

# Syllidae (Annelida, Polychaeta) from the Caribbean coast of Venezuela

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## Abstract

Venezuela possesses a great variety of coastal environments allowing for a high diversity of marine species. However, systematic studies on marine invertebrates are scarce, especially on polychaetes. The family Syllidae is poorly known, and only 14 genera and 42 species have been reported from this country. A total of 13 genera and 26 species the Syllidae were identified from benthic samples collected on different substrata of the northeastern coast of Venezuela. Of these, seven genera and 16 species constitute new records for Venezuela: *Odontosyllis guillermoi*, *Syllides floridanus*, *Salvatoria clavata*, *S. limbata*, *Sphaerosyllis longicauda*, *Parapionosyllis longicirrata*, *Trypanosyllis parvidentata*, *T. vittigera*, *Opisthosyllis* sp., *Syllis amica*, *S. armillaris*, *S. gracilis*, *S. pseudoarmillaris*, *S. vittata*, *Parasphaerosyllis indica* and *Myrianida convoluta*.

## Resumen

Venezuela posee una amplia variedad de ambientes costeros que permiten la existencia de una elevada diversidad de especies. Sin embargo, los estudios sobre la sistemática de los invertebrados marinos son escasos, especialmente en poliquetos. La familia Syllidae es muy poco conocida en este país, puesto que sólo han sido registrados 14 géneros y 42 especies. En muestreos realizados en diferentes tipos de substrato, se han recolectado 13 géneros y 26 especies, de los cuales 7 géneros y 16 especies constituyen nuevos registros para Venezuela: *Odontosyllis guillermoi*, *Syllides floridanus*, *Salvatoria clavata*, *S. limbata*, *Sphaerosyllis longicauda*, *Parapionosyllis longicirrata*, *Trypanosyllis parvidentata*, *T. vittigera*, *Opisthosyllis* sp., *Syllis amica*, *S. armillaris*, *S. gracilis*, *S. pseudoarmillaris*, *S. vittata*, *Parasphaerosyllis indica* y *Myrianida convoluta*.

## Keywords

Annelida, Polychaeta, Syllidae, Venezuela, Caribbean

## Introduction

There have been very few studies done on the benthic macrofauna, especially polychaetes, along the Caribbean coast of South America. Syllidae is one of the most abundant within the polychaete families. It is constituted by about 55 valid genera and approximately 667 species (San Martín 2003), of which a total of 31 genera and 167 species have been described from the Great Caribbean Region (Salazar-Vallejo 1996). In soft and hard bottoms of the eastern coasts of Mexico (Gulf of Mexico and Caribbean), 45 species of syllids were identified by Granados-Barba et al. (2003). In nearby Trinidad and Tobago islands, Syllidae was both the most abundant (70%) and diverse (30 species) family collected from hard bottom substrates (Gobin 2010). In Venezuela, very little is known about this family, and only two systematic studies have been carried out, both by San Martín and Bone (1999, 2001) on *Thalassia testudinum* (Bank & Köning, 1805) meadows. In 1999 these authors described two new species and in 2001 they reported 13 genera and 40 species, of which 35 constituted new records for Venezuela. In this study, syllid species collected from different localities and substrata of the northeastern coast of Venezuela are reported.

## Materials and methods

The examined material belongs to samples from the Benthos Laboratory polychaete collection at the Instituto Oceanográfico de Venezuela, collected from 1984 until the present. Samples were collected manually or by using dredges and corers on different substrata: rocky shores, sandy and muddy bottoms, on dock piles of PVC and in dead of the fire coral *Millepora alcicornis* Linnaeus in Mochima Bay (Isla Larga, Punta León, Ensenada de Reyes, Mangle Quemado, Cabruta, and La Virgen) and the Gulf of Cariaco (Turpialito, Guacarapo and La Bruja), inside sponges *Aplysina fistularis* (Pallas, 1766), *Ircinia felix* (Duchassaing & Michelotti, 1864), and *Chondrila nucula* Schmidt, 1862 (Porifera: Demospongiae) in Mochima Bay (Isla Larga, Punta León); from *Rhizophora mangle* Linnaeus root mats covered with the bivalve *Crassostrea rhizophorae* (Gmelin) in La Restinga Lagoon, Margarita Island, from sandy bottoms at the mouth of Bocaripo Lagoon, and as epibionts on tubes of *Americanuphis magna* (Andrews, 1891) from Chacopata Beach (see coordinates and dates of collections in Table 1).

Specimens were fixed in 10% seawater formalin during at least 24 hours and then preserved in 70% ethanol. Microscope slides of specimens were made in glycerine. Measurements were made using an ocular micrometer. Voucher specimens are deposited in the Benthos Laboratory at the Instituto Oceanográfico de Venezuela.

**Table 1.** List of sites (codes, names), coordinates and dates where the syllids were collected.

SITE CODE	SITE NAME	COORDINATES	DATE
<b>Mochima Bay</b>			
BMC101	Cabruta	10°22'05"N, 64°20'14"W	18/11/01
BMC203	Cabruta	10°22'05"N, 64°20'14"W	05/08/03
BMLV101	La Virgen	10°22'35"N, 64°20'42"W	05/08/03
BMPL197	Punta León	10°22'20"N, 64°20'22"W	22/04/97
BMPL197	Punta León	10°22'20"N, 64°20'22"W	19/07/07
BMPL297	Punta León	10°22'20"N, 64°20'22"W	23/11/97
BMPL398	Punta León	10°22'20"N, 64°20'22"W	28/01/98
BMPL498	Punta León	10°22'20"N, 64°20'22"W	15/05/98
BMPL501	Punta León	10°22'20"N, 64°20'22"W	18/11/01
BMMQ103	Mangle Quemado	10°21'55"N, 64°21'05"W	05/08/03
BMMQ205	Mangle Quemado	10°21'55"N, 64°21'05"W	14/02/05
BMIL197	Isla Larga	10°21'21"N, 64°20'58"W	22/04/97
BMIL297	Isla Larga	10°21'21"N, 64°20'58"W	19/07/97
BMIL397	Isla Larga	10°21'21"N, 64°20'58"W	23/11/97
BMIL498	Isla Larga	10°21'21"N, 64°20'58"W	28/01/98
BMIL598	Isla Larga	10°21'21"N, 64°20'58"W	15/05/98
BMIL602	Isla Larga	10°21'21"N, 64°20'58"W	27/03/02
BMIL803	Isla Larga	10°21'21"N, 64°20'58"W	05/08/03
BMER103	Ensenada de Reyes	10°20'19"N, 64°22'07"W	05/05/03
BMER203	Ensenada de Reyes	10°20'19"N, 64°22'07"W	05/08/03
<b>Cariaco Gulf</b>			
GCPG198	Guacarapo	10°28'49"N, 64°42'01"W	12/05/98
GCET103	Turpialito	10°26'34"N, 64°01'59"W	12/10/03
GCLB104	La Bruja	10°26'43"N, 63°58'25"W	29/05/04
GCLB205	La Bruja	10°26'43"N, 63°58'25"W	26/07/05
GCPT106	Tocuchare	10°26'26"N, 64°00'46"W	29/05/06
<b>Peninsula of Araya</b>			
PALB104	Bocaripo lagoon	10°39'36"N, 63°49'25"W	29/05/04
PAPC106	Chacopata beach	10°40'40"N, 63°49'19"W	18/06/06
<b>Margarita Island</b>			
IMLR102	La Restinga lagoon	10°59'30"N, 64°09'21"W	22/05/02
IMLR202	La Restinga lagoon	10°59'30"N, 64°09'21"W	12/10/06

## Results

### Family Sillyidae Grube, 1850

### Subfamily Anoplosyllinae Aguado & San Martín, 2009

### Genus *Odontosyllis* Claparède, 1863

Type species: *Syllis fulgurans* Audouin & Milne Edwards, 1834

### *Odontosyllis enopla* Verrill, 1900

[http://species-id.net/wiki/Odontosyllis\\_enopla](http://species-id.net/wiki/Odontosyllis_enopla)

Figs 1.1–1.4

*Odontosyllis enopla* Hartman 1951:41. Taylor 1971:205. Uebelacker 1984:81–82, fig. 76a–g. San Martín and Bone 2001:611.

**Material examined.** GCPG198, (8), fine sand, 2 m depth; BMMQ103, (22), fine to coarse sand, 1 m depth; GCLB205, (17), fine sand, 1 m depth.

**Description.** Length to 22.3 mm, width to 1.1 mm. Body with up to 76 chaetigers. Prostomium with anterior pair of eyespots and two pairs of large, lentigerous eyes. Median antenna long; lateral antennae shorter than median one. Nuchal organs as crescent-shaped ridges along posterior margin of prostomium. Occipital flap present. Dorsal cirri alternating in length. Compound falcigers bidentate, with fimbriated sheath between blade and shaft-head (Fig. 1.1). Dorsal simple chaeta, only present on posterior chaetigers (Fig. 1.2). Ventral simple chaeta bidentate (Fig. 1.3). Acicula subdistally enlarged, with numerous serrations encircling the tip (Fig. 1.4). Pharynx extending to chaetigers 4–7, with six relatively large teeth, two lateral plates and four smaller ones; proventriculus from chaetigers 5–8 to 9–11, with 41–57 rows of muscle cells. Pygidium with a pair of cirriform anal cirri.

**Distribution.** Barbados, Bermuda, Gulf of Mexico, Venezuela.

### *Odontosyllis guillermoi* Fukuda & Nogueira, 2006

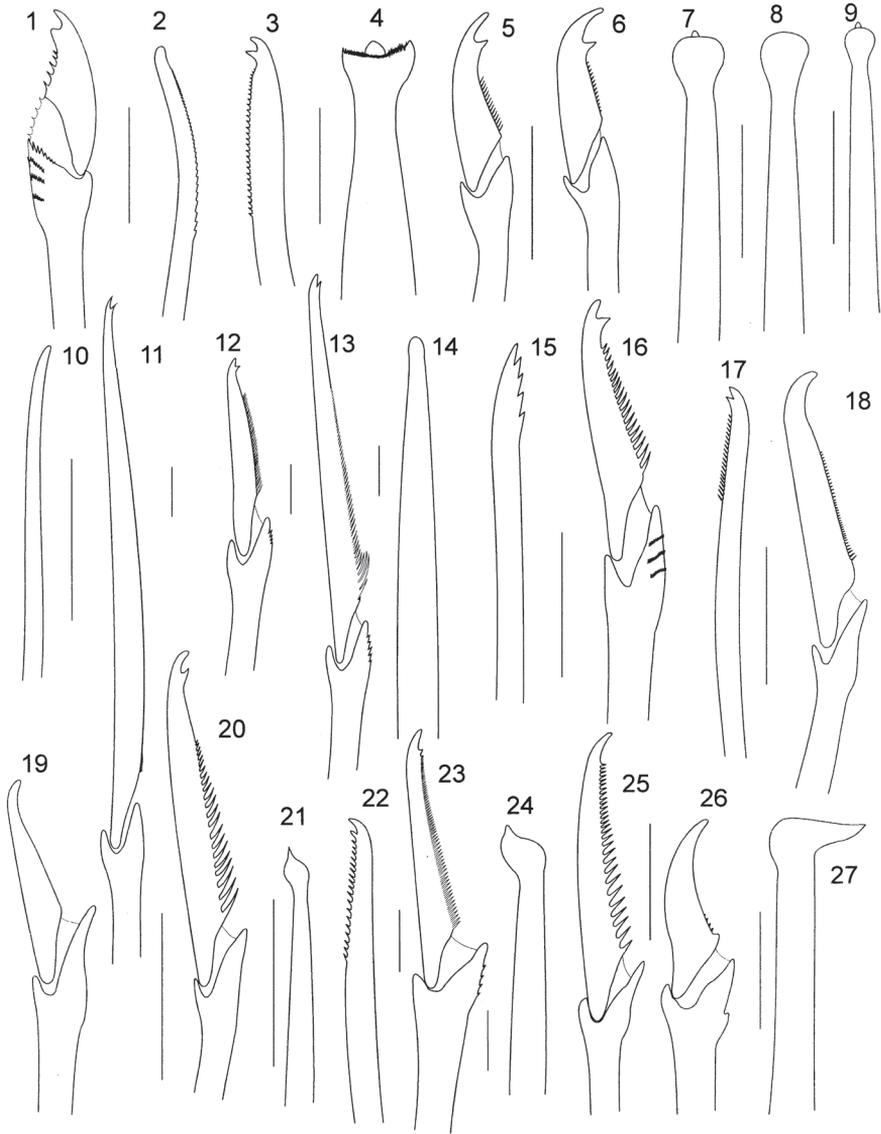
[http://species-id.net/wiki/Odontosyllis\\_guillermoi](http://species-id.net/wiki/Odontosyllis_guillermoi)

Figs 1.5–1.10

*Odontosyllis guillermoi* Fukuda and Nogueira 2006:225–229, figs. 1–2.

**Material examined.** IMLR102, (18), as epibionts on *Crassostrea rhizophorae*, 0–0.5 m depth.

**Description.** Length to 15.3 mm, width to 1.2 mm. Body with up to 76 chaetigers, with two black transverse stripes per segment. Nuchal organs at center of prostomium. Occipital flap rounded with diffuse black spot. Dorsal cirri of chaetiger 1 longer than remainder cirri. Dorsal cirri in median region alternately long and short. Bidentate falcigers serrated, with distal tooth hooked and slightly longer than subdistal



**Figure 1.** *Odontosyllis enopla* **1** bidentate falciger, midbody chaetiger **2** dorsal simple chaeta, posterior chaetiger **3** ventral simple chaeta **4** acicula. *O. guillermoi* **5** bidentate falciger, anterior chaetiger **6** bidentate falciger, midbody chaetiger **7-10** aciculae, anterior chaetiger. *Syllides floridanus* **11** long bidentate falciger, anterior chaetiger **12** short bidentate falciger, midbody chaetiger **13** bidentate falciger from same **14** neuroacicula, midbody chaetiger. *Salvatoria clavata* **15** dorsal simple chaeta, anterior chaetiger **16** ventral bidentate falciger, midbody chaetiger **17** ventral simple chaeta, posterior chaetiger. *S. limbata* **18** unidentate serrated falciger, midbody chaetiger **19** unidentate smooth falciger from same **20** bidentate falciger, midbody chaetiger **21** acicula from same. *Sphaerosyllis longicauda* **22** dorsal simple chaeta, anterior chaetiger **23** bidentate falciger, midbody chaetiger **24** acicula from same. *S. piriferopsis* **25** dorsal unidentate falciger, anterior chaetiger **26** ventral unidentate falciger from same **27** acicula, midbody chaetiger (scale bars: 10µm).

one on anterior chaetigers (Fig. 1.5), much longer from midbody (Fig. 1.6). Dorsal simple chaeta, only present on posterior chaetigers, with rounded tip and short subdistal spines. Ventral shorter simple chaeta may be present. Anterior parapodia with four aciculae subdistally inflated (Figs. 1.7–1.9), and slender, pointed acicula (Fig. 1.10). Parapodia from midbody region with 2–3 aciculae, on posterior chaetigers a single acicula subdistally inflated. Pharynx extending through 9–10 chaetigers, trepan with 6 ventral teeth and 2 lateral plates. Proventriculus extending through 5–10 chaetigers, with numerous rows of muscle cells. Pygidium with a pair of anal cirri.

**Distribution.** Sao Paulo (Brazil), Margarita Island (Venezuela).

### Genus *Syllides* Örsted, 1845

**Type species:** *Syllides longocirrata* Örsted, 1845

#### *Syllides floridanus* Perkins, 1981

[http://species-id.net/wiki/Syllides\\_floridanus](http://species-id.net/wiki/Syllides_floridanus)

Figs 1.11–1.14

*Syllides floridanus* Perkins 1981:1151–1155, figs. 31–32. Uebelacker 1984:45–47, fig. 38a–d. San Martín 1990: 609.

**Material examined.** BMMQ103, (8), fine sand, 4 m depth; BMC203, medium sand, 2 m depth. GCET103, (10), coarse sand, 1 m depth.

**Description.** Length to 3.1 mm, width to 0.4 mm. Body small, slender; complete specimens with up to 22 chaetigers. Prostomium rounded, with three pairs of lentigerous eyes Median and lateral antennae digitiform, median slightly longer, about as long as prostomium plus palps. Palps short, triangular, fused basally. Dorsal tentacular cirri longer than median antenna, ventral tentacular cirri shorter than dorsal ones. Dorsal cirri of chaetigers 1 and 2 slightly wrinkled. Articulated dorsal cirri from chaetiger 3, with 14–19 articles. Dorsal simple chaeta pointed and serrated, from chaetiger 1. Compound falcigers bidentate, with long and short blades serrated (Fig. 1.11, 1.12), basal serrations longer and coarser on some blades (Fig. 1.13). Noto and neuroacicula slender, the alter with blunt end (Fig. 1.14). Pharynx extending through 5–7 chaetigers, with about 10 marginal papillae. Proventriculus extending through 5 chaetigers, with 38–44 rows of muscle cells. Pygidium with a pair of cirriform anal cirri.

**Distribution.** East coast of Florida, Gulf of Mexico, Venezuela.

**Subfamily Exogoninae Langerhans, 1879****Genus: *Salvatoria* McIntosh, 1885****Type species: *Salvatoria kerguelensis* McIntosh, 1885*****Salvatoria clavata* (Claparède, 1863)**[http://species-id.net/wiki/Salvatoria\\_clavata](http://species-id.net/wiki/Salvatoria_clavata)

Figs 1.15–1.17

*Grubea clavata* Fauvel 1923:296–298, fig. 114a–e.*Brania clavata* Pettibone 1963:133, fig. 35b. Imajima 1966:393, fig. la–g. Taylor, 1971:198–200. Gardiner 1976:130, fig. 10l–n. Uebelacker 1984:16–19, figs. 10a–e. Russell 2007:51–52.*Salvatoria clavata* San Martín 2003:176–181, figs. 89–93. Gobin 2010 (list only).

**Material examined.** BMIL197, (23); BMIL498, (18); BMPL398, (2), all specimens associated with *Aplysina fistularis*, 1–3 m depth; BMIL397, (50); BMPL398, (13); BMPL501, (14), all specimens associated with *Ircinia felix*, 1–2m depth; GCPG198, (6), on artificial substrate (PVC pipes), 1 m depth.

**Description.** Length to 3.8 mm width to 0.4 mm. Body small, slender; complete specimens with up to 33 chaetigers. Prostomium with two pairs of lentigerous eyes on posterior region of prostomium and two ocular spots near posterior base of palps. Subulate enlarged antennae. Palps fused dorsally. Tentacular and dorsal cirri fusiform. Dorsal tentacular cirri about twice length of ventral ones. Ventral cirri digitiform. Dorsal simple chaeta bidentate with subdistal serrations (Fig. 1.15). Compound bidentate falcigers with serrated blades (Fig. 1.16). Bidentate ventral simple chaeta subdistally serrated, only present on posterior chaetigers (Fig. 1.17). Pharynx extending through 4 chaetigers, with anterior rhomboidal dorsal tooth. Proventriculus extending through 3–4 chaetigers, with 19–22 rows of muscle cells. Pygidium with a pair of cirriform anal cirri.

**Distribution.** Africa, Mediterranean, Yellow Sea, Japan, Okhotsk Sea, Bering Sea, North Atlantic, Gulf of Mexico, Belize, Caribbean Sea.

***Salvatoria limbata* (Claparède, 1868)**[http://species-id.net/wiki/Salvatoria\\_limbata](http://species-id.net/wiki/Salvatoria_limbata)

Figs 1.18–1.21

*Salvatoria limbata* San Martín 2003:166–169, figs. 82–83.

**Material examined.** BMIL197, (2); BMIL498, (4); BMPL197, (3); BMIL197, (7); BMIL297, (5); BMIL498, (2); all specimens associated with *Chondrila nucula*, 1–2 m depth.

**Description.** Length to 2.3 mm, width to 0.12 mm. Body small, slender; complete specimens with up to 33 chaetigers. Subulate antennae with enlarged median

zone and long distal one. Median antenna longer than lateral ones. Prostomium with a pair of eyespots and two posterior pairs of eyes in trapezoidal arrangement. Compound unidentate falcigers with serrated blades (Fig. 1.18) and with smooth blades (Fig. 1.19). In each parapodium one bidentate compound falciger with long basal serrations (Fig. 1.20). Slender, unidentate dorsal simple chaeta with slight serrations, from chaetiger 1–2. Ventral simple chaeta unidentate, only present on posterior chaetigers. Acicula subdistally enlarged with pointed tip (Fig. 1.21). Pharynx extending through 3 chaetigers, with dorsal rhomboidal tooth located near anterior margin; proventriculus through 3–4 chaetigers with 16–18 rows of muscle cells. Pygidium with a pair of cirriform anal cirri.

**Distribution.** *Salvatoria limbata* is considered cosmopolitan, although San Martín (2003) pointed out that it could be restricted to the Northwestern Atlantic Ocean and Mediterranean.

### Genus *Sphaerosyllis* Claparède, 1863

**Type species:** *Sphaerosyllis hystrix* Claparède, 1863

### *Sphaerosyllis longicauda* Webster & Benedict, 1887

[http://species-id.net/wiki/Sphaerosyllis\\_longicauda](http://species-id.net/wiki/Sphaerosyllis_longicauda)

Figs 1.22–1.24

*Sphaerosyllis longicauda* Webster and Benedict 1887:720, pl. 3, figs. 35–39.

*Sphaerosyllis erinaceus* Pettibone 1963:135–136, fig. 35a. Gardiner 1976:131, fig. 10s–v.

*Sphaerosyllis longicauda* Perkins 1981:1127, figs. 20a–c, 21a–i. Uebelacker 1984:24–27, fig. 18a–f. Gobin 2010 (list only).

**Material examined.** BMER203, (2), fine sand, 4 m depth; GCPT106, (4), fine sand, 0.5–1.5 m depth.

**Description.** Length to 3.1 mm, width to 0.5 mm. Body slender, with up to 26 chaetigers. Papillae scattered, of different length. Prostomium with a pair of eyespots on anterior margin of prostomium, and four large, lentigerous eyes in arc on posterior region of prostomium. Nuchal organs small, rounded, posterior to lateral eyes. Palps wide and short, directed ventrally. Clavate antennae with enlarging basal zone. Tentacular cirri clavate, each with long cirriform dorsal papilla. Dorsal cirri subulate, replaced by a cirriform papilla on chaetiger 2. Dorsal simple chaeta bidentate slender, with slight serrations from chaetiger 1 (Fig. 1.22); dorsal compound falcigers uni and bidentate with serrated blades (Fig. 1.23). Ventral compound falcigers either smooth or with fine serrations. Slender ventral bidentate simple chaeta, only present on posterior chaetigers. Acicula enlarged subdistally, with curved, pointed tip (Fig. 1.24). Pharynx extending through 3 chaetigers, with dorsal tooth located near anterior margin;

proventriculus through 3–4 chaetigers with 16–20 rows of muscle cells. Pygidium with a pair of stout anal cirri.

**Distribution.** Maine to Florida, Gulf of Mexico, Venezuela.

***Sphaerosyllis piriferopsis* Perkins, 1981**

[http://species-id.net/wiki/Sphaerosyllis\\_piriferopsis](http://species-id.net/wiki/Sphaerosyllis_piriferopsis)

Figs 1.25–1.26

*Sphaerosyllis piriferopsis* Perkins 1981:1133, figs. 23a–f, 24a–i. Uebelacker 1984:31–33, fig. 24a–f. Ruiz-Ramírez and Salazar-Vallejo 2001:130–131, fig. 5(98–107). San Martín and Bone 2001:613. Russell 2007:66–69, fig. 7.

