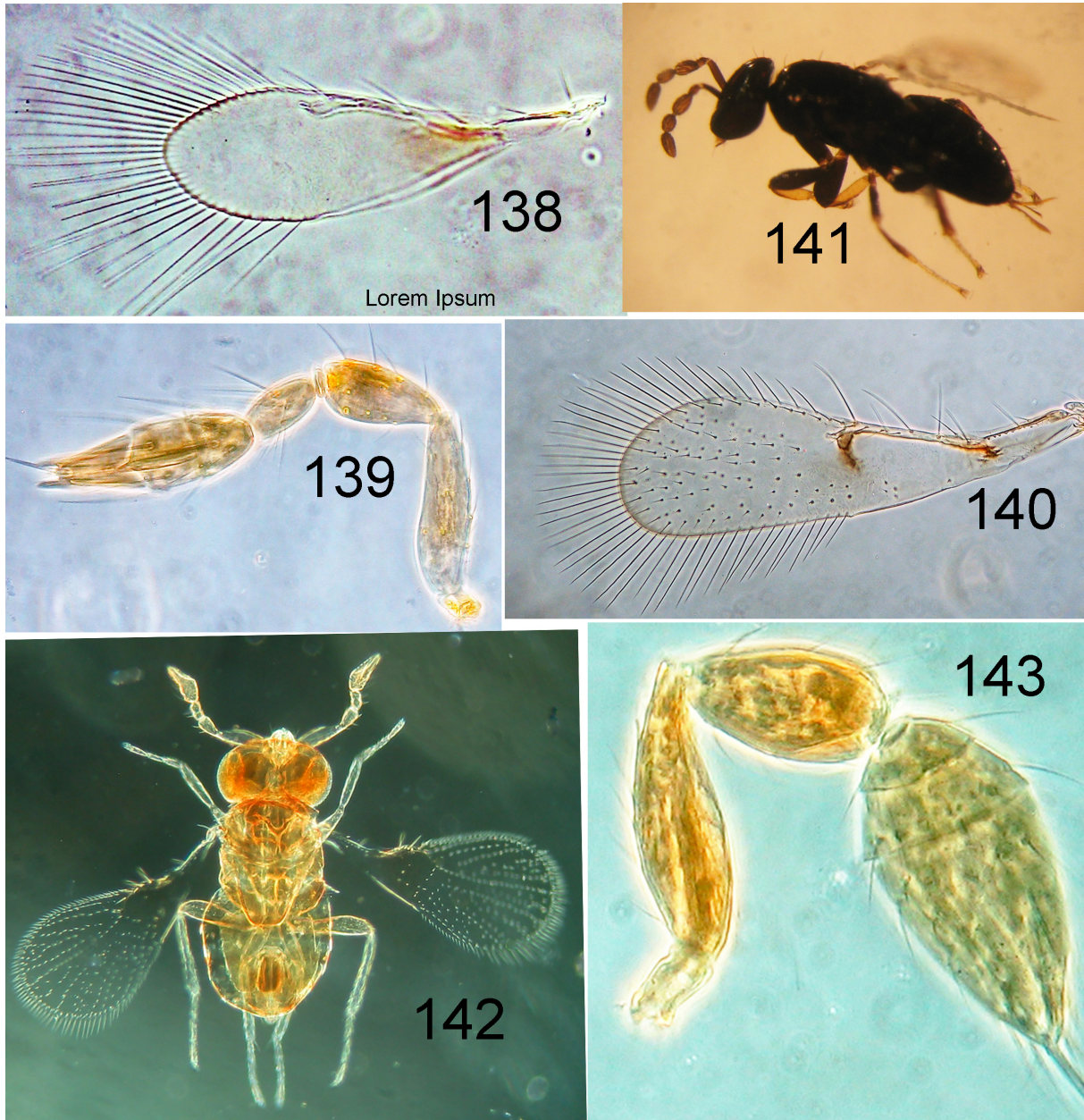
Figs. 122-127. 122) *Ufensia* sp., male genitalia, dorsal view. 123) *Ufensia* sp., male genitalia, lateral view. 124) *Uscana spermophagi*, female, lhabitus. 125) *Uscana semifumipennis*, female antenna. 126) *Uscana semifumipennis*, fore wing. 127) *Uscana senex*, male genitalia.



