

New records of water mites of the family Torrenticolidae (Acari, Hydrachnidia) with descriptions of two new species from Nanshih River system in Taiwan and redescription of *Torrenticola ussuriensis* (Sokolow, 1940) from the Russian Far East

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| [urn:lsid:zoobank.org:author:7B4248A8-7B5D-4794-A876-466334667785](https://doi.org/10.3897/zookeys.116.1253)

¶ [urn:lsid:zoobank.org:author:8C3C6E7D-96C0-4E60-BF2B-DF76E03CE0BD](https://doi.org/10.3897/zookeys.116.1253)

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Academic editor: Andre Bochkov | Received 14 March 2011 | Accepted 1 April 2011 | Published 7 July 2011

[urn:lsid:zoobank.org:pub:A6FDA397-BD72-45B5-AEEF-9E141EA283A7](https://doi.org/10.3897/zookeys.116.1253)

Citation: Pešić V, Semenchenko KA, Chatterjee T, Yam RSW, Chan BKK (2011) New records of water mites of the family Torrenticolidae (Acari, Hydrachnidia) with descriptions of two new species from Nanshih River system in Taiwan and redescription of *Torrenticola ussuriensis* (Sokolow, 1940) from the Russian Far East. ZooKeys 116: 1–14. doi: 10.3897/zookeys.116.1253

Abstract

New records of torrenticolid water mites (Acari: Hydrachnidia, Torrenticolidae) from Nanshih River, Taiwan, are presented. Two new species are described: *Torrenticola nanshihensis* and *T. taiwanicus*; the latter species is compared with *T. ussuriensis* (Sokolow, 1940), a poorly known species which is re-described based on a new material from the Russian Far East; *Monatractides* cf. *circulooides* (Halík, 1930) is reported for the first time for Taiwan.

Keywords

Acari, water mites, new species, running waters, Nanshih River system, Taiwan

Introduction

Taiwan, an island situated in East Asia in the Western Pacific Ocean, covering a land area of 35,801 km², is located off the southeastern coast of mainland China.

The water mite fauna of Taiwan is very incompletely known. History of water mite research of Taiwan started in the beginning of the last century when Lohmann (1909) described a new species of marine water mite genus *Pontarachna* (*P. formosa*). Later on, Uchida (1935) reported *Limnesia lebangensis* Piersig, 1906. Since then this group had remained untouched till the 2007's when Pešić et al. (2008) reported *Pontarachna australis* Smit, 2003.

Water mites of the family Torrenticolidae Piersig, 1902 are presently known from all continents except Antarctica. In general, torrenticolid mites colonize fast flowing streams with well oxygenated interstitial habitats where proto- and tritonymphs can survive the quiescent phase of their life cycle (Di Sabatino et al. 2003).

During a recent survey of the macrozoobenthos of Nanshih River system in Taiwan, some water mites of the genera *Torrenticola* and *Monatractides* were collected. Nanshih River system is located in the northern Taiwan, and originates from Sunglo Lake (1250 m a.s.l.). Drainage network consists of 11 major feeder tributaries (mostly in Wulia District of New Taipei City) connected to Nanshih River which runs into Xindian River in the urbanised Xindian District, the New Taipei City. Collection sites in the present study were located on Xindian River, Nanshih River and one of the tributary Tonghou River (Fig. 1).

Three torrenticolid species are identified, two of them are new to science. Descriptions of these species, as well as the redescription of *Torrenticola ussuriensis* (Sokolow, 1940), that is closely related to one of new species, are given in this paper.

Material and methods

Water mites were collected by standard Surber sampling method using WaterMark® Surber Type Stream Bottom Sampler (500 µm mesh). All material was preserved in 90% ethanol, and water mites were sorted in the laboratory with the aid of a stereo microscope. The material from Taiwan has been collected by Rita Yam and this is not repeated in the text. Examination of specimens using Scanning Electron Microscopes followed Chatterjee et al. (2009). Holotypes and paratypes of the new species are deposited in the National Museum of Natural Science (NMNS), Taichung, Taiwan. Material of *Torrenticola ussuriensis* (Sokolow, 1940) is deposited in the research collections of the Institute of Biology and Soil Science, Vladivostok, Russia (IBSS).

The composition of the material is given as: males/females/nymphs. All measurements are given in µm. The following abbreviations are used: Cx-1 = first coxae, Cxgl-4

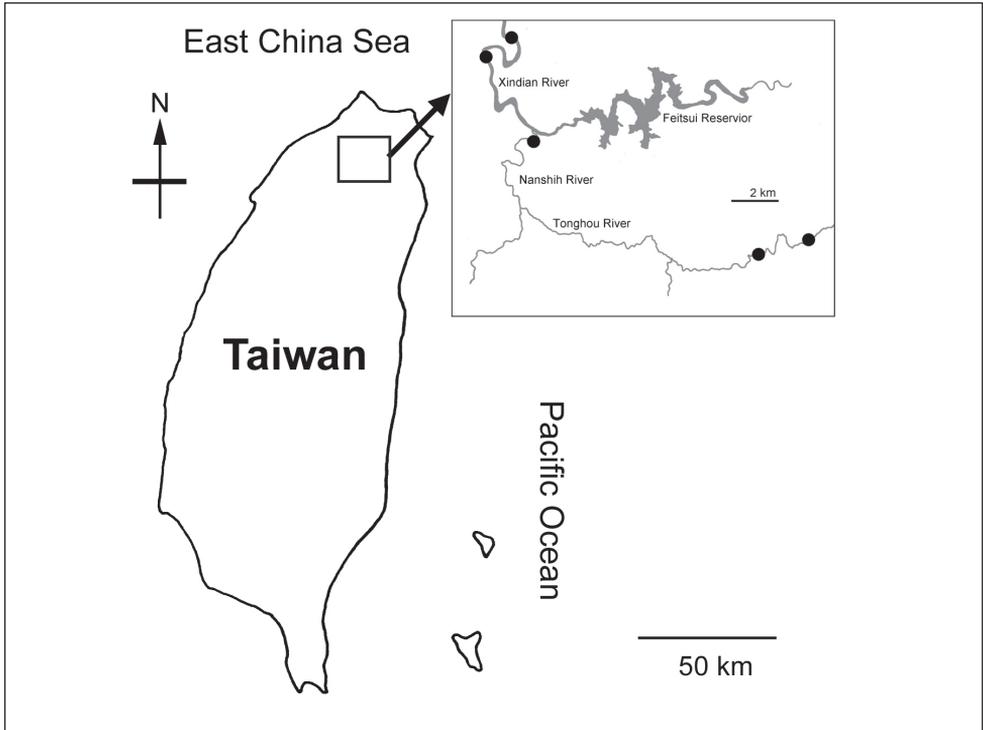


Figure 1. Map of the study area, showing location of sampling sites (black circles).

= coxoglandularia of fourth coxae (= E4 in Wiles 1997), Dgl-3 = dorsoglandularia 3, L = length, P-1 = palp, first segment, W = width.

Systematics

Family Torrenticolidae

Genus *Torrenticola* Piersig

Torrenticola taiwanicus sp. n.

urn:lsid:zoobank.org:act:9D3C9A70-EF8A-40AB-9680-0257DF27AF91

http://species-id.net/wiki/Torrenticola_taiwanicus

Figs 2, 3, 4C–D, 7A

Type material. Holotype male (NMNS-6599-001), dissected and slide mounted, Taiwan, Tonghou River, 24°50'23.74"N, 121°38'10.06"E, 25.viii.2009. Paratypes (NMNS-6599-002): 0/2/0 (0/1/0 mounted), Nanshih River, 24°54'09.87"N, 121°33'20.74"E, 02.iii.2010; 0/1/0, *ibid.*, 25.viii. 2009; 1/0/0, Xindian River, 24°56'52.27"N, 121°32'42.54"E, 24.vi.2009; 1/2/0 (1/0/0 mounted), *ibid.*, 16.vii.2009.

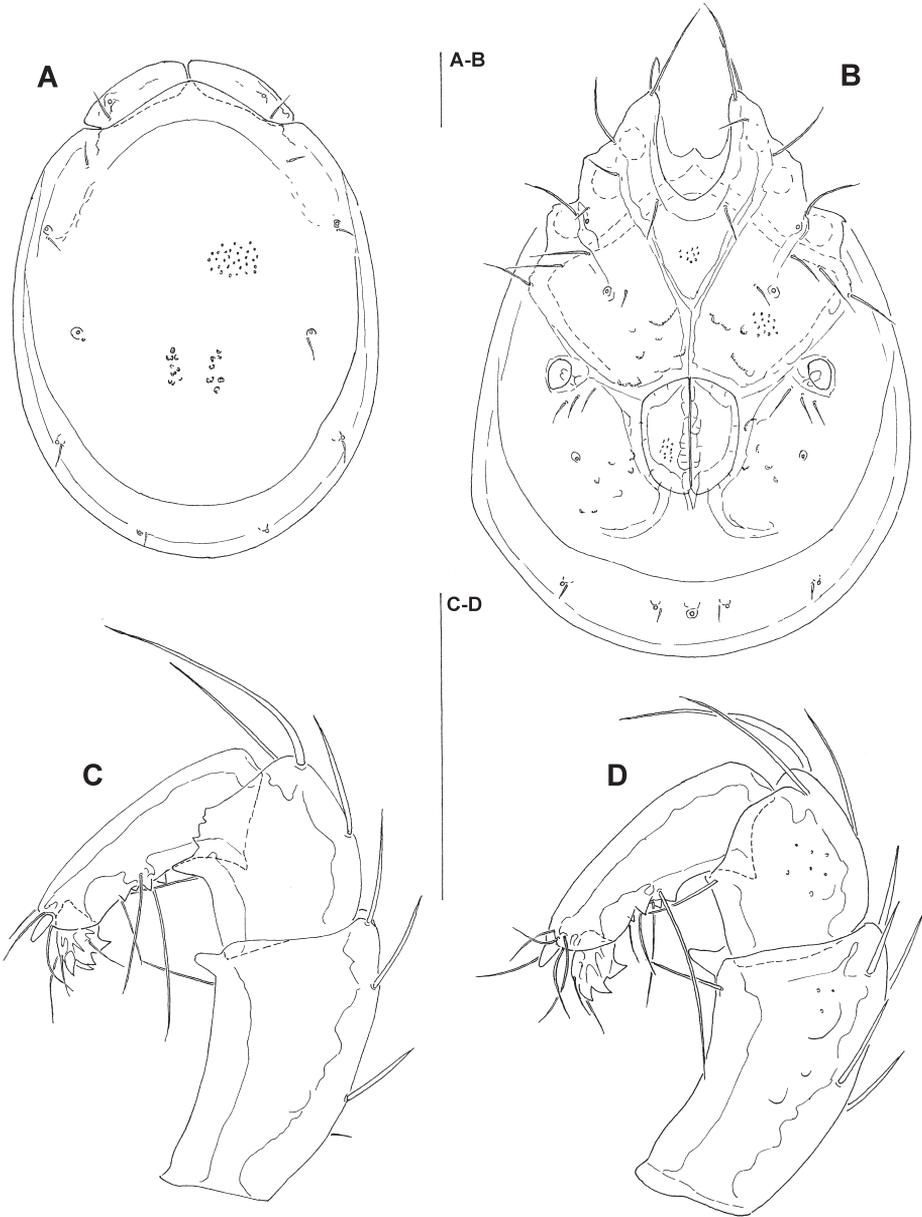


Figure 2. *Torrenticola taiwanicus* sp. n., male: **A** dorsal shield **B** ventral shield **C** palp (P-1 missing), medial view **D** palp (P-1 missing), lateral view. Scale bars = 100 μ m.

Diagnosis. Shoulder plates fused with dorsal plate, the angles of the traces of shoulder plates posterior to setae Dgl-3 weakly pronounced, the angle of dorsal plate between frontal plates slightly pointed, the anterior part of the dorsal plate lying between the traces of the shoulder plates delimitation relatively wide; Cxgl-4 posterior

to Cxgl-2, glandular pore Cxgl-4 distanced from Cxgl-2 by 81–90 μm ; P-3 distal margin with denticles; P-4 stocky, relatively short (L P-2/P-4 ratio 1.1–1.2), without ventral denticles.

Description. Male (holotype, in parentheses measurements of paratype). Idiosoma (ventral view: Fig. 2B, 7A) L 741 (734), W 587 (559); dorsal shield (Fig. 2A) L 658 (650), W 488 (494), L/W ratio 1.35 (1.32); dorsal plate L 631 (626); dorsal plate with colour pattern as illustrated in Fig. 4C; frontal plate L 150 (147), W 50 (50–52), L/W ratio 3.0 (2.8–3.0) gnathosomal bay L 139 (131), Cx-1 total L 281 (270), Cx-1 medial L 142 (139), Cx-2+3 medial 85 (91); ratio Cx-1 L/Cx-2+3 medial L 3.3 (3.0); Cx-1 medial L/Cx-2+3 medial L 1.67 (1.53); Cxgl-4 posterior to Cxgl-2, distance between glandular openings of Cxgl-4 and Cxgl-2 81–86 (81–86); genital field L/W 152 (156)/125 (122), L/W ratio 1.22 (1.28), ejaculatory complex conventional in shape, L 234; distance genital field–excretory pore 156 (150), genital field–caudal idiosoma margin 219 (216); capitulum ventral L 322 (328); chelicera total L 378 (383); palp (Figs 2C–D) total L 302 (312), L: P-1 37 (39), P-2 102 (103), P-3 57 (60), P-4 89 (92), P-5 17 (18); P-2/P-4 ratio 1.15 (1.11); distal margin of P-3 with denticles; P-4 with four well developed ventral tubercles.

Female: Idiosoma (ventral view: Fig. 3A) L 828, W 663; dorsal shield L 756, W 541, L/W ratio 1.4; dorsal plate L 724; frontal plate L 156, W 52–55, L/W ratio 2.8–3.0; gnathosomal bay L 159, Cx-1 total L 300, Cx-1 medial L 141, Cx-2+3 medial 48; ratio Cx-1 L/Cx-2+3 medial L 6.25; Cx-1 medial L/Cx-2+3 medial L 2.9; distance between glandular openings of Cxgl-4 and Cxgl-2 86–90; genital field L/W 170/155, L/W ratio 1.1; distance genital field–excretory pore 181, genital field–caudal idiosoma margin 300; capitulum ventral (Fig. 3C) L 363; palp (Fig. 3B) total L 348, L: P-1 47, P-2 115, P-3 65, P-4 98, P-5 18; P-2/P-4 ratio 1.17; shape and setation as in male.

Etymology. The species is named after the country where it was collected.