**Material examined.** PAPC106, (12), coarse sand near *T. testudinum* bed, 0.5–1.3 m depth; BMER103, (8), fine to coarse sand, 1 m depth.

**Description.** Length to 2.8 mm, width to 0.15 mm. Body slender, with up to 40 chaetigers. Papillae short scattered. Antennae clavate. Prostomium with two pairs of lentigerous eyes in trapezoidal arrangement. Palps fused dorsally. Dorsal cirri clavate, absent on chaetiger 2, replaced by papillae. Dorsal simple chaeta stout, present on all chaetigers. Dorsal compound falcigers unidentate with serrated blades (Fig. 1.25). Ventral falcigers smooth or with few serrations (Fig. 1.26) Slender ventral simple chaeta, only present on posterior chaetigers. Acicula enlarged subdistally, with curved, pointed tip (Fig. 1.27). Pharynx extending through 3–4 chaetigers, with anterior dorsal tooth. Proventriculus extending through 2 chaetigers, with 10–15 rows of muscle cells. Pygidium with a pair of anal cirri and several dorsal and ventral papillae.

**Distribution.** Bahamas, Florida, Gulf of Mexico, Belize, Venezuela.

***Sphaerosyllis taylori* Perkins, 1981**

[http://species-id.net/wiki/Sphaerosyllis\\_taylori](http://species-id.net/wiki/Sphaerosyllis_taylori)

Figs 2.1–2.5

*Sphaerosyllis (Sphaerosyllis) taylori* Nuñez et al. 1992:49–50.

*Sphaerosyllis taylori* Perkins 1981:1140, fig. 26a–k. Uebelacker 1984:29–31, fig. 22a–f. Ruiz-Ramírez and Salazar-Vallejo 2001:131–134, fig. 6(115–122). San Martín and Bone 2001:614. San Martín 2003:206–208, fig. 108. Russell 2007:71–72.

**Material examined.** PAPC106, (2), coarse sand, 2 m depth; GCLB104, (8), coarse sand near *T. testudinum* bed, 0.5–1.3 m depth.

**Description.** Length to 2.4 mm, width to 0.18 mm. Body broad, with up to 24 chaetigers. Small scattered papillae on dorsum and parapodia. Antennae clavate. Prostomium with two pairs of lentigerous eyes in slightly trapezoidal arrangement. Palps

fused. Dorsal cirri clavate, absent from chaetiger 2, replaced by papillae. Dorsal simple chaeta slender, curved (Fig. 2.1), from chaetiger 1, with minute serrations on anterior chaetigers. Anterior dorsal compound falcigers unidentate with serrated edges (Fig. 2.2), posterior ones with few coarse serrations (Fig. 2.3); median and ventral chaetae with smooth blades. Smooth, slender ventral simple chaeta, only present on posterior chaetigers (Fig. 2.4). Acicula stout with curved tip (Fig. 2.5). Pharynx extending through 3 chaetigers, with dorsal tooth located on anterior margin; proventriculus through 2 chaetigers with 17–19 rows of muscle cells. Pygidium with a pair of anal cirri and dorsal papillae.

**Distribution.** Galapagos Islands, Black Sea, North Atlantic (North Sea to Canary Islands), Mediterranean, Connecticut, Maryland, Florida, Gulf of Mexico, Belize, Venezuela.

### Genus *Exogone* Örsted, 1845

**Type species:** *Exogone naidina* Örsted, 1845

#### *Exogone (Exogone) dispar* (Webster, 1879)

[http://species-id.net/wiki/Exogone\\_\(Exogone\)\\_dispar](http://species-id.net/wiki/Exogone_(Exogone)_dispar)

Figs 2.6–2.10

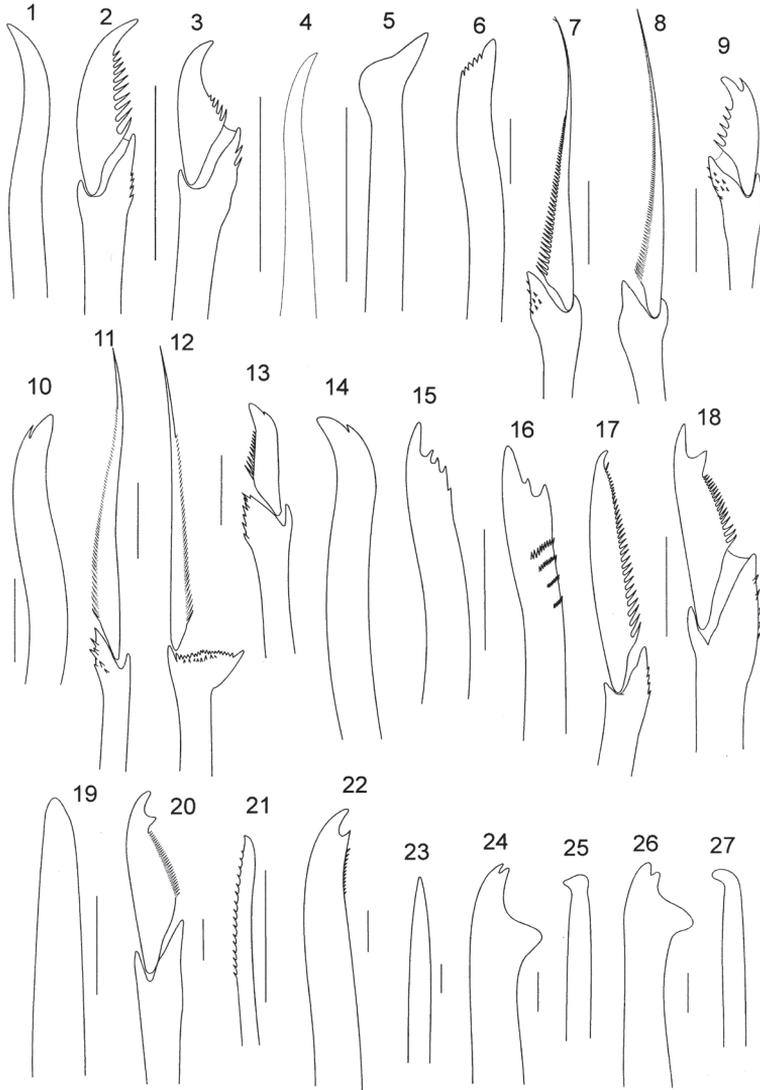
*Paedophylax dispar* Webster 1879:223, pl.4, fig. 49, pl.5, figs. 50–55.

*Exogone dispar* Day 1973:33. Pettibone 1963:130–131, fig. 35d. Taylor, 1971:201–204. Westheide 1974:106, figs. 48A H, 49A D. Gardiner 1976:132, fig. 11f–i. Perkins 1981:1090. Uebelacker 1984:42–43, fig. 36a–e.

*Exogone (Exogone) dispar* Ruiz-Ramírez and Salazar-Vallejo 2001:127, fig. 3(45–54). San Martín and Bone 2001:612. San Martín 2003:274–276, figs. 149, 150. –2005:137–138, figs. 81F, 85A G.

**Material examined.** GCPG198, (4), fine sand, 1 m depth; BMER203, (2), fine sand, 4 m depth; PALB104, (16), sand with *Gemma gemma* (Totten 1834) (Bivalvia: Veneridae), 1 m depth; BMIL197, (6); BMIL498, (12); BMIL602, (3); all specimens associated with *A. fistularis*, 1–3 m depth; BMPL197, (12), BMIL602 (8), associated with *I. felix*, 1–2 m depth.

**Description.** Length to 6.2 mm, width to 0.4 mm. Body relatively long, with up to 41 chaetigers. Prostomium with two pairs of lentigerous eyes. Median antenna fusiform, lateral antennae small, ovoid. Palps fused dorsally. All cirri ovoid. Dorsal cirri on all chaetigers. Dorsal simple chaeta blunt with subdistal spines (Fig. 2.6), present from chaetiger 1. Dorsal compound pseudospinigers serrated, slightly bifid, on anterior chaetigers (Fig. 2.7), (Fig. 2.8); compound falcigers bidentate with small distal tooth, and spines on the shaft-head (Fig. 2.9). Ventral simple chaeta bidentate with



**Figure 2.** *Sphaerosyllis taylora* **1** dorsal simple chaeta, anterior chaetiger **2** dorsal falciger, anterior chaetiger **3** dorsal falciger, posterior chaetiger **4** ventral simple chaeta, posterior chaetiger **5** acicula from same. *Exogone (Exogone) dispar* **6** dorsal simple chaeta, midbody chaetiger **7** bifid spiniger, anterior chaetiger **8** spiniger, midbody chaetiger **9** bidentate falciger from same **10** ventral simple chaeta, posterior chaetiger. *E. (E.) lourei*, **11** dorsal spiniger, midbody chaetiger **12** dorsal spiniger, chaetiger 2 **13** falciger, anterior chaetiger **14** ventral simple chaeta, posterior chaetiger. *Parapionosyllis longicirrata* **15** dorsal simple chaeta, anterior chaetiger **16** same, posterior chaetiger **17** dorsal falciger, anterior chaetiger. *P. parvidentata*, dorsal falciger, midbody chaetiger **19** acicula, midbody chaetiger. *Trypanosyllis vittigera* **20** ventral falciger, midbody chaetiger **21** dorsal simple chaeta, posterior chaetiger **22** ventral simple chaeta from same. *Haplosyllis spongicola* **23** acicula, anterior chaetiger **24** simple chaeta, midbody chaetiger **25** acicula from same **26** simple chaeta, posterior chaetiger **27** acicula from same (scale bars: 10µm).

small distal tooth, only present on posterior chaetigers (Fig. 2.10). Pharynx extending through 4 chaetigers, with marginal crown of papillae, and subterminal dorsal tooth. Proventriculus extending through 4 chaetigers, with 19–22 rows of muscle cells. Pygidium with a pair of cirriform, relatively long cirri.

**Remarks.** From hard bottom substrats of Trinidad and Tobago islands is the most abundant species (Gobin 2010).

**Distribution.** North Pacific, Galapagos Islands, South Japan, Australia, North Atlantic, Mediterranean, Arctic, Alaska to Mexico, South Africa, Maine to Florida, Gulf of Mexico, Trinidad & Tobago, Venezuela.

***Exogone (Exogone) lourei* Berkeley & Berkeley, 1938**

[http://species-id.net/wiki/Exogone\\_\(Exogone\)\\_lourei](http://species-id.net/wiki/Exogone_(Exogone)_lourei)

Figs 2.11–2.14

*Exogone lourei* Berkeley and Berkeley 1938:44, figs. 6–12. Banse 1972:200, fig. 5A D. Banse and Hobson 1974:58, fig. 14h–j. Perkins 1981:1092. Uebelacker 1984:39–41, fig. 34a–f. Russell 2007:56–57, fig. 2. Gobin 2010 (list only).

*Exogone (Exogone) lourei* San Martín and Bone 2001:612. San Martín 2005:129–130, fig. 78A J.

**Material examined.** GCPG198, (3), fine sand, 2 m depth; BMER203; (15); fine sand, 4 m depth; BMC101, (7); BMLV101, (9), inside dead *M. alvicornis*, 1–2 m depth; BMC103 (7), medium sand 1–2 m depth.

**Description.** Length to 7.6 mm, width to 0.2 mm. Body with up to 50 chaetigers. Prostomium with two pairs of lentigerous eyes. Median antenna digitiform, lateral antennae short, ovoid. Palps fused dorsally. Tentacular, dorsal and ventral cirri ovoid. Dorsal simple chaeta with bent tip, minutely serrated on outer edge, present from chaetiger 1. Dorsal compound spinigers serrated (Fig. 2.11), with shaft-heads enlarged on chaetiger 2 (Fig. 2.12); ventral compound falcigers on anterior chaetigers bidentate with very small terminal tooth and serrated edges (Fig. 2.13). Ventral simple chaeta bidentate (Fig. 2.14), present on middle and posterior chaetigers. Pharynx extending through 4–5 chaetigers, with 10 marginal papillae and subterminal dorsal tooth. Proventriculus extending from chaetigers 4–5 to 5–8, with 17–24 rows of muscle cells. Pygidium with a pair of anal cirri.

**Distribution.** South of British Columbia to Panama, Canary Islands, Australia, Florida, Gulf of Mexico, Belize, Cuba, Venezuela.

**Genus *Parapionosyllis* Fauvel, 1923****Type species: *Pionosyllis gestans* Pierantoni, 1903*****Parapionosyllis longicirrata* (Webster & Benedict, 1884)**[http://species-id.net/wiki/Parapionosyllis\\_longicirrata](http://species-id.net/wiki/Parapionosyllis_longicirrata)

Figs 2.15–2.17

*Sphaerosyllis longicirrata* Webster and Benedict 1884:715, pl. 8, figs. 95–100.*Parapionosyllis longicirrata* Pettibone 1963:132, fig. 35e,f. Perkins 1981:1102, fig. 9a–m. Uebelacker 1984:58–60, fig. 52a–g.**Material examined.** PAPC106, (13), as epibionts on tubes of *Americanuphis magna* (Andrews 1891), 0.3–0.6 m depth.**Description.** Length to 3.9 mm, width to 0.26 mm. Body with up to 42 chaetigers. Prostomium with a pair of anterior eyespots and two pairs of posterior lentigerous eyes in trapezoidal arrangement. Antennae fusiform with digitiform end. Palps fused dorsally over half their length. Tentacular and dorsal cirri subulate. Dorsal cirri fusiform. Dorsal simple chaeta with subdistal serrations present from chaetiger 1 (Fig. 2.15, 2.16). Compound falcigers unidentate with coarse serrations and subdistal spine (Fig. 2.17). Ventral simple falcate chaeta, only present on posterior chaetigers. Acicula with circular end. Pharynx extending through 3 chaetigers, with anterior middorsal tooth. Proventriculus extending through 2 chaetigers, with 14–17 rows of muscle cells. Pygidium with two cirriform anal cirri.**Distribution.** Massachusetts, Florida, Gulf of Mexico, Venezuela.**Subfamily Syllinae Grube, 1850****Genus *Trypanosyllis* Claparède, 1864****Type species: *Syllis zebra* Grube, 1860*****Trypanosyllis parvidentata* Perkins, 1981**[http://species-id.net/wiki/Trypanosyllis\\_parvidentata](http://species-id.net/wiki/Trypanosyllis_parvidentata)

Figs 2.18–2.19

*Trypanosyllis parvidentata* Perkins 1981:1161, fig. 36a–h. Uebelacker 1984:91–93, fig. 86a–e.**Material examined.** Guacarapo (Gulf of Cariaco), GCPG198, (1), fine sand, 1 m depth.**Description.** Length to 9.4 mm, width to 0.65 mm. Body incomplete, with up to 88 chaetigers. Prostomium with a pair of lentigerous eyes in trapezoidal arrangement.

Median antenna with 10 articles, lateral antennae with 9 articles. Palps separated. Dorsal tentacular cirri with 11 articles, ventral ones with 9 articles. Dorsal cirri with 13 articles in chaetiger 1; from chaetiger 5 alternating longer, with 15 articles, and shorter cirri, with 9 articles. Dorsal compound falcigers bidentate, serrated (Fig. 2.18), ventral ones with shorter blades. Ventral simple chaeta bidentate, slender, on posterior chaetigers. Acicula stout, solitary in posterior chaetigers (Fig. 2.19) Pharynx extending through 5 chaetigers. Proventriculus extending through 4 chaetigers, with 17 rows of muscle cells.

**Distribution.** Southern Florida, Gulf of Mexico, West Indies, Venezuela.

*Trypanosyllis vittigera* Ehlers, 1887

[http://species-id.net/wiki/Trypanosyllis\\_vittigera](http://species-id.net/wiki/Trypanosyllis_vittigera)

Figs 2.20–2.22

*Trypanosyllis vittigera* Hartman 1951:41. Uebelacker 1984:88, fig. 82a–h. San Martín 1991:227–228.

**Material examined.** GCPG198, (4), fine sand, 1 m depth; GCPT106, (8), fine sand, 0.5–1.5 m depth.

**Description.** Length to 12.4 mm, width to 2.2 mm, with 56 chaetigers. Body long, and flattened; with two dorsal transverse brown stripes per segment anteriorly. Prostomium with a pair of lentigerous eyes in trapezoidal arrangement. Median antenna with 17–21 articles, lateral ones with 10–13 articles. Dorsal tentacular cirri with 29–36 articles, lateral ones with 19–23 articles. Dorsal cirri alternating in length longer, with 19–26 articles, and shorter, with 9–12 articles. Ventral cirri cirriform. Compound falcigers bidentate with small serrations, blades of dorsal falcigers longer than ventral ones (Fig. 2.20). Dorsal simple chaeta slender with subdistal small serrations (Fig. 2.21), and ventral simple chaeta bidentate, with subdistal serrations (Fig. 2.22), both only present on posterior chaetigers. Pharynx extending through 4–5 chaetigers, with distal trepan of ten teeth. Proventriculus extending through 4 chaetigers, with 31–37 rows of muscle cells. Pygidium with a pair of anal cirri with 6–9 articles.

**Remarks.** According to San Martín (1991) *T. zebra* from the Mediterranean Sea is very similar to *T. vittigera*, differing only in the number of teeth on the trepan and in the length of the proventriculus, thus suggesting the need for a revision of *T. zebra* and related species.

**Distribution.** Circumtropical.

**Genus *Haplosyllis* Langerhans, 1879****Type species: *Syllis spongicola* Grube, 1855*****Haplosyllis spongicola* (Grube, 1855)**[http://species-id.net/wiki/Haplosyllis\\_spongicola](http://species-id.net/wiki/Haplosyllis_spongicola)

Figs 2.23–2.28

*Syllis* (*Haplosyllis*) *spongicola* Fauvel 1923:257, fig. 95a–d.*Haplosyllis spongicola* Imajima 1966:220, fig. 38a–h.*Syllis* (*Haplosyllis*) *spongicola* Day 1967:240–241, fig. l2.1.e–i. Gardiner 1976:139, fig. 12i–k.*Haplosyllis spongicola* Uebelacker 1984:109–111, fig. 104a–d. San Martín 1991:233. San Martín and Bone 2001:615. San Martín 2003:323–325, figs. 179–180. Martin et al. 2003:145–162, figs. 1–12. Lattig et al. 2007:554–557, figs. 1–2. Gobin 2010 (list only).

**Material examined:** BMIL598, (84); BMPL498, (36); associated with *C. nucula*, 1–2 m depth; BMIL297, (1566); BMIL498, (607); BMPL197, (132); BMPL297, (506), all specimens associated with *A. fistularis*, 1–3 m depth; BMIL297, (1147); (3789), BMIL397; BMIL498, (3689). BMPL297, (2852); BMPL297, (2667), BMPL398, (2808); all specimens associated with *I. felix*, 1–2 m depth; GCPG198, (78), fine sand, 1 m depth; GCET103, (18); BMER103, (13), fine to coarse sand, 1 m depth. BMMQ205, (2), inside dead *M. alvicornis*, 1–2 m depth.

**Description.** Length to 5.6 mm, width 2.4 mm. Body with up to 85 chaetigers, broad anteriorly, thinner from mid-body to pygidium. Prostomium with a pair of small eyes in trapezoidal arrangement. Median antenna with 24–33 articles, lateral antennae with 8–19 articles. Palps fused dorsally. Dorsal tentacular cirri with 18–36 articles. Anterior dorsal cirri with 7–47 articles. First cirri longer than remaining ones. Dorsal cirri of middle region alternating in length longer, with 8–16 articles, and shorter, with 4–10 articles. Ventral cirri digitiform, shorter than parapodial lobes. Two (1–3) simple and stout chaetae, with two distal teeth and main fang prominent (Figs. 2.24, 2.26) and with upper side rugose. Aciculae either with pointed tip (Fig. 2.23) or with curved end (Figs. 2.25, 2.27). Pharynx extending through 7–11 chaetigers; with 8–10 soft distal papillae, encircling middorsal tooth. Proventriculus extending through about 12 chaetigers, with 34–52 rows of muscle cells. Pygidium with a pair of long moniliform anal cirri.

**Remarks.** This species is one of the most abundant syllid in the Great Caribbean region in both soft and hard bottoms (Granados-Barba et al. 2003); Gobin (2010) pointed out that is one of the most abundant species from hard bottoms of Trinidad and Tobago. Martin et al. (2003) based on the wide variability observed within the *Haplosyllis* species, pointed out that the so-called *H. spongicola* must be considered as a pseudo-sibling species-complex.

**Distribution.** Considered cosmopolitan, although Martin et al. (2003) and Lattig et al. (2007) pointed out that records in temperate and tropical seas must be reviewed.

### Genus *Opisthosyllis* Langerhans, 1879

Type species: *Opisthosyllis brunnea* Langerhans, 1879

#### *Opisthosyllis* sp.

Figs 3.1–3.7

**Material examined.** IMLR102, (1); IMLR202, (4), as epibionts on *C. rhizophorae*, 0–0.5 m.

**Description.** Length up to 21 mm, 0.2 mm in width, with 78 chaetigers. Prostomium with two pairs of lentigerous eyes in trapezoidal arrangement on posterior half of prostomium. Antennae longer than prostomium and palps, with 18–19 articles each. Palps separated at the base. Dorsal tentacular cirri with 26 articles, ventral ones with 18. Dorsal cirri, alternating in length longer, with 23–25 articles, and shorter, with 17–19 articles (Fig. 3.1). Compound falcigers unidentate with spiniferous cutting edge, dorsal ones with longer blades (Fig. 3.2) than ventral ones (Fig. 3.3, 3.4). Acicula subterminally thickened (Fig. 3.5, 3.6). Dorsal simple chaeta with slightly bifid tip (Fig. 3.7), only present on last chaetigers. Pharynx extending through 9 chaetigers; with dorsal tooth located at the level of the chaetiger 7; proventriculus extending through 6–7 chaetigers, with about 45 rows of muscle cells.

**Remarks.** *Opisthosyllis* sp. resembles *O. brunnea* Langerhans 1991, in having compound chaetae with unidentate blades, and in the location of the pharyngeal tooth; it differs in the absence of an occipital flap, having a wider proventriculus, and in the number of rows of muscle cells in the proventriculus.