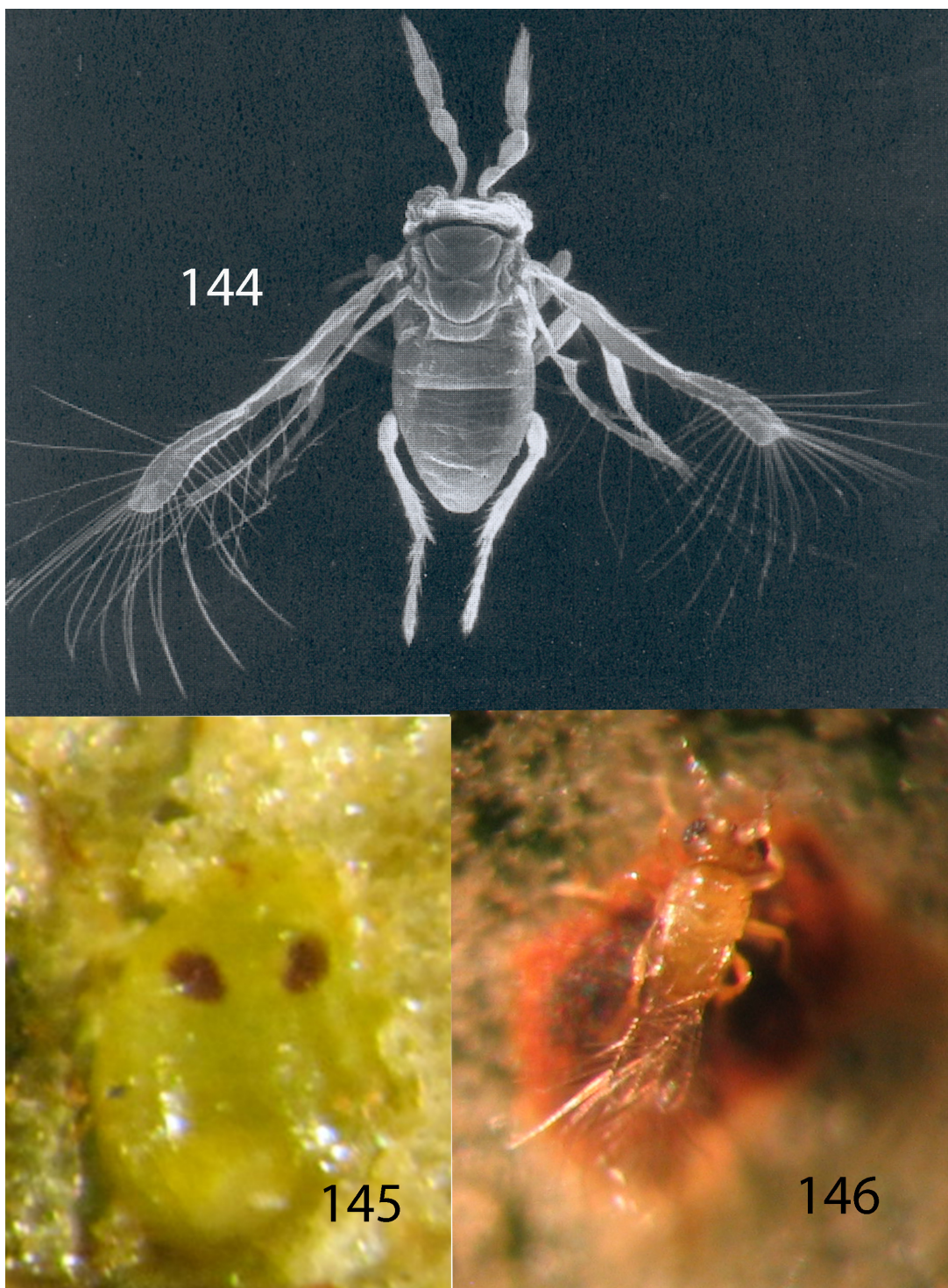
Figs. 128-132. 128) *Xiphogramma holorhoptra*, female antenna. 129) *Xiphogramma holorhoptra*, mesosoma and metasoma. 130) *Xiphogramma holorhoptra*, fore wing. 131) *Xiphogramma fuscum*, male genitalia, dorsal. 132) *Xiphogramma fuscum*, male genitalia, ventral.



Figs. 133-137. 133) *Aphelinoidea* sp., female, habitus. 134) *Aphelinoidea* sp., fore wing. 135) *Chaetostricha* sp., fore wing. 136) *Bloodiella andalusica*, fore wing. 137) *Bloodiella andalusica*, male genitalia.



Figs. 138-143. 138) *Epoligosita arabica*, fore wing. 139) *Pseudoligosita* sp., female antenna. 140) *Pseudoligosita* sp., fore wing. 141) *Poropoea africana*, female, habitus. 142) *Trichogramma* sp., adult female. 143) *Tumidiclava* sp., female antenna.



Figs. 144-146. 144) *Megaphragma mymaripenne*, female, habitus (SEM). 145) Pupa of *Megaphragma* sp. in egg of *Heliothrips haemorrhoidalis*. 146) *Megaphragma* sp., ovipositing in the egg of *Heliothrips haemorrhoidalis*.