Remarks. Due to the Cxgl-4 posterior to Cxgl-2 and the shape of palp (distal margin of P-3 with denticles, P-4 stocky and relatively shorter, without ventral denticles), the new species closely resembles *Torrenticola ussuriensis* (Sokolow, 1940) (see below). The latter species differs from *Torrenticola taiwanicus* sp. n., in the shape of dorsal shield (compare Figs 4A–B with Figs 4C–D) with the angle of dorsal plate between the frontal plates more pointed, the anterior part of the dorsal plate lying between the traces of the shoulder plates delimitation more narrower and the angles of the traces of shoulder plates delimitation posterior to setae Dgl-3 more pronounced. A further difference is found in the glandular openings of Cxgl-4 and Cxgl-2 more distanced from each other in *T. taiwanicus* sp. n. (81–90 vs. 48–60 μm in *T. ussuriensis*).

Torrenticola occulta Lundblad, 1971, a species known from a single juvenile male specimen from Java (Lundblad 1971) resembles *T. ussuriensis* and *T. taiwanicus* sp. n., due to the Cxgl-4 posterior to Cxgl-2 and P-4 without ventral denticles, but clearly differs in the shape of palp (see: Lundblad 1971, Fig. 12), with P-2 ventral margin straight and P-4 more slender and relatively longer, L P-2/P-4 ratio 1.0 vs. P-2 ventral margin concave, P-4 more stocky and distinctly shorter than P-2, L P-2/P-4 ratio 1.08–1.2 in

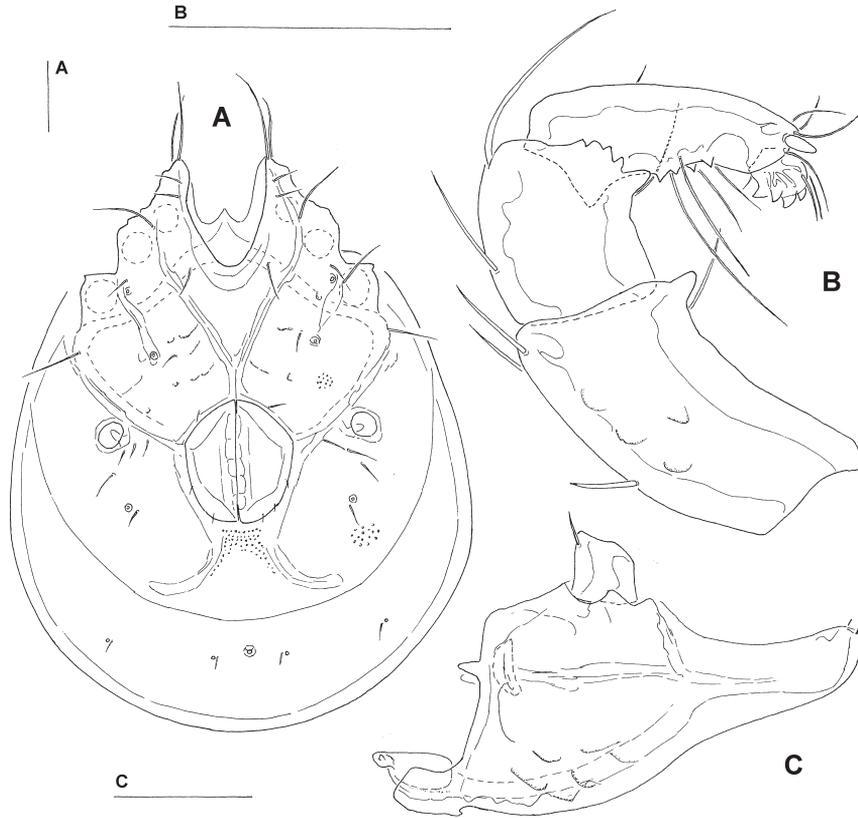


Figure 3. *Torrenticola taiwanicus* sp. n., female: **A** ventral shield **B** palp (P-1 missing), medial view **C** capitulum. Scale bars = 100 μ m.

T. ussuriensis and *T. taiwanicus* sp. n. Because some important characters (e.g., the shape and colour of dorsal plate, presence of denticles on distal margin of P-3, distance between the glandular openings of Cxgl-4 and Cxgl-2) were lacking in original description of *Torrenticola occulta*, additional specimens are required to clarify status of this species (see: Wiles 1997 and Pešić and Smit 2009, for an discussion on the Asian *Torrenticola* species that have a dorsal shield with shoulder platelets fused or partially fused with dorsal plate).

Distribution. Taiwan.

***Torrenticola ussuriensis* (Sokolow, 1940)**

http://species-id.net/wiki/Torrenticola_ussuriensis

Figs 4A–B, 5

Material examined. Russia, Primory Territory: Anuchinsky District, 10 km from Vinogradovka, Arsen'evka River, 43°48.261'N, 132°56.407'E, 13.ix.2008, K.A.

Semenchenko & D.A. Sidorov 0/1/0; Anuchinsky District, Arsen'evka River near Kornilovka, 43°07.757'N, 133°13.280'E, 03.vi.2009, K.A. Semenchenko & D.A. Sidorov 1/6/0; Khabarovsk Territory, Bikinsky District, Bikin River, 46°46.531'N, 134°17.026'E, 17.vi.2005, K.A. Semenchenko & D.A. Sidorov 0/2/0; Jewish Autonomous Area, Birobidzhansky District, 4 km from Zholty Yar, Bira River, 48°32.373'N, 133°01.664'E, 16.vii.2005, K.A. Semenchenko & D.A. Sidorov 1/2/0; Amurskaya Area, Mazanovsky District, Zeya River, 51°40.034'N, 128°51.265'E, 06.viii.2006, K.A. Semenchenko & T.M. Tiunova 0/2/0.

Morphology. *Male* (n = 2). Idiosoma (ventral view: Fig. 5B) L 697–748, W 548–554; dorsal shield (Fig. 5A) L 581–620, W 435–482, L/W ratio 1.28–1.33; dorsal plate L 508–541; dorsal plate with colour pattern as illustrated in Fig. 4A; frontal plate L 119–135, W 44–46, L/W ratio 2.5–3; gnathosomal bay L 110–118, Cx-1 total L 257–264, Cx-1 medial L 152–158, Cx-2+3 medial 72–74; ratio Cx-1 L/Cx-2+3 medial L 3.5; Cx-1 medial L/Cx-2+3 medial L 2–2.19; Cxgl-4 posterior to Cxgl-2, distance between glandular openings of Cxgl-4 and Cxgl-2 48–60; genital field L/W 154–173/118–121, L/W ratio 1.3–1.43, ejaculatory complex conventional in shape, L 153–189; distance genital field–excretory pore 138–165, genital field–caudal idiosoma margin 185–232; capitulum ventral L 302–310; chelicera total L 356–372; palp (Fig. 5D) total L 300–303, L: P-1 32–38, P-2 101–102, P-3 58–59, P-4 89–94, P-5 16–17; P-2/P-4 ratio 1.08–1.12; distal margin of P-3 with denticles; P-4 with four well developed ventral tubercles.

Female (n = 2). Idiosoma (ventral view: Fig. 5C) L 782–816, W 594–595; dorsal shield L 643–673, W 468–488, L/W ratio 1.36–1.37; dorsal plate L 547–607; dorsal plate with colour pattern as illustrated in Fig. 4B; frontal plate L 130–132, W 35–40, L/W ratio 3.3–3.7; gnathosomal bay L 125–145, Cx-1 total L 264–284, Cx-1 medial L 140–152, Cx-2+3 medial 46–47; ratio Cx-1 L/Cx-2+3 medial L 5.62–6.16; Cx-1 medial L/Cx-2+3 medial L 3–3.23; distance between glandular openings of Cxgl-4 and Cxgl-2 48–54; genital field L/W 167–172/138–140, L/W ratio 1.19–1.25; distance genital field–excretory pore 191–204, genital field–caudal idiosoma margin 270–363; capitulum ventral L 350–356; chelicera total L 420–435; palp total L 354–358, L: P-1 46–48, P-2 116–119, P-3 69–70, P-4 102–103, P-5 18–21; P-2/P-4 ratio 1.13–1.16; shape and setation as in male.

Remarks. *Torrenticola ussuriensis* was described from the Primory Territory, in Russian Far East (Sokolow 1934) and later reported from Uzi region in Japan (Enami 1940). The specimens from Japan agree with the material from the Far East of Russia in the shape of dorsal shield (e.g., the angle of dorsal plate between the frontal plates pointed, the anterior part of the dorsal plate lying between the traces of the shoulder plates delimitation narrow and the angles of the traces of shoulder plates delimitation posterior to setae Dgl-3 pronounced, see: Enami 1940, Figs 19, 21) and shape of palp (P-3 distal margin with denticles, P-4 relatively short, L P-2/P-4 ratio 1.2 in male, data taken from Enami 1940). However, because some characters (e.g., distance between the glandular openings of Cxgl-4 and Cxgl-2) were lacking in original description,

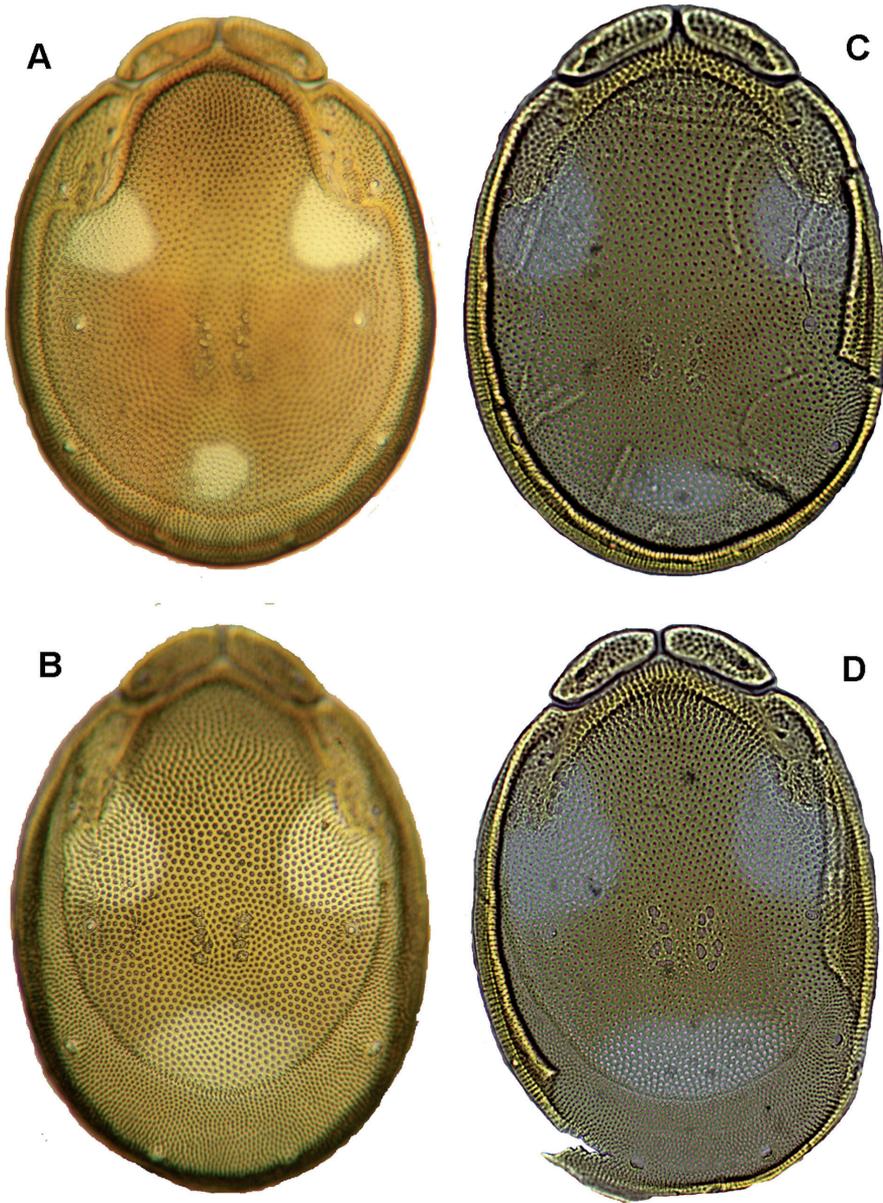


Figure 4. A–B: *Torrenticola ussuriensis* (Sokolow, 1940) (**A** male, **B** female), dorsal shield; **C–D:** *Torrenticola taiwanicus* sp. n. (**C** male, **D** female), dorsal shield.

additional specimens are required to confirm that the specimens from Japan are conspecific with *T. ussuriensis*.

Distribution. Far East of Russia (Primory and Khabarovsk Territory, Jewish Autonomous and Amurskaya Area - Sokolow 1934; present study); Japan (Uzi region - Enami 1940).

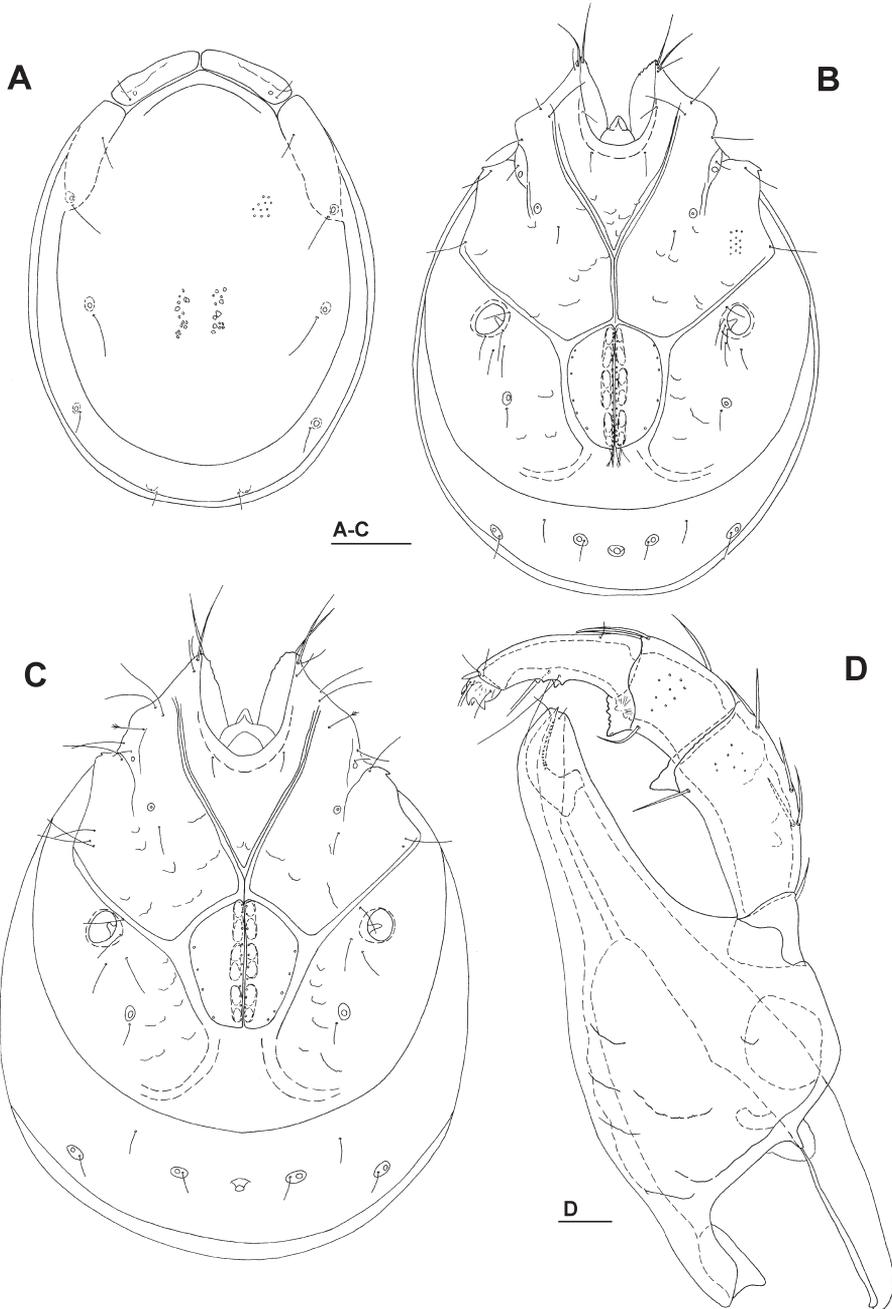


Figure 5. *Torrenticola ussuriensis* (Sokolow, 1940) (**A–B, D** male, **C** female): **A** dorsal shield **B–C** ventral shield **D** capitulum and palp, lateral view. Scale bars = 100 µm (**A–C**), 25 µm (**D**).