### Genus *Branchiosyllis* Ehlers, 1887

Type species: *Branchiosyllis oculata* Ehlers, 1887

#### *Branchiosyllis exilis* (Gravier, 1900)

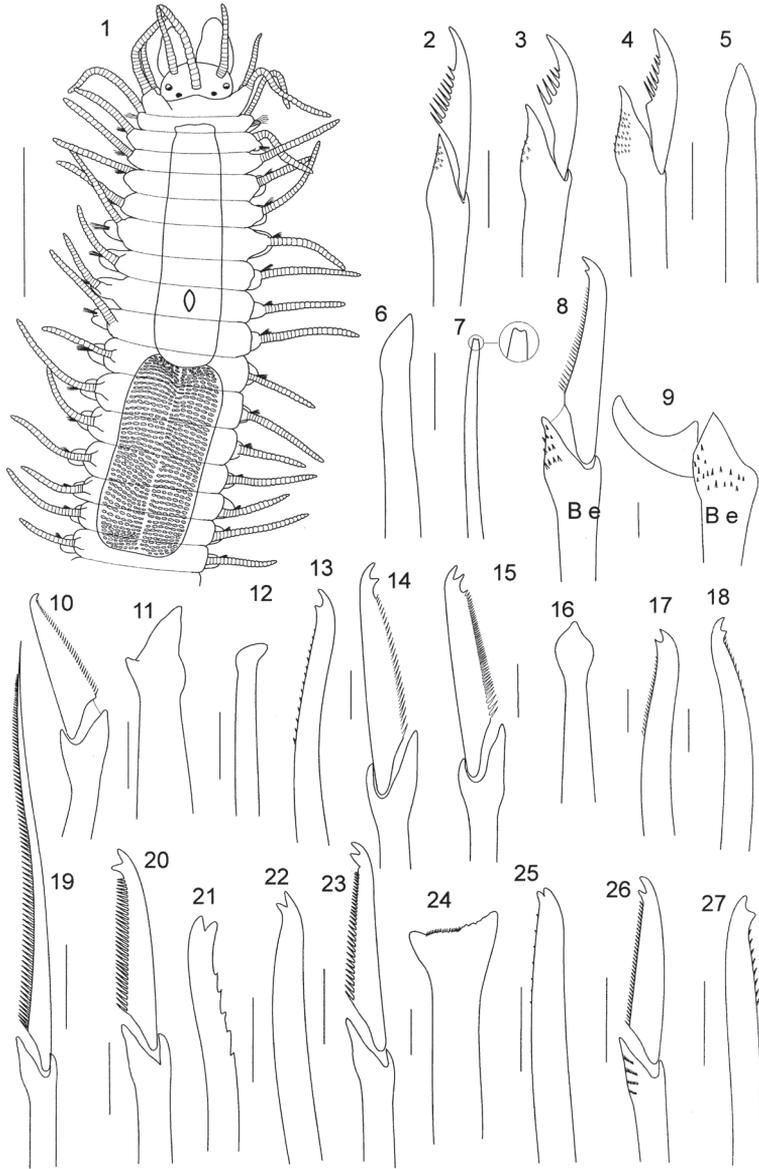
[http://species-id.net/wiki/Branchiosyllis\\_exilis](http://species-id.net/wiki/Branchiosyllis_exilis)

Figs 3.8–3.9

*Syllis* (*Typosyllis*) *exilis* Gravier 1900:160, pl. 10, fig. 19.

*Branchiosyllis exilis*, Westheide 1974:60, fig. 26A H. Uebelacker 1984:105–107, fig. 100a–f. San Martín 1991:233. San Martín and Bone 2001:614. San Martín 2003:332–336, figs. 184–185.

**Material examined.** BMIL197, (1); (9), BMIL297, (9); BMIL498, (8); BMPL197, (7); BMPL398, (16), all specimens associated with *C. nucula*; BMIL498, (11); (22);



**Figure 3.** *Opisthosyllis* sp. **1** anterior end, dorsal view **2** dorsal long falciger **3, 4** ventral short falcigers **5, 6** aciculae **7** dorsal simple chaeta, posterior chaetiger. *Branchiosyllis exilis* **8** dorsal falciger, anterior chaetiger **9** ventral falciger, midbody chaetiger. *Syllis amica* **10** falciger, anterior chaetiger **11** dorsal simple chaeta, midbody chaetiger **12** acicula from same. *S. armillaris* **13** dorsal simple chaeta, posterior chaetiger **14** bidentate falciger, anterior chaetiger. *S. coralicolla* **15** bidentate falciger, anterior chaetiger **16** acicula, posterior chaetiger **17** dorsal simple chaeta from same **18** ventral simple chaeta from same. *S. cornuta* **19** dorsal spiniger, anterior chaetiger **20** dorsal bidentate falciger from same **21** dorsal simple chaeta, posterior chaetiger **22** ventral simple chaeta from same. *S. gracilis* **23** dorsal falciger, anterior chaetiger **24** ypsiloid simple chaeta, midbody chaetiger. *S. prolifera* **25** dorsal simple chaeta, posterior chaetiger **26** dorsal falciger, anterior chaetiger **27** ventral simple chaeta, posterior chaetiger (scale bars: 1 = 1 mm; 2–27 = 10 $\mu$ m).

BMPL197, (5); BMPL398, (6), all specimens associated with *A. fistularis*, 1–3 m depth; BMPL197, (13); BMIL498, (14); BMPL197, (6), all specimens associated with *I. felix*, 1–2 m depth.

**Description.** Length to 17.6 mm, width 1.2 mm. Body with up to 68 chaetigers. Prostomium with a pair of anterior small eyes and two posterior pairs of lentigerous eyes in trapezoidal arrangement. Median antenna with 15–21 articles; lateral antennae with 12–15 articles. Palps stout, rounded, fused basally. Dorsal tentacular cirri with 19–23 articles, ventral ones with 10–13 articles. Anterior dorsal cirri alternating longer, with 22–38 articles, and shorter, with 17–31 articles. Length and number of articles diminishing posteriorly. Dorsal compound falcigers bidentate (Fig. 3.8), ventral falcigers bidentate in anterior chaetigers, falcate in middle and posterior chaetigers (Fig. 3.9). Pharynx extending through 7 chaetigers. Proventriculus extending through 9–12 chaetigers, with 39–48 rows of muscle cells. Pygidium with a pair of anal cirri with 13–21 articles.

**Distribution.** Circumtropical, Mediterranean, Balears and Chafarinas Island (Spain), and Venezuela.

### Genus *Syllis* Lamarck, 1818

**Type species:** *Syllis monilaris* Savigny in Lamarck, 1818

#### *Syllis amica* Quatrefages, 1865

[http://species-id.net/wiki/Syllis\\_amica](http://species-id.net/wiki/Syllis_amica)

Figs 3.10–3.12

*Syllis* (*Typosyllis*) *amica* Uebelacker 1984:127–129, fig. 120a–e.

*Syllis amica* Fauvel 1923:258–259, fig. 95e–n. San Martín 2003:366–370, figs. 199–200.

**Material examined.** GCPG198, (15), fine sand, 1 m depth; PAPC106, (2), coarse sand, 2 m depth; GCLB205, (6), fine sand, 1 m depth; (8), GCLB205, coarse sand near *T. testudinum* bed, 0.5–1.3 m depth; BMC101, (4), medium sand, 1 m depth; BMLV101, (28), inside dead *M. alcornis*, 1–2 m depth; BMIL297, (11); BMIL498, (6), associated with *A. fistularis*, 1–3 m depth; BMPL297, (15); BMPL398, (8), associated with *I. felix*, 1–2 m depth; BMIL397, (34), associated with *C. nucula*, 1–2 m depth.

**Description.** Length to 22.6 mm, width 0.2 mm. Body with up to 125 chaetigers. Prostomium with two pairs of lentigerous eyes. Median antenna with 15–20 articles, lateral antennae with 12–19 articles. Dorsal tentacular cirri with 16–21 articles, ventral ones with 9–12 articles. Dorsal cirri of chaetiger 1 longer than remaining, with 19–22 articles. Dorsal cirri alternating longer, with 19–22 articles, and shorter, with 15–18 articles in middle region. Compound falcigers unidentate, coarsely serrated (Fig. 3.10). Dorsal chaeta in middle and posterior regions, simple due to loss of blade (Fig. 3.11). Dorsal and ventral simple chaetae of posterior region, slender, bidentate and minutely

serrated. Acicula distally enlarged (Fig. 3.12). Pharynx extending through 6–8 chaetigers, with middorsal anterior tooth. Proventriculus extending through 4–5 chaetigers, with about 40 rows of muscle cells. Pygidium with a pair of anal cirri moniliform and digitiform, short cirrus.

**Distribution.** Cosmopolitan in temperate and tropical seas.

***Syllis armillaris* (Müller, 1771)**

[http://species-id.net/wiki/Syllis\\_armillaris](http://species-id.net/wiki/Syllis_armillaris)

Figs 3.13–3.14

*Nereis armillaris* Müller 1771 in Müller 1776:217.

*Syllis* (*Typosyllis*) *armillaris* Fauvel 1923:264, fig. 99a–f. Day 1967:249, fig. 12.4.a–d.

Uebelacker 1984:129–131, 122a–g.

*Syllis armillaris* San Martín 2003:423–426, figs. 232–233.

**Material examined.** BMIL197, (2); BMIL602, (9), associated with *A. fistularis*, 1–3 m depth; BMIL197, (4); BMIL397 (6), associated with *I. felix*, 1–2 m depth.

**Description.** Length to 11.5 mm, width 0.62 mm. Body with up to 121 chaetigers. Prostomium with a pair of anterior eyespots and two pairs of lentigerous eyes in trapezoidal arrangement. Median antenna with 9–19 articles, lateral antennae with 11–13 articles. Palps fused basally. Dorsal tentacular cirri with 11–16 articles, ventral ones with 9–15 articles. Dorsal cirri alternating in anterior segments longer, with 12–16 articles, and shorter, with 8–10 articles, becoming shorter in middle and posterior regions. Slender, bidentate dorsal simple chaeta (Fig. 3.13) only present on posterior chaetigers. Compound falcigers bidentate in anterior (Fig. 3.14) and posterior chaetigers, unidentate or subbidentate in midbody region. Simple ventral chaeta bidentate only present on posterior chaetigers. Pharynx extending through 8–9 chaetigers, with 10 marginal papillae encircling middorsal tooth. Proventriculus extending through 6 chaetigers, with 36–44 rows of muscle cells. Pygidium with a pair of anal cirri with 14–18 articles and slender midventral cirrus.

**Distribution.** Cosmopolitan.

***Syllis coralicolla* Verrill, 1900**

[http://species-id.net/wiki/Syllis\\_coralicolla](http://species-id.net/wiki/Syllis_coralicolla)

Figs 3.15–3.18

*Syllis coralicolla* San Martín 1992:185–186, fig. 1A D. San Martín and Bone 2001:616.

Nogueira and San Martín 2002:73–75, figs. 11, 12. San Martín 2003:439–443, figs. 242–243.

**Material examined.** BMC101, (5), inside dead *M. alcicornis*, 1–2 m depth.

**Description.** Length to 9.5 mm, width 0.59 mm. Body with up to 79 chaetigers. Prostomium with a pair of anterior eyespots and two pairs of lentigerous eyes in trapezoidal arrangement. Median antenna with 19–30 articles, lateral ones with 15–17 articles. Dorsal tentacular cirri with 24–38 articles, ventral ones with 15–18 articles. Dorsal cirri of chaetiger 1 long, with 35–41 articles. Dorsal cirri alternating longer, with 24–33 articles, and shorter, with 14–19 articles. Compound falcigers bidentate and serrated (Fig. 3. 15). Acicula enlarged subdistally with rounded tip (Fig. 3.16). Dorsal bifid simple chaeta (Fig. 3.17), and ventral simple chaeta bidentate, both only present on posterior chaetigers (Fig. 3.18). Pharynx extending through 7–8 chaetigers, with anterior tooth. Proventriculus extending through 5–7 chaetigers, with 33–41 rows of muscle cells. Pygidium with a pair of anal cirri.

**Distribution.** Iberian Peninsula, Mediterranean, Balear Islands, Antillas, Bermuda, Cuba, Venezuela.

### *Syllis cornuta* Rathke, 1843

[http://species-id.net/wiki/Syllis\\_cornuta](http://species-id.net/wiki/Syllis_cornuta)

Figs 3.19–3.22

*Syllis (Ehlersia) cornuta* Fauvel 1923:267, fig. 100g–1.

*Langerhansia cornuta* Imajima 1966:256, fig. 51a–o.

*Syllis (Langerhansia) cornuta* Day 1967:244, fig. 12.2.s–u; 1973:29. Gardiner 1976:140, fig. 12o–s. Uebelacker 1984:120–122, fig. 114a–f.

*Syllis cornuta* Pettibone 1963:118, figs. 31i, j.

**Material examined.** BMIL297, (37); (2), BMIL397; BMIL498, (18), all specimens associated with *A. fistularis*, 1–3 m depth; BMPL297, (10); BMPL398, (3), all specimens associated with *I. felix* 1–2 m depth.

**Description.** Length to 29.5 mm, width 0.77 mm. Body with up to 107 chaetigers. Prostomium with a pair of anterior eyespots and two pairs of eyes in trapezoidal arrangement. Median antenna with 11–27 articles; lateral ones with 9–20 articles. Palps long, fused basally. Dorsal tentacular cirri with 11–19 articles, ventral ones with 7–16 articles. Dorsal cirri on anterior chaetigers with 7–33 articles, 5–25 articles medially. Dorsal compound spiniger chaetae, finely serrated, present from chaetiger 1 (Fig. 3. 19). Compound falcigers bidentate, serrated with small subterminal tooth (Fig. 3.20). Stout, bifid, dorsal simple chaeta with subdistal serrations (Fig. 3.21) and bidentate ventral simple chaeta (Fig. 3.22) both only present on posterior chaetigers. Pharynx extending through 6–12 chaetigers, with a crown of ten soft papillae and middorsal subterminal tooth. Proventriculus extending through 4–6 chaetigers, with 36–48 rows of muscle cells. Pygidium with a pair of anal cirri with 18–28 articles and midventral digitiform cirrus.

**Distribution.** Cosmopolitan.

***Syllis gracilis* Fauvel, 1923**

[http://species-id.net/wiki/Syllis\\_gracilis](http://species-id.net/wiki/Syllis_gracilis)

Figs 3.23–3.24

*Syllis (Syllis) gracilis* Day 1967:241, fig. 12.1.m–p. Gardiner 1976:139, fig. 12 l–n. Uebelacker 1984:116–118, fig. 112a–h. Nogueira and San Martín 2002:68–72, figs. 7, 8.

*Syllis gracilis* Fauvel 1923:259 fig. 96f–i. Pettibone 1963:116, fig. 32a–e. Imajima 1966:248, fig. 49a–k.– Taylor, 1971:212–214. San Martín 1992:178.–2003:413–416, figs. 226–227. Gobin 2010 (list only).

**Material examined.** BMPL297, (8); BMPL398, (4), associated with *C. nucula*, 1–2 m depth; BMPL297, (2); BMPL398, (4), all specimens associated with *A. fistularis*, 1–3 m depth; BMIL598, (4); BMPL297, (3); BMPL398, (16); all specimens associated with *I. felix*, 1–2 m depth; GCET1030, (6), fine to coarse sand, 1 m depth.

**Description.** Length to 19.5 mm, width 0.7 mm. Body with up to 107 chaetigers. Anterior segments with a pair of dark, dorsal, transverse stripes. Prostomium with two pairs of lentigerous eyes in trapezoidal arrangement. Median antenna with 14–20 articles; lateral antennae with 12–15 articles. Dorsal tentacular cirri with 12–18 articles, ventral ones with 6–12 articles. Dorsal cirri alternating longer, with 16–21 articles, and shorter, with 14–16 articles, diminishing posteriorly. Anterior chaetae compound, bidentate, falcigers (Fig. 3.23), replaced by thick, simple, ypsiloid chaetae (Fig. 3.24) on median chaetigers. Posterior chaetae compound, bidentate, falcigers and slender, bidentate dorsal and ventral simple chaetae. Acicula enlarged subdistally. Pharynx extending through 8–9 chaetigers, with 10 marginal soft papillae, and middorsal subdistal tooth. Proventriculus extending through 11–13 chaetigers, with 36–42 rows of muscle cells. Pygidium with a pair of anal cirri with 6–12 articles and midventral cirrus.

**Distribution.** Cosmopolitan in temperate and tropical seas.

***Syllis prolifera* Krohn, 1852**

[http://species-id.net/wiki/Syllis\\_prolifera](http://species-id.net/wiki/Syllis_prolifera)

Figs 3.25–3.27

*Typosyllis prolifera* Imajima 1966:292, fig. 65a–n.

*Syllis (Typosyllis) prolifera* Fauvel 1923:261, fig. 97a–g. Day 1967:248, fig. 12.3.g–i.–1973:30. Uebelacker 1984:150–151, fig. 146a–g.

*Syllis prolifera* San Martín 1992:171–173, fig. 1E H. San Martín and Bone 2001:617. San Martín 2003:344–347, figs. 186–187. Gobin 2010 (list only).

**Material examined:** BMIL297, (3); BMPL297, (3); BMPL398, (10), BMIL598, (8); all specimens associated with *C. nucula*, 1–2 m depth.

**Description.** Length to 25.5 mm, width 0.7 mm. Body with up to 97 chaetigers. Anterior segments with a pair of brown, dorsal, transverse stripes. Prostomium with a pair of anterior eyespots and two pairs of eyes in trapezoidal arrangement. Median antenna with 21–30 articles, lateral ones with 17–23 articles. Dorsal tentacular cirri with 14–28 articles, ventral ones with 8–14 articles. Dorsal cirri alternating longer, with 24–42 articles, and shorter, with 10–19 articles. Dorsal simple chaeta, bifid from mid-body chaetigers (Fig. 3.25). Compound falcigers bidentate and serrated (Fig. 3.26). Ventral simple chaeta bidentate, slender with subdistal serrations (Fig. 3.27), only present on posterior chaetigers. Anterior aciculae slender with blunt tip, posterior ones enlarged distally. Pharynx extending through 5 chaetigers, with 10 marginal papillae encircling middorsal tooth. Proventriculus extending through 5 chaetigers, with 27–35 rows of muscle cells. Pygidium with a pair of anal cirri with 14–29 articles and digitiform midventral cirrus.

**Distribution.** Japan, Indian Ocean, South Africa, Mediterranean Sea, Atlantic Ocean, Caribbean Sea, Gulf of Mexico.

***Syllis pseudoarmillaris* Nogueira & San Martín, 2002**

[http://species-id.net/wiki/Syllis\\_pseudoarmillaris](http://species-id.net/wiki/Syllis_pseudoarmillaris)

Figs 4.1–4.5

*Syllis pseudoarmillaris* Nogueira and San Martín 2002:83–85, figs. 17–18.

**Material examined.** PAPC106, (8), as epibionts on *Americanuphis magna* tubes (Andrews 1891), 0.3–0.6 m depth; GCLB205 (3), fine sand, 1 m depth.

**Description:** Length to 9.5 mm, width 0.29 mm. Body with up to 91 chaetigers. Prostomium with two pairs of eyes in trapezoidal arrangement. Antennae moniliform; median antenna with 13–19 articles; lateral ones with 8–12 articles. Palps basally fused. Dorsal tentacular cirri with 14–19 articles, ventral ones with 9–11 articles. Dorsal cirri moniliform, those from chaetiger 1 longer than the following ones, with 15–21 articles; dorsal midbody chaetigers with 9–14 articles, posterior ones with few articles (3–6). Compound falcigers bidentate, with serrated blades (Fig. 4.1). Dorsal and ventral simple chaetae bidentate with subdistal serrations (Fig. 4.2, 4.3) on posterior chaetigers. Anterior acicula subdistally enlarged with blunt tip (Fig. 4.4), posterior acicula subdistally enlarged with bent tip (Fig. 4.5). Pharynx extending through 7–9 chaetigers, with distal middorsal large tooth; surrounded by soft papillae; proventriculus extending through 4 chaetigers, with 38–41 rows of muscle cells. Pygidium with a pair of anal cirri with 3–5 articles.

**Distribution.** Brazil, Venezuela.

***Syllis vittata* Grube, 1840**

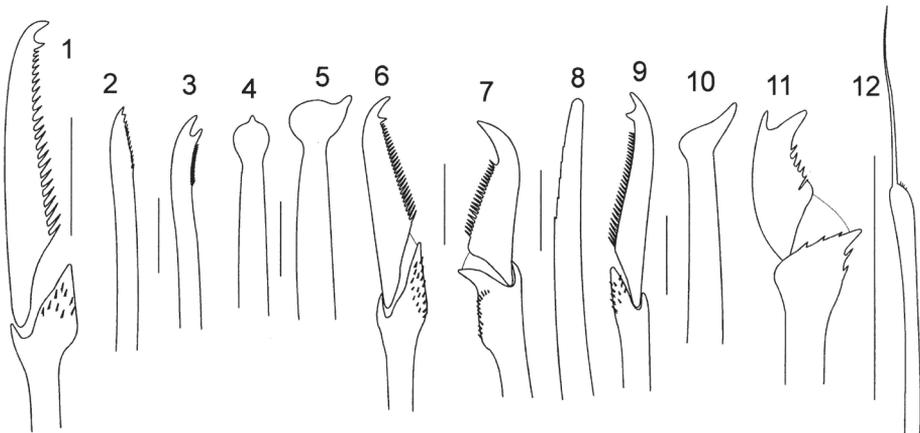
[http://species-id.net/wiki/Syllis\\_vittata](http://species-id.net/wiki/Syllis_vittata)

Figs 4.6–4.7

*Syllis* (*Typosyllis*) *vittata* Fauvel 1923:263–264, fig. 98i–l. Day 1967:252, Fig. 12.4.m–o.  
*Syllis vittata* Taylor, 1971:220–222. San Martín 2003:430–432, figs. 236–237.

**Material examined.** BMIL803, (8), on rocks covered by *Enteromorpha intestinalis* (Linnaeus), 1–2 m depth.

**Description.** Length to 21.5 mm, width 1.1 mm. Body broad with up to 101 chaetigers, with dorsal transverse dark stripe per segment. Prostomium with two pairs of eyes in trapezoidal arrangement. Median antenna with 20–26 articles; lateral ones with 18–24 articles. Palps stout basally fused. Antennae moniliform; median antenna with 23–31 articles, lateral antennae with 20–23 articles. Dorsal tentacular cirri with 30–39 articles, ventral ones with 19–23 articles. Dorsal cirri alternating longer, with 20–27 articles, and shorter, with 19–24 articles. Dorsal simple chaeta bifid serrated, only present on posterior chaetigers. Anterior compound falcigers bidentate and serrated (Fig. 4.6). Posterior compound falcigers with short blades unidentate and serrated (Fig. 4.7). Ventral simple bidentate serrated chaeta, only present on posterior chaetigers. Pharynx extending through 10 chaetigers, with 10 marginal papillae encircling distal tooth. Proventriculus extending through 9 chaetigers, with 37–40 rows of muscle cells. Pygidium with a pair of anal cirri with 9–12 articles and digitiform midventral cirrus.



**Figure 4.** *Syllis pseudoarmillaris* 1 bidentate falciger, anterior chaetiger 2 dorsal simple chaeta, posterior chaetiger 3 ventral simple chaeta from same 4 acicula, anterior chaetiger 5 acicula, posterior chaetiger. *S. vittata* 6 dorsal falciger, anterior chaetiger 7 falciger, posterior chaetiger. *Parasphaerosyllis indica* 8 dorsal simple chaeta, midbody chaetiger 9 dorsal falciger, anterior chaetiger 10 acicula, midbody chaetiger. *Myrianida convoluta* 11 bidentate falciger, anterior chaetiger 12 bayonet chaeta, midbody chaetiger (scale bars: 10µm).

**Distribution.** Eastern Atlantic, Mediterranean Sea, Indian Ocean, Florida, Great Caribbean.

**Genus *Parasphaeropsyllis* Monro, 1937**

**Type species: *Parasphaeropsyllis indica* Monro, 1937**

***Parasphaeropsyllis indica* Monro, 1937**

[http://species-id.net/wiki/Parasphaeropsyllis\\_indica](http://species-id.net/wiki/Parasphaeropsyllis_indica)

Figs 4.8–4.10

*Parasphaeropsyllis indica* Rioja 1958:246–251, figs. 21, 22, 26, 27. Westheide 1974:64–66, figs. 27–29. San Martín 1991:234.–1994:130.

**Material examined.** BMMQ205, (19); BMLV101, (8); GCET103, (22), inside dead *M. alcicornis*, 1–2 m depth; BMPL398, (24), associated with *A. fistularis*, 1–3 m depth.