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Giulio GARDINI*

Two new subterranean species of the genus *Chthonius* from Latium (Pseudoscorpiones, Chthoniidae)

Abstract: Two new subterranean species of the genus *Chthonius* C.L. Koch, 1843 from Latium caves are described: *Chthonius auruncus* n. sp. (♀, Voragine del Vallaroce 1000 La/LT, Formia, Latina province, Aurunci Mountains) and *Chthonius hernicus* n. sp. (♀, Grotta della Regina Margherita 22 La/FR, Collepardo, Frosinone Province, Ernici Mountains). *Chthonius auruncus* n. sp. is compared to the widespread epigeal *Chthonius tenuis* L. Koch, 1873 and the subterranean *Chthonius ligusticus* Beier, 1930, *Chthonius lanzai* Caporiacco, 1947 and *Chthonius elongatus* Lazzeroni, 1970 from caves in eastern Liguria and Tuscany. *Chthonius hernicus* n. sp. is compared to the widespread epigeal *Chthonius densedentatus* Beier, 1938 and the subterranean *Chthonius caoduroi* Callaini, 1987 from a cave in Basilicata. *Chthonius vannii* Callaini, 1986 (n. stat.) is upgraded from subspecies of *Chthonius lanzai* Caporiacco, 1947.

Riassunto: Due nuove specie sotterranee del genere *Chthonius* del Lazio (Pseudoscorpiones, Chthoniidae).

Sono descritte due nuove specie sotterranee del genere *Chthonius* C.L. Koch, 1843 di grotte del Lazio: *Chthonius auruncus* n. sp. (♀, Voragine del Vallaroce 1000 La/LT, Formia, Latina, Monti Aurunci) e *Chthonius hernicus* n. sp. (♀, Grotta della Regina Margherita 22 La/FR, Collepardo, Frosinone, Monti Ernici). *Chthonius auruncus* n. sp. è comparato con *Chthonius tenuis* L. Koch, 1873, specie epigea diffusa nella stessa area geografica, e con le specie sotterranee *Chthonius ligusticus* Beier, 1930, *Chthonius lanzai* Caporiacco, 1947 e *Chthonius elongatus* Lazzeroni, 1970, di grotte della Liguria orientale e della Toscana. *Chthonius hernicus* n. sp. è comparato con *Chthonius densedentatus* Beier, 1938, specie epigea largamente diffusa nell'Italia appenninica, e con *Chthonius caoduroi* Callaini, 1987 della Grotta di Sant'Angelo 40 B/PZ (Trecchina, Basilicata). *Chthonius vannii* Callaini, 1986 (n. stat.) è elevato al rango di specie da sottospecie di *Chthonius lanzai* Caporiacco, 1947.

Key words: new species, *Chthonius*, Latium, Italy.

To meet the requirements by the International Code of Zoological nomenclature (ICZN), this article was registered at Zoobank (25 July 2026) under the Zoobank life Science Identifier (ISID): urn:lsid:zoobank.org:pub:E5EFA491-3A5F-4FE5-989C-E09FBD9C7A27. Published: 30 July 2026.

INTRODUCTION

The pseudoscorpion genus *Chthonius* C.L. Koch, 1843 comprises 120 extant nominal species distributed mainly in the Euro-Mediterranean-Turanic region, eastwards to Azerbaijan and Tajikistan, with only four exceptions in this regard: *Chthonius ischnocheles* (Hermann, 1804), introduced from its primary European range to St Helena and the USA, *Chthonius pacificus* Muchmore, 1968, *Chthonius paganus* (Hoff, 1961) and *Chthonius paludis* (Chamberlin, 1929), all known from USA (World Pseudoscorpiones Catalog, 2026). Furthermore, three fossil species of this genus are known from Baltic and Rovno amber (World Pseudoscorpiones Catalog, 2026).

A total of 40 species of *Chthonius* are known from mainland Italy and its islands, of which 19 are epigeic and 21 subterranean (Gardini, 2000, 2021; World Pseudoscorpiones Catalog, 2026). Only 7 species are known to occur in Latium, none of which

is troglotic. The 2 new subterranean species of this genus, described in this paper, come from caves in the Aurunci Mountains and the Ernici Mountains, respectively, in southern Latium.

MATERIALS AND METHODS

The specimens were cleared in a very dilute KOH solution for a few hours, then in 70% lactic acid for a few days, and finally temporarily mounted on cavity slides with the same medium, after dissection of the palp and chelicera. After examination, each specimen was rinsed in distilled water and returned to a vial of 70% ethanol, together with the dissected parts in glass capillary tubes. All specimens were examined with an Olympus BHB compound microscope and drawn with the aid of a Nachet drawing tube. Terminology and reference points for measurements largely follow Chamberlin (1931);

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measurements are given in mm, with proportions expressed as length/breadth for carapace, chelicera and pedipalpal femur, and as length/depth for pedipalpal chela. Following Gardini (2013) and Zaragoza (2017), measurements of the pedipalpal trochanter and patella and leg IV have been excluded because they provide no additional information. The use of the terms rallum, antiaxial and paraxial follows Judson (2007). Acronyms: Muséum d'Histoire naturelle, Geneva (MHNG).