***Torrenticola nanshibensis* sp. n.**

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http://species-id.net/wiki/Torrenticola_nanshibensis

Fig. 6

Type material. Holotype male (NMNS-6600-001), dissected and slide mounted, Taiwan, Xindian River, 24°56'19.41"N, 121°31'38.38"E, 26.viii.2009.

Diagnosis. Frontal platelets broad (L/W ratio about 1.5); medial suture line Cx-2+3 relatively short; Cx-4 with a prominent suture line of starting at right angle from genital field, laterally curved anteriorly; capitulum deep with a short rostrum; palp robust and compact, P-2 shorter than P-4.

Description. Male. Idiosoma (ventral view: Fig. 6B) L 700, W 587; dorsal shield (Fig. 6A) L 641, W 481, L/W ratio 1.33; dorsal plate L 578; frontal plate L 123–125, W 81–84, L/W ratio 1.49–1.52; shoulder plate L 184, W 83, L/W ratio 2.2; L shoulder/frontal plate ratio 1.47; gnathosomal bay L 109, Cx-1 total L 253, Cx-1 medial L 142, Cx-2+3 medial 94; ratio Cx-1 L/Cx-2+3 medial L 2.7; Cx-1 medial L/Cx-2+3 medial L 1.5; genital field L/W 159/123, L/W ratio 1.3, ejaculatory complex conventional in shape, L 256; distance genital field–excretory pore 141, genital field–caudal idiosoma margin 194; capitulum (Fig. 6C) ventral L 269; chelicera total L 290; palp (Figs 6D–E) total L 303, L: P-1 34, P-2 89, P-3 62, P-4 93, P-5 25; L P-2/P-4 ratio 0.96; P-4 with well developed ventral tubercles.

Etymology. The species is named after Nanshih River system where it was collected.

Remarks. Due to the deep capitulum with a short rostrum, a prominent suture line of Cx-4 starting at right angle from genital field, a relatively short medial suture line of Cx-2+3 and the similar shape of the palp with robust and compact segments, P-2 shorter than P-4, and P-4 with well developed ventral tubercles, the new species resembles *Torrenticola brevisrostris* (Halbert, 1911). *Torrenticola nanshibensis* sp. n., can be easily distinguished from the latter species in having broad frontal platelets (L/W ratio about 1.5).

Distribution. Taiwan; known only from the *locus typicus*.

Genus *Monatractides* K. Viets***Monatractides* cf. *circuloides* (Halík, 1930)**http://species-id.net/wiki/Monatractides_circuloides

Fig. 7B–D

Material examined. Taiwan, Tonghou River, 24°50'23.74"N, 121°38'10.06"E, 25.viii.2009, 2/0/0 (1/0/0 mounted); *ibid.*, 24°50'23.74"N, 121°38'26.52"E, 15.vii.2009 3/0/0; *ibid.*, 25.viii.2009 1/1/0; *ibid.*, Nanshih River, 24°54'09.87"N, 121°33'20.74"E, 02.iii.2010, 0/1/0 (0/1/0 mounted); *ibid.*, 25.viii.2009, 0/1/0; Xindian River, 24°56'52.27"N, 121°32'42.54"E, 24.vi.2009 2/0/0; *ibid.*, 24°56'19.41"N, 121°31'38.38"E, 26.viii.2009 2/0/0.

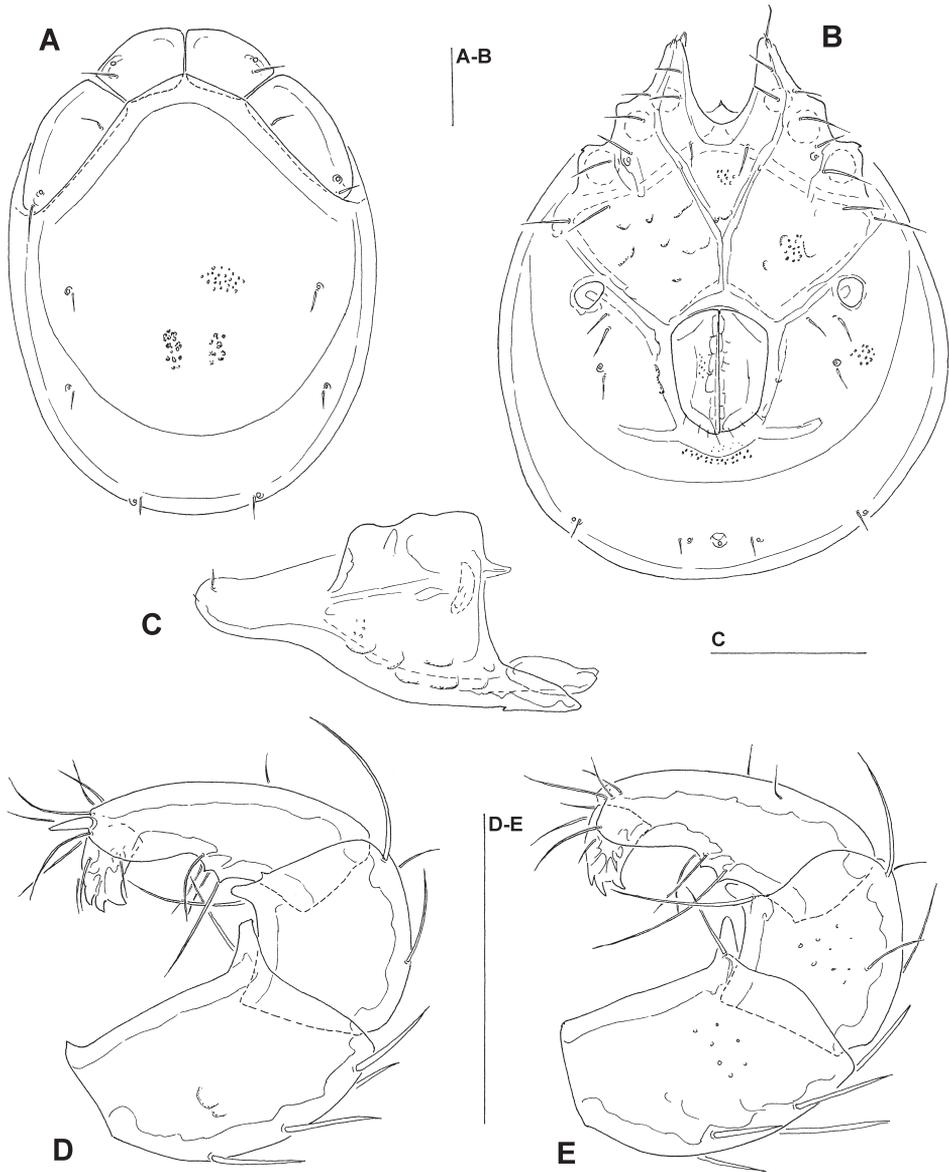


Figure 6. *Torrenticola nanshihensis* sp. n., male: **A** dorsal shield **B** ventral shield **C** gnathosoma **D** palp (P-1 missing), medial view **E** palp (P-1 missing), lateral view. Scale bars = 100 μ m.

Morphology. *Male.* Idiosoma L 966, W 719; dorsal shield L 806, W 600, L/W ratio 1.34; dorsal plate L 754; shoulder plate L 219, W 84, L/W ratio 2.6; frontal plate L 147, W 75, L/W ratio 1.85; shoulder/frontal plate L ratio 1.5; capitular bay L 188, its lateral margin with the three pairs of knob-shaped protrusions; Cx-1 total L 326, Cx-1 medial L 138, Cx-2+3 medial 127; ratio Cx-1 L/Cx-2+3 medial L 2.57; Cx-1

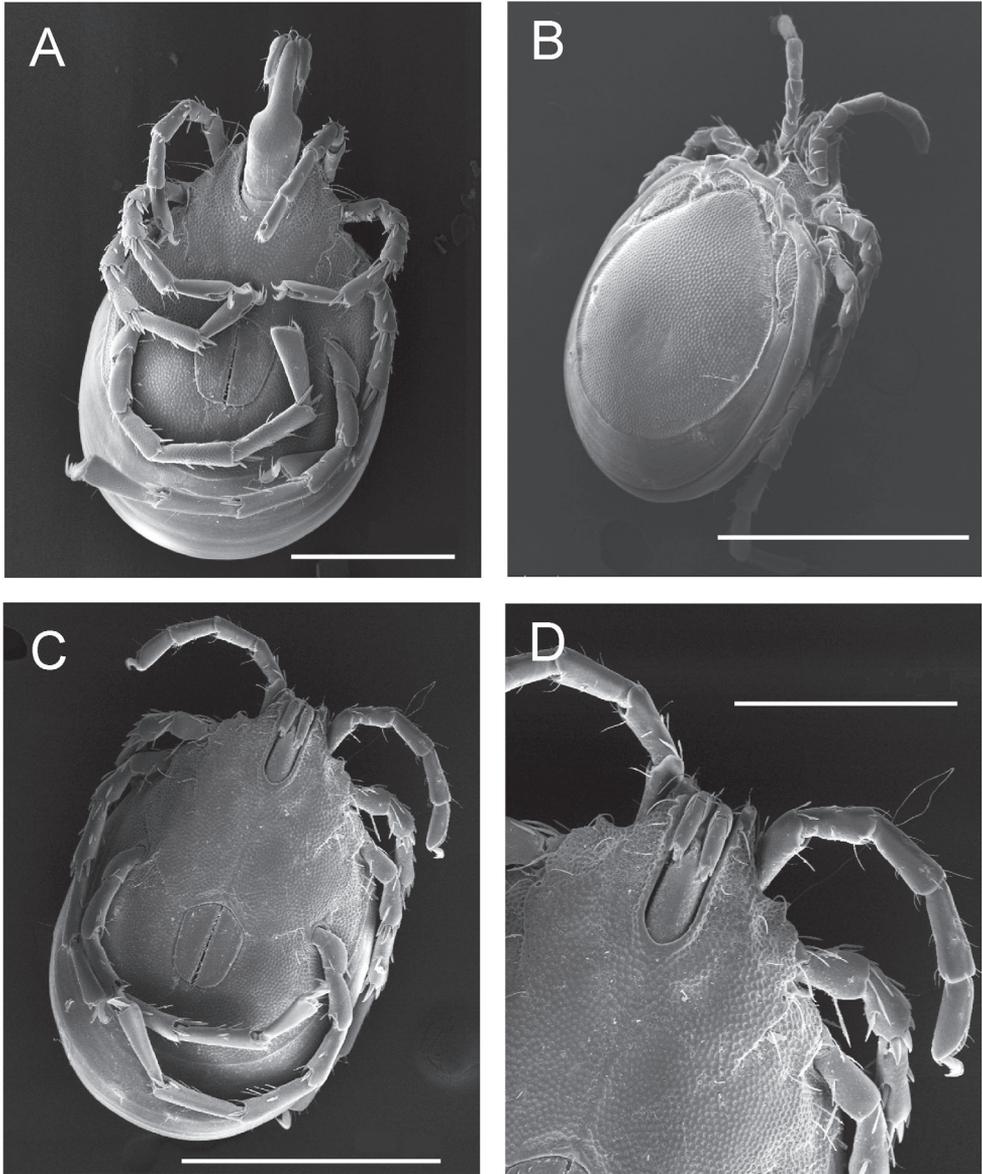


Figure 7. SEM photographs. **A** *Torrenticola taiwanicus* sp. n., female: **A** ventral view of idiosoma and gnathosoma, scale bar = 200 μ m. **B–D** *Monatractides* cf. *circuloides* (Halík, 1930), male: **B** dorso-lateral view of idiosoma and gnathosoma, scale bar = 500 μ m **C** ventral view of idiosoma and gnathosoma, scale bar = 500 μ m. **D** ventral view of gnathosoma and anterior part of idiosoma, scale bar = 200 μ m.

medial L/Cx-2+3 medial L 1.09; genital field L/W 188/144, L/W ratio 1.3; ejaculatory complex L 259; distance genital field–excretory pore 227, genital field–caudal idiosoma margin 320. Capitulum ventral L 220; chelicera L 262; palp total L 254, dL: P-1

29, P-2 83, P-3 47, P-4 63, P-5 32; P-2/P-4 ratio 1.3; P-4 with well visible denticle near the insertion of the ventral hairs; L I-L-4–6: 127, 120, 123.

Female. Idiosoma L 1094, W 806; dorsal shield L 894, W 687, L/W ratio 1.3; dorsal plate L 851; shoulder plate L 213, W 84, L/W ratio 2.54; frontal plate L 150, W 72, L/W ratio 2.08; shoulder/frontal plate L ratio 1.42; capitular bay L 205; Cx-1 total L 328, Cx-1 medial L 123, Cx-2+3 medial 105; ratio Cx-1 L/Cx-2+3 medial L 3.12; Cx-1 medial L/Cx-2+3 medial L 1.17; genital field L/W 206/194, L/W ratio 1.06; distance genital field–excretory pore 264, genital field–caudal idiosoma margin 438; capitulum ventral L 238; chelicera L 258; palp total L 260, L: P-1 29, P-2 85, P-3 50, P-4 64, P-5 32; P-2/P-4 ratio 1.33; L I-L-4–6: 135, 126, 120.