**Description.** Length to 9.5 mm, width 0.6 mm. Body slender with up to 106 chaetigers. Prostomium with two pairs of lentigerous eyes in trapezoidal arrangement. Median antenna with 18–21 articles, lateral ones with 13–15 articles. Dorsal tentacular cirri with 32–51 articles, ventral ones with 18–23 articles. Dorsal cirri alternating longer, with 21–33 articles, and shorter, with 19–22 articles. Large, ovoid dorsal cirri with small distal button, from chaetigers 24. Dorsal simple chaeta with blunt end and subdistally serrated (Fig. 4.8). Compound falcigers bidentate and serrated (Fig. 4.9). Ventral simple chaeta bidentate, slender. Acicula subdistally enlarged, with acuminate, oblique tip (Fig. 4.10). Pharynx extending through 6 chaetigers, with 10 marginal papillae encircling anterior tooth. Proventriculus extending through 3–5 chaetigers, with 25–28 rows of muscle cells.

**Distribution.** Circumtropical.

**Subfamily Autolytinae Langerhans, 1879**

**Genus *Myrianida* Milne Edwards, 1845**

**Type species: *Myrianida fasciata* Milne Edwards, 1845**

***Myrianida convoluta* (Cognetti, 1953)**

[http://species-id.net/wiki/Myrianida\\_convoluta](http://species-id.net/wiki/Myrianida_convoluta)

Figs 4.11–4.12

*Autolytus convolutus* Cognetti 1953:323–332, figs 1–12.–1957:71–72, fig. 15A B.

Ben-Eliahu 1972:217–218, fig. 14A D. Amaral and Nonato 1975:235–236. Ben-Eliahu 1977:85–86, fig. 12. San Martín 1994:271.

*Autolytus (Regulatus) convolutus* Imajima 1966:47–49, fig. 12A H.

*Autolytus convolutus* San Martín 2003:483–486, figs 265–266.

*Myrianida convoluta* Nygren 2004:125–126, fig. 60A D.

**Material examined.** GCPG198, (2), on artificial substrate (PVC pipe), 1 m depth; BMC101, (1), inside dead *M. alvicornis*, 1–2 m depth.

**Description.** Length to 2.6 mm, width 0.2 mm. Body slender with up to 14 chaetigers, without stolons. Prostomium with a pair of anterior eyespots and two posterior pairs of lentigerous eyes in trapezoidal arrangement. Median antenna longer than lateral ones. Palps fused. Nuchal organs extending to chaetiger 2. Dorsal tentacular cirri as long as lateral antennae; ventral ones shorter. Dorsal cirri of chaetiger 1 as long as median antenna, remaining dorsal cirri short, digitiform. Compound bidentate chaetae with short serrated blades, with small distal tooth and broad subdistal one (Fig. 4.11). Slender bayonet chaetae from chaetiger 4–11 (Fig. 4.12). Pharynx with many circumvolutions. Trepan with 9 equal teeth. Proventriculus in chaetigers 8–10 with 19–20 rows of muscle cells. Pygidium with a pair of anal cirri.

**Distribution.** North Pacific, Suez Canal, Japan, North Atlantic, Mediterranean, Great Caribbean.

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# Five new species of the genus *Cryptopimpla* Taschenberg (Hymenoptera, Ichneumonidae) with a key to species known from China

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## Abstract

Eight species of the genus *Cryptopimpla* Taschenberg, 1863 are reported from China, five of them new to science: *C. flavipedalis* Sheng, **sp. n.**, collected from Ningxia Hui Autonomous Region, and *C. rufipedalis* Sheng, **sp. n.** collected from Jilin Province, both from the Palearctic part of China. *Cryptopimpla carinifacialis* Sheng, **sp. n.**, *C. flavifacialis* Sheng, **sp. n.** and *C. maculifacialis* Sheng, **sp. n.** were collected from Jiangxi Province in the Oriental part of China. A key to the species of *Cryptopimpla* known from China is provided.

## Keywords

Banchinae, taxonomy, parasitoid wasp, identification

## Introduction

According to recent publications (Kuslitzky 2007, Sheng et al. 2005, 2009, Yu et al. 2005), the genus *Cryptopimpla* Taschenberg, 1863, belonging to the tribe Atrophini of the subfamily Banchinae (Hymenoptera, Ichneumonidae), comprises 41 species, of which 13 are from the Oriental Region, 20 from the Palearctic, five from the Nearctic,

one is Holarctic, one is Nearctic and Neotropical, and one is from the Ethiopian region. Four species of *Cryptopimpla* have been reported from China (Sheng and Zheng 2005, Sheng and Sun 2009). The status of the genus was elucidated by Townes (1970) and by Chandra and Gupta (1977).

The Oriental species of *Cryptopimpla* Taschenberg were described or redescribed and keyed by Chandra and Gupta (1977). Kuslitzky (2007) provided a key to the banchine genera and species of the Russian Far East. Two species have been described from Japan (Momoi 1970). The European species were catalogued by Aubert (1978). So far, species reported from China were from Henan, Inner Mongolia, Jilin and Taiwan. China is very large and spans two Regions, the Oriental and Palaearctic regions. The genus has not been studied thoroughly in either the Oriental or Palaearctic regions of China.

In the last four years the author has been exploring Jiangxi Province, situated in the northern border of the Oriental part of China, Jilin Province and Ningxia Hui Autonomous Region, both situated at the southern border of the Palaearctic part of China, and has collected large numbers of ichneumonids. New discoveries have been reported (Sheng et al. 2009, 2010, 2011), and will be reported successively. In this article, five new species of *Cryptopimpla* are reported, of which one, collected from Jilin Province in the Palaearctic part of China, was previously mistaken as *Cryptopimpla helvetica* Brauns.

## Materials and methods

Specimens were collected using entomological nets in the forests of Quannan, Ji'an and Qianshan Counties, Jiangxi Province; Liupanshan Natural Reserve, Ningxia Hui Autonomous Region; Baihe, Jilin Province (CHINA).

Images of whole bodies were taken using a CANON Power Shot A650 IS. Other images were taken using a Cool SNAP 3CCD attached to a Zeiss Discovery V8 Stereomicroscope and captured with QCapture Pro version 5.1.

The morphological terminology is mostly that of Gauld (1991). Wing vein nomenclature is based on Ross (1936) and the terminology on Mason (1986, 1990).

Type specimens are deposited in the Insect Museum, General Station of Forest Pest Management, State Forestry Administration, People's Republic of China.

### *Cryptopimpla* Taschenberg, 1863

<http://species-id.net/wiki/Cryptopimpla>

*Cryptopimpla* Taschenberg, 1863. Zeitschrift für die Gesamten Naturwissenschaften, 21:292. Type-species: *Phytodietus blandus* Gravenhorst.

**Diagnosis.** Upper tooth of mandible longer than lower tooth. Genal carina joining hypostomal carina above base of mandible. Occipital carina complete. Without epomia. Lower half of mesopleuron weakly convex. Posterior transverse carina of propodeum

usually present. Propodeal spiracle round or slightly elongate. Areolet present, front side truncate or pointed. 2m-cu with two closely spaced bullae or with one that is 0.5 to 1.0 times as long as the section of 2m-cu behind bulla. First tergum evenly and strongly tapered toward base. Apical portion of metasoma weakly to strongly compressed. Ovipositor sheath approximately 0.6 times as long as hind tibia. Subapical portion of ovipositor with a dorsal notch.

### Key to species of the genus *Cryptopimpla* known from China

- 1 Claws pectinate..... 2
- Claws simple..... 5
- 2 Areolet pentagonal, with 3-Rs distinctly present. Mesosoma, metasoma, hind coxa and femur entirely black. .... *C. benanensis* Sheng
- Areolet quadrilateral, 3-Rs lacking, or areolet very small and obliquely elongate. Body, at least mesosoma or metasoma, with yellow or white spots, or hind coxa and femur light-colour. .... 3
- 3 Areolet rather small, obliquely elongate. First tergum 2.5 times as long as apical width..... *C. taiwanensis* (Momoi)
- Areolet relatively big, not so obliquely elongate. First tergum usually short, not more than 2.0 times as long as apical width, or areolet petiolate ..... 4
- 4 Face with strong median carina (Fig. 2). Areolet petiolate. Face black with latero-median yellowish white spots. Median portion of flagellomeres white. Front and middle femora reddish brown, hind femur brownish black (Fig. 1). Basal and apical portions of tergum 1, apical portions of terga 2, 3, 7 and 8 white. .... *C. carinifacialis* Sheng, sp. n.
- Face slight convex, without median carina (Fig. 12). Areolet sessile. Face yellowish white, upper margin irregularly black. Flagellomeres without white band. All femora yellowish white (Fig. 11). Terga entirely black. .... *C. flavipedalis* Sheng, sp. n.
- 5 Face, mesosoma and all terga entirely black..... *C. brevis* Sheng
- Face yellow, or black with a light-coloured spot. Mesosoma with yellow spots. Median terga reddish brown, or apical margins of terga white or whitish yellow..... 6
- 6 Face black (Fig. 21), median sections of inner orbits more or less yellow. Median terga reddish brown (Fig. 20). .... *C. rufipedalis* Sheng, sp. n.
- Face yellow, or yellowish white with median longitudinal black band. Terga black, hind margins widely yellowish white..... 7
- 7 First tergum 1.6 times as long as apical width. Face white with median longitudinal black band (Fig. 17). Flagellomeres 10 to 16 white. Scutellum yellowish white. .... *C. maculifacialis* Sheng, sp. n.
- First tergum 1.8 to 1.9 times as long as apical width. Face yellow (Fig. 7). Median to subapical portion of flagellomeres yellowish brown. Scutellum black. .... *C. flavifacialis* Sheng, sp. n.

***Cryptopimpla carinifacialis* Sheng, sp. n.**

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[http://species-id.net/wiki/Cryptopimpla\\_carinifacialis](http://species-id.net/wiki/Cryptopimpla_carinifacialis)

Figures 1–5

**Etymology.** The name of the new species is based on the median longitudinal carina of the face.

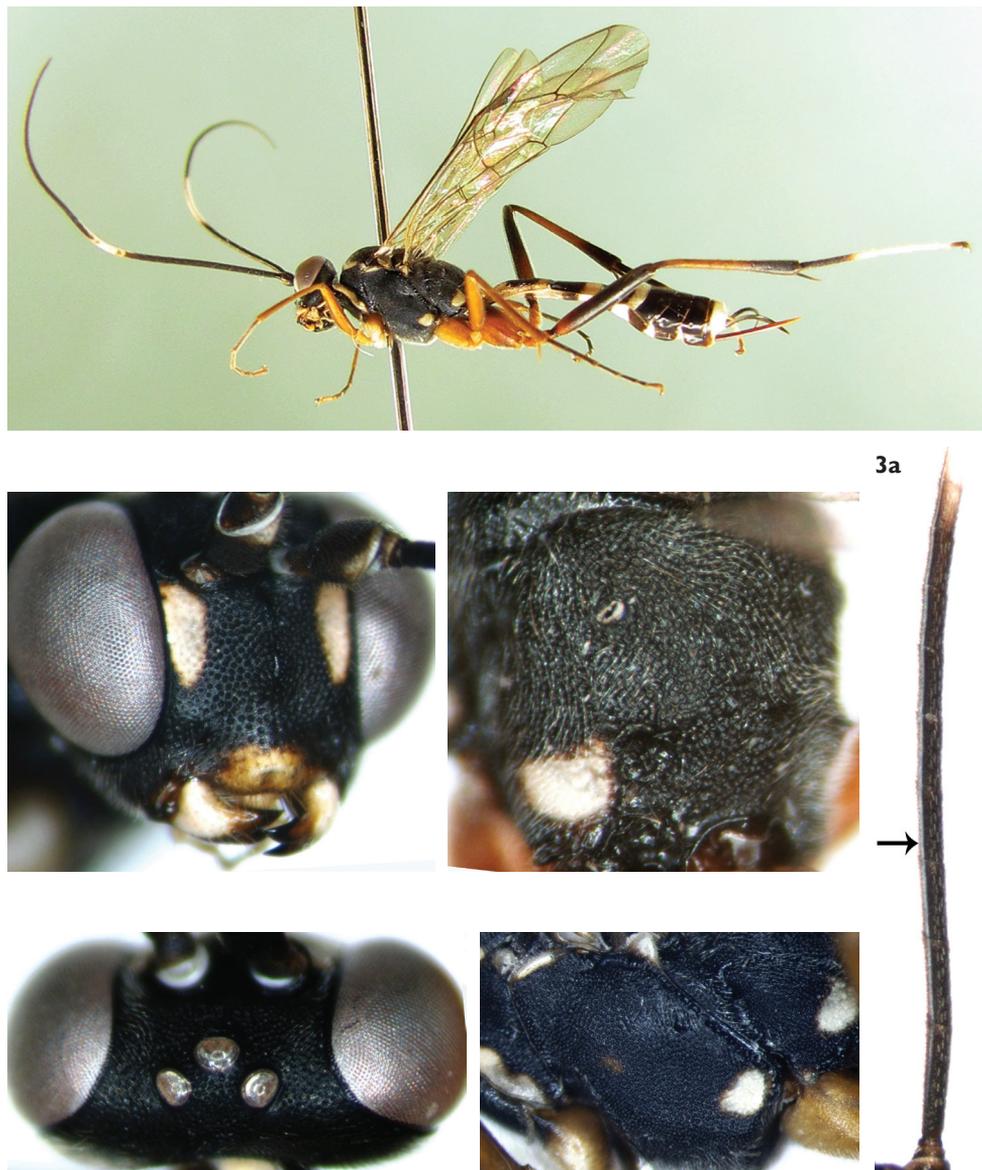
**Material examined.** *Holotype*: female, CHINA: Wuyishan Natural Reserve, 1200m, Qianshan County, Jiangxi Province, 11 July 2009, leg. Zhi-Ping Zhong.

**Diagnosis.** Median portion of face strongly convex, with distinct median longitudinal carina. Areolet petiolate. Scutellum and postscutellum with dense punctures. Claws pectinate. Hind wing vein 1/cu approximately 3.8 times as long as cu-a. First tergum approximately 2.5 times as long as apical width, slightly narrowed towards base. Ovipositor almost straight. Face black with latero-median yellowish white spots.

**Description.** Female. Body length about 10.0 mm. Fore wing length about 8.0 mm. Ovipositor sheath length about 2.0 mm.

**Head.** Inner margins of eyes parallel. Face and clypeus with fine leathery texture. Face (Fig. 2) approximately 1.38 times as wide as long, median portion strongly convex longitudinally, with distinct median longitudinal carina; upper-lateral portion longitudinally concave; medially with dense punctures, distance between punctures 0.1 to 0.2 times diameter of puncture; laterally with relatively sparse punctures, distance between punctures 0.5 to 1.0 times diameter of puncture. Clypeus approximately 2.2 times as wide as long, almost smooth, strongly convex, basal portion with sparse punctures, apical median portion slightly concave; apical margin thick and convex, with brown hairs. Mandible strong, subapical portion with sparse and shallow punctures. Teeth sharp, upper tooth distinctly longer than lower tooth. Malar space, gena, vertex and frons with fine leathery texture. Malar space approximately 0.55 times as long as basal width of mandible, with indistinct and fine punctures. Gena directly convergent posteriorly, with fine punctures, distance between punctures 0.2 to 2.0 times diameter of puncture, but gradually more densely punctate towards lower portion. Vertex (Fig. 3) with punctures slightly larger than that of gena, distance between punctures 0.5 to 2.5 times diameter of puncture. Interocellar area weakly convex. Postocellar line approximately as long as ocular-ocellar line. Frons almost flat, sublateral portion with dense and unclear punctures, distance between punctures 0.1 to 0.5 times diameter of puncture, almost contacting each other transversely. Lower-median portion with longitudinal wrinkles. Antenna with 47 flagellomeres, each segment longer than wide. Inner profile of basal half of flagella with a distinctive structure, a strong longitudinal carina (Fig. 3a). Ratio of length from first to fifth flagellomeres: 8.8:6.3:5.7:5.3:5.0. Occipital carina complete, lower end joining hypostomal carina slightly above base of mandible.

**Mesosoma.** Anterior margin of pronotum almost smooth, with indistinct punctures. Laterally concave with short transverse wrinkles. Upper-posterior portion with even and dense punctures, distance between punctures approximately 0.2 times diameter of puncture. Mesoscutum evenly convex, rough, with punctures denser than



**Figures 1–5.** *Cryptopimpla carinifacialis* sp. n. Holotype. Female **1** Body, lateral view **2** Face **3** Vertex **3a** Basal portion of flagellum **4** Mesopleuron **5** Propodeum.

on upper-posterior portion of pronotum. Without notaulus. Scutellum evenly convex, with punctures as mesoscutum. Postscutellum more convex, with dense and large punctures, larger than on scutellum, latero-anterior portion concave. Mesopleuron (Fig. 4) with dense punctures, distance between punctures 0.1 to 0.6 times diameter of puncture. Upper end of epicnemial carina reaching about lower 0.2 level of front margin of mesopleuron, distant from front margin of mesopleuron. Mesopleural fovea

round, deep. Without speculum. Metapleuron with denser and finer punctures than mesopleuron. Submetapleural carina complete, triangularly convex anteriorly. Without juxtacoxal carina. Wings brownish hyaline. Vein 1cu-a distal of 1/M, distance between them approximately 0.26 times length of 1cu-a. Areolet quadrate, petiolate, vein 3rs-m distinctly longer than 2rs-m, receiving vein 2m-cu approximately 0.8 distance from vein 2rs-m to 3rs-m. Vein 2-Cu slightly longer than 2cu-a. Hind wing vein 1/cu about 3.8 times as long as cu-a. Legs comparatively long. Ratio of length of hind tarsomeres 10.0:4.3:3.1:1.5:2.3. Claws densely pectinate. Propodeum (Fig. 5) evenly convex, rough, with dense and indistinct punctures. Median point and lateral portion at the place of apophysis of posterior transverse carina and apical section of pleural carina present. Propodeal spiracle elongate, approximately 2 times as long as maximum width.

**Metasoma.** First tergum approximately 2.5 times as long as apical width, slightly narrowed towards base, with distinct and dense punctures. Without median dorsal carina. Basal portion of dorsolateral carina, basal of spiracle, present. Spiracle very small, round, evidently before middle of tergum. Second tergum about 1.1 times as long as apical width, with dense punctures, distance between punctures 0.1 to 0.3 times diameter of puncture, but gradually finer and more sparsely punctate towards apical margin, basal margin with semicircular thyridium. Third tergum with finer punctures than second tergum, lateral and apical portion weakly, sparsely punctate. Fourth tergum slightly rough, indistinctly punctate. Following terga smooth, with more or less clear transverse lines. Ovipositor sheath approximately 0.55 times as long as hind tibia, approximately as long as first tergum. Ovipositor strongly compressed, almost straight.

**Color.** (Fig. 1). Black, except the following. White or yellowish white portions: ventral-apical portions of scape and pedicel, apical portion of flagellomere 9, flagellomeres 10 to 16, basal portion of 17, latero-median spots of face, main portion of clypeus, mandible except teeth, maxillary palpus, labial palpus except apical segment grayish brown, front margin and upper-posterior corner of pronotum, elongate spots on latero-anterior portion of mesoscutum, subalar ridge, scutellum except anterior-median portion, spots of posterior portions of mesopleuron and metapleuron, apical part of basitarsus 1, and 2 to 4 entirely, basal, lateral and apical portions of first tergum, posterior margins of terga 2 and 3 widely, 7 and 8 mainly. A small spot near front median portion of mesopleuron vaguely reddish brown. Front and middle coxae and trochanters, ventral profiles of hind coxae, yellowish brown. Front and middle femora, hind coxae, trochanters and base of femora reddish brown. Front and middle tibiae and basitarsus, about basal 0.7 of hind tibiae darkish brown. Stigma blackish brown. Veins brownish black.

**Remarks.** This new species can be easily distinguished from other species of this genus as the face has a distinct median longitudinal carina, the areolet is clearly petiolate, the first tergum is slightly narrowed towards the base and the inner profile of the basal half of the flagella has a particular structure, a strong longitudinal carina.

***Cryptopimpla flavifacialis* Sheng, sp. n.**

urn:lsid:zoobank.org:act:83E14931-95D2-4DF9-80F4-EE2DBBA88EF8

[http://species-id.net/wiki/Cryptopimpla\\_flavifacialis](http://species-id.net/wiki/Cryptopimpla_flavifacialis)

Figures 6–10

**Etymology.** The specific name is derived from the face being fulvous.

**Material examined.** *Holotype*: female, CHINA: Sanjiaotan, 335m, Quannan, Jiangxi Province, 24 March 2009, leg. Shi-Chang Li. *Paratypes*: 1 female, CHINA: Shuangjiang Forest Farm, 174m, Ji'an, Jiangxi Province, 9 April 2009, leg. Da-Lin Li; 1 female, CHINA: Laomaotu, 340m, Quannan, Jiangxi Province, 7 April 2009, leg. Shi-Chang Li.

**Diagnosis.** Face whitish yellow. Hind coxae brownish red entirely. Basal portion of lower margin of mandible with distinct semitransparent edge. Antenna with 33 flagellomeres. Mesosoma shining. Claws simple. Ovipositor strongly upcurved.

**Description.** Female. Body length 8.5 to 9.5 mm. Fore wing length 6.5 to 7.5 mm. Ovipositor sheath length 1.5 to 2.0 mm.

**Head.** Face (Fig. 7) approximately 1.4 times as wide as long, with even, dense and fine punctures, distance between punctures 0.2 to 0.5 times diameter of puncture, median portion slightly convex, upper margin medially concave, with small tubercle. Clypeus smooth, evenly convex, basal portion with sparse, fine punctures, apical portion almost impunctate; apical margin thick, convex, with relatively long hairs. Mandible strong, with weak, fine punctures, distance between punctures 0.5 to 1.0 times diameter of puncture. Basal portion of lower margin with semitransparent edge. Upper tooth slightly longer than lower tooth. Malar space 0.47 to 0.48 times as long as basal width of mandible, slightly coarse, with shallow, indistinct punctures. Gena with fine leathery texture and uneven, fine punctures, distance between punctures 0.2 to 2.5 times diameter of puncture. Vertex (Fig. 8) with texture as that of gena, intercellular area with dense punctures, distance between punctures less than 0.5 times diameter of puncture; Postocellar line 0.9 to 1.0 times as long as ocular-ocellar line. Frons almost flat, with relatively deep, dense punctures, lower portion near antennal socket smooth, impunctate. Antenna with 33 flagellomeres, each segment longer than wide; ratio of length from first to fifth flagellomeres: 2.0:1.8:1.7:1.6:1.5. Occipital carina complete, lower end joining hypostomal carina slightly above base of mandible.

**Mesosoma.** Mesosoma smooth, with dense punctures, distance between punctures less than diameter of puncture. Anterior margin of pronotum with elongate punctures; laterally concave with short longitudinal wrinkles. Notaulus unclear. Scutellum evidently convex, without lateral carina. Postscutellum transverse. Median portion of mesopleuron (Fig. 9) slightly convex. Upper end of epicnemial carina reaching level of lower third of hind margin of pronotum, comparatively far distant from front margin of mesopleuron. Without speculum. Metapleuron with punctures as mesopleuron. Front portion of submetapleural carina anteriorly convex. Wings brownish hyaline.



**Figures 6–10.** *Cryptopimpla flavifacialis* sp. n. Female **6** Body, lateral view **7** Face **8** Vertex **9** Mesopleuron **10** Propodeum.

Vein 1cu-a distal of 1/M, distance between them approximately 0.4 times length of 1cu-a. Areolet quadrate, vein 3rs-m distinctly longer than 2rs-m, receiving vein 2m-cu at 0.6 to 0.7 distance from vein 2rs-m to 3rs-m. Vein 2-Cu slightly longer than 2cu-a.

Hind wing vein 1/cu about 2 times as long as cu-a. Legs comparatively robust. Ratio of length of hind tarsomeres 6.2:3.8:1.9:1.0:1.4. Claws simple. Propodeum (Fig. 10) evenly convex, with punctures as on mesosoma. Pleural carina and median portion of posterior transverse carina present. Propodeal spiracle small, oval.