TAXONOMY

Chthonius auruncus n. sp.

urn:lsid:zoobank.org:act:

EF83BEDD-85AD-49B9-BC00-33D1E740979A

(Figs. 1-5)

TYPE LOCALITY. Italy, Latium, Latina Province, Formia, Voragine del Vallaroce 1000 La/LT (41°18'52"N, 13°38'54"E).

DISTRIBUTION. Italy (Latium).

DIAGNOSIS (♀). An anophthalmic hypogean *Chthonius* that differs from other Italian species of the *orthodactylus-tenuis* group (sensu Gardini, 2021) in the following combination of characters: anterior margin of carapace with one preocular microseta on each side; posterior margin with two macrosetae and one lateral microseta on each side; tergite I with 4 setae; chelicerae with 2-3 lateral microsetae, movable cheliceral finger with an isolated subapical tooth; chela length 1.49 mm; movable chelal finger length 0.97 mm; chela 6.62 times as long as deep; both chelal fingers with reclined, spaced teeth; fixed chelal finger with 51 teeth, movable chelal finger with 26 visible teeth plus approximately 14 in the proximal half, identifiable by the presence of the dental canal; ratio of pedipalpal femur/carapace 1.84.

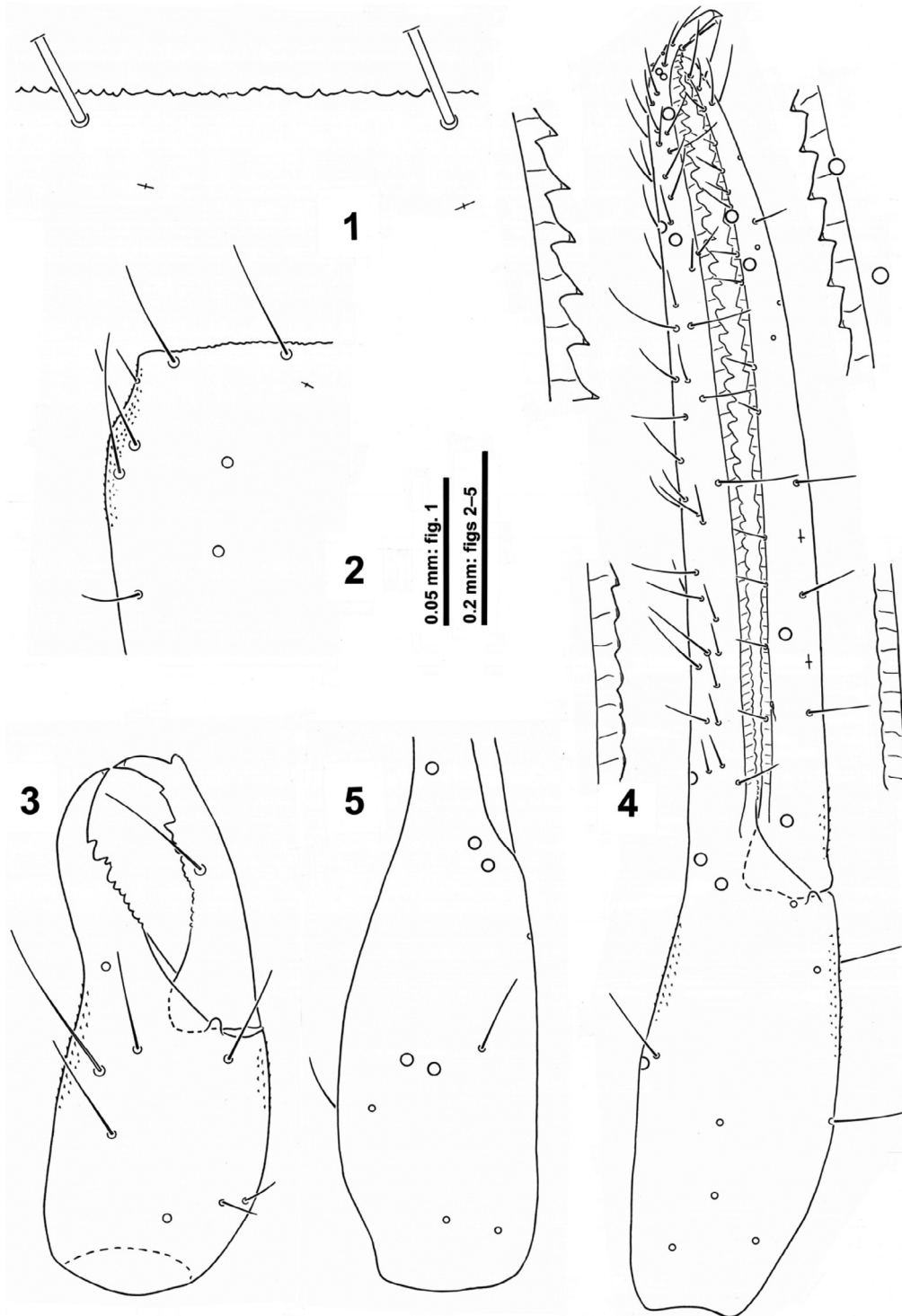
TYPE MATERIAL. ITALY—*Latium*: 1 ♀ (holotype, with damaged opisthosoma), Latina Province, Formia, Pagliarello, Voragine del Vallaroce 1000 La/LT (41°18'52"N, 13°38'54"E), 1255 m a.s.l., 25.II.1990, S. Gambari leg. (MHNG).