Remarks. Due to the presence of three pairs of knob-shaped protrusions at the margin of the capitular bay (Fig. 7D), a rounded capitular bay (Fig. 7D), a short capitular rostrum, relatively longer median suture line of Cx-2+3 (Fig. 7C–D), and the posterior medial region behind the genital field pointed, the specimens from Taiwan agree well with *Monatractides circulooides* (Halík, 1930), a species known from Malaysia and Thailand (Pešić and Smit 2009, 2010). Differences (in parentheses measurements of male specimen from Malaysia, data taken from Pešić and Smit 2010) are found in its larger idiosoma and palp dimensions (e.g., idiosoma L 881, dorsal shield L 763, genital field L/W 170/134, P-2 L 69, P-4 L 54). Knowledge on the degree of variability of the additional specimens from a wide area is necessary before we can assess the taxonomic status of these populations.

Distribution. Malaysia, Thailand, Taiwan.

Acknowledgements

RSWY acknowledges the Agriculture Department, New Taipei City Government for providing a collecting permit and a grant from the National Science Council, Taiwan (NSC) (NSC-99-2627-B-002-011-) and BKKC acknowledges the NSC grant (NSC-99-2621-B-001-007-MY3). We also express our deep gratitude to D.A. Sidorov and T.M. Tiunova (Institute of Biology and Soil Science, Vladivostok, Russia) for help in collecting the material.

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On the Chinese species of the genus *Intestinarius* Kurbatov (Coleoptera, Staphylinidae, Pselaphinae)

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Academic editor: Roberto Poggi | Received 31 March 2011 | Accepted 7 June 2011 | Published 7 July 2011

urn:lsid:zoobank.org:pub:8E3712E4-4BB4-4B59-A114-DEF3A7B24730

Citation: Yin Z-W, Li L-Z, Zhao M-J (2011) On the Chinese species of the genus *Intestinarius* Kurbatov (Coleoptera, Staphylinidae, Pselaphinae). ZooKeys 116: 15–24. doi: 10.3897/zookeys.116.1329

Abstract

A total of three Chinese species of the genus *Intestinarius* Kurbatov, 2007 are recognized, among which, two new species are described: *I. guangdongensis* **sp. n.** from Guangdong and *I. longiceps* **sp. n.** from Guizhou. Illustrations of major diagnostic characters are given for all three Chinese species including *I. kuzmini* Kurbatov, 2007. A key is included to aid in their identification.

Keywords

Coleoptera, Staphylinidae, Pselaphinae, *Intestinarius*, new species, key, taxonomy, China

Introduction

Eight species of the genus *Intestinarius* Kurbatov, 2007 (type species: *Batrisodes quinquesulcatus* Raffray, 1904) have been so far known from the Southeast Asia: one from Indonesia, two from Laos, three from Malaysia, one from both Singapore and Malaysia and one from China. *Intestinarius* was thought to be closely allied to *Mnia* Newton & Chandler, 1989 by certain shared morphological characters (Kurbatov 2007: 282; re-

ferring to *Mnia* see Löbl (1973)) and may be distinguished from *Mnia* by the presence of well-defined longitudinal sulci on the head and pronotum, by the first antennomere not remarkably elongate, by each elytron with three basal foveae, and by the sternite IV without discal carinae (basolateral incisions in Kurbatov (2007)).

Species of *Intestinarius* are morphologically similar and the correct identification must be based on the study of male sexual characters. In the present study, we found that characters on female genitalia may also provide a faithful identification.

During several recent collecting trips conducted in South and Southwest China, the authors and their colleagues collected some *Intestinarius* specimens in Guangdong, Guizhou, and Yunnan Provinces which prove to be two new and one known species. The purpose of this paper is to describe the new species, to provide illustrations of major diagnostic characters and a key for the identification of the so far known Chinese species.

Material and methods

All specimens were collected from the leaf litter of the forest floor by sifting. They were killed with ethylacetate and then dried. Dissections were done in 75% ethanol. The genital organs and other dissected parts were mounted in Euparal (Chroma Gesellschaft Schmidt, Koengen, Germany) on plastic slides that were placed on the same pin as the specimen. Photos were taken by a Canon EOS 40D Camera mounted with an MP-E 65 mm Macro Photo Lens or by a Canon G9 Camera mounted on an Olympus CX31 microscope; line drawings were made using Adobe Illustrator CS2.

Slash (/) is used to separate different lines on the same label. The terminology of foveal system follows Chandler (2001).

The following acronyms are used in the text:

- BL** length of body (= hl+pl+el+al)
- HL** maximum length of head, measured from anterior margin of clypeus to posterior base, excluding occiput
- HW** maximum width of head, measured across eyes
- PL** length of pronotum, measured along midline
- PW** maximum width of pronotum
- EL** length of elytra, measured along sutural line
- EW** maximum width of elytra
- AL** maximum length of abdomen
- AW** maximum width of abdomen.

Measurements were made based on a random sample of 45 specimens, unite is in millimeter.

All specimens studied are deposited in the Insect Collection of Shanghai Normal University, Shanghai, China (SNUC).

Taxonomy

Intestinarius guangdongensis Yin and Li, sp. n.

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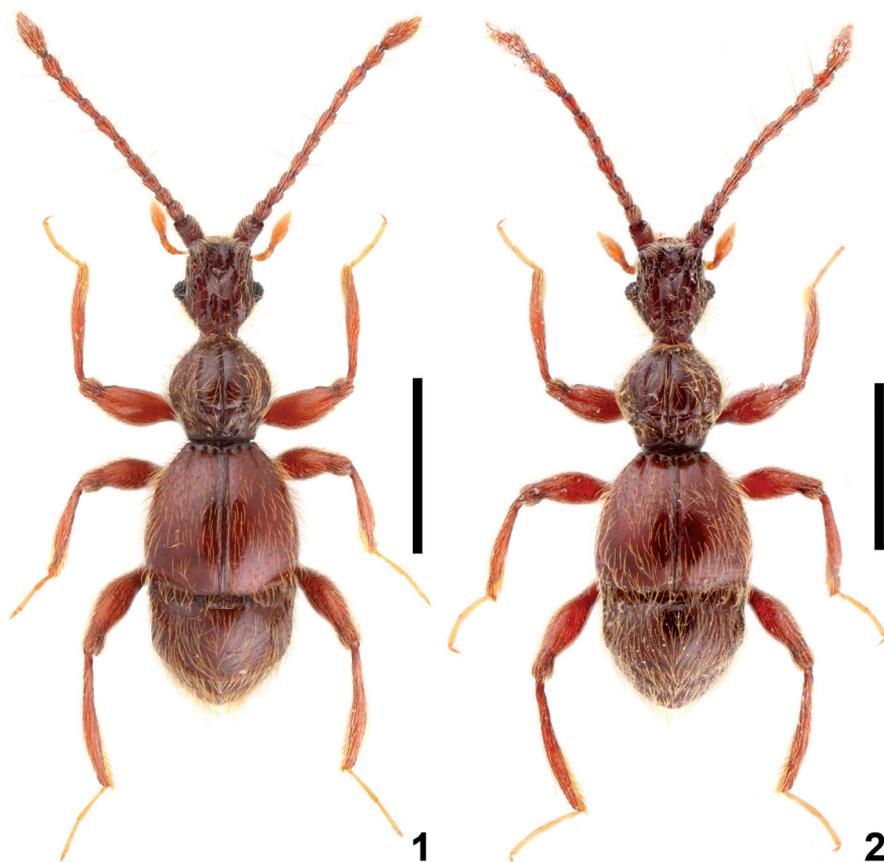
http://species-id.net/wiki/Intestinarius_guangdongensis

Figs 1, 3, 6, 9, 12, 15–22, 39–40, 45–46

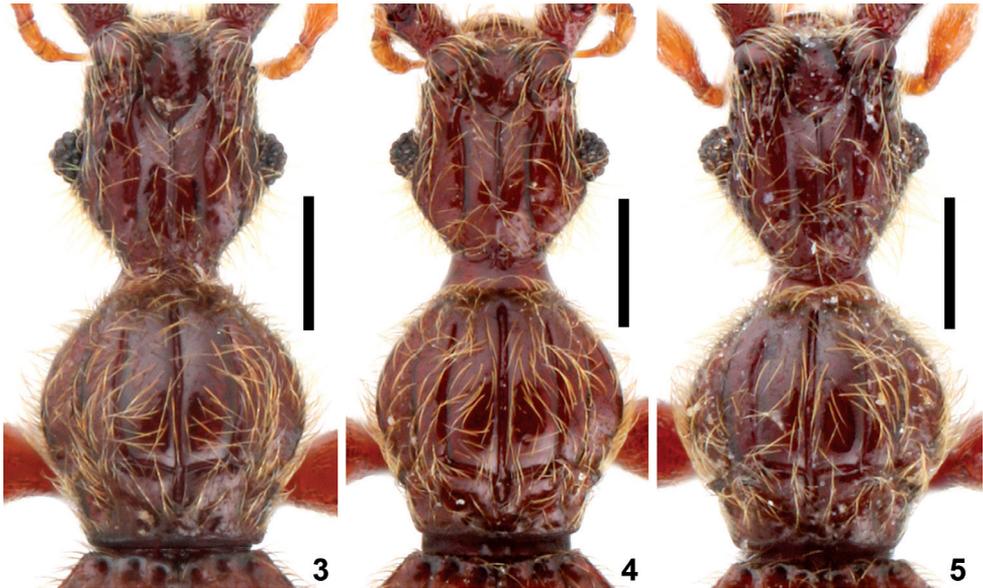
Type locality. Nan-ling National Nature Reserve, Guangdong Province, South China

Type material (7 ♂♂, 5 ♀♀). HOLOTYPE: ♂, labelled 'CHINA: GUANGDONG Prov. / Shaoguan City / Nanling National N. R. / 09.viii.2010 / Li-Zhen LI leg.'; Paratypes: 6 ♂♂, 5 ♀♀, same label data as holotype.

Description. Measurements: male (female). BL 2.62–2.72 (2.40–2.56), HL 0.58–0.63 (0.58–0.60), HW 0.52–0.55 (0.49–0.50), PL 0.56–0.58 (0.55–0.56), PW 0.58–0.59 (0.53–0.57), EL 0.87–0.89 (0.77–0.78), EW 0.93–0.94 (0.84–0.88), AL 0.61–0.62 (0.50–0.62), AW 0.83–0.85 (0.80–0.81). Length of aedeagus 0.41. Width of female genitalia 0.32.



Figures 1–2. Male habitus of *Intestinarius* spp. **1** *I. guangdongensis* **2** *I. longiceps*. Scales: 1.0 mm.

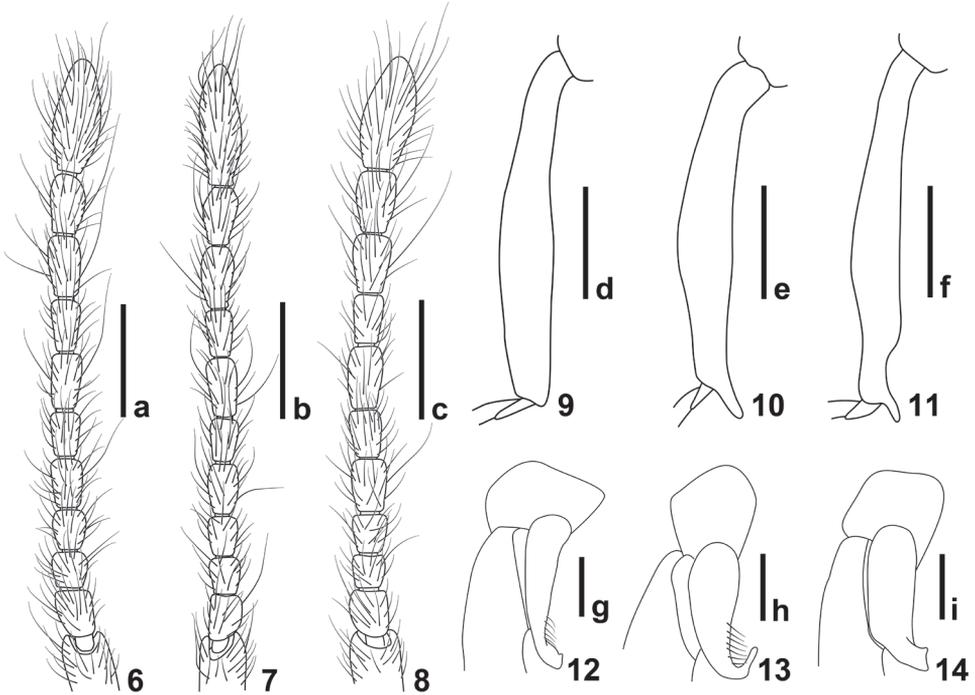


Figures 3–5. Head and pronotum of *Intestinarius* spp., male. **3** *I. guangdongensis* **4** *I. kuzmini* **5** *I. longiceps*. Scales: 0.3 mm.

Male (Fig. 1). Reddish-brown, maxillary palpi and tarsi lighter. Head, pronotum and elytra covered with long setae. Head (Fig. 3) slightly longer than wide. Clypeus short in dorsal view, roundly arcuate on anterior margin; frons markedly impressed between profoundly raised antennal tubercles; vertexal foveae situated backwards, vertexal sulci extended from vertexal foveae to frons; carinae lateral to the vertexal sulci derived from base of antennal tubercles well-defined; occipital carina reaching posterior margin of frontal impression; postocular margins moderately long, nearly straight, gradually narrowed toward base. Eyes well-developed, each comprised of about 25 facets. Fourth palpomere of maxillary palpi with tuft of dense and fine external setae. Gular carina not conjoint with gular fovea. Antennae as in Fig. 6. Pronotum (Fig. 3) about as long as wide, median longitudinal sulcus extended beyond transverse antebasal sulcus, two lateral longitudinal sulci well-defined, exterior one born from lateral antebasal foveae; two pairs of basolateral foveae and two pairs of antebasal conical tubercles well-defined. Each elytron with three basal foveae and complete sutural stria; discal stria short, reaching less than half of elytral length. Mesotrochanters slightly protuberant on posterior margin, mesotibiae without apical protuberance; metatrochanters modified (Fig. 12), setose on posterior margin.

Abdomen with tergite IV largest, V–VI about same length and successively narrowed, tergite (Figs 15–16) VII modified, provided with median small round impression, tuft of long setae directed toward posterior margin; tergite VIII as in Fig. 17; sternite VIII as in Fig. 18; sternite IX as in Fig. 19; aedeagus as in Figs 20–22.