**Metasoma.** First to third terga with dense punctures, but slightly sparser than on mesosoma. First tergum 1.8 to 1.9 times as long as apical width, evenly narrowed towards base; median longitudinal portion nearly impunctate; lateral portion behind spiracle with fine longitudinal wrinkles. Spiracle convex, slightly before middle of tergum. Second tergum about as long as apical width. Thyridium almost semicircular. Basal width of third tergum slightly wider than apical width, 0.9 times as long as widest portion, latero-basally concave. Fourth tergum with very weak and fine punctures. Following terga indistinctly punctate. Ovipositor sheath approximately 0.7 to 0.8 times as long as hind tibia, 1.2 to 1.3 times as long as first tergum. Ovipositor strongly upcurved and compressed.

**Color.** (Fig. 6). Black, except the following. Median to subapical portion of flagellum yellowish brown. Ventral profile of scape and pedicel, face except upper-median margin with longitudinal dark groove and a small tubercle, malar space, frontal orbit, latero-anterior margin of mesoscutum, tegula, subalar ridge, ventral profiles and apices of front and middle coxae, ventral profiles of front and middle trochanters and femora, posterior margin of each tergum whitish yellow. Maxillary and labial palpi bright yellow with brown flecks. Legs reddish brown, basal portions of front and middle tibiae, apices of first to fourth front and middle tarsomeres, basal portion of hind tibia, first to fourth hind tarsomeres white. Hind coxa brownish red. Dorsal profile of hind trochanter, apex of hind femur, apical half of hind tibia and fifth tarsomere black to brownish black. Stigma and veins brownish black.

**Variation.** The specimen from Shuangjiang Forest Farm, Ji'an, Jiangxi Province, has the first tergum more or less and irregularly darkish red.

**Remarks.** Similar to *C. taiwanensis* (Momoi, 1968), but can be distinguished from the latter by the antenna with 33 flagellomeres, simple tarsal claws, first tergum 1.8 to 1.9 times as long as apical width, second tergum about as long as apical width, ovipositor strongly upcurved, first tergum except apical portion and terga 6 to 8 black, except hind margin narrowly whitish yellow. *Cryptopimpla taiwanensis*: antenna with 48 flagellomeres, tarsal claws strongly pectinate, first tergum about 2.5 times as long as apical width, second tergum about 1.3 times as long as apical width, ovipositor straight, basal portion of first tergum and terga 6 to 8 entirely, yellow.

***Cryptopimpla flavipedalis* Sheng, sp. n.**

urn:lsid:zoobank.org:act:63B65E54-E7EB-481B-8B2D-03A3EAF9A1CB

[http://species-id.net/wiki/Cryptopimpla\\_flavipedalis](http://species-id.net/wiki/Cryptopimpla_flavipedalis)

Figures 11–15

**Etymology.** The specific name is derived from the entirely yellow legs.

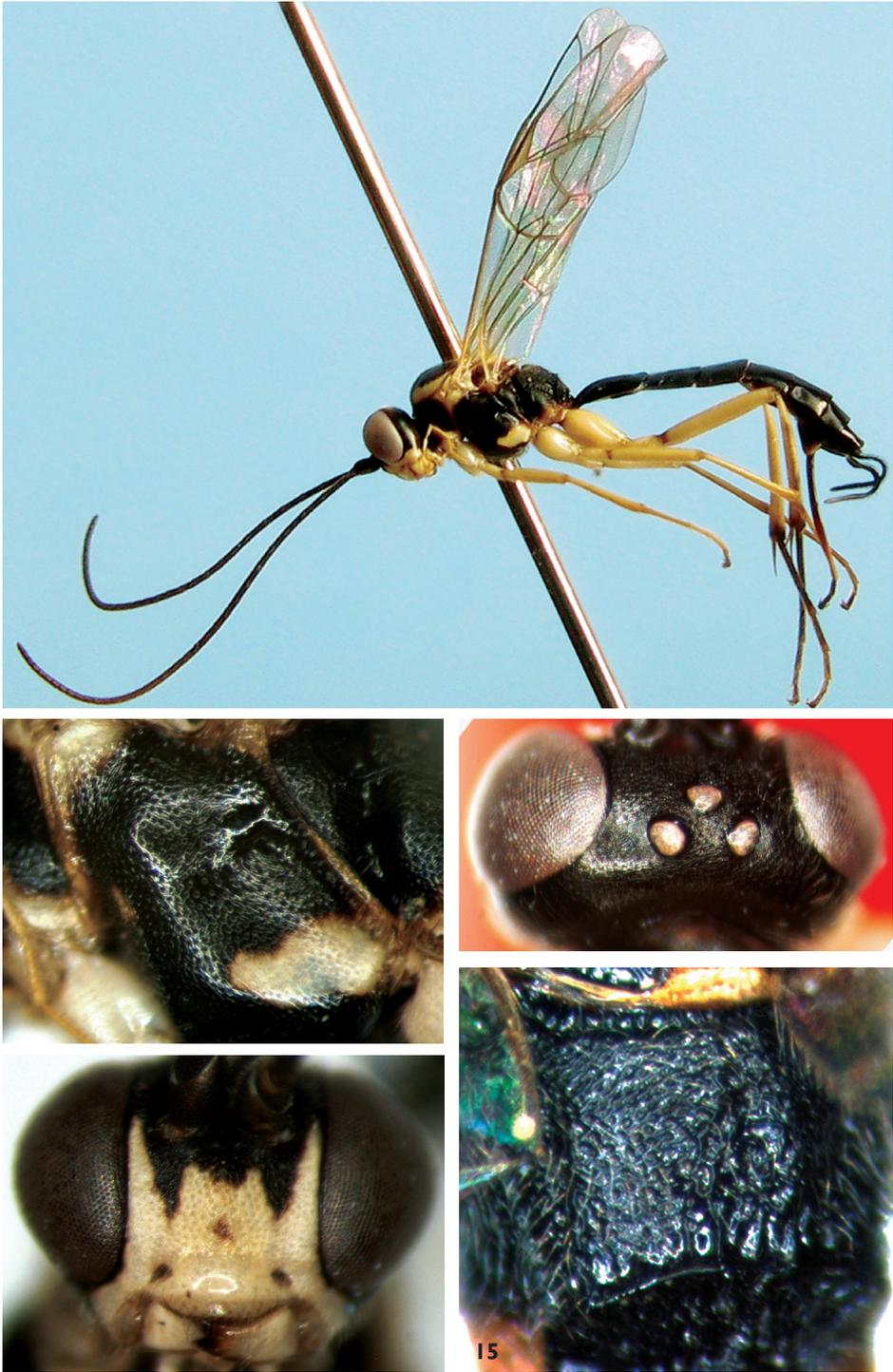
**Material examined.** *Holotype*: female, CHINA: Liupanshan, 1280m, Ningxia Hui Autonomous Region, 25 August 2005, leg. Mao-Ling Sheng.

**Diagnosis.** Gena with fine granular texture, almost impunctate. Mesosoma with fine leathery texture. Legs yellowish white, except apical portions of middle and hind tibiae and tarsi yellowish brown to darkish brown. Claws pectinate.

**Description.** Female. Body length about 7.2 mm. Fore wing length about 5.8 mm. Ovipositor sheath length about 1.7 mm.

**Head.** Face (Fig. 12) convex centrally, approximately 1.5 times as wide as long, with leathery texture and fine punctures, distance between punctures 0.3 to 1.5 times diameter of puncture; upper margin with weak median elongate tubercle. Clypeus smooth, median portion transversely convex, with sparse, fine punctures; apical margin weakly convex forward, with light brown hairs. Mandible relatively short and wide, with sparse, fine punctures, upper tooth slightly wider and longer than lower tooth. Cheek and gena with fine granular texture. Malar space approximately 0.5 times as long as basal width of mandible. Gena almost impunctate, slightly convergent posteriorly, in lateral view about 0.6 times as long as width of eye. Vertex (Fig. 13) with texture as that of gena, lateral portion between posterior ocellus and eye with fine punctures. Postero-ocellar line about 0.9 times as long as ocular-ocellar line. Upper and lateral portions of frons approximately flat, with distinct, dense, fine punctures; lower portion concave centrally, slightly rough, with dense, indistinct, fine punctures. Antenna relatively thin and long, with 32 flagellomeres, each segment longer than wide; ratio of length of flagellomere 1:2:3:4:5 is 6.3:4.7:4.3:4.2:3.8. Occipital carina complete and strong, joining hypostomal carina above base of mandible.

**Mesosoma.** With fine leathery texture. Lateral concave part of pronotum with weak, short transverse wrinkles; upper-posterior portion with weak, fine punctures, distance between punctures 0.5 to 2.0 times diameter of puncture. Mesoscutum evenly convex, with dense punctures, distance between punctures 0.2 to 1.0 times diameter of puncture; notauli very weak, vestigial on front portion of mesoscutum. Scutellum slightly convex, with very sparse, fine punctures; without lateral carina except lateroanterior corner. Postscutellum transverse, anterior portion concave, with short longitudinal wrinkles. Mesopleuron (Fig. 14) with even, fine punctures, distance between punctures 0.2 to 1.0 times diameter of puncture. Upper end of epicnemial carina almost reaching mid-height of front margin of mesopleuron, distant from front margin of mesopleuron. Speculum present, small. Mesopleural fovea deep. Metapleuron with texture as that of mesopleuron, but slightly coarser. Anterior portion of submetapleural carina convex, as a broad lobe, translucent. Wings hyaline. Fore wing vein 1cu-a distal of 1/M, distance between them about 0.4 times length of 1cu-a. Areolet obliquely quadrate, receiving vein 2m-cu approximately at apical 0.25. 2-Cu slightly longer than 2cu-a. Hind wing vein 1/cu about 3.0 times as long as cu-a. Legs comparatively gracile. Claws pectinate. Ratio of length of hind tarsomere 1:2:3:4:5 is 1.0:4.6:3.3:1.8:2.2. Length of hind claw approximately 1.7 times as long as largest width of hind tarsomere 5 in lateral view. Propodeum (Fig. 15) rough, with irregular short wrinkles. Posterior transverse carina complete and strong. Pleural carina and median portion of lateral longitudinal carina (between spiracle



**Figures 11–15.** *Cryptopimpla flavipedalis* sp. n. Female 11 Body, lateral view 12 Face 13 Vertex 14 Mesopleuron 15 Propodeum.

and posterior transverse carina) present. Petiolar area with flabelliform wrinkles. First and second lateral areas with indistinct punctures. Propodeal spiracle small, round.

**Metasoma.** Terga with dense punctures, but slightly finer than on mesosoma, posterior margins smooth. First tergum approximately 1.6 times as long as apical width, evenly narrowed towards base, with fine transverse lines. Median dorsal carina indistinct. Anterior portion of dorsolateral carina, before spiracle, strong; posterior portion weak. Spiracle convex, located slightly before middle of tergum. Second and following terga with leathery texture and fine transverse lines. Second tergum approximately 0.9 times as long as apical width. Thyridium oblique, basal margin reaching basal margin of second tergum. Third tergum approximately 0.75 times as long as apical width. Ovipositor sheath approximately 0.7 times as long as hind tibia, 1.3 times as long as first tergum. Ovipositor strongly compressed, weakly upcurved.

**Color.** (Fig. 11). Black, except the following. Apical portion of flagella slightly blackish brown. Ventral side of scape, apical margin of pedicel, face (except upper margin irregularly black), clypeus, mandible except teeth, cheek, maxillary and labial palpi (except apical segments slightly filemot), lower portion of anterior margin, posterior margin and upper-posterior corner of pronotum, lateral margin widely and two narrow longitudinal median strips of mesoscutum, tegula, scutellum, posterior margin of postscutellum, a small spot on lower-anterior portion and irregular transverse band on lower-posterior portion of mesopleuron, lower portion of metapleuron, front legs, coxae, trochanters and femora of middle and hind legs yellowish white. Apical portion of middle tibia and tarsomeres yellowish brown to dark brown. Ventral and dorsal sides of hind tibia yellow, lateral sides dark brown. Hind tarsomeres dark brown, apical portions of each tarsomere yellowish brown. Stigma yellow. Veins brownish black.

**Remarks.** This new species is similar to *C. helvicoxis* Chandra & Gupta, 1977, but can be distinguished from the latter by the following combination of characters: gena almost impunctate, hind wing vein 1-cu about 3.0 times as long as cu-a, posterior transverse carina complete and strong, hind coxae and femora yellow. *Cryptopimpla helvicoxis*: gena with dense, distinct punctures, hind wing vein 1-cu about 2.0 times as long as cu-a, posterior transverse carina interrupted or weak on either side of the middle, hind coxae and femora black.

***Cryptopimpla maculifacialis* Sheng, sp. n.**

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[http://species-id.net/wiki/Cryptopimpla\\_maculifacialis](http://species-id.net/wiki/Cryptopimpla_maculifacialis)

Figures 16–19

**Etymology.** The specific name is derived from the face, which has a dark fleck.

**Material examined.** *Holotype*: female, CHINA: Shuangjiang Forest Farm, Ji'an, Jiangxi Province, 15 June 2008, leg. Yi Kuang. *Paratypes*: 1 male, CHINA: Matubei, 320m, Quannan, Jiangxi Province, 6 May 2009, leg. Shi-Chang Li. 1 male, CHINA: Wokou, 320m, Quannan, Jiangxi Province, 13 May 2009, leg. Shi-Chang Li. 1 male, CHINA:

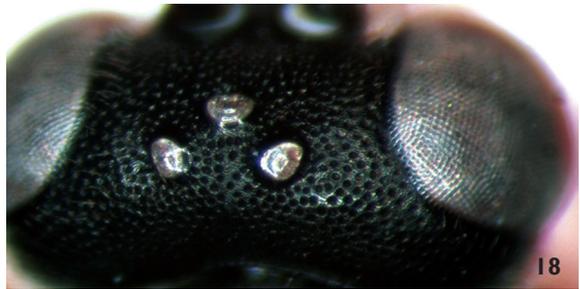
Citangbei, 378m, Quannan, Jiangxi Province, 27 May 2009, leg. Shi-Chang Li. 1 male, CHINA: Shuangjiang Forest Farm, Ji'an, Jiangxi Province, 1 June 2009, leg. Da-Lin Li.

**Diagnosis.** Mesosoma with fine leathery texture. Ovipositor sheath shorter than first tergum. Face white with median longitudinal black band. Flagellomeres 10 to 16 white. Scutellum yellowish white. Basal-median portion of first tergum white to yellowish white.

**Description.** Female. Body length about 8.3 mm. Fore wing length about 6.2 mm. Ovipositor sheath length about 1.6 mm.

**Head.** Face (Fig. 17) slightly convergent ventrally, approximately 1.7 times as wide as long, median portion evenly convex, with dense punctures, distance between punctures 0.1 to 0.3 times diameter of puncture; lateral portion with punctures almost contacting each other as transverse wrinkles, upper margin with small median tubercle. Clypeus approximately 2.2 times as wide as long, smooth, evenly convex, basal portion with sparse, fine punctures, apical portion almost impunctate; apical margin thick, convex, with relatively long hairs. Mandible strong, with weak, fine punctures, distance between punctures 0.5 to 2.0 times diameter of puncture. Upper tooth sharp, longer than lower tooth. Malar space, gena, vertex and frons with fine leathery texture. Malar space approximately 0.5 times as long as basal width of mandible, with indistinct punctures. Gena slightly convergent posteriorly, with distinct punctures, distance between punctures 0.2 to 1.5 times diameter of puncture. Vertex (Fig. 18) with punctures slightly denser than on gena. Interocellar area slightly convex. Postocellar line approximately 1.1 times as long as ocular-ocellar line. Frons almost flat, with dense punctures, distance between punctures 0.1 to 0.5 times diameter of puncture, almost contacting each other transversely. Upper median portion, below median ocellus, concave. Antenna with 34 flagellomeres, each flagellomere longer than wide; ratio of length from first to fifth flagellomeres: 6.4:4.4:4.2:4.0:3.7. Occipital carina complete, lower end joining hypostomal carina above base of mandible.

**Mesosoma.** Mesosoma with fine leathery texture. Anterior margin of pronotum with elongate punctures, lateral concavity with short transverse wrinkles, posterior portion with dense punctures, distance between punctures 0.2 to 0.5 times diameter of puncture. Mesoscutum evenly convex, with punctures as on posterior portion of pronotum. Without notaulus. Scutellum slightly convex, with sparse, shallow, irregular punctures, distance between punctures 0.2 to 3.0 times diameter of puncture, without lateral carina. Postscutellum transverse, with weak punctures, anterior portion with transverse concavity and deep lateral pit. Mesopleuron (Fig. 19) with dense punctures, distance between punctures 0.2 to 1.0 times diameter of puncture. Upper end of epicnemial carina reaching level of lower third of front margin of mesopleuron, distant from front margin of mesopleuron. Mesopleural fovea deep. Without speculum. Metapleuron with denser, finer punctures than mesopleuron. Front portion of submetapleuron carina convex, as a broad lobe. Without juxtacoxal carina. Wings brownish hyaline. Vein 1cu-a distal of 1/M, distance between them approximately 0.4 times length of 1cu-a. Areolet quadrate, vein 3rs-m distinctly longer than 2rs-m, receiving vein 2m-cu approximately at 0.7 distance from vein 2rs-m to 3rs-m. Vein 2-Cu slightly longer than 2cu-a. Hind wing vein 1/cu about 2 times as long as cu-a. Legs comparatively robust. Ratio of length of hind tarsomeres 10.0:4.6:3.2:1.7:2.1. Claws simple.



**Figures 16–19.** *Cryptopimpla maculifacialis* sp. n. Female **16** Body, lateral view **17** Face **18** Vertex **19** Mesopleuron.

Propodeum evenly convex, with dense, fine, indistinct punctures. Posterior transverse carina complete and strong. Pleural carina weak. Propodeal spiracle almost round.

**Metasoma.** First tergum approximately 1.6 times as long as apical width, evenly narrowed towards base, rough, with dense, indistinct punctures, lateral portion with short longitudinal wrinkles, median dorsal carina indistinct, basal portion of dorso-lateral carina present, spiracle small, weakly convex, slightly before middle of tergum. Second tergum about 0.9 times as long as apical width, with dense punctures, distance between punctures 0.1 to 0.5 times diameter of puncture, apical margin narrowly smooth, basal margin with transverse thyridium, spiracle distinctly convex. Third tergum with finer punctures than second tergum. Fourth tergum almost smooth, indistinctly punctate. Following terga smooth, with more or less clear fine transverse lines. Ovipositor sheath approximately 0.5 times as long as hind tibia, 0.9 times as long as first tergum. Ovipositor evenly upcurved and compressed.

**Color.** (Fig. 16). Black, except the following. White portions: ventral profile of scape and pedicel, flagellomeres 10 to 16 and apical portion of 9, face except upper narrow margin and median longitudinal band and short elongate spot below antennal socket, clypeus except apical half yellowish brown, mandible except teeth, maxillary palpus except apical 2 segments yellowish brown, labial palpus except apical segment yellowish brown, upper-posterior corner of pronotum, elongate spot on latero-anterior portion of mesoscutum, subalar ridge, scutellum, ventral profile of front coxa and trochanter, ventral profile of middle coxa, basal-median portion of tergum 1, apical bands of terga 1 to 3, narrow apical margins of terga 4 to 7. Legs reddish brown. Basal-ventral sides of front and middle femora, dorsal sides of basal portions of front and middle tibiae, basal portion of hind tibia and tarsomeres 1 to 4 white. Apex of hind coxa, hind trochantellus, apical portion of hind femur, apical half of hind tibia, and hind tarsomere 5 black. Stigma dark brown. Veins brownish black.

**Male.** Body length 8.5 to 8.8 mm. Fore wing length 6.3 to 6.5 mm. Antenna with 33 to 34 flagellomeres. Face yellow with irregular transverse black band to almost entirely black.

**Variation.** The face of one male specimen is almost entirely black, with only very narrow sublateral yellow lines. Tergum 1 of male with basal and apical portions white to unevenly brownish yellow with two small longitudinal black spots.

**Remarks.** Similar to *C. flavifacialis* Sheng, but can be distinguished from the latter in having the first tergum approximately 1.6 times as long as apical width, mesosoma with fine leathery texture, metapleuron with denser and finer punctures than mesopleuron, face white with median longitudinal black band, flagellomeres 10 to 16 white, scutellum yellowish white, basal median portion of tergum 1 white to yellowish white. *Cryptopimpla flavifacialis*: first tergum 1.8 to 1.9 times as long as apical width, mesosoma with smooth texture, metapleuron with punctures as on mesopleuron, face yellow, without median longitudinal black band, median to subapical portion of flagella yellowish brown, without white portion, scutellum black, basal portion of tergum 1 black.

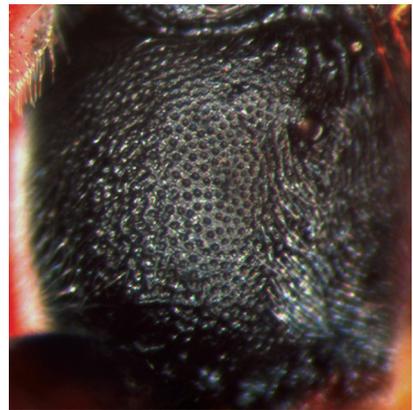
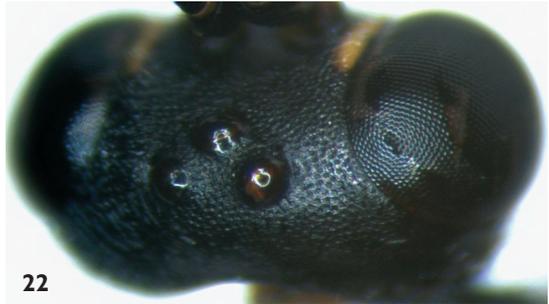
***Cryptopimpla rufipedalis* Sheng, sp. n.**

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[http://species-id.net/wiki/Cryptopimpla\\_rufipedalis](http://species-id.net/wiki/Cryptopimpla_rufipedalis)

Figures 20–24

*Cryptopimpla helvetica* Brauns, 1901: Sheng, Acta Zootaxomica Sinica, 2005, 30:417.**Etymology.** The name of the new species is based on the leg being brownish red.**Material examined.** *Holotype*: female, CHINA: Baihe, Jilin Province, 14 July 2002, leg. D-J Hao.**Diagnosis.** Hind wing 1/cu approximately 4.7 times as long as cu-a. Posterior transverse carina of propodeum weakly present centrally. Face black, median portion of inner orbit yellow; legs almost entirely brown. Apical portion of tergum 1, terga 2 to 3, basal portion of tergum 4 and subposterior margin of tergum 5 reddish brown. Stigma yellowish brown.**Description.** Female. Body length about 7.0 mm. Fore wing length about 5.8 mm. Ovipositor sheath length about 1.5 mm.**Head.** Head with fine leathery texture. Inner orbits parallel. Face (Fig. 21) approximately 1.45 times as wide as long. Median portion slightly convex, with weak, fine punctures, distance between punctures 0.2 to 1.0 times diameter of puncture. Upper margin with median concavity, without tubercle. Clypeus convex, 2.4 times as wide as long, basal portion with fine, indistinct punctures, apically almost smooth, apical margin thick, evenly convex. Mandible strong, with weak, fine punctures, upper tooth longer than lower tooth. Malar space approximately 0.6 times as long as basal width of mandible, with fine punctures. Gena slightly convergent backwardly, with distinct punctures, distance between punctures 0.2 to 1.0 times diameter of puncture on lower portion, 0.2 to 3.0 times on upper portion. Vertex (Fig. 22) almost smooth, with distinct punctures, distance between punctures 0.2 to 1.5 times diameter of puncture. Interocellar area slightly convex. Postocellar line 0.8 times as long as ocular-ocellar line. Frons almost flat, with texture as that of face. Antenna with 34 flagellomeres, each of them longer than wide, ratio of length from first to fifth flagellomeres: 1.5:1.2:1.0:0.9:0.8. Occipital carina complete.**Mesosoma.** With fine, unclear leathery texture. Pronotum with distinct punctures, distance between punctures 0.2 to 0.5 times diameter of puncture, upper half of lateral concavity with indistinct, short transverse wrinkles. Mesoscutum correspondingly convex, with punctures as on pronotum, but median portion of median lobe comparatively finely and indistinctly punctate. Without notaulus. Scutellum evidently convex, with punctures as on lateral lobe of mesoscutum. Postscutellum transverse, with indistinct punctures, latero-anterior portion with small deep fovea. Mesopleuron (Fig. 23) with dense punctures, distance between punctures 0.1 to 1.5 times diameter of puncture. Upper end of epicnemial carina reaching level of lower third of front margin of mesopleuron, distant from front margin. Without speculum. Metapleuron with finer and denser punctures than mesopleuron, distance between punctures 0.1



**Figures 20–24.** *Cryptopimpla rufipedalis* sp. n. Holotype. Female **20** Body, lateral view **21** Face **22** Vertex **23** Mesopleuron **24** Propodeum.

to 0.5 times diameter of puncture. Without Juxtacoxal carina. Submetapleural carina complete, anterior portion strongly convex as a broad lobe. Wings gray-brownish hyaline. Vein 1cu-a distal of 1/M, distance between them 0.3 times 1cu-a. Areolet slanting quadrate. Vein 3rs-m distinctly longer than 2rs-m. 2m-cu slightly basal of lower-outer corner of areolet. Vein 2-Cu slightly longer than 2cu-a. Hind wing vein 1/cu about 4.7 times as long as cu-a. Legs comparatively long. Ratio of length of hind tarsomeres 10.0:4.0:3.0:2.0:2.5. Claws simple. Propodeum (Fig. 24) evenly convex, with punctures as on metapleuron, pleural and median portion of posterior transverse carinae present. Propodeal spiracle almost round.