DERIVATIO NOMINIS. The Aurunci were an ancient Italic people who settled in southern Latium; they gave their name to the Aurunci Mountains, where the type locality of *Chthonius auruncus* n. sp. is situated: the cave Voragine di Vallaroce.

DESCRIPTION OF ADULT (♀; ♂ unknown).

Highly specialized troglomorphic facies; integument slightly pigmented, carapace, tergites, chelicerae and pedipalps pale brown; weak hispid granulation on lateral surfaces of carapace, on cheliceral palm and on base of chelal fingers. Carapace 0.93 times longer than broad; anterior margin without epistome (Fig. 1); ocular area as in Fig. 2, no eyes or eye-spots; chaetotaxy m4m:6:4:2:m2m (18 macrosetae), length of anteromedian macrosetae 0.155 mm. Chaetotaxy of tergites I-IV: 4:4:4:4. Chaetotaxy of sternites not visible. Chelicerae (Fig. 3) 2.47 times as long as broad, palm with 6 setae and 2-3 lateral microsetae; with 2 large distal teeth followed proximally by 7 teeth of decreasing size; movable finger with an isolated subapical tooth (*di*) located proximal to the spinneret, followed by a large tooth and 11 teeth proximally reduced in size; *gs* ratio 0.57; spinneret prominent, apically rounded; rallum with 11 blades; serrulae not seen. Coxal setae: pedipalp 5 (including 2 on manducatory process), I 3 + 3 marginal microsetae, II 4, III 5, IV 6; coxal spines not visible; intercoxal tubercle bisetose. Pedipalp: femur 6.86 times as long as broad; chela (Fig. 4) 6.62 times as long as deep; hand of chela 2.13 times as long as deep, with subparallel sides in dorsal view (Fig. 5); fixed chelal finger with 51 reclined teeth increasingly reduced towards the finger base: 4 small distal ones, followed by 27 with pointed tips and 20 rounded ones, which gradually decrease in size until they disappear (Fig. 4), fixed chelal finger at level of *est-it* with 4 teeth occupying 0.1 mm (distance between successive apices 0.028-0.030 mm); all teeth with dental canal; distal paraxial seta apically broken; movable chelal finger with about 40 teeth: 16 teeth reclined and apically pointed in the distal half of the finger, followed by 10 teeth apically broadly rounded and increasingly reduced proximally, and about 14 teeth, between *sb* and *b*, recognizable only by the presence of dental canal (Fig. 4); coupled sensilla *pc* closer to *sb* than to *b*; trichobothria as in Fig. 4; ratio of movable finger/hand of chela 2.02; ratio of pedipalpal femur/movable finger 1.06; ratio of pedipalpal femur/carapace 1.84.

MEASUREMENTS. Body length not measured due to the contracted opisthosoma. Carapace 0.56×0.60 (anteriorly). Chelicerae 0.605×0.245; movable finger length 0.32. Pedipalp: femur 1.03×0.15; chela 1.49×0.225; hand length 0.48; movable finger length 0.97.



Figs. 1-5. *Chthonius auruncus* n. sp., female holotype. 1) Anterior margin of carapace; 2) left ocular area of carapace; 3) right chelicera, dorsal view; 4) right pedipalpal chela, antiaxial view, with magnified details of teeth at level of trichobothria *sb* and *st-t/est-it*; 5) hand of right chela, dorsal view.