Female. Slightly smaller than male; each eye comprised of about 15 facets; maxillary palpi, legs and tergite VII lacking modifications; tergite VIII as in Fig. 39; sternite VIII as in Fig. 40; female genitalia as in Figs 45–46.



Figures 6–14. Details of *Intestinarius* spp., male. **6–8** antenna **9–11** mesotibia **12–14** metatrochanter **6, 9, 12** *I. guangdongensis* **7, 10, 13** *I. kuzmini* **8, 11, 14** *I. longiceps*. Scales: a–c = 0.3 mm, d–f = 0.2 mm, g–i = 0.1 mm.

Distribution. Known only from the type locality.

Etymology. The species is named after its type locality.

Remarks. The modified maxillary palpomere IV of the new species is shared only with *I. quinquesulcatus*, type species of the genus, described from Singapore and Malaysia; the unmodified male mesotibiae is similar to that of *I. orthopygium* (Laos); the modified metatrochanters resemble those of *I. distorticeps* (Java), *I. quinquesulcatus*, *I. kuzmini* (Yunnan, China), *I. orthopygium*, *I. crassicornis* (Laos) and *I. longiceps* sp. n. (Guizhou, China); the modified tergite VII also occurs in most species of the genus except for *I. distorticeps* and *I. pexatus*. *Intestinarius guangdongensis* may be distinguished from all its congeners by a combination of the following characters: simple mesotibiae, shape of modified metatrochanters and shape of sternite VIII in male, shape of female tergite and sternite VIII and genital organs of both sexes.

One female specimen has tergite VII with median protuberance, but it is identical to other females in all characters including female genitalia. Thus, females of this species are most probably polymorphic in this character. Such polymorphism in *I. kuzmini* was also observed in Kurbatov (2007: 284) and in the present study (see remarks under *I. kuzmini*).

***Intestinarius kuzmini* Kurbatov**

http://species-id.net/wiki/Intestinarius_kuzmini

Figs 4, 7, 10, 13, 23–30, 41–42, 47–48

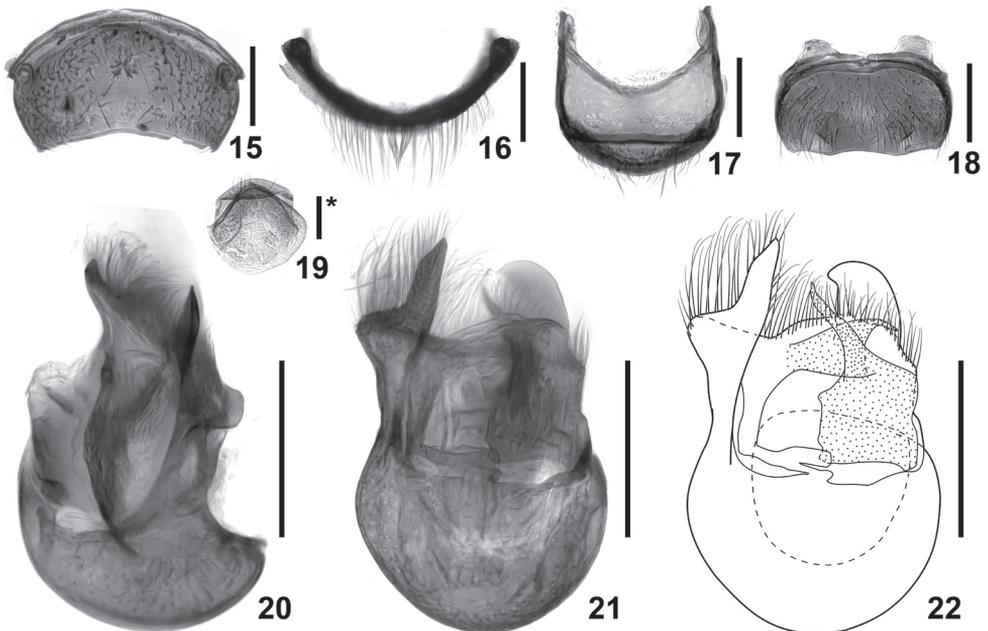
Intestinarius kuzmini Kurbatov, 2007: 283

Type locality. Mengyang Nature Reserve, South Yunnan Province, Southwest China.

Material studied (13 ♂♂, 9 ♀♀). 4 ♂♂ (1 ♂ with only aedeagus remained in Euparal), 2 ♀♀, labelled ‘CHINA: YUNNAN Prov. / Na-Ban-He N. R. / Xiao-nuo-you-xia-zhai / 20.ix.2008, alt. 950 m / HU & TANG leg.’; 5 ♂♂, 5 ♀♀, same, but ‘9.ix.2008, alt. 1,500 m’; 3 ♂♂, same, but ‘Man-fei / 18.ix.2008, alt. ca. 600 m’; 1 ♀, same, but ‘Guo-men-shan / 21.xi.2008, alt. ca 1,000 m / HU & TANG leg.’; 1 ♂, same, but ‘08.v.2009, alt. 1,200 m / HU & YIN leg.’; 1 ♀, same, but ‘05.i.2004 / LI & TANG leg.’.

Description. Measurements: male (female). BL 2.55–2.61 (2.42–2.57), HL 0.56–0.58 (0.55–0.56), HW 0.51–0.52 (0.50–0.51), PL 0.57–0.58 (0.56–0.57), PW 0.56–0.57 (0.55–0.56), EL 0.81–0.82 (0.73–0.75), EW 0.89–0.92 (0.90–0.92), AL 0.61–0.63 (0.58–0.69), AW 0.83–0.85 (0.86–0.88). Length of aedeagus 0.52. Width of female genitalia 0.28.

Eyes of male comprised of about 25 facets, of female of about 15 facets.



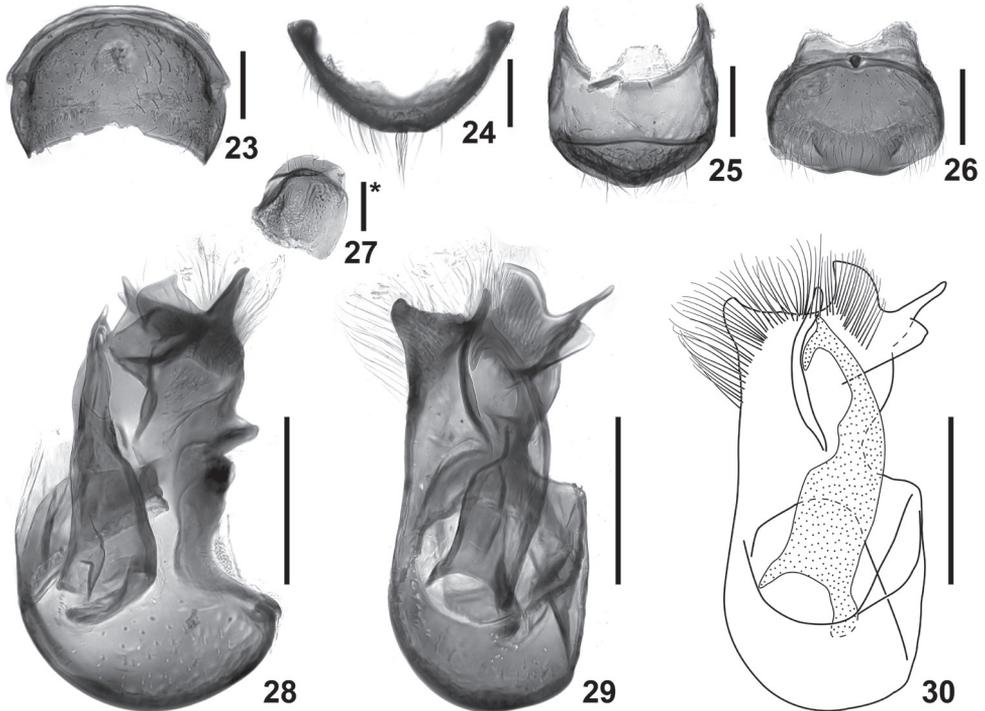
Figures 15–22. Details of *Intestinarius guangdongensis*, male. **15** tergite VII **16** same, anterior view **17** tergite VIII **18** sternite VIII **19** sternite IX **20** aedeagus, lateral view **21–22** same, dorsal view. Scales: 0.2 mm (scale with ‘*’ = 0.1 mm).

Detailed description of *I. kuzmini* refers to Kurbatov 2007: 283–284. Additional illustrations of the following major diagnostic characters are provided. Male: head and pronotum (Fig. 4), left antenna (Fig. 7), modified mesotibia (Fig. 10) and metatrochanter (Fig. 13), tergite VII (Fig. 23–24), tergite VIII (Fig. 25), sternite VIII (Fig. 26), sternite IX (Fig. 27) and aedeagus (Figs 28–30). Female: tergite VIII (Fig. 41), sternite VIII (Fig. 42) and genitalia (Figs 47–48).

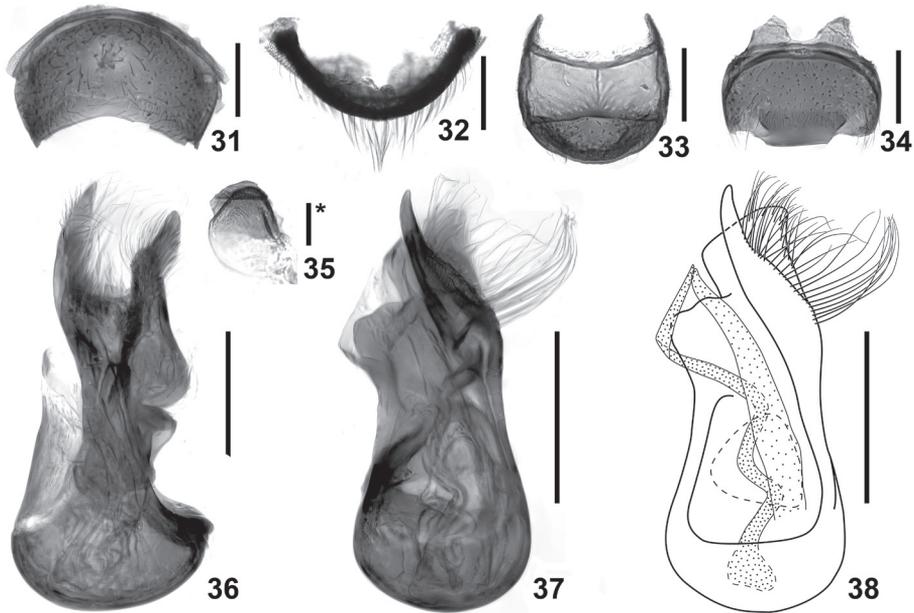
Distribution. Known from Meng-yang and Na-ban-he Nature Reserves of Yunnan Province, Southwest China.

Remarks. *Intestinarius kuzmini* is similar to its Chinese congeners with respect to the sexually modified tergite VII and metatrochanter. Male of this species may be distinguished by having long apical tooth on mesotibiae, by the shape of modified metatrochanter and by the shape of aedeagus; females may be identified based on the shape of tergite VIII, sternite VIII and genitalia.

Seven females out of nine studied have tergite VII with short, blunt to long, sharp median protuberance, but all morphological characters including genitalia are identical also with those two specimens lacking modified tergite VII. Thus, we believe that in some species of *Intestinarius*, females are most probably polymorphic in this character. (see also remarks under *I. guangdongensis*).



Figures 23–30. Details of *Intestinarius kuzmini*, male. **23** tergite VII **24** same, anterior view **25** tergite VIII **26** sternite VIII **27** sternite IX **28** aedeagus, lateral view **29–30** same, dorsal view. Scales: 0.2 mm (scale with ‘*’ = 0.1 mm).



Figures 31–38. Details of *Intestinarius longiceps*, male. **31** tergite VII **32** same, anterior view **33** tergite VIII **34** sternite VIII **35** sternite IX **36** aedeagus, lateral view **37–38** same, dorsal view. Scales: 0.2 mm (scale with ‘*’ = 0.1 mm).

***Intestinarius longiceps* Yin and Li, sp. n.**

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http://species-id.net/wiki/Intestinarius_longiceps

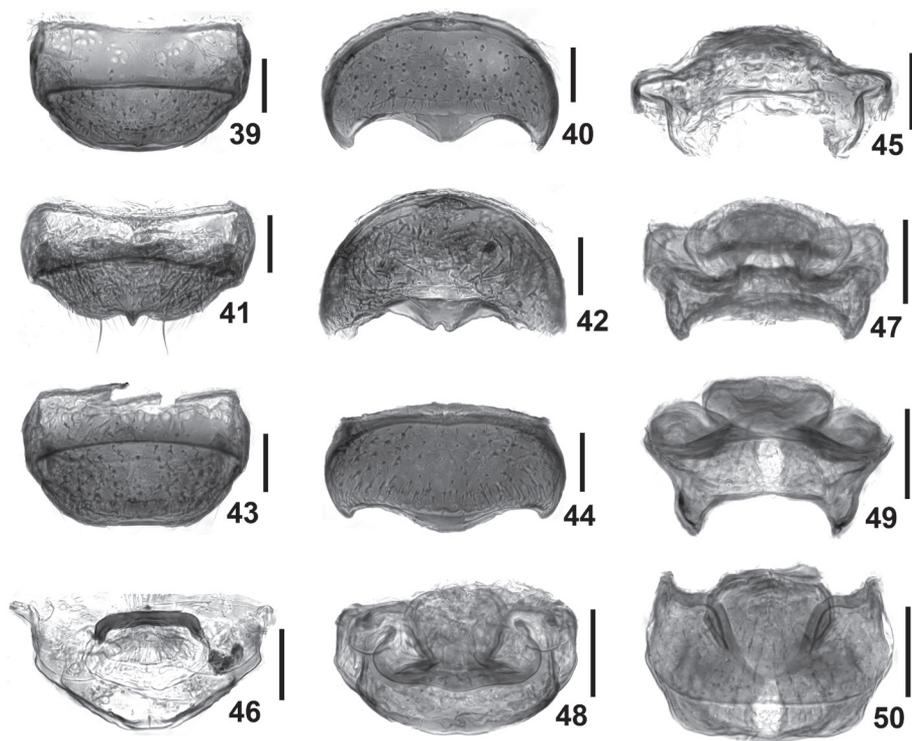
Figs 2, 5, 8, 11, 14, 31–38, 43–44, 49–50

Type locality. Kuankuoshui Nature Reserve, Guizhou Province, Southwest China

Type material (2 ♂♂, 10 ♀♀). HOLOTYPE: ♂, labelled ‘CHINA: Guizhou Prov. / Kuankuoshui N. R. / Baishaogou / 04.vi.2010 / alt. 700 m / YIN & ZHAI leg.’; Paratypes: 1 ♂, 8 ♀♀, same label data as holotype; 1 ♀, same, but ‘750–900 m / 05.vi.2010 / YIN & ZHAI leg.’; 1 ♀, same, but ‘03.vi.2010 / alt. 700 m’.