**Metasoma.** Terga with fine leathery texture. First tergum approximately 1.8 times as long as apical width, evenly narrowed toward base, convex longitudinally, anterior portion of postpetiole, near spiracle, with dense punctures, posterior portion sparsely punctate, median portion of posterior margin smooth. Without median dorsal carina. Basal and apical portions of dorsolateral carina present. Spiracle small, round, convex, located at basal 0.35 of first tergum. Second tergum approximately as long as apical width, with fine, irregular, indistinct punctures, apical margin almost smooth, thyridium indistinct. Third tergum approximately 0.9 times as long as apical width, lateral margins almost parallel, with texture as second tergum but punctures comparatively finer, sparser than second tergum. Ovipositor sheath approximately 0.6 times as long as hind tibia, as long as first tergum. Ovipositor evenly upcurved and compressed.

**Color.** (Fig. 20). Black, except the following. Apical portion of pedicel slightly taupe. Apical portion of flagella brownish black. Apical half of clypeus and base of mandible reddish brown. Median portion of inner orbit, anterior margin and upper-posterior corner of pronotum, triangular spot on latero-anterior margin of mesoscutum, tegula, transverse spot on subalar ridge, dorsal profiles of front and middle coxae yellow. Maxillary and labial palpi dust-coloured. Legs reddish brown. Basal portions of ventral profiles of coxae and dorsal profiles of trochanters more or less black. Apical portion of tergum 1, terga 2 and 3, basal portion of tergum 4 and subposterior margin of tergum 5 reddish brown. Stigma yellow. Veins dark brown.

**Remarks.** This new species is similar to *C. helvetica* but can be distinguished from the latter by the following combination of characters. Ovipositor sheath about 0.6 times as long as the length of hind tibia. Ovipositor curved upwardly. Second tergum with dense and distinct punctures. 1/cu straight, approximately 4.7 times as long as cu-a. Median portion of posterior transverse carina of propodeum weakly present. Face black, inner orbits yellow. Ventral sides of fore and mid coxae reddish brown, dorsal sides yellow. Anterior margin of pronotum and latero-anterior portion of mesonotum yellow. *Cryptopimpla helvetica*: ovipositor sheath approximately 0.9 times as long as the length of hind tibia. Ovipositor straight. Second tergum with sparse and indistinct punctures. 1/cu bowing inward, approximately 3.5 times as long as cu-a. Posterior transverse carina of propodeum complete and strong. Inner orbits and face entirely black. Fore and mid coxae black or brownish black. Pronotum and mesonotum entirely black.

***Cryptopimpla brevis* Sheng, 2005**

*Cryptopimpla brevis* Sheng, 2005. Acta Zootaxomica Sinica, 30:415.

**Specimens examined.** 1 female, CHINA: Huhehaote, Inner Mongolia, 29 August 1995, Mao-Ling Sheng.

***Cryptopimpla henanensis* Sheng, 2005**

*Cryptopimpla henanensis* Sheng, 2005. Acta Zootaxomica Sinica, 30:416.

**Specimens examined.** 1 female, CHINA: Laojieling Natural Reserve, 1350 m, Henan Province, 17 July 1998, Mao-Ling Sheng. 3 females, CHINA: Baiyuanshan Natural Reserve, 1400m, Henan Province, 24 to 25 July 2003, Ji-Xing Fan, Wen-Jun Wang. 2 females 5 males, CHINA: Liupanshan, 1820m, Ningxia Hui Autonomous Region, 4 to 18 August 2005, Mao-Ling Sheng. 1 female, CHINA: Taibai Mt. 1600–1800m, Shanxi Province, 7 July 2007, Xi Zhu. 1 female, CHINA: Beishan Forest Farm, Huzhu, Qinghai Province, 2366m, 20 July 2010, Mao-Ling Sheng.

***Cryptopimpla taiwanensis* (Momoi, 1968)**

*Fintona taiwanensis* Momoi, 1968. Kontyu, 36(2):187.

Specimens not examined.

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# Taxonomic notes on the small resin bees *Hypanthidioides* subgenus *Michanthidium* (Hymenoptera, Megachilidae)

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## Abstract

As part of ongoing investigations on anthidiine bees, the type of *Anthidium albitarse* Friese was found to be conspecific with one of the two species of the small resin bees *Hypanthidioides* subgenus *Michanthidium*. The new combination, *H. (Michanthidium) albitarsis*, is the oldest name, resulting in *Gnathanthidium sakagami* Urban as a new junior synonym. The previously unknown male of the second species, *H. ferrugineus*, is described and figured, including the genitalic structure and associated sterna. Males and females of *H. ferrugineus* have been collected from flowers of *Cuphea* sp. (Lythraceae).

## Keywords

Apoidea, Anthidiini, Anthophila, South America, taxonomy

## Introduction

The Neotropical anthidiine bee genus *Hypanthidioides* Moure (*sensu* Michener 2007) contains 51 species grouped into 10 subgenera (Michener 2007; Ascher and Pickering 2011) that are treated at the generic level in the classification of Urban and Moure (2007). Some subgenera are monotypic or contain a few species (Table 1) with unusual characters related to adaptations for pollen collecting (e.g., modified hairs on the mouthparts) or secondary sexual characters (e.g., spines on the hind coxa of the male). In the absence of a phylogenetic analysis it seems preferable to show their relationship by placing them within an inclu-

**Table 1.** Subgenera of *Hypanthidioides sensu* Michener (2007). Number of species according to Urban and Moure (2007).

Subgenus	Number of included species
<i>Anthidium</i> Michener	7
<i>Ctenanthidium</i> Urban	4
<i>Dichanthidium</i> Moure	1
<i>Dicranthidium</i> Moure	8
<i>Hypanthidioides</i> Moure	1
<i>Larocanthidium</i> Urban	10
<i>Michanthidium</i> Urban	2
<i>Mielkeanthidium</i> Urban	3
<i>Moureanthidium</i> Urban	6
<i>Saranthidium</i> Moure and Hurd	9

sive taxonomic category, such as *Hypanthidioides*, rather than separating them in multiple genera. If future studies show that *Hypanthidioides sensu lato* constitutes a monophyletic group or users decide to continue to follow Michener's classification, a few homonyms created by such a change need to be corrected, as indicated by Ascher and Pickering (2011).

*Hypanthidioides s.l.* is easily recognized by its small (length 5–9 mm) and usually slender body, the presence of juxtantennal carinae, and the absence of a preoccipital carina in both sexes. Little is known about the biology of these bees. The nests, only known for two species, one each in the subgenera *Dicranthidium* and *Hypanthidioides s. str.*, are made of resins and are built inside empty cavities or entirely exposed, attached to stems or twigs (Schrottky 1902; Laroca and Rosado-Neto 1975). Although floral relationships are largely unknown in *Hypanthidioides*, the presence of curved or hooked hairs on the labiomaxillary complex in species of the subgenera *Michanthidium* and *Larocanthidium* suggest a special floral relationship (Michener 2007). Similar modified hairs occur in other unrelated bees and are used to extract pollen from tubular flowers with hidden anthers, such as those in the plant families Boraginaceae and Verbenaceae (e.g., Thorp 2000).

As part of a revision of *Anthidium* Fabricius, we examined the type of *Anthidium albitarse* Friese, 1917. The male specimen is labeled San Jose, Costa Rica, and agrees with the original description of Friese (1917). It proved not to be a species of *Anthidium*, but rather to belong to *Hypanthidioides* subgenus *Michanthidium* (Figs. 1–5). *Michanthidium* was described by Urban (1993) as *Gnathanthidium*, a name she subsequently replaced to avoid the junior homonymy with the African *Gnathanthidium* Pasteels (Urban 1995). The two species currently known in *Michanthidium*, *H. sakagami* (Urban) and *H. ferrugineus* (Urban), occur in southern Brazil and northern Argentina; the latter is known only from the female. Here we present the taxonomic changes to *Hypanthidioides (Michanthidium)* resulting from the inclusion of *Anthidium albitarse*, and describe for the first time the male of *H. ferrugineus*. Morphological terminology follows that of Michener (2007). The abbreviations S and T are used for metasomal sterna and terga, respectively. Institutional acronyms used herein are: **BBSL**, U.S. National Pollinating Insects Collection, Bee Biology and Systematics Laboratory, Utah State University, Logan, UT; **DZUP**, Departamento de Zoologia, Universidade Federal do Paraná,

Brazil; **FSCA**, Florida State Collection of Arthropods, Florida State University, Gainesville, USA, and **ZMB**, Museum für Naturkunde, Humboldt-Universität zu Berlin, Berlin, Germany. Photomicrographs were taken using a Keyence® VHX-500F Digital Imaging System.

## Systematics

### Genus *Hypanthidioides* Moure

#### Subgenus *Michanthidium* Urban

<http://species-id.net/wiki/Michanthidium>

*Gnathanthidium* Urban, 1993 [1992]: 337 (not Pasteels, 1969: 92). Type species: *Gnathanthidium sakagamii* Urban, 1992 [= *Anthidium albitarse* Friese, 1917]  
*Michanthidium* Urban, 1995 [1994]: 281. *Nomen novum pro Gnathanthidium* Urban, 1993.

**Comments.** *Michanthidium* is most similar to the subgenus *Larocanthidium*, from which it can be separated by the following characters: female mandible without distinct carinae on outer surface, without a strong basal tooth separated from mandibular margin by a deep emargination; male T6 without distal margin expanded, elevated, or bilobed medially. In the key to the subgenera of *Hypanthidioides* (Michener 2007), the presence of a hind coxal spine in the male is one of the characters that separates *Michanthidium* from *Larocanthidium*. However, this spine is not present in the male of *H. ferrugineus* and therefore should be removed from the key.

#### *Hypanthidioides (Michanthidium) albitarsis* (Friese, 1917), **comb. n.**

[http://species-id.net/wiki/Hypanthidioides\\_\(Michanthidium\)\\_albitarsis](http://species-id.net/wiki/Hypanthidioides_(Michanthidium)_albitarsis)

Figs 1–5

*Anthidium albitarse* Friese, 1917: 345 (Holotype: ZMB; ♂, San José, Costa Rica)

*Gnathanthidium sakagamii* Urban, 1993 [1992]: 339 (Holotype: DUZP; ♂, Foz do Iguaçu, Parana, Brazil), new junior synonym

**Diagnosis.** *Hypanthidioides albitarsis* differs from *H. ferrugineus* in the finer punctures on the scutum, scutellum and terga (Figs 4 and 5). The female can be further recognized by the absence of a median spine on the preapical carina of T6. Additional characters that distinguish the male include: hind coxa with midapical spine (Fig. 3), S2–S4 with incomplete, poorly developed premarginal hair bands, T6 with small sub-lateral spine (barely visible in Fig. 5), and T7 without median spine (Fig. 5).

**Comments.** *Michanthidium* is currently known from southern South America; the holotype of *H. albitarsis*, if from Costa Rica, would considerably extend its geographi-



**Figures 1–5.** Male holotype of *Anthidium albitarse* Friese **1** lateral habitus **2** facial view **3** hind coxa with arrow pointing to small spine **4** T2 to T4 **5** T6 and T7 with arrow pointing to small sublateral spine of T6.

cal distribution. Such an expansion is possible considering that other bee genera, such as *Duckeanthidium* Moure and Michener, previously thought to be restricted to South America, have been recently found in Central America (Michener 2002). Alternatively, it might represent a mislabeled specimen because other examples of inaccurate locality labels on specimens in the Friese collection exist. For example, *Dasycolletes ventralis* Friese (now in the colletid genus *Leioproctus* Smith) is a South American species described by Friese from Sydney, Australia (Michener 2007: 154). Further support for mislabeling comes from the absence of *Michanthidium* in more than 38,000 specimens of bees from Costa Rica that we have examined.

**Distribution.** *Hypanthidioides albitarsis* is known from southern Brazil and adjacent Argentina Urban (1993). Additional records are from the departments of Iguazú, Veinticinco de Mayo, and Candelaria in the Province of Misiones, Argentina (see below).

**Material examined.** ( $n = 12♀, 8♂$ )  $10♀, 7♂$ ; ARGENTINA: Misiones, Cataratas del Iguazú, 5.9.XI.1970, C. Porter, L. A. Stange; remaining specimens also from Misiones but from the following localities:  $1♀$ , Loreto, A. A. Oglobin;  $1♀$ , Dos de Mayo, 12.73, Fritz;  $1♂$ , San Javier, 20.XI.1973, Willink-Tomsoc (BBSL, FSCA).

### *Hypanthidioides (Michanthidium) ferrugineus* (Urban, 1993)

[http://species-id.net/wiki/Hypanthidioides\\_\(Michanthidium\)\\_ferrugineus](http://species-id.net/wiki/Hypanthidioides_(Michanthidium)_ferrugineus)

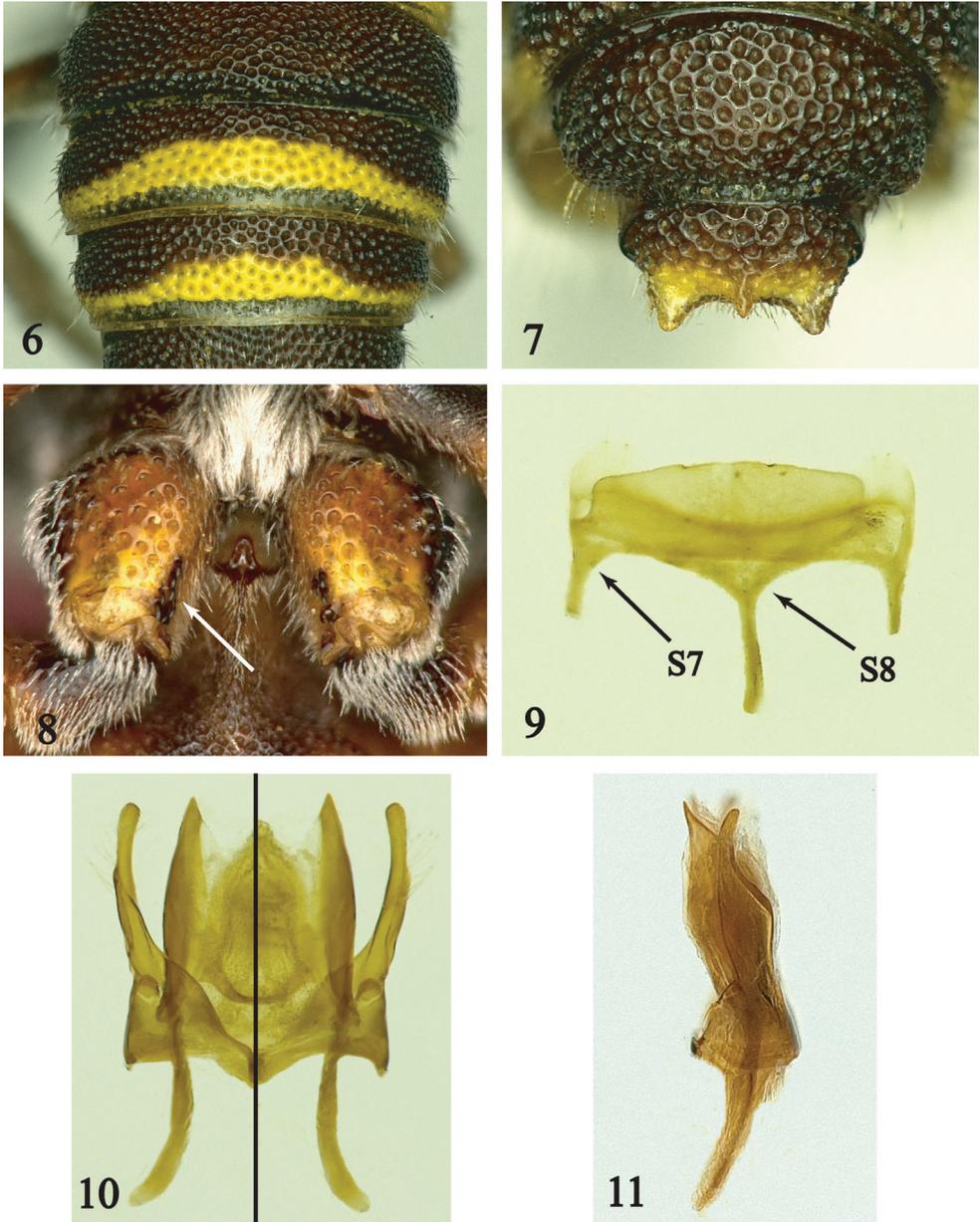
Figs 6–11

*Gnathanthidium ferrugineum* Urban, 1993 [1992]: 342 (Holotype: DUZP; ♀, San Pedro Colalao, Tucuman, Argentina)

**Diagnosis.** This species can be easily separated from *H. albitarsis* by the coarser punctures on the scutum, scutellum and terga (compare Figs 4 and 6), small median spine on the preapical carina of female T6, and the following characters in the male: T6 without small sublateral spines, T7 with acute lateral and median spines (Fig. 7), hind coxa without midapical spine, with a short row of black, thick short hairs on median margin (Fig. 8), and S2–S4 with complete, well-developed premarginal hair bands.

**Description.** Male: Body length, 8.2 mm; forewing length, 5.5 mm. *Structure.* Hind coxa ventrally without apical spine on median margin; hind trochanter carinate medially. T6 without sublateral spines or protuberances; T7 with acute lateral and median spines (Fig. 7); S5 and S6 each with small lateral spine; S7, S8 and genital capsule as in Figs 9–11.

Head ferruginous including antennal scape and pedicel except: dark reddish brown on mandible, inferior gena and distal flagellomeres; black on labrum, ocellar and torular areas; yellow on clypeus and inferior paraocular area. Mesosoma black except: ferruginous on tegula and legs excluding coxae (trochanters and femora variably darkened); yellow on pronotal lobe, tegula anteriorly, scutum on anterior and lateral margins, axilla, scutellum on distal margin, coxae. Metasoma dark reddish brown, lighter on sterna except T1, T3, T5, T7 and S2–S4 each with complete yellow band, remain-



**Figures 6–11.** Male of *Hypanthidioides (Michanthidium) ferrugineus* Urban **6** T2 to T4 **7** T6 and T7 **8** hind coxa with arrow pointing to modified hairs **9** ventral view of S7 and S8 **10, 11** genitalia in dorsal (left half), ventral (right half), and lateral views.

ing terga maculate laterally. Wings brownish, darker on anterior margin including marginal cell; veins, stigma and prestigma dark brown.

Pubescence whitish except yellowish on inner surfaces of tarsi; hairs long, dense, distinctly plumose on paraocular area, pronotal lobe, mesepisternum and metepisternum ventrally, lateral surface of propodeum, inferior margin of fore femur, pre-marginal areas of S2–S4; hind coxa with distinct row of stout black hairs medially on ventral surface (Fig. 8).

Head and mesosoma including coxae, anterior surfaces of hind trochanter and femur coarsely punctate, punctures about one-fourth to one-third width of median ocellus except finely punctate on pronotum, omaulus, metepisternum, most of propodeum and remainder of legs; terga as coarsely punctate as scutum with wide, impunctate, translucent, apical margins on T1–T6.

**Material examined.** ( $n = 5\text{♀}$ ,  $8\text{♂}$ )  $5\text{♀}$ ,  $6\text{♂}$ ; ARGENTINA: Prov. Tucumán, Tacanas, 10-XII-1977, L. A. Stange. Flowers, *Cuphea* sp. [Lythraceae]; two other males with the same data but collected on November and December of 1968 (BBSL, FSCA).

**Comments.** Both males and females of this species have been collected on flowers of *Cuphea* sp. (Lythraceae).

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# A new remarkable subterranean beetle of the Rhodopes: *Paralovricia* gen. n. *beroni* sp. n. belonging to Lovriciina new subtribe (Coleoptera, Carabidae, Trechinae, Bembidiini)

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## Abstract

*Paralovricia* gen. n. *beroni* sp. n., belonging to the new subtribe Lovriciina, is described from two caves in the Western Rhodopes (Bulgaria): Kraypatnata peshtera, near Smilyan Village (Smolyan Municipality) and Snezhanka, near Peshtera Town (Peshtera Municipality). Three currently known genera, *Lovricia* Pretner, 1979, *Neolovricia* Lakota, Jalžić & Moravec, 2009 and *Paralovricia* gen. n. represent a monophyletic unit supported by important synapomorphies that allows to propose the establishment of the new subtribe Lovriciina, characterized by the following characters: last maxillary palpomeres very long and narrow, basal angles of pronotum without seta, elytra without discal setae, elytral umbilicate series of nine pores in which the main pores are the 2nd, 6th and 9th, apical recurrent striae absent and mesotibial apex expanded outward. Its systematic position within the subfamily Trechinae (sensu Lorenz 2005) is discussed and Lovriciina is placed near Anillina. Key to the genera of the subtribe is proposed. Distribution data and zoogeographical hypotheses are discussed.

**Keywords**

Coleoptera, Carabidae, new species, new genus, new subtribe, Lovricia, Neolovricia, Rhodopes, Bulgaria

**Introduction**

The genera *Lovricia* Pretner, 1979 and *Neolovricia* Lakota, Jalžić & Moravec, 2009 are sporadically and restrictedly distributed in Dinaric Alps. To date they contain three very rare species known only after few specimens. *Lovricia jalzici* Pretner, 1979 is presently known only for a single female specimen from cave Gospodska pećina in the vicinity of the village Cetina (Dinara Mt.); *L. aenigmatica* Lakota, Mlejnek & Jalžić, 2002, for one male and one female from an unnamed pit near the peak Sveti Jure on the Biokovo Mt., which recently received the name of Lovrićija Jama I (Bedek et al. 2006) and for another female from Lovrićija Jama II (Sveti Jure, Biokovo) (Lakota et al. 2009); *Neolovricia ozimeci* Lakota, Jalžić & Moravec, 2009, for one female from cave Špilja u Radinovicima, near Dedići, Rastovac on the massif of Biokovo.