REMARKS. Among the Apennine species of the *Chthonius orthodactylus-tenuis* group that possess an isolated subapical tooth (*di*) on the movable cheliceral finger, *Chthonius auruncus* n. sp. is most similar to the epigeal *Chthonius tenuis* L. Koch, 1873 and the subterranean *Chthonius ligusticus* Beier, 1930 and *Chthonius lanzai* Caporiacco, 1947. *Chthonius vannii* Callaini, 1986 (n. stat.)—described from a female and a tritonymph from the cave Buca della Ghiandaia 736 T/FI, Calenzano near Florence—is upgraded here from *Chthonius lanzai vannii* Callaini, 1986 and given species rank because, compared with *Chthonius lanzai*, it lacks the isolated tooth *di* on the movable cheliceral finger, lacks microchaetae at the base of the carapace, and is larger in size (chela 2.08 mm in *Chthonius vannii*, 1.70–1.75 mm in females of *Chthonius lanzai*).

Chthonius tenuis, which is widespread in northern Italy but also occurs in central and southern Italy (Gardini, 2000, 2009), exhibits the same cephalothoracic chaetotaxy and shares the same chelal tooth pattern as *Chthonius auruncus* n. sp. However, the latter differs from the former in several marked adaptive characters: no eyes in *Chthonius auruncus* n. sp. vs. four well-developed eyes in *Chthonius tenuis*; larger size and more slender appendages in *Chthonius auruncus* n. sp.: [length of pedipalpal chela (♀) 1.49 mm, chela (♀) 6.62 times as long as deep, fixed and movable chelal fingers with 51 and 40 teeth, respectively, in *Chthonius auruncus* n. sp.; length of pedipalpal chela (♀) 0.87–1.16 mm, chela (♀) 4.6–5.2 times as long as deep, fixed and movable chelal fingers with a maximum of 38 and 34 teeth, respectively, in *Chthonius tenuis*] (DeVore-Scribante, 1999; Gardini, 2009).

Chthonius auruncus n. sp. is morphologically similar to *Chthonius ligusticus* and *Chthonius lanzai*, subterranean species from the eastern Ligurian Apennines and the Apuan Alps (Tuscany), respectively. All three species share the same chelal fingers dentition pattern, but *Chthonius auruncus* n. sp. exhibits a higher degree of troglomorphy, as shown by the absence of eyes (anterior eyes with flat lens, posterior ones absent or reduced to a white spot in *Chthonius ligusticus* and *Chthonius lanzai*), the higher number of teeth on the fixed chelal finger (51 teeth in *Chthonius auruncus* n. sp., 25–30 in females of *Chthonius ligusticus* and about

40 in females of *Chthonius lanzai*), and the more slender appendages [pedipalpal chela 6.62 times as long as deep in *Chthonius auruncus* n. sp., 4.36–5.20 (♀) times as long as deep in *Chthonius ligusticus* and 6.00–6.30 (♀) times as long as deep in *Chthonius lanzai*] (Callaini, 1986; Gardini, 1979, 1980; Gardini & Oggianu, 1992; Lazzeroni, 1970).

Chthonius auruncus n. sp. can also be compared with *Chthonius elongatus* Lazzeroni, 1970—a subterranean species endemic to Monte Pisano near Pisa—although the presence of the isolated tooth on the movable cheliceral finger has not yet been definitively established in the latter species (Gardini, 1979; Callaini, 1986). *Chthonius auruncus* n. sp. differs in lacking both eyes and eye spots (anterior eyes with flat lens, posterior ones reduced to a white spot in *Chthonius elongatus*), in having less slender palps and smaller size (chela 6.62 times as long as deep, 1.49 mm long in *Chthonius auruncus* n. sp., 7.17–7.50 times as long as deep, 2.37–2.49 mm long in females of *Chthonius elongatus*).

***Chthonius hernicus* n. sp.**

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(Figs. 6–10)

TYPE LOCALITY. Italy, Latium, Frosinone Province, Collepardo, Grotta della Regina Margherita 22 La/FR (41°45'31"N, 13°22'01"E).

DISTRIBUTION. Italy (Latium).

DIAGNOSIS (♀). An anophthalmic hypogean *Chthonius* that differs from other Italian species of the *ischnocheles* group (sensu Gardini, 2021) in the following combination of characters: anterior margin of carapace with one preocular microseta on each side; posterior margin with two macrosetae and one lateral microseta on each side; tergite I with 4 setae; chelicerae with 3 lateral microsetae, movable cheliceral finger with an isolated subapical tooth; chela length 1.49 mm; movable chelal finger length 1.01 mm; chela 7.45 times as long as deep; both chelal fingers with reclined, contiguous teeth; fixed and movable chelal fingers with 82 and 68 teeth, respectively; ratio of pedipalpal femur/carapace 1.64.

TYPE MATERIAL. ITALY—*Latium*: 1 ♀ (holotype), Frosinone Province, Collepardo, Grotta della

Regina Margherita 22 La/FR (= Grotta di Colleparado or Grotta dei Bambocci) (41°45'31"N, 13°22'01"E), 490 m a.s.l., 13.II.1994, L. Latella leg. (MHNG).