Description. Measurements: male (female). BL 2.54–2.63 (2.49–2.57), HL 0.59–0.60 (0.59–0.62), HW 0.51–0.52 (0.51–0.52), PL 0.56–0.57 (0.55–0.56), PW 0.55–0.57 (0.55–0.56), EL 0.74–0.75 (0.73–0.75), EW 0.90–0.91 (0.85–0.88), AL 0.63–0.69 (0.61–0.64), AW 0.76–0.80 (0.78–0.80). Length of aedeagus 0.50. Width of female genitalia 0.27.

General morphology similar to *I. guangdongensis* sp. n., but it differs in the followings: Male maxillary palpomere IV not modified; postocular margins remarkably long; antennae (Fig. 8) more robust; mesotibiae (Fig. 11) constricted in apical portion, apical tooth slightly shorter than first tarsomere; metatrochanter (Fig. 14) on posterior margin with broad protuberance, not setose; tergite VII as in Figs 31–32; tergite VIII as in



Figures 39–50. Details of *Intestinarius* spp., female. **39, 41, 43** tergite VIII **40, 42, 44** sternite VIII **45, 47, 49** female genitalia, posterior view **46, 48, 50** same, dorsal view **39, 40, 45, 46** *I. guangdongensis* **41, 42, 47, 48** *I. kuzmini* **43, 44, 49, 50** *I. longiceps*.

Fig. 33; sternite VIII as in Fig. 34; sternite IX as in Fig. 35; aedeagus as in Figs 36–38; female tergite VIII as in Fig. 43; sternite VIII as in Fig. 44; genitalia as in Figs 49–50.

Distribution. Known only from the type locality.

Etymology. The new species is named after its long postocular margins.

Remarks. The new species may be distinguished from all its congeners by the combination of the male secondary sexual characters, *viz.* the mesotibiae and metatrochanter, the tergites VII–VIII and the sternites VIII–IX, and the shapes of male and female genitalia.

Key to Chinese species of the genus *Intestinarius* Kurbatov

All the Chinese species are externally very similar, thus, a faithful identification must be based on the dissection of the male and female genital organs combined with certain male secondary sexual characters included in the following key.

- 1 Male: fourth maxillary palpomere with tuft of dense and short setae on exterior margin; mesotibiae lacking apical protuberance (Fig. 9); aedeagus robust,

- shape as in Figs 20–22. Female: sternite VIII as in fig. 40, female genitalia membranous in most parts, shape as in Figs 45–46. (Guangdong)
 ***I. guangdongensis* sp. n.**
- Male: maxillary palpi unmodified, mesotibiae with apical protuberance; aedeagus elongate, not fitting above. Female: sternite VIII not as in Fig. 40, female genitalia weakly sclerotized in most parts, structure not as above **2**
- 2 Postocular margins not straight, shorter than anterior half of head (Fig. 4). Male: apical protuberance of mesotibiae much longer than first tarsomere (Fig. 10), metatrochanters on posterior margin with apically narrowed and abruptly curved thick spine, setose (Fig. 13), aedeagus as in Figs 28–30 (also see Kurbatov 2007: 284, fig. 12). Female: tergite VIII with median prominence (Fig. 41) and tergite VIII with median emargination (Fig. 42) on each posterior margin; female genitalia as in Figs 47–48. (Yunnan) ***I. kuzmini* Kurbatov**
- Postocular margins straight, about as long as anterior half of head (Fig. 5). Male: apical protuberance of mesotibiae slightly shorter than first tarsomere (Fig. 11), metatrochanters on posterior margin with apically broad protuberance, lacking setae (Fig. 14), aedeagus as in Figs 36–38. Female: tergite VIII with posterior margin almost flat (Fig. 43), sternite VIII not emarginated medially (Fig. 43), female genitalia as in Figs 49–50. (Guizhou) ***I. longiceps* sp. n.**

Acknowledgements

The authors thank Drs. S. A. Kurbatov and Ivan Löbl for sending reprints of their papers. The collectors mentioned in the text are acknowledged for making the specimens available to the present study. Sincere thanks also go to the two anonymous reviewers who provided valuable comments on this manuscript. The present study is supported by the National Natural Science Foundation of China (No. 30870323) and the Shanghai Natural Science Foundation (No. 10ZR1421600).

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Hypsilara royi gen. n. and sp. n. (Coleoptera, Elmidae, Larainae) from Southern Venezuela, with a revised key to Larainae of the Western Hemisphere

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Academic editor: Terry Erwin | Received 4 April 2011 | Accepted 14 June 2011 | Published 7 July 2011

[urn:lsid:zoobank.org:pub:35154508-B060-41D7-936C-98A309A22177](https://doi.org/urn:lsid:zoobank.org:pub:35154508-B060-41D7-936C-98A309A22177)

Citation: Maier CA, Spangler PJ (2011) *Hypsilara royi* gen. n. and sp. n. (Coleoptera, Elmidae, Larainae) from Southern Venezuela, with a revised key to Larainae of the Western Hemisphere. ZooKeys 116: 25–36. doi: 10.3897/zookeys.116.1347

Abstract

Here we describe a new genus, for a new species of riffle beetle, *Hypsilara royi* **gen. n.** and **sp. n.**, from the tepui Cerro de la Neblina in southern Venezuela. This new genus can be distinguished from all other laraine genera by its small size (ca. 4.5 mm) and the presence of a shallow, wide, V-shaped groove across the apical third of the pronotum. An updated key to the genera of Western Hemisphere Larainae is provided, along with information on habitat and collection methods for this taxon.

Resumen

Se describe un género nuevo, para una especie nueva de Elmidae, *Hypsilara royi* **gen. n.** and **sp. n.**, del tepui Cerro de la Neblina en el sur de Venezuela. Este género nuevo se distingue de todos los otros géneros de Larainae por su tamaño pequeño (aprox. 4.5 mm) y por la presencia de un surco superficial en forma de “V” en el tercio apical del pronoto. Se presenta una clave actualizada de los géneros de la subfamilia Larainae en el hemisferio occidental, así como información del hábitat y métodos de colecta de este taxón.

Keywords

Aquatic insects, Cerro de Neblina, Neotropical Region, riffle beetle, tepui, Guiana Shield

Introduction

The Elmidae are a cosmopolitan family of beetles common in a variety of running water habitats. They are known for their “leggy” appearance, with long legs and claws that aid in clinging to rocks and other detritus in fast-flowing water. Members of the subfamily Larainae are atypical among the riffle beetles, as the adults do not live submerged, but on water-splashed rocks and in moist detritus at the water’s edge.

Currently, there are 26 genera of laraines described, with ten occurring in the Neotropical Region. The Central American and West Indian fauna was revised in 1991 by Spangler and since then, two other genera have been described from the tepuis of southern Venezuela, *Roraima* Kodada and Jäch, from Mount Roraima, and *Neblinagena* Spangler, from Cerro de Neblina.

Specimens of the new genus described here were collected from Cerro de la Neblina, the “Mountain of the Mists” in southeastern Amazonas State, Venezuela (Fig. 1). Cerro de la Neblina is a 647 km² precipitous sandstone mesa or tepui, one of numerous high, table-top mountains that occur in northern South America (Spangler 1985). These mesas are the eroded remains of a former large plateau, the Guiana Highland Shield and rise sharply from the tropical rain forests, with their tops often obscured by a dense cloud cover.

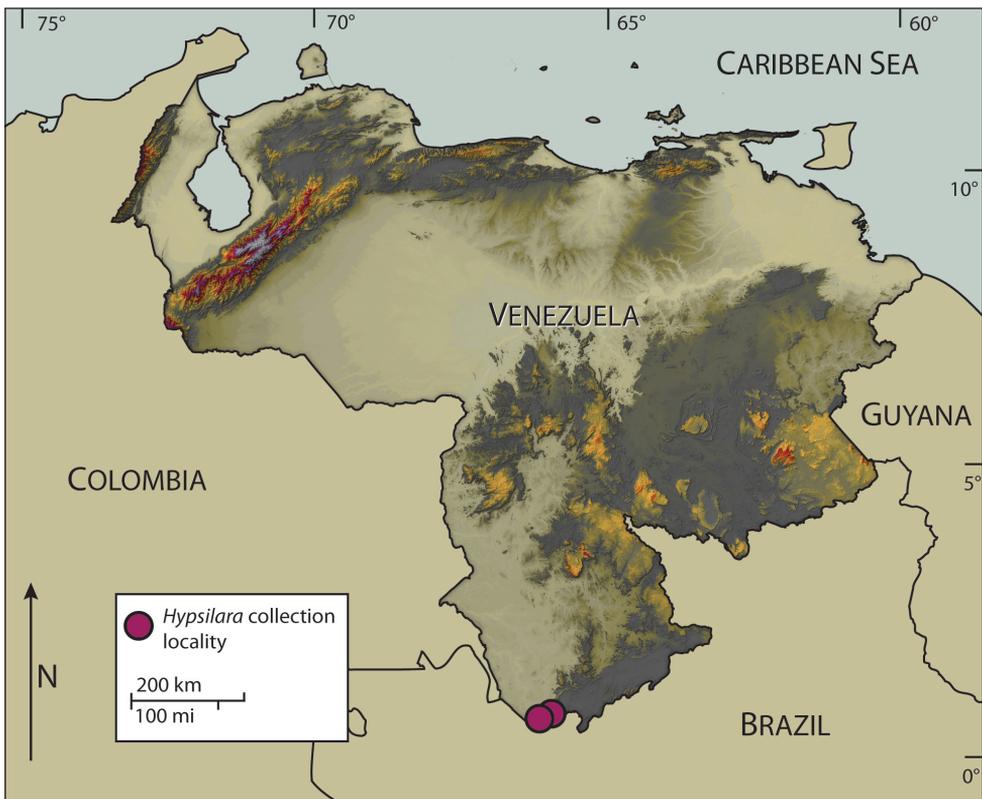


Figure 1. Map of Venezuela, showing collection localities for *Hypsilara* spp.

Methods

Specimens of this new taxon were collected during a biological survey of Cerro de la Neblina in 1985. They were photographed using a Canon EOS 70D with a Visionary Digital imaging system and photos were stacked using CombineZM image editing software.

For scanning electron micrographs, the specimen was dehydrated in 100% ethanol and cleaned with an insect pin and fine brush. The specimen was then affixed to an SEM stub using carbon tape and coated with gold. Micrographs were taken using a Leo 1550 Scanning Electron Microscope at the Microscopy and Analytical Imaging Laboratory at the University of Kansas.

The genitalia were extracted from relaxed specimens through the caudal opening in the abdomen. The genitalia were then cleared in heated potassium hydroxide for thirty minutes, rinsed with water, and temporarily mounted in glycerin for observation and illustration. The cleared genitalia were then placed in a glass genitalia vial below the specimen for storage.

Hind wings were removed and dry mounted on slides using methods outlined in Kukulová-Peck and Lawrence (1993). Veins were homologized using terminology from Kukulová-Peck and Lawrence (1993) and Kodada and Jäch (2005). Illustrations were made in pen and ink using a camera lucida attached to a Olympus SZX7 microscope. Images were edited in Adobe Illustrator and Adobe Photoshop. Specimens were deposited in the following collections:

- MIZA** Museo del Instituto de Zoología Agrícola Maracay, Venezuela
MALUZ La Universidad del Zulia, Maracaibo, Venezuela
NMPC National Museum, Prague, Czech Republic
NMW Naturhistorisches Museum, Vienna, Austria
SEMC Snow Entomology Collection, University of Kansas, Lawrence, Kansas, USA
USNM Smithsonian Institution, Washington, DC, USA

Taxonomy

Hypsilara gen. n.

urn:lsid:zoobank.org:act:0F2AFFF1-1D67-4FDD-BE59-1151F6926584

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

Figs 2–17

Type species: *Hypsilara royi* sp. n.

Diagnosis. This genus can be distinguished from all other laraine genera by its small size (ca. 4.5 mm), and the presence of a shallow, wide, V-shaped groove across apical third of the pronotum (Fig. 10).



Figures 2–4. *Hysilara royi* sp. n. **2** Habitus, dorsal view; Scale bar = 2 mm **3** Habitus, ventral view **4** Habitus, lateral view.

Description. Body elongate, form gradually widening to posterior two-thirds of elytra then converging to elytral apex, moderately convex (Fig. 2). Integument clothed with dense, recumbent pubescence.

Head capable of being partly retracted into prothorax but not beyond the basal portion of the submentum (Fig. 4). Maxillary palpus four segmented. Labial palpus three segmented. Antenna eleven segmented, with apical six segments forming a club (Fig. 8). Clypeus transversely subrectangular; frontoclypeal suture deeply impressed between bases of antennae; anterolateral angles broadly rounded. Labrum transversely subrectangular; anterior margin without distinct emargination medially; anterolateral angles broadly rounded.