The systematic position of *Lovricia*, and its related genus *Neolovricia*, remains controversial. Pretner (1979) placed *Lovricia* as an independent genus of uncertain position followed by Casale and Laneyrie (1982) who lists it at the end of the subfamily Trechinae among “the genera with uncertain taxonomic position” but probably related with Anillini. Lakota et al. (2002), within the description of *L. aenigmatica*, maintain the same approach, while in the later work concerning the description of the genus *Neolovricia* (Lakota et al. 2009), emphasize some probable relationships of these genera with Anillini (sensu Jeannel 1937). The allocation of a proper systematic position was hampered by the unknown male genital morphology. The only known male (of *L. aenigmatica*) was an immature specimen and its genitalia were damaged during the extraction (Lakota et al. 2002).

The discovery, by Petar Beron, Boyan Petrov and Pavel Stoev, in two different caves in the Rhodopes, of two specimens (male and female) of a new genus and new species clearly belonging to the same phyletic lineage (originally mentioned as “undefined blind carabid beetle” by Giachino and Guéorguiev 2006: 61) and as “Trechini gen. & sp. indet.” by Guéorguiev and Lobo (2006: 305), allows us to clarify the systematic position of this monophyletic complex.

**Material and methods**

The following acronyms have been used for depositories of material:

**NMNHs** National Museum of Natural History, Sofia, Bulgaria

**CGi** Collection Giachino, Torino, Italia.

The following acronyms have been used for the type material:

**HT** Holotype  
**PT** Paratype

The specimens, whose drawings of the habitus and genitalia were made, were previously included in Canada balsam. Genitalia were pinned beneath the specimens. The drawings were made by means of a camera lucida connected to a Leitz Dialux. Measurements in millimetres (mm).

For measurement uniformity it was decided to use the same methodology proposed by Sokolov et al. (2004), so measurements for various body parts are coded as follows:

**ABL** apparent body length, from clypeus to apex of elytra;  
**WH** head width, at the level of the first orbital setae;  
**W<sub>Pm</sub>** maximum width across pronotum;  
**W<sub>Pa</sub>** width across anterior angles of pronotum;  
**W<sub>Pp</sub>** width across posterior angles of pronotum;  
**LP** length of pronotum from base to apex along midline;  
**WE** maximum width of elytra;  
**LE** length of the elytra, from apex of scutellum to apex of left elytron.

Only ABL measurements are reported, the other measurements are given as 7 ratios.

General width: WH/W<sub>Pm</sub> and W<sub>Pm</sub>/We.

Body parts: W<sub>Pa</sub>/W<sub>Pp</sub>, W<sub>Pm</sub>/W<sub>Pp</sub>, W<sub>Pm</sub>/LP and WE/LE.

***Paralovricia* gen. n.**

urn:lsid:zoobank.org:act:AA3230A9-D4BC-45C8-BC8F-0CEF2688F108

<http://species-id.net/wiki/Paralovricia>

**Type species:** *Paralovricia beroni* sp. n.

**Diagnosis.** A genus closely related to *Lovricia* and *Neolovricia* by the shape of the penultimate maxillary palpomeres, narrow and elongate, by the hind angle of the pronotum lacking seta, and by mesotibiae distally expanded outwards. *Paralovricia* gen. n. differs from both *Lovricia* and *Neolovricia* by the less “aphaenopsian” body shape, with a more cordiform pronotum and elytra with more evident and finely denticulate shoulders. From *Lovricia*, the new genus differs by the shape of the penultimate maxillary palpomere not subtriangular and by mesotibiae furnished of spurs besides the inner angles. From *Neolovricia*, the new genus differs by the labium with a developed median tooth and by the different shape of the female gonocoxite.

**Description.** Body small (ABL = mm - 2.19), elongate, rather flattened, anophthalmous, pubescent, reddish-ferruginous, with palpi and last tarsomeres paler.

Head relatively large, clypeus separated from the frons by a transverse impression, with two pairs of long thin setae. Frontal furrows ending with round foveae impressed posteriorly, neck distinct; two supraorbital setae not reduced in length. Labrum transverse, with a slight emargination in the middle, bearing six setae. Mandibles slender with a simple apex. Maxillae strongly prominent, penultimate segments of maxillary palpi longer than broad, slightly clavate, terminal palpomeres protracted, needle-shaped and pointed. Mentum without a suture between labium and pre-basilar; labium with a large median tooth. Antennae moniliform. Surface fine, microreticulate, pubescence relatively dense, recumbent, as long as that of pronotum and elytra. Cephalic capsule covered by yellowish, recumbent, relatively long and sparse hairs.

Pronotum subcordiform, hardly explanate sides usually narrowed at posterior angles, with the maximum width at the anterior third. Anterior edge arcuate, with angles entirely rounded. Lateral margin hardly sinuated before rectangular posterior angles. Disc slightly convex, with longitudinal median furrow impressed. Basal transversal furrow deep and conspicuous. Surface with distinct puncturation and long, somewhat sparse, fine erected pubescence. Anterior sixth of their length with pair of marginal setae; basal setae lacking. Scutellum subtriangular.

Elytra longer than their combined width, rounded apically near the suture, wholly covering the abdomen, dorsoventrally slightly convex without a distinct marginal groove. Humeral angles rounded but evident; lateral margins with edges finely denticulate. Sculpture of elytra distinctly microreticulate consisting of wrinkled lines; striae missing; recurrent striola lacking. Elytral disc without discal setiferous punctures, with pubescence relatively dense, recumbent and long, not arranged in rows. Umbilicate series consisting in 9 setiferous pores, with 2<sup>nd</sup>, 6<sup>th</sup> and 9<sup>th</sup> ones bearing a long seta; a geminate pair is made by 5<sup>th</sup> and 6<sup>th</sup> pores, with the 5<sup>th</sup> placed after the 6<sup>th</sup> one.

Abdominal sterna smooth, with fine and sparse pubescence.

Legs relatively short. Femora robust. Protarsomeres not dilated in the male. Mesotibiae distally expanded outwards and fringed with dense bristles, inner angles with additional spurs. Metafemora smooth. Tarsal claws simple.

Aedeagus with the median lobe stout and poorly arcuate, with a simple narrowly and irregularly sub-squared apex. Basal bulb with the orifice greatly expanded dorsally and delimiting two subequal lateral lobes as in Anillini (Jeannel 1941). Left and right parameres similar to each other, long, widened at the base; narrow, elongated and strongly curved upwards at the apex. One large coaxial seta at the apex and a second one, small, ventral, in a preapical position. Inner sac with a median copulatory sclerite, clew-shaped with two dorsolateral branches.

Female genitalia with the gonocoxite separated from the subgonocoxite (fig. 11). The latter narrow and elongated, drop-like shaped, totally free from setae or thorns. Gonocoxite stocky, angular and slightly curved, not pointed at the apex; bearing 3 stocky ensiform setae on the external-proximal edge and a dorsal one at the internal edge. The apical part of the gonocoxite shows, at the inner edge, a sensorial dimple bearing two fine and short nematiform setae. Spermatheca (fig. 10) short and stocky, membranous, not sclerotized; spermathecal gland not found.

**Etymology.** *Paralovricia* (feminine in gender), combination of the Greek prefix “παρᾶ” (= near) and the genus name *Lovricia*.

***Paralovricia beroni* sp. n.**

urn:lsid:zoobank.org:act:FFDDD4DB-5B2E-4036-9DD2-C30C3A14A347

[http://species-id.net/wiki/Paralovricia\\_beroni](http://species-id.net/wiki/Paralovricia_beroni)

Figs 1-11

**Type locality:** Bulgaria, Western Rhodopes, Smolyan Municipality, near the village of Smilyan, Kraypatnata peshtera cave, 41.5123° N; 24.7600° E, 780 m.

**Type series.** HT ♂, Bulgaria, Western Rhodopes, Smolyan Municipality, near the village of Smilyan, Kraypatnata peshtera cave, 41.5123° N; 24.7600° E, 780 m, 11.VII.1997, Boyan Petrov leg. (NMNHS). PT: 1 ♀, Bulgaria, Western Rhodopes, Peshtera Municipality, near the town of Peshtera, Snezhanka cave, 42.0092° N; 24.2720° E, 860 m, 17.VI.2005, Petar Beron & Pavel Stoev leg. (CGi).

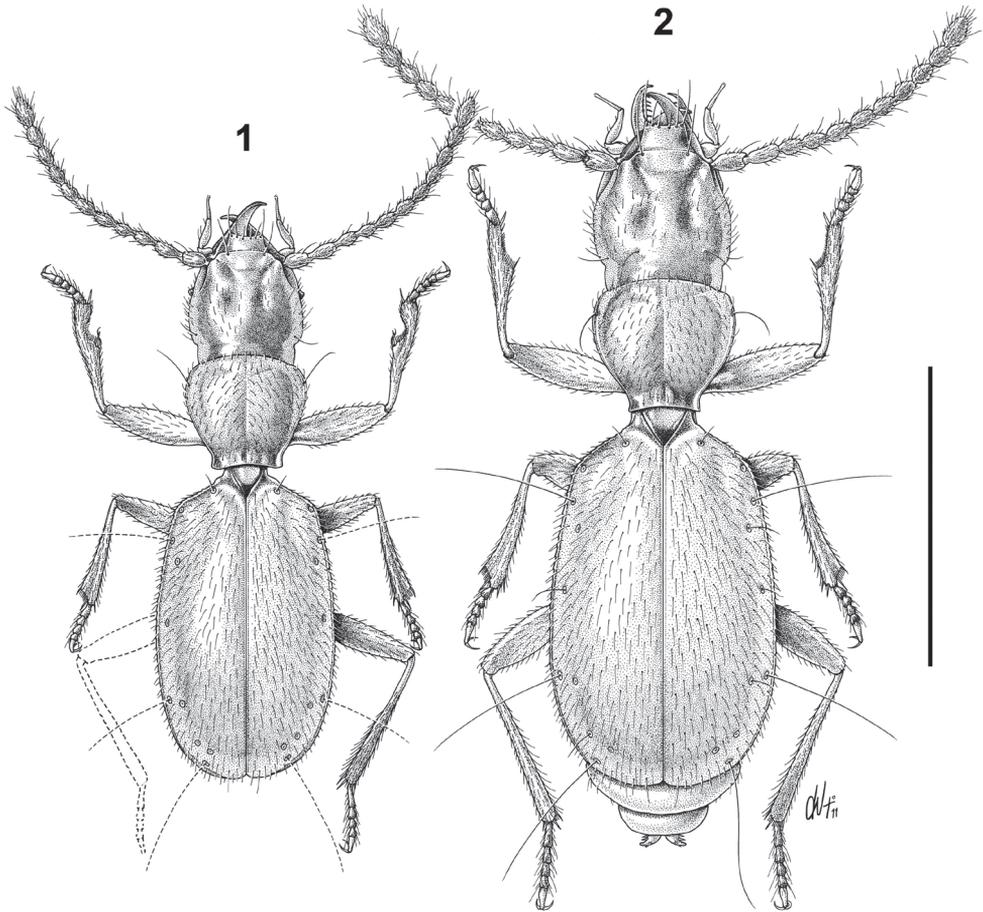
Note: Male HT was completely dismembered and lacking of abdominal sternites and left metathoracic leg. The drawing of the habitus of this specimen is therefore entirely reconstructed on the basis of individual anatomical parts that are included now in Canada Balsam.

**Description.** Body small (ABL = mm 1.80 ♂ 2.19 ♀), elongate, rather flattened, anophthalmous. Pubescence very sparse, short, yellow, recumbent.

Head relatively large but narrower than pronotum (WH/WPm = 0.97 ♂, 0.95 ♀), clypeus truncate with the frontoclypeal sulcus distinct. Frontal furrows with posterior round foveae, occiput coarsely and densely punctate. Mandibles slender with a simple apex. Maxillae strongly prominent, penultimate segments of maxillary palpi longer than broad, bearing 4 setae, terminal palpomeres protracted, needle-shaped, with an apical tuft of sensillae (Figs 3-4). Labium (Figs 5-6) with a large median tooth, showing two small basal setae; mentum with a large, rounded, depressed fovea, latero-posteriorly surrounded by a ring of 10-12 setae. Antennae moniliform from the fourth antennomere onwards, long, markedly exceeding the humeral portion of the elytra when stretched backwards. Cephalic chaetotaxy as in the description of the genus.

Pronotum slightly convex, subcordiform (WPa/WPp = 1.42 ♂, 1.54 ♀), with the maximum width at the anterior third (WPm/LP = 1.09 ♂, 1.10 ♀). Anterior angles obtuse and broad. Lateral margin hardly sinuated before the posterior angles, which are rectangular and slightly projecting laterally. Punctures of the disc nearly equal to those of the occiput. Anterior sixth of their length with a pair of marginal setae; basal setae lacking. Scutellum subtriangular, pointed apically, with distinct transverse cells.

Elytra longer than their combined width (WE/LE = 0.62 ♂, 0.66 ♀), widest closely behind one half of their length. Humeral angles rounded but evident; lateral margins without a distinct marginal groove but with edges finely denticulate. Sculpture of elytra

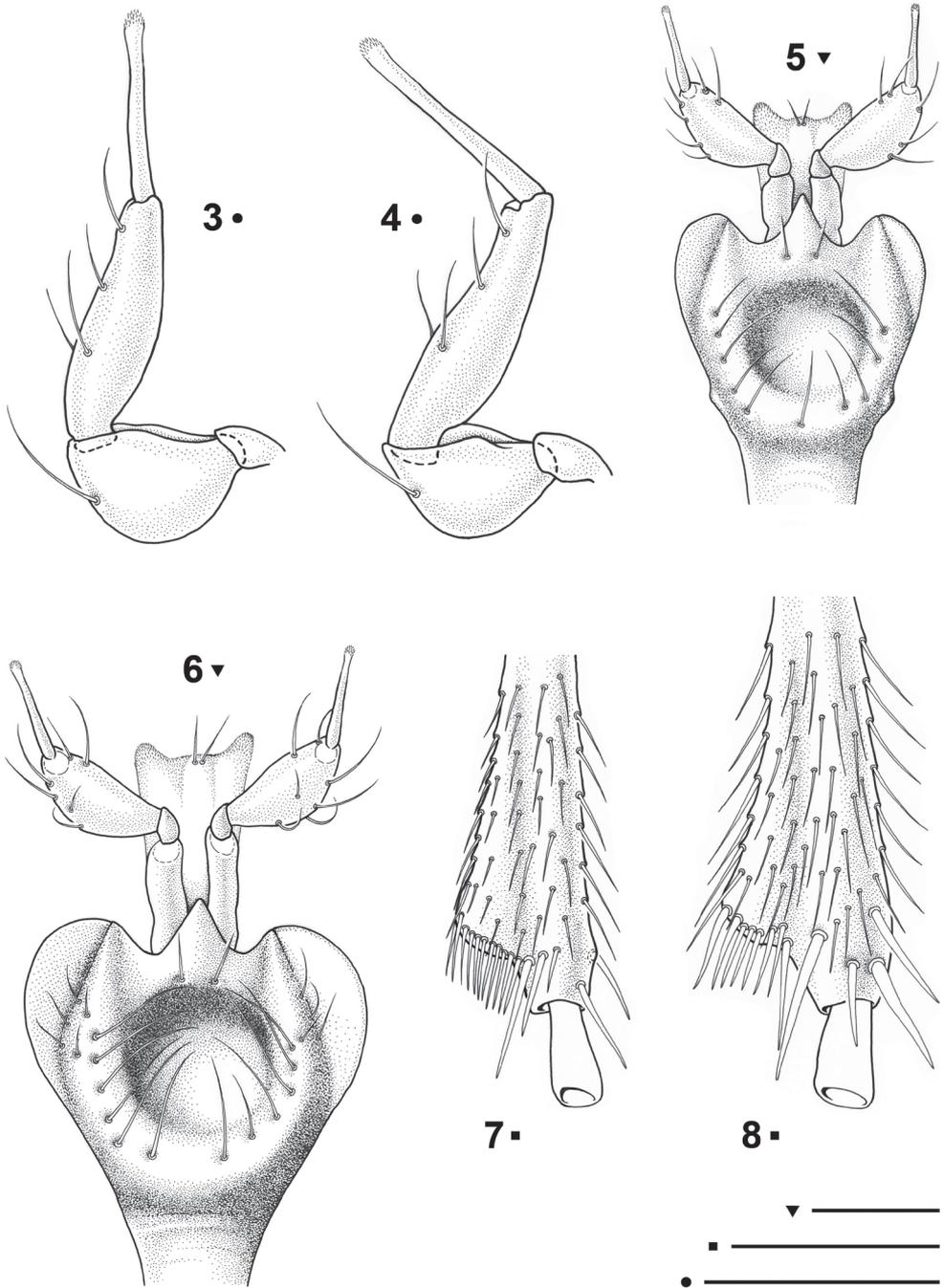


**Figures 1-2.** Habitus of *Paralovricia* gen. n. *beroni* sp. n. **1** HT ♂ **2** PT ♀. Scale bar: 1 mm.

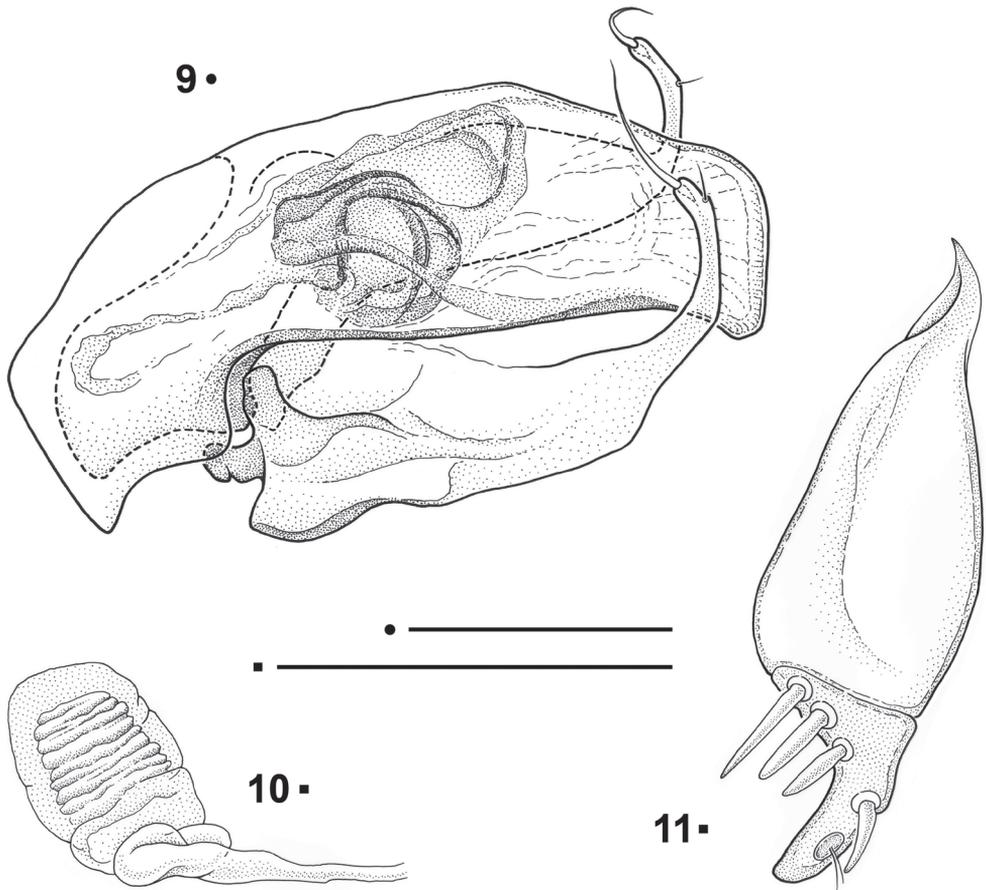
distinctly microreticulate consisting of wrinkled lines; striae missing; recurrent striola lacking, disc without discal setiferous punctures. Scutellar pore umbilicate and shifted from its normal position, placed near the front edge of the elytra. Umbilicate series as in Figs 1-2, consisting in 9 setiferous pores; the main umbilicate pores bearing a long seta (sensu Giachino and Vailati in press) are the 2<sup>nd</sup>, 6<sup>th</sup> and 9<sup>th</sup> ones. 5<sup>th</sup> and 6<sup>th</sup> pores make a geminate pair, 5<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> decidedly shifted on the disc; 5<sup>th</sup> pore shifted after the 6<sup>th</sup> one.

Protarsomeres not dilated in the male. Mesotibiae (Figs 7-8) distally expanded on outwards and fringed with dense bristles, inner angles with additional spurs. All the last tarsomeres of pro- meso- and metatibiae hyaline and with a peculiar shape: widened at the base and narrowed at the apex.

Aedeagus (Fig. 9) with median lobe stout and poorly arcuate; apex, in lateral view, stout, and irregularly sub-squared, slightly bent downwards. Basal bulb of the median lobe small, with the basal orifice greatly expanded dorsally, reaching about one third



**Figures 3-8.** *Paralovricia* gen. n. *beroni* sp. n. **3** Maxillary palpomere, HT ♂ **4** Maxillary palpomere, PT ♀ **5** Mentum, labial palpomeres and ligula in ventral view, HT ♂ **6** Mentum, labial palpomeres and ligula in ventral view, PT ♀ **7** Apex of right mesotibia in ventral view, HT ♂ **8** Apex of right mesotibia in ventral view, PT ♀. Scale bars: 0.1 mm.



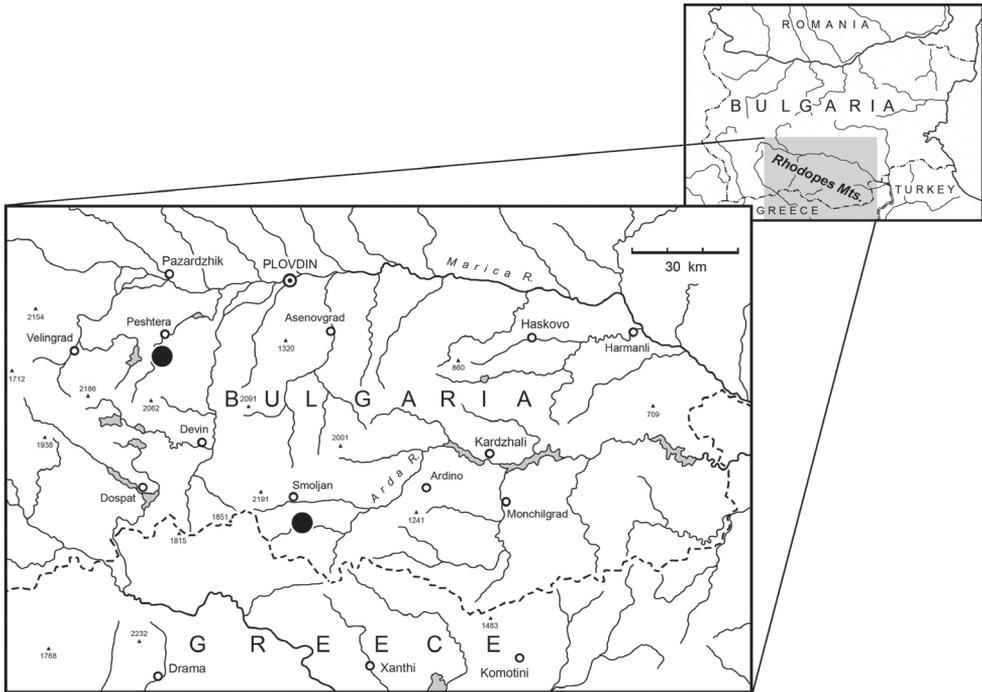
**Figures 9-11.** *Paralovricia* gen. n. *beroni* sp. n. **9** Aedeagus in lateral view, HT ♂ **10** Spermatheca, PT ♀ **11** Right gonocoxite in ventral view, PT ♀. Scale bars: 0.1 mm

of the length of the median lobe, delimiting two subequal lateral lobes. Shape of left and right parameres similar to each other, long, strongly widened at the base, sharply restricted, elongated and strongly curved upwards in the apical third. One large and stout coaxial seta at the apex and a second one, frail, small, ventral, in a preapical position. Inner sac with a median copulatory sclerite, claw-shaped with two dorsolateral branches.