DERIVATIO NOMINIS. From the adjective *hernicus*, -a -um, meaning "pertaining to the Hernici", an ancient Italic people who settled in southern Latium, bordering the territories of the Volsci and the Marsi. The cave Grotta della Regina Margherita, the type locality of *Chthonius hernicus* n. sp., is situated in the mountain range named after the Hernici people.

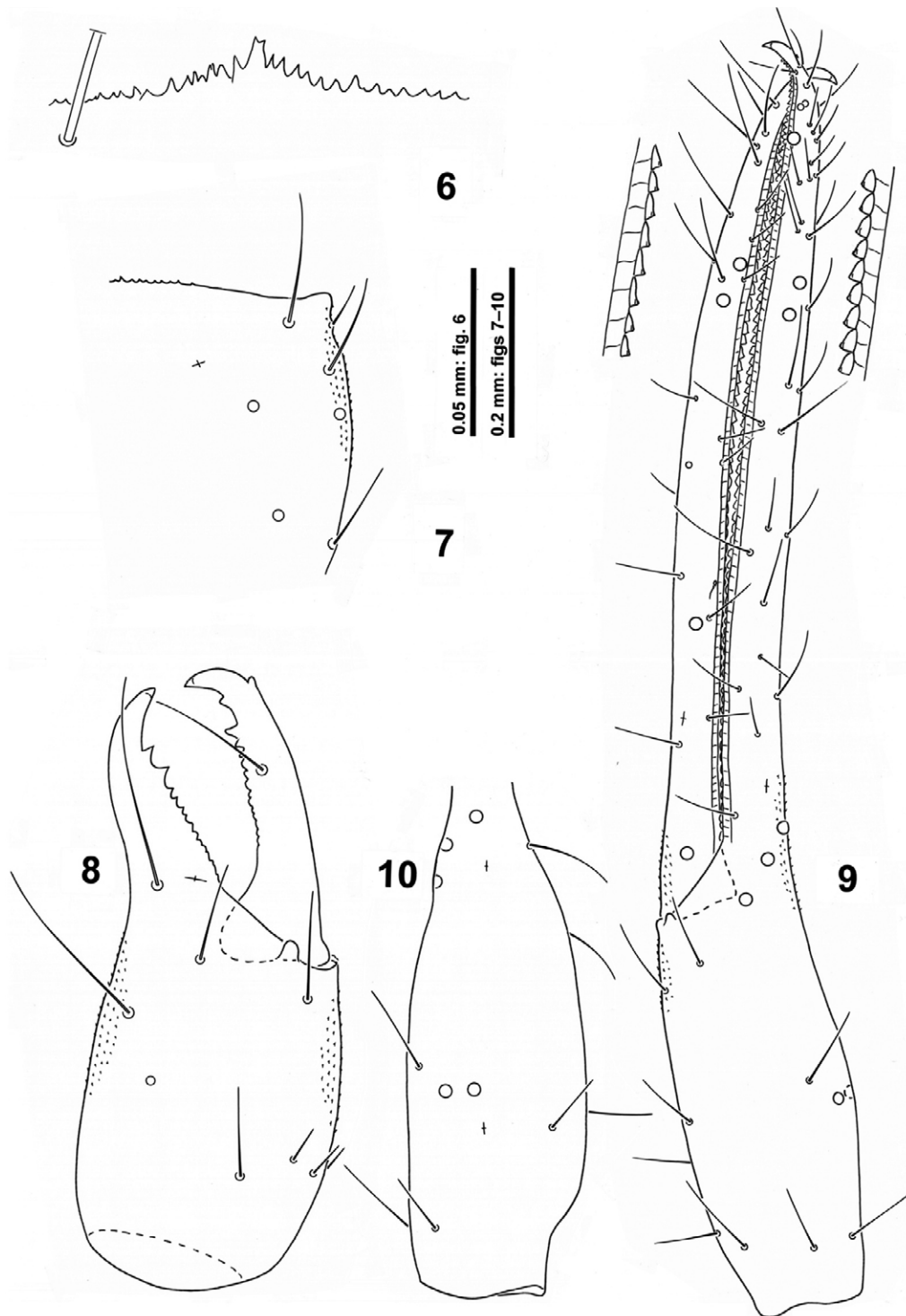
DESCRIPTION OF ADULT (♀; ♂ unknown). Highly specialized troglomorphic facies; integument slightly pigmented, carapace, tergites, chelicerae and pedipalps pale brown; weak hispid granulation on lateral surfaces of carapace, on cheliceral palm and on base of chelal fingers. Carapace 0.94 times longer than broad, trapezoidal, constricted posteriorly; anterior margin with an evident epistome (Fig. 6); ocular area as in Fig. 7, no eyes or eye-spots; chaetotaxy m3m:6:4:2:m2m (17 macrosetae), length of anteromedian macroseta 0.18 mm. Chaetotaxy of tergites I-X: 4:4:4:4:6:6:6:6:6:4. Chaetotaxy of sternites II-IX: 9:(3)8(3):(2)7(2):8:6:6:6:6. Chelicerae (Fig. 8) 2.41 times as long as broad, palm with 6 setae and 3 lateral microsetae; fixed finger with 2 large distal teeth followed proximally by 8 teeth of decreasing size; movable finger with an isolated subapical tooth (*di*) located at level of the spinneret, followed by a large tooth and 7 teeth proximally reduced in size; *gs* ratio 0.62; spinneret prominent, apically rounded; rallum with 11 blades; serrula exterior with 18 blades. Coxal setae: pedipalp 5 (including 2 on manducatory process), I 3 + 3 marginal microsetae, II 4, III 5, IV 6; coxa II with 7 coxal spines, coxa III with 4 coxal spines; intercoxal tubercle bisetose. Pedipalp: femur 7.03 times as long as broad; chela (Fig. 9) 7.45 times as long as deep; hand of chela 2.40 times as long as deep, with subparallel sides in dorsal view (Fig. 10); fixed chelal finger with 82 long reclined teeth increasingly reduced towards the finger base (Fig. 9), at level of *est-it* with 8 teeth occupying 0.1 mm (distance between successive apices 0.012 mm); all teeth with dental canal; distal paraxial seta slightly sigmoid; movable chelal finger with about 68 teeth, reclined and apically pointed in the distal half of the finger, apically broadly rounded and increasingly reduced towards