Pronotum widest at base, weakly sinuate laterally, becoming evenly arcuate over head; base trisinate, broadly sinuate on each side and much more narrowly so immediately anterior to scutellum; anterolateral angles explanate and broadly depressed;

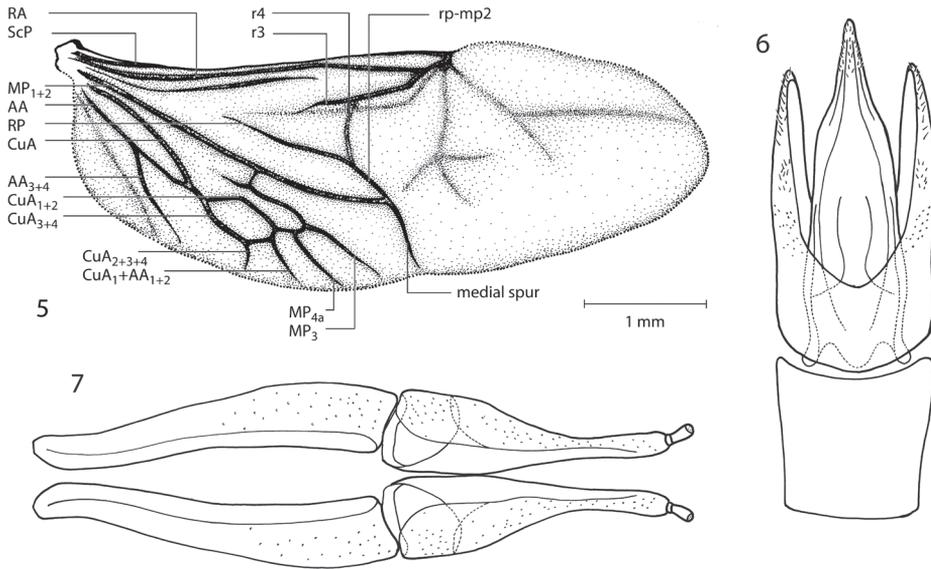
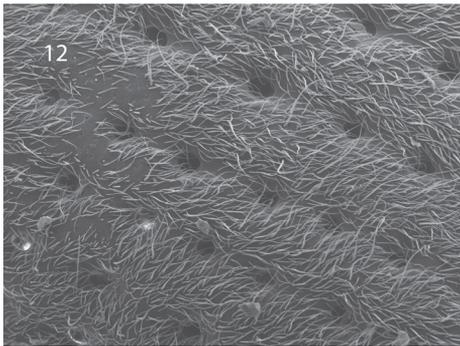
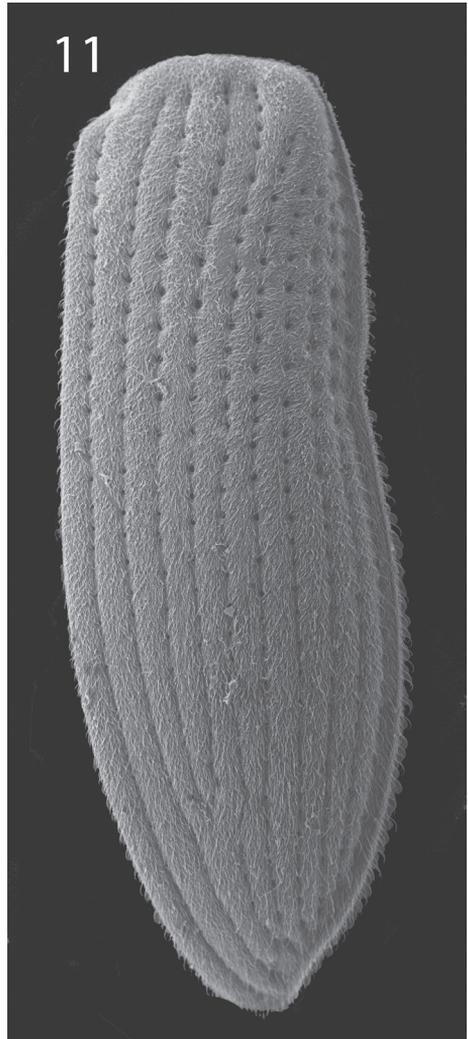
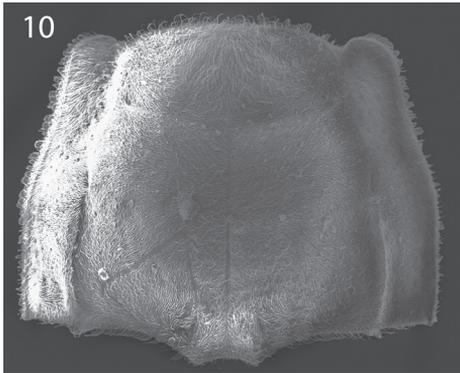
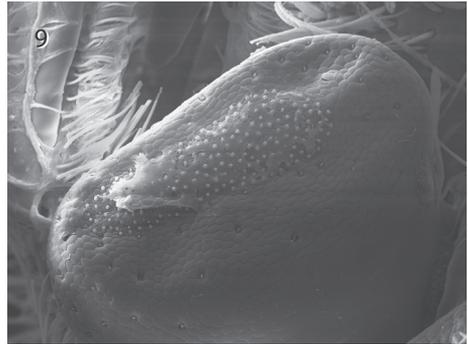
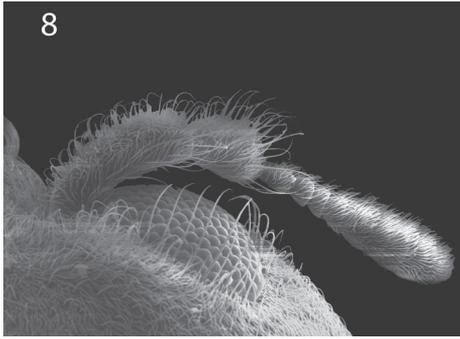


Figure 5–7. *Hypsilara royi* sp. n. **5** Hind wing **6** Male genitalia **7** Female genitalia.

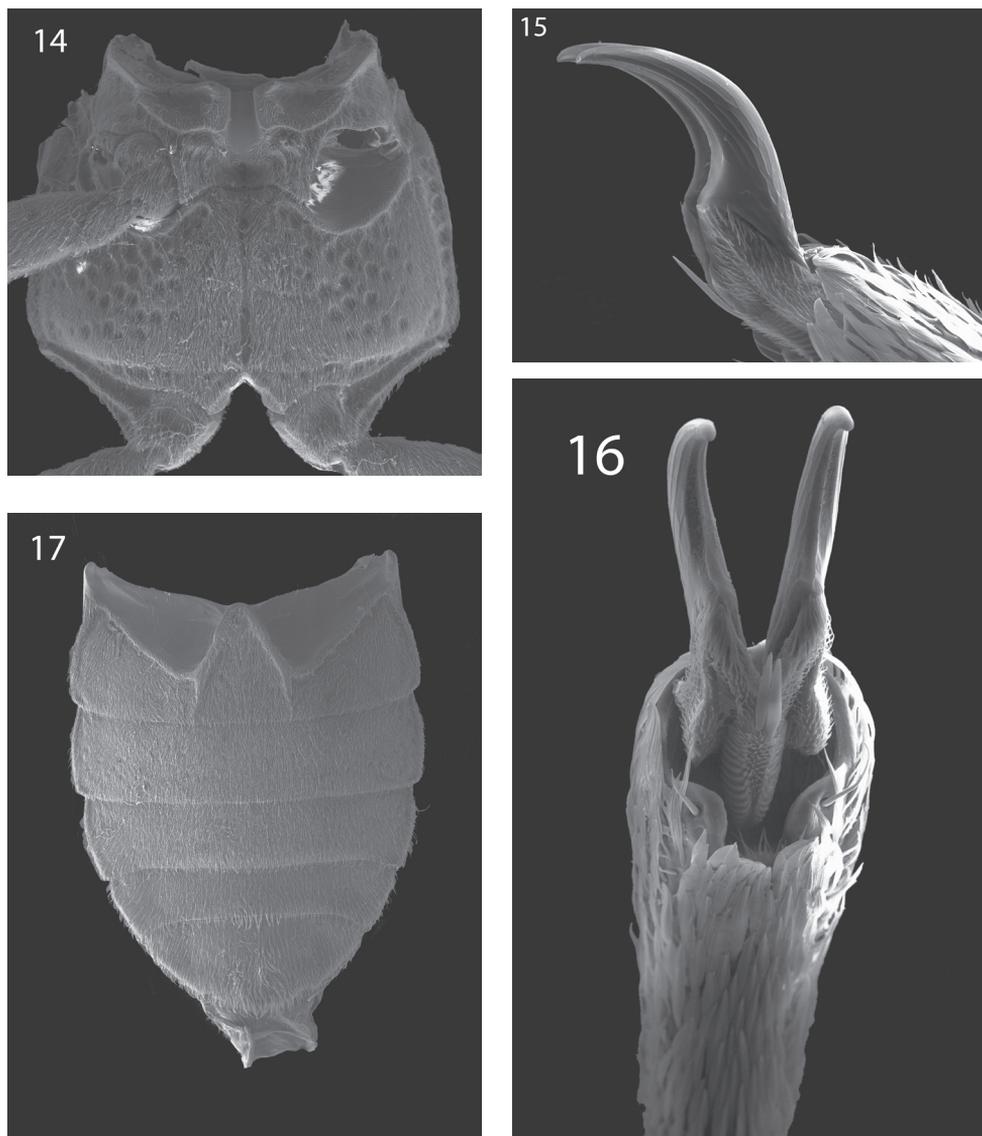
posterolateral angles slightly explanate, declivous, not depressed; middle of base with two short, broad, prescutellar cariniform ridges, each ridge with distinct lateral depression (Fig. 10). Pronotum with V-shaped discal groove; lateral branches of groove shallowly depressed, almost confluent with sublateral arcuate-sinuate groove but interrupted by short carina laterally; stem of Y-shaped groove shallow; sublateral carina short, evident at base then merging with lateral margin. Scutellum flat, wider than long, subtriangular. Elytron with ten longitudinal rows of deep punctures; without accessory row of punctures; without complete longitudinal carinae; apex rounded, not prolonged (Fig. 11). Prosternum very long anterior to procoxae, about as long as prosternal process; moderately reflexed along anterior margin (Fig. 3). Prosternal process broadly triangular between procoxae; apex narrowed and rounded. Mesoventrite with deep, broadly V-shaped depression on midline for the reception of apex of prosternal process. Metaventrite with disc shallowly, broadly depressed on posterior two-thirds; with longitudinal groove deepest and broadest on posterior third of midline (Fig. 14). Legs with visible portion of procoxae transverse and trochantin visible. Claws prominent and without teeth (Figs 15, 16).

Hind wing lightly pigmented. Radial bar strong; radio-medial loop and radial cross vein r4 distinct; radial cell incomplete; medial fleck absent; media posterior MP_{1+2} strong, distinct; medial spur long, nearly reaching wing margin; first and second cubito-anal cells present; medial field with five free veins reaching margin (medial spur not included); anal field with single vein; apical field with two lightly pigmented bands (Fig. 5).

Abdomen with five ventrites. First ventrite with paired, broad carinae posterior to metacoxae extending almost to hind margin of ventrite (Fig. 17).



Figures 8–13. *Hysilara royi* sp. n. **8** Antenna **9** Maxillary palp **10** Pronotum, dorsal view **11** Elytron **12** Elytron, detail **13** Elytron, setae removed to show configuration.



Figures 14–17. *Hypsilara royi* sp. n. **14** Metaventrite **15** Tarsal claw, lateral view **16** Tarsal claw, ventral view **17** Abdomen, ventral view.

Etymology. *Hypsilara* from the Greek “hypsos” meaning “aloft”, from its elevated habitat on Cerro de Neblina, and “lara”, from the subfamily name, Larainae. The gender is feminine.

Remarks. *Hypsilara royi* sp. n. was also collected from a flight intercept trap operated in the lowland rain forest (140 m elev.) near the base camp (00°50'N 66°10'W) (Fig. 1). PJS had designated this single male specimen as a new species; based on genitalia differences, though specimens bearing genitalia similar to the base camp specimen

were collected at the type locality of *Hypsilara royi* sp. n. Therefore, we decided not to designate it as a new species at this time.

Comparative notes. This new genus keys to couplet 4 in Brown's (1981) key to the world genera of the elmid subfamily Larainae. Since Brown's key was published, four new genera of Larainae have been described from the Western Hemisphere: *Nebelinagena* Spangler, *Pharceonus* Spangler and Santiago, *Roraima* Kodada and Jäch, and *Hypsilara* gen. n. Therefore we are presenting the following revised key to the Larainae of the Western Hemisphere which incorporates all genera described to date.

Key to the Genera of Adult Larainae of the Western Hemisphere

- | | | |
|-------|---|---|
| 1 | Body size smaller, length 2.5 to 4.5 mm..... | 2 |
| 1' | Body size larger, length 5.1 to 10.1 mm..... | 6 |
| 2(1) | Elytron with one accessory basal stria. Chile and Argentina | |
| | | <i>Hydora</i> Broun, 1882 |
| 2' | Elytron without an accessory basal stria | 3 |
| 3(2') | Pronotum with a deep transverse groove across apical third (see Spangler and Santiago 1992: Fig. 5)..... | 5 |
| 3' | Pronotum without a transverse groove, or with a shallow, wide, V-shaped groove across apical third (Figs 3, 10; see Spangler and Santiago 1992: Fig. 3) | 4 |
| 4(3') | Pronotum with a shallow, wide, V-shaped groove across apical third (Fig. 10). Southern Venezuela..... | <i>Hypsilara</i> gen. n. |
| 4' | Pronotum without a transverse groove (see Spangler and Santiago 1992: Fig. 3). Texas, USA, south to Peru, Greater Antilles | <i>Phanocerus</i> Sharp, 1882 |
| 5(3) | Pronotum with a median groove and without small prescutellar foveae; anterolateral angles of pronotum rounded (see Spangler and Santiago 1992: Fig. 4). Costa Rica, south to Venezuela | <i>Pharceonus</i> Spangler and Santiago, 1992 |
| 5' | Pronotum without a median groove and with two small prescutellar foveae; anterolateral angles of pronotum declivous (see Spangler and Santiago 1992: Fig. 5). Mexico, south to Peru and West Indies | <i>Hexanchorus</i> Sharp, 1882 |
| 6(1') | Elytron with one accessory basal stria. British Columbia, Canada and Pacific Northwestern United States | <i>Lara</i> LeConte, 1852 |
| 6' | Elytron without an accessory basal stria | 7 |
| 7(6') | Elytron with distinct longitudinal carinae (see Kodada and Jäch 1999: Fig. 28). Southern Venezuela | <i>Roraima</i> Kodada & Jäch, 1999 |
| 7' | Elytron without distinct longitudinal carinae..... | 8 |
| 8(7') | Pronotum with a distinct transverse groove across apical third | 9 |
| 8' | Pronotum without a transverse groove across apical third (see Spangler and Santiago 1992 Fig. 8). Costa Rica, south to Peru | <i>Disersus</i> Sharp, 1882 |
| 9(8) | Pronotum with a lateral longitudinal carina or arcuate-sinuate groove on basal third..... | 10 |
| 9' | Pronotum without a carina or arcuate-sinuate groove on basal third | 11 |
| 10(9) | Pronotum with two prescutellar mammiform tubercles at base and one similar tubercle near each posterolateral angle, thus appearing bidentate (see | |

- Spangler and Santiago 1992: Fig. 6). Panama, south to Ecuador.....
*Pseudodisersus* **Brown, 1981**
- 10' Pronotum with two short, converging, prescutellar carinae, each with a deep pit laterally (see Spangler 1989: Fig. 9). Venezuela
*Neblinagena* **Spangler, 1985**
- 11(9') Body narrow. Prosternal process sagittate, tapering gradually to apex (see Spangler and Santiago 1992: Fig. 215). Hispaniola.....
*Hispaniolara* **Brown, 1981**
- 11' Body broad. Prosternal process ligulate at apex (see Spangler and Santiago 1987: Fig. 128). Argentina and Brazil*Potamophilops* **Grouvelle, 1896**

***Hypsilara royi* sp. n.**

urn:lsid:zoobank.org:act:F34363E2-E809-4193-8EC6-35416E0D66FF

http://species-id.net/wiki/Hypsilara_royi

Figs 2–17

Type material. Holotype male: “VENEZUELA: T. F. AMAZ./ Cerro de la Neblina/ Camp XI 1450 m/ 00°52'N 65°58'W” “at stream/ 26–27 February 5 1985/ P. J. and P. M. Spangler, R. A. Faitoute/ collector”. Holotype deposited in MIZA. Paratypes (31): Same locality data as holotype (4 males 11 females); same data as holotype, except Camp X, 00° 54'N 60° 2'W, 1690m, 12–13 February 1985, W. Steiner (8 males 8 females). Paratypes will be deposited in: 7 in MIZA, 1 in MALUZ, 1 in NMPC, 1 in NMW, 5 in SEMC, and 16 in USNM.