Female genitalia as in the description of the genus.

**Etymology.** This interesting new species is dedicated to one of its collectors, Dr. Petar Beron, a passionate biospeleologist, former Director of the National Natural History Museum of Sofia and former Vice-President of the Bulgarian Parliament, as a sign of friendship and esteem for the impetus given to the knowledge of the Bulgarian subterranean fauna.

**Distribution and ecology.** *Paralovricia beroni* gen. n. sp. n. was discovered in the cave Kraypatnata peshtera (in English: “cave near the way”). The cave (Fig. 12) is situ-



**Figure 12.** Distribution map of genus *Paralovricia* gen. n. (black circles indicate two known findings of *P. beroni* sp. n.).

ated on the left riverbank of the river Arda, at an altitude of 780 m a.s.l. and approximately 1 km east of the village of Smilyan. It is a diacalse cave with a total length of 38 m, -10 m in depth, and a precipice at the end. The cave entrance is situated about 2-3 meters above the level of the road Smilyan-Rudozem. Air temperature measured in the last chamber is 12°C. The cave has an ascending principal gallery, dripping water in some places and the floor covered with wet clay, rotten logs, and some bat guano. The beetle fauna there consists of *Laemostenus plasoni plasoni* (Reitter, 1885) and the Leptodirine *Gueorguievella petrovi* Giachino & Guéorguiev, 2006 (Giachino and Guéorguiev 2006). In this cave the male specimen of *Paralovricia beroni* gen. n. sp. n. was found digging in rotten wood.

The second known locality (Fig. 12), cave Snezhanka (in English: “Snow-White”) is a national tourist site. This cave is provided with utilities and has limited access to the interior. The cave is situated 5 km southwest of the town of Peshtera, on the left slope over the Novomachlenska reka River, a tributary of the Stara reka River (Petrov & Stoev 2007). It has a total length of 368 m (in the main axis 145 m) and a depth of -18 m. The main chamber measures 48 × 36 m. The female of the new species has been collected in a small right side-gallery immediately after the entrance; this part of the cave is unlit and normally not visited by tourists. The entrance is situated in the midst of a beech forest (*Fagetum sylvatica*). The beetle fauna inside includes as well *Bryaxis* sp. (R. Bekchiev det.).

It is worth mentioning that the distance between these two caves is 64–65 km by airline (Fig. 12) and that the same species lives in such a relatively wide distance. This is not only a remote question, but between these points are situated the valley of Vacha River and first and third highest elevations of the Rhodopes. Chernatitsa Mt. (with maximal point Golyam Persenk, 2091 m a.s.l.) in the north and the Perelik Mt. (with maximal point Golyam Perelik, 2191 m a.s.l.) in the south form united mountain ridge with lowest points between them the col Pamporovo (1620 m a.s.l.) and the col Prevala (1665 m a.s.l.). This seems to confirm that the apparent rarity of one species cannot be presumed as synonymous of short range distribution. It may be attributed instead to our lack of bionomic knowledge. Indeed, both caves were visited several times by bio-speleologists at any time, but no more specimens from this new genus have been found. For instance, after finding of this new species, the Kraypatnata peshtera Cave was visited six times, and the Snezhanka Cave more than ten times after that. According to Lakota et al. (2002), the species of *Lovricia* are very rare because of their hidden bionomy. For the time being, we have very scanty information on the life history of these remarkable beetles. It seems very probable that *P. beroni* sp. n. just like most known Anillini, is not typical cave-inhabitant. It lives, probably, in the deep network of microcaverns and cracks, as supposed by Giachino and Vailati (2010) for many subterranean beetles, from where penetrates accidentally into people-accessible caves.

**Systematic discussion.** As already discussed in the introduction, the systematic position of the genera complex formed by *Lovricia* and *Neolovricia*, to which now *Paralovricia* gen. n. is added, has always been controversial. The lack of knowledge on the morphology of the aedeagus, even in a single known species, together with a too brief, too superficial, or misinterpreted description, of a number of important characters, such as the elytral chaetotaxy, helped to postpone the solution of the problem. In this way, some important phylogenetic characters could not be controlled with certainty because they were misinterpreted or omitted from the original descriptions. For example, we do not know if, even in *Lovricia* and *Neolovricia*, scutellar setiferous pores are moved toward the elytral base. While, conversely, an examination of the original drawings, although incomplete (in small specimens drawn without inclusion in Canada Balsam), allows us to say with good approximation that the umbilicate series of *Lovricia* and *Neolovricia* are similar to that of *Paralovricia*.

The three currently known genera, *Lovricia*, *Neolovricia* and *Paralovricia* represent a clear monophyletic unit supported by important synapomorphies that allow us to propose the establishment of a new subtribe.

### **Lovriciina subtrib. n.**

<http://species-id.net/wiki/Lovriciina>

**Type genus.** *Lovricia* Pretner, 1979

**Diagnosis.** A subtribe characterized by genera that present the following synapomorphic characters: last maxillary palpomeres very long and narrow, basal angles of the

pronotum without seta, elytra without discal setiferous punctures, elytral umbilicate series of nine pores in which the main pores are the 2<sup>nd</sup>, 6<sup>th</sup> and 9<sup>th</sup> ones, apical recurrent striole absent and mesotibial apex expanded outward.

**Systematic position.** Now the examination of several characters allows us to define better the position of Lovriciina within the subfamily Trechinae (sensu Lorenz 2005). The initial doubt about the attribution of *Lovricia* to Trechini rather than Bembidiini was given by the strange morphology of the last maxillary palpomeres, which do have neither the typical conical shape of Trechini nor the small and very reduced one of Bembidiini. The examination of the elytral umbilicate series consisting in 9 setiferous pores as in Bembidiini (Jeannel 1941) can now exclude, with certainty, the belonging of Lovriciina to Trechini, that is characterized instead by a series of 8 umbilicate pores (Jeannel 1941). The absence, in Lovriciina, of an apical recurrent striole on the elytra, which is present in Bembidiina and Tachyina but lacking in Anillina (Jeannel 1941), as well as the basal part of the median lobe of the aedeagus, divided into two sub-equal basal lobes, characteristic of Anillina (Jeannel 1941), allows us to assign Lovriciina near Anillina (sensu Lorenz 2005).

### Key of the genera of Lovriciina

- 1 Pronotum cordate, wider than long (ratio pronotum width / pronotum length more than 1.05) ..... ***Paralovricia gen.n.***
- Pronotum sub-elongate, longer than wide (ratio pronotum width / pronotum length less than 0.95). ..... **2**
- 2 Smaller species (length of body less than 2.2 mm). Shoulders of elytra distinct, more or less angulate. ... ***Neolovricia Lakota, Jalžić & Moravec, 2009***
- Larger species (length of body more than 2.3 mm). Shoulders of elytra indistinct, oblique, without distinct angles. .... ***Lovricia Pretner, 1979***

**Zoogeography.** Analysis, from a historical zoogeographical point of view, of the distribution of the phyletic lineage of Lovriciina (Fig. 13) provides several interesting insights. First we must consider that the currently known distribution, although widely disjoint, ranging from the Dinarides to the Rhodopes and that, as widely discussed for Anillina (Giachino 2005, 2008, Giachino and Vailati in press), we are handling a group with a likely ancient origin. In this way we must go back at least to the Late Oligocene (29-24 Ma) before finding, in the paleogeographic reconstructions currently available (Popov et al. 2004), a continuum of land that connects each other Dinarides and Rhodopes allowing a colonization by this phyletic lineage. Conversely, a paleogeographic event that could be placed at the origins of the separation of *Paralovricia* (on Rhodopes) from a common ancestor, which then enabled a further differentiation of *Lovricia* and *Neolovricia* on Dinarides, may be identified in the Early Miocene (20.5-19 Ma) when a strip of lowlands, covered with freshwater lakes and marshes seems to have again divided the Dinarides from Rhodopes (Popov et al. 2004).



**Figure 13.** Distribution map of the species from subtribe Lovriciina (1 – *Lovricia jalzici* Pretner; 2 – *Lovricia aenigmatica* Lakota, Mlejnek & Jalžić and *Neolovricia ozimeci* Lakota, Jalžić & Moravec; 3 – *Paralovricia beroni* sp. n.).

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# Preliminary list of horse flies (Diptera, Tabanidae) of Serbia

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## Abstract

Thirty six species of horse flies (Tabanidae) were previously known from Serbia (Europe). The present faunistic study of horse flies (Tabanidae) has resulted in the recording of the 4 new species *Atylotus fulvus* (Meigen, 1804); *Tabanus miki* Brauer in Brauer and Bergenstamm, 1880; *Tabanus unifasciatus* Loew, 1858; and *Heptatoma pellucens* (Fabricius, 1776), in the fauna of Serbia. The genus *Heptatoma* Meigen, 1803 is cited for the first time in the fauna of Serbia. 40 species are currently known from Serbia, belonging to nine genera. The fauna can be considered relatively poorly studied. Most of the species belong to the Boreal-Eurasian type of fauna 23, followed by the South European group with 8 species, the Mediterranean group with 6 species, European group with 2 species and Central European group with 1 species.

## Keywords

Tabanidae, Diptera, Serbia, Europe

## Introduction

The Tabanidae family contains over 4,000 described species found throughout the world (Chainey 1993). The females are known as mechanical vectors of viruses, bacteria, protozoans and helminths that cause various diseases in wild and domestic animals (Foil 1989, Desquesnes and Dia 2004). Therefore, during the last thirty years numerous studies into the effectiveness of synthetic and natural attractants in the sampling of horse flies have been carried out around the world (French and Kline 1989, Phelps and

Holloway 1992, Hribar et al. 1992, Hayes et al. 1993, Leprince et al. 1994, Krčmar et al. 2005, 2006, Krčmar 2007, Mihok et al. 2007, Cilek and Olson 2008, Mihok and Mulye 2010). Moreover, in this period a few new traps for collecting horse flies have been made (Hribar et al. 1991, Cilek and Medrano 2000, Mihok 2002, Dia et al. 2004, Mihok et al. 2006). However, there are some regions in the world that have not yet been sufficiently studied, one of these regions is the Balkan Peninsula. The horsefly fauna is poorly known in Central Balkan countries, 40 species were recorded in Macedonia, 42 species in Montenegro and 36 species in Serbia (Strobl 1898, 1900, 1902, Doflein 1921, Leclercq 1959, 1960a, 1960b, 1965, 1966, 1968, Coe 1958, 1960, Moucha 1959, 1965, Moucha and Chvála 1964, Majer 1985, Krčmar et al. 2002, Zeegers 2005, [www.faunaeur.org](http://www.faunaeur.org)). At the beginning of the twentieth century there were a few sporadic visits by foreign entomologists to Central Balkan countries, during which time several species of horse flies were collected. Most horse flies in the Central Balkan countries were collected after the Second World War, during the sixties and during the study tour of Czech and Belgian entomologists in the countries of Southeastern Europe. During my visits to Serbia in 2004 and 2006, I collected a few interesting species of horse flies, which led me to summarize all available data on the horsefly fauna of Serbia. Because of this, this work is based on literature findings and data obtained from a faunal survey conducted in the summer of 2004 and during the spring and summer months of 2006.

## Material and methods

Samplings of horse flies in Serbia were carried out during 2004 and 2006 mostly in the area of the Fruška Gora national park. In this period, horse flies were collected at 8 localities. The Fruška Gora national park is an isolated, narrow, mainland mountain in the Pannonian plain. Most of the mountain lies in Vojvodina, Serbia except for a small section to the west which lies in Croatia. To the north, the mountain is bordered by the Danube. Lengthwise, it is approximately 80 km east to west and 15 km north to south (45° 10' 0" N, 19° 40' 0" E). Its highest peak is Crveni Čot at 539 m (<http://en.wikipedia.org>). Its location, specific geological history and different microclimatic conditions make it very interesting and important to science. Thanks to the unique and very rich deposits of fossil fauna and flora, Fruška Gora is called the mirror of the geological past. The main characteristic of this region is the existence of numerous protected, rare and endangered species (<http://www.npfruskagora.co.rs>). The horse flies were collected on 25 June 2004, 24 July 2004, 20 May 2006, 24 July 2006, and 10 August 2006 from horses by hand and by means of a sampling net when horse flies flew into a car. All collected horse flies were preserved in ethanol. Identification and nomenclature followed that of Chvála et al. (1972), Chvála (1988) and Mally (1987). Also, the presence of some species was determined upon a review of literature data. The full scientific names for all species including the author and year is only provided in the updated list of Serbian Tabanidae and is omitted from the text below.

## Results of the study at Fruška Gora

All together 542 specimens were collected (Table 1) belonging to 24 species of horse flies grouped into the subfamilies Chrysopsinae and Tabaninae and the genera: *Chrysops*, *Atylotus*, *Hybomitra*, *Tabanus*, *Heptatoma* and *Haematopota*. Four species: *Tabanus glaucopis*, *Tabanus exclusus*, *Haematopota pluvialis*, and *Tabanus tergustinus* made up 81% of the fauna of horse flies in the researched area, while 19% were representatives of other species (Table 1). The most numerous genus is *Tabanus* with 11 species, followed by *Haematopota* with 4 species, *Atylotus* and *Hybomitra* with 3 species, *Chrysops* with 2 species and *Heptatoma* with 1 species (Table 1). From the collected sample, 4 species of horse flies new to the fauna of Serbia were determined, these are *Atylotus fulvus*, *Tabanus miki*, *Tabanus unifasciatus*, and *Heptatoma pellucens*. Four females of the species *Atylotus fulvus* were collected in Letenka on 24 July 2006. One female of the species *Tabanus miki* was collected in Brankovac on 24 July 2006. The third new species *Tabanus unifasciatus* was collected in Brankovac on 24 July 2006 (1♀), and 10 August 2006 (3♀), while two females were collected at the locality in Zmajevac on

**Table 1.** Species and numbers of horse flies collected in Serbia during 2004 and 2006.

Species	No. of Specimens	%
<i>Tabanus glaucopis</i>	231	42.61
<i>Tabanus exclusus</i>	98	18.08
<i>Haematopota pluvialis</i>	63	11.62
<i>Tabanus tergustinus</i>	45	8.30
<i>Haematopota bigoti</i>	26	4.79
<i>Tabanus bromius</i>	19	3.50
<i>Tabanus sudeticus</i>	14	2.58
<i>Hybomitra ciureai</i>	12	2.21
<i>Tabanus unifasciatus</i>	6	1.10
<i>Tabanus autumnalis</i>	4	0.73
<i>Atylotus rusticus</i>	4	0.73
<i>Atylotus fulvus</i>	4	0.73
<i>Tabanus maculicornis</i>	2	0.36
<i>Atylotus loewianus</i>	2	0.36
<i>Chrysops caecutiens</i>	2	0.36
<i>Haematopota italica</i>	2	0.36
<i>Chrysops viduatus</i>	1	0.18
<i>Hybomitra bimaculata</i>	1	0.18
<i>Hybomitra solstitialis</i>	1	0.18
<i>Tabanus bovinus</i>	1	0.18
<i>Tabanus cordiger</i>	1	0.18
<i>Tabanus miki</i>	1	0.18
<i>Heptatoma pellucens</i>	1	0.18
<i>Haematopota pandazisi</i>	1	0.18
Total: 24	542	

10 August 2006. Finally, the fourth species is *Heptatoma pellucens* that was collected at Brankovac on 10 August 2006. Thanks to the kindness of Dr. Th. Zeegers and the data he provided for this manuscript four additional horse fly species are added to the Serbian fauna: *Theriopectes tunicatus*, *Hybomitra aterrima*, *Hybomitra micans* and *Dasyrhamphis umbrinus*. Two females of *Hybomitra aterrima* were collected at the locality in Kopaonik, Jankova Bara on 11 June 2009 (Th. Zeegers unpublished data through personal communication). Also, one female specimen of *T. miki* was collected at the locality in Kopaonik, Lisina on 12 June 2009 (Th. Zeegers unpublished data through personal communication). Most of the species belong to the Boreal-Eurasian type of fauna (n= 23), (Olsufjev 1977). These species are: *Chrysops caecutiens*, *C. relictus*, *C. rufipes*, *C. viduatus*, *Atylotus fulvus*, *A. rusticus*, *Hybomitra aterrima*, *H. bimaculata*, *H. ciureai*, *H. distinguenda*, *H. muehlfeldi*, *Tabanus autumnalis*, *T. bovinus*, *T. bromius*, *T. cordiger*, *T. glaucopsis*, *T. maculicornis*, *T. miki*, *T. sudeticus*, *Heptatoma pellucens*, *Haematopota italica*, *Hae. pluvialis*, and *Hae. subcylindrica*. The following 6 are Mediterranean species: *C. flavipes*, *Th. tunicatus*, *T. promesogaeus*, *T. exclusus*, *T. lunatus*, and *Philipomyia graeca* (Olsufjev 1977, Chvála et al. 1972). Furthermore, the following 8 are Southern European species: *A. loewianus*, *T. quatuornotatus*, *T. tergestinus*, *T. unifasciatus*, *Hae. bigoti*, *Hae. ocelligera*, *Hae. pandazisi*, *D. umbrinus* (Olsufjev 1977, Chvála et al. 1972). Only, *Hybomitra micans*, and *H. pilosa* belong to the group of European species (Chvála et al. 1972), while *Theriopectes gigas* belong to Central European group of species (Zeegers 2005).

The following list of species includes all available literature records and new records based on the study at Fruška Gora and previously unpublished records provided by Dr. Theo Zeegers.

## List of Tabanidae species recorded in Serbia.

### Subfamily Chrysopsinae

#### Genus *Chrysops* Meigen, 1803

1. *Chrysops caecutiens* (Linnaeus, 1758)
2. *Chrysops flavipes* Meigen, 1804
3. *Chrysops relictus* Meigen, 1820
4. *Chrysops rufipes* Meigen, 1820
5. *Chrysops viduatus* (Fabricius, 1794)

### Subfamily Tabaninae

#### Genus *Atylotus* Osten – Sacken, 1876

6. *Atylotus fulvus* (Meigen, 1804)
7. *Atylotus loewianus* (Villeneuve, 1920)

8. *Atylotus rusticus* ( Linné, 1767)

**Genus *Therioplectes*** Zeller, 1842

9. *Therioplectes gigas* (Herbst, 1787)

10. *Therioplectes tunicatus* Szilády, 1927

**Genus *Hybomitra*** Enderlein, 1922

11. *Hybomitra aterrima* (Meigen, 1820)

12. *Hybomitra bimaculata* (Macquart, 1826)

13. *Hybomitra ciureai* (Séguy, 1937)

14. *Hybomitra distinguenda* (Verrall, 1909)

15. *Hybomitra micans* (Meigen, 1804)

16. *Hybomitra muehlfeldi* (Bauer in Brauer and Bergenstamm, 1880)

17. *Hybomitra pilosa* (Loew, 1858)

**Genus *Tabanus*** Linnaeus, 1758

18. *Tabanus autumnalis* Linnaeus, 1761

19. *Tabanus bovinus* Linnaeus, 1758

20. *Tabanus bromius* Linnaeus, 1758

21. *Tabanus cordiger* Meigen, 1820

22. *Tabanus exclusus* Pandellé, 1883

23. *Tabanus glaucopis* Meigen, 1820

24. *Tabanus lunatus* Fabricius, 1794

25. *Tabanus maculicornis* Zetterstedt, 1842

26. *Tabanus miki* Brauer in Brauer and Bergenstamm, 1880

27. *Tabanus promesogaeus* Mally, 1987

28. *Tabanus quatuornotatus* Meigen, 1820

29. *Tabanus sudeticus* Zeller, 1842

30. *Tabanus tergestinus* Egger, 1859

31. *Tabanus unifasciatus* Loew, 1858

**Genus *Heptatoma*** Meigen, 1803

32. *Heptatoma pellucens* (Fabricius, 1776)

**Genus *Haematopota*** Meigen, 1803

33. *Haematopota bigoti* Gobert, 1880

34. *Haematopota italica* Meigen, 1804

35. *Haematopota ocelligera* (Kröber, 1922)

36. *Haematopota pandazisi* (Kröber, 1936)

37. *Haematopota pluvialis* (Linnaeus, 1758)

38. *Haematopota subcylindrica* Pandellé, 1883

**Genus *Philipomyia*** Olsufjev, 1964

39. *Philipomyia graeca* ( Fabricius, 1794)

**Genus *Dasyrhamphis*** Enderlein, 1922

40. *Dasyrhamphis umbrinus* (Meigen, 1820)

## Discussion

A previous list of Tabanidae of Serbia was based on literature data from previous studies (Strobl 1900, 1902, Coe 1958, 1960, Moucha 1959, 1965, Moucha and Chvála 1964, Leclercq 1966, 1968, Krčmar et al. 2002, Zeegers 2005, [www.faunaeur.org](http://www.faunaeur.org)). According to these studies 36 species were mentioned from Serbia. Four species were recorded as new for the fauna of Serbia during this study; two of them belong to genus *Tabanus*, followed by the genera *Atylotus* and *Heptatoma* with one species. All new species for the fauna of Serbia were collected during field work. New species were mainly collected on the localities of the Fruška Gora national park. The analysis of the recorded species during the 2004 and 2006 study resulted in a very high percent of Mediterranean species *T. exclusus* in localities of Fruška Gora. *T. exclusus* was represented with 18% in the collected sample indicating different microclimatic conditions. Interesting data for comparison with this high percent of records of *T. exclusus* in Fruška Gora is that this species in the Mediterranean part of Croatia was the most common with 21% (Krčmar 1999). Furthermore, very few specimens of *T. exclusus* were collected on the southern slopes of the mountain massifs of Dilj, Krndija and Papuk in the continental part of Eastern Croatia (Krčmar and Mikuska 2001). The distribution of this species belong to the area of Southern Europe and South Eastern Europe (Chvála et al. 1972). All these comparisons confirmed that Fruška Gora is very interesting and important for faunistical studies. Only Strobl (1900) and Moucha (1959) mentioned the presence of species *C. relictus* in Serbia but gave no other data except the name of country where the horse flies were collected, which they marked as “Serbia”. Also, there are no exact data about the dates of collection, for the species *Th. gigas* and *T. lunatus* (Strobl 1902, Moucha 1959). However, two years ago on 8 June 2009 one female of the species *Th. gigas* was collected on Stara Planina 35 km ENE of Pirot (Th. Zeegers unpublished data through personal communication). The Tabanidae fauna of Serbia is very poor compared with neighboring countries (e.g., Croatia 78 species, Bosnia and Herzegovina 62 species). The most recent published article about Tabanidae fauna of Serbia was from the 1960s, where all the records were summarized as horse flies from Yugoslavia. The 40 determined species of horse flies indicate the necessity to continue with faunistical research, because this is certainly not the final number of horse flies in Serbia, the occurrence of many additional species is expected.

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