finger base, between *sb* and *b* recognizable only by the presence of dental canal (Fig. 9); coupled sensilla *pc* just distal *sb*, not on a tubercle; trichobothria as in Fig. 9; ratio of movable finger/hand of chela 2.10; ratio of pedipalpal femur/movable finger 1.01; ratio of pedipalpal femur/carapace 1.64.

MEASUREMENTS. Body length ca. 1.8. Carapace 0.62×0.66 (anteriorly). Chelicerae 0.70×0.29; movable finger length 0.37. Pedipalp: femur 1.02×0.145; chela 1.49×0.20; hand length 0.48; movable finger length 1.01.

REMARKS. Among the species of the *Chthonius ischnocheles* group, *Chthonius hernicus* n. sp. is most similar to the epigean *Chthonius densedentatus* Beier, 1938, which occurs in the same geographical area. Both species share the same chelal tooth pattern, the presence of 2 microsetae on the posterior margin of carapace and 3 lateral microsetae on the cheliceral palm. *Chthonius hernicus* n. sp. differs from *Chthonius densedentatus* for evident adaptive characters: no eyes in *Chthonius hernicus* n. sp. vs. four eyes in *Chthonius densedentatus*; larger in size and more slender appendages in *Chthonius hernicus* n. sp. [length of pedipalpal chela (♀) 1.49 mm, chela (♀) 7.45 times as long as deep, fixed and movable chelal fingers with 82 and 68 teeth, respectively, in *Chthonius hernicus* n. sp.; length of pedipalpal chela (♀) 0.73-1.18 mm, chela (♀) 4.45-5.5 times as long as deep, fixed and movable chelal fingers with 32-53 and 23-47 teeth, respectively, in *Chthonius densedentatus*].

Chthonius hernicus n. sp. is morphologically similar to *Chthonius caoduroi* Callaini, 1987, a subterranean species from the Lucanian Apennines (Basilicata), just south of Cilento. The two species share the same cephalothoracic chaetotaxy, the same number of lateral microsetae on the cheliceral palm, and, above all, the same chelal fingers dentition pattern. *Chthonius hernicus* n. sp. exhibits a higher degree of troglomorphy, as shown by the absence of eyes (anterior eyes with flat lens, posterior ones absent in *Chthonius caoduroi*), and by its more slender appendages: pedipalpal chela 7.45 (♀) times as long as deep in *Chthonius hernicus* n. sp., 6.2-6.4 (♀) times as long as deep in *Chthonius caoduroi*, hand of chela 2.4 (♀) times as long as deep in *Chthonius hernicus* n. sp., 2.0-2.05 (♀) times as long as deep in *Chthonius caoduroi*.



Figs. 6-10. *Chthonius hernicus* n. sp., female holotype. 6) Anterior margin of carapace; 7) right ocular area of carapace; 8) right chelicera, dorsal view; 9) left pedipalpal chela, antiaxial view, with magnified details of teeth at level of trichobothria *st-t/est-it*; 10) hand of left chela, dorsal view.

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