Other Material Examined: “VENEZ., T.F.A./C.d.I. Neblina/Base camp/26–31 Jan. 1985/Flite [sic] intercept Pan/Trap” (1 male). “VENEZUELA: T. F. AMAZ./ Cerro de la Neblina/ Camp X, 1690m/ 00° 54'N 60° 2'W/ 12 February 1985” “Small sunlit stream;/leaf packs in falls/between boulders/ W. E. Steiner,/collector” (3 females).

Diagnosis. Monotypic genus – see generic diagnosis.

Description. Holotype Male. Body elongate, subparallel, dorsum moderately convex. Length, 4.4 mm; greatest width, 2.0 mm. Body dark brown dorsally; venter light reddish brown, except elytral epipleura, metepisternum, lateral margins of abdominal ventrites 3–5 dark brown. Antenna, maxillary palpus, labial palpus, labium, maxilla, coxa, trochanter, basal four-fifths of profemora and mesofemora lighter reddish-brown. Dorsal and ventral surface densely covered with recumbent setae (Fig. 2).

Head moderately coarsely, densely punctate; punctures separated by their diameter; cuticle microreticulate. Eye hemispherical, bordered with row of long, curved setae (Fig. 8). Basal two segments of antenna with long, dense pubescence (Fig. 8). Clypeus anteriorly with shallow arcuate emargination. Labrum subrectangular; surface with fine, dense punctation and densely fringed with long, fine, golden, hairlike setae; anterolateral angles rounded but not expanded laterally; lateral margins not expanded, with a long, dense tuft of golden hairlike setae curled over margin. Labium with long,

dense setae. Last segment of maxillary palpus broad and bearing sensillae on flattened apex (Fig. 9).

Pronotum 1.4 mm long, 1.5 mm wide; with deep sinuate sublateral groove, which extends from apical third of pronotum to base; lateral margins slightly sinuate; anterolateral angles obtuse, distinctly explanate and broadly depressed behind each angle; apex slightly sinuate and with broad lobe medially; posterolateral angles obtuse, slightly explanate, declivous, not depressed adjacent to each angle (Fig. 10); discal area with fine, dense punctures, punctures separated by a distance equal to or less than their diameter; cuticle microreticulate.

Prosternum very long in front of procoxae; bearing a tuft of sparse, long, dark brown setae and dense golden setae apicomediaally. Prosternal process (Fig. 3) triangular, broad at base and tapering to apex; lateral margins reflexed; middle moderately longitudinally cariniform; apex narrow, rounded. Mesoventrite with a deep, broad, V-shaped depression for reception of apex of prosternal process. Metaventrite with disc depressed on posterior three-fourths, coarsely punctate behind mesocoxae, punctures becoming more sparse laterally, with large, rounded depressions scattered on disc (Fig. 14); with a deep, narrow, shining, longitudinal groove on midline of disc, groove deepest and broadest on posterior third of disc; with short, dense, golden pubescence and a patch of longer darker brown setae on each side of median groove on apical third; cuticular surface of metaventrite finely microreticulate. Procoxae and metacoxae moderately widely separated; mesocoxae slightly more widely separated. Legs long and slender. Protibiae, mesotibiae, and metatibiae (Fig. 3) with dense spatulate pubescence distally. Tarsal claws long and stout (Figs 15, 16).

Elytron with ten rows of coarse, very deep punctures (Fig. 11); punctures separated by a distance two times the diameter of the puncture (Fig. 12); intervals with fine, dense pubescence; each larger seta surrounded by four to seven smaller setae (Fig. 13) humeral area moderately swollen; elytra margined laterally; widening to about posterior two-thirds before converging to rounded apex.

Abdomen with five ventrites (Fig. 17). First ventrite with intercoxal process broadly, shallowly depressed and distinctly carinate adjacent to metacoxae; carinae extending longitudinally behind metacoxae for almost entire length of ventrite; cuticle densely covered with setae. Last visible ventrite broadly rounded.

Aedeagus with parameres straight and wide (Fig. 6). Median lobe of aedeagus slightly constricted distally.

Female. Similar to male, except lacks the patch of longer setae apicomediaally on prosternum and the patch on each side of median groove on apical third on metasternum. Genitalia as illustrated (Fig. 7).

Intraspecific variation. As noted in the “Remarks” section, the shape of the parameres of the aedeagus vary from straight and wide to narrow and curved. This species exhibits only minor variations in length, which ranges from 4.2 to 4.5 mm, and varies from a medium brown to light brown in color.

Etymology. The specific epithet, “royi” is a patronym named for Roy McDiarmid, herpetologist and biological coordinator for the survey of the flora and fauna of Cerro de la Neblina.

Habitat. The type specimen was collected from a small, shallow brook about one to two meters wide and with occasional pools about one meter deep, with a substrate of sand, boulders, and bedrock. This small tributary originates on Cerro de la Neblina and feeds the Rio Baria, which drains most of the massif. The highwater marks and polished boulders along the stream bed indicate that in times of heavy rainfall, the brook becomes scoured by flash flooding. Paratypes were collected from similar small streams at high elevations.

Water quality data obtained by using colorimetric analyses of the brook at the type-locality are as follows; pH: 4, hardness: 0, oxygen: 9 ppm. The air temperature was 21°C and the water temperature was 17°C when the analyses were made.

Acknowledgments

The authors thank Robin A. Faitoute, Warren E. Steiner, and Phyllis M. Spangler for their help with collecting the adults and larvae of this new genus; Charles Brewer Carias, who coordinated the expedition to Cerro de la Neblina Park; Andrew Short for comments on earlier version of the manuscript and taking the scanning electron micrographs; and Taro Eldredge and Matthew Gimmel for proofreading the manuscript. This research was supported by Smithsonian Institution’s Scholarly Research Fund (to PJS) and US National Science Foundation grant #DEB-0816904 to Andrew Short.

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Discovery of the female of *Pyrocoelia prolongata* in Taiwan (Coleoptera, Lampyridae)

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Academic editor: Terry Erwin | Received 19 April 2011 | Accepted 14 June 2011 | Published 6 July 2011

Citation: Jeng M-L, Engel MS, Yang P-S (2011) Discovery of the female of *Pyrocoelia prolongata* in Taiwan (Coleoptera, Lampyridae). ZooKeys 116: 49–57. doi: 10.3897/zookeys.116.1412

Abstract

The female of *Pyrocoelia prolongata* Jeng & Lai, a diurnal lampyrid species from Taiwan, is described for the first time. A single individual was found in a small, shady, dry streambed at the edge of a mixed forest at 2700 m elevation. The individual glowed in darkness and would move its abdomen up and down when disturbed and as a deterring behavior. A key to the females of the species of *Pyrocoelia* Gorham in Taiwan is provided. The morphology of photogenic organs of females and the function of bioluminescence of day-active species of *Pyrocoelia* are discussed.

Keywords

Pyrocoelia prolongata, female, Taiwan, diurnal, Lampyridae, Asia

Introduction

The genus *Pyrocoelia* Gorham is a group of Asian lampyrids including more than 60 known species (McDermott 1966; Jeng et al. 1999b). Males of the genus are alate while, where known, females have vestigial elytra to various degrees and lack hind wings. They can be divided into diurnal and nocturnal groups in which the males possess well-developed photogenic organs in the former but reduced in the latter.

The nomenclature of *Pyrocoelia* was clarified and the species of Taiwan were revised by Jeng et al. (1999b). Several publications provided additional information and images of the females of Taiwanese species (Ho 1997; Chen 1999, 2003; Ho and Chu 2002). Until now, four out of the five species (except *P. prolongata* Jeng & Lai, a species endemic to Taiwan) have confirmed females. Generally it is difficult to find the flightless females in the field, especially for the diurnal species (Ohba 1983). Because of the limited availability and dramatic sexual dimorphism, many of the females were identified to species by rearing larvae to adults. This has not been achieved for *P. prolongata*. Fortunately a female of the species was discovered in the field during a collecting trip to high mountains in southern Taiwan in 2004. Herein we describe this individual and its remarkable bionomics, and provide a key to the females of Taiwan's species of the genus.

Material and methods

The only female specimen available for study was collected by the late Japanese coleopterist Dr. M. Satô while digging in a dry streambed for ground beetles at high elevations in southern Taiwan. The female was kept in a transparent plastic cup which was spread with wet tissue paper and moss to maintain suitable humidity and for observation.

Measurements were made by outlining the target structures under a Nikon SMZ-10 microscope with a camera lucida. Body length (BL) was measured as the distance between pronotal and abdominal apices when the body was fully stretched, and body width (BW) as the greatest distance across the abdomen. The abbreviations PL and PW denote pronotal length and width, respectively; while T#, P#, and S# refer to the tergite, pleurite, and sternite of the #th abdominal segment (true segmentation), respectively.

Systematics

Pyrocoelia prolongata Jeng and Lai

http://species-id.net/wiki/Pyrocoelia_prolongata

Pyrocoelia prolongata Jeng & Lai, in Jeng et al. 1999b: 358.

Diagnosis. The female is characterized by the bell-shaped pronotum which resembles that of the male and is one of the diagnostic characters of the species (Jeng et al. 1999b). No other congeneric species from Taiwan share a similar pronotal morphology and coloration in the female. The temporal and spatial distribution also fits that of *P. prolongata*.

Description. *Female* (Figs 1–7): BL: 15.6 mm; BW: 4.6 mm. Body form elliptical and depressed. Head, antennae, and legs dark brown to black; pronotum translucent

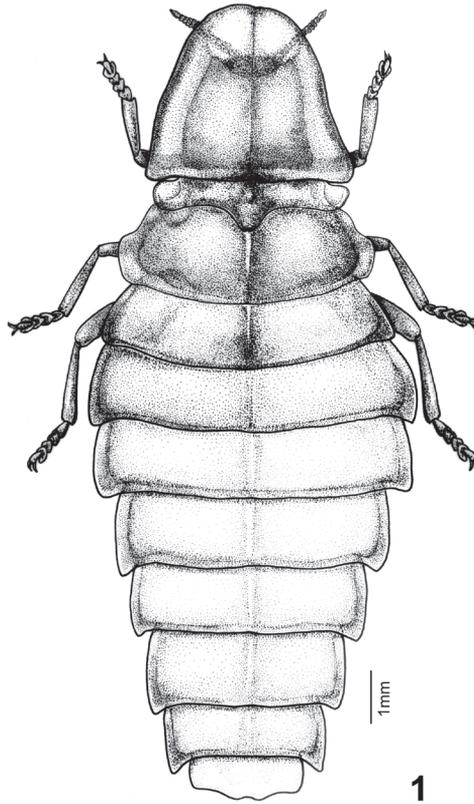
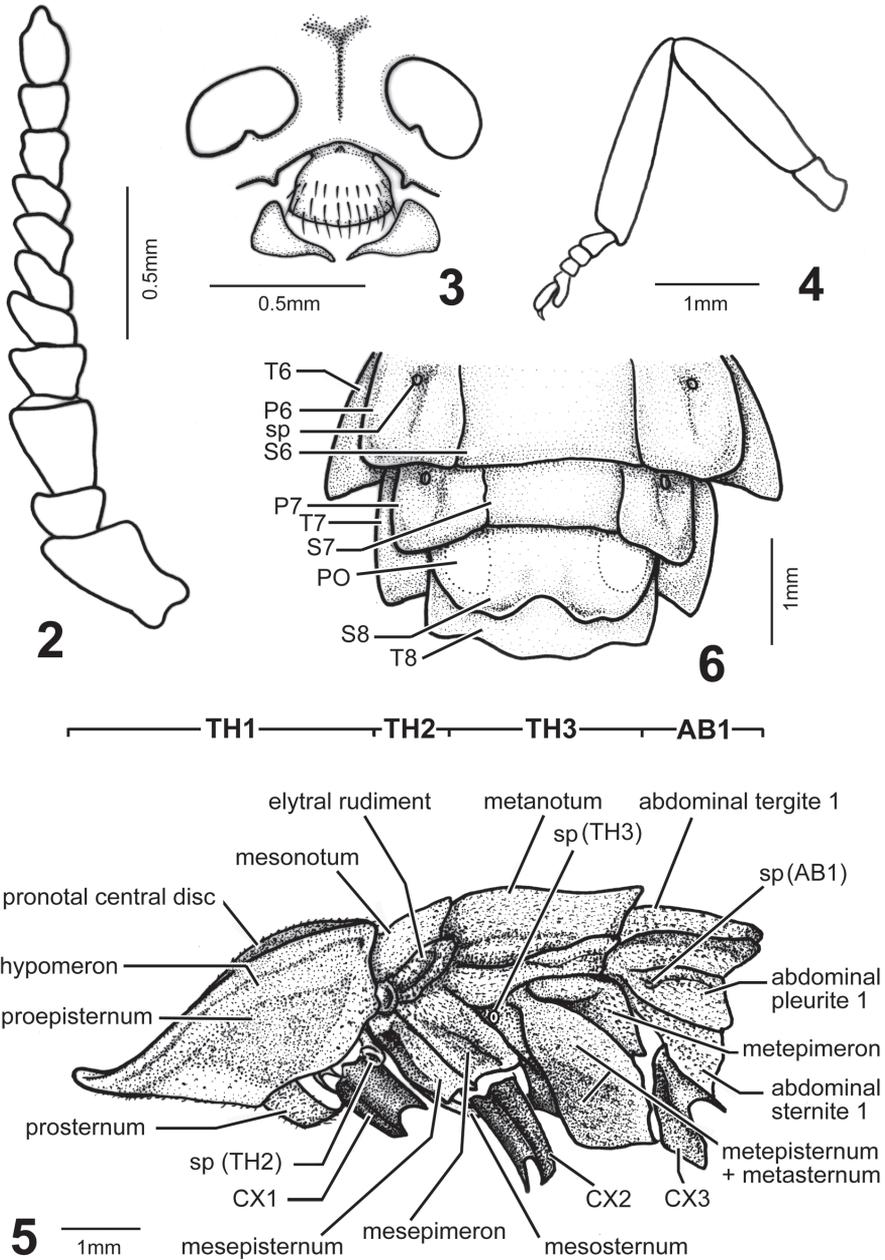


Figure 1. Female dorsal habitus of *Pyrocoelia prolongata* Jeng and Lai.

gray, with margins and central carina light brown and central disc pink; mesonotum pink, central disc and mesoscutellum dark brown, translucent gray at sides (elytral rudiments); metanotum bronze; abdominal T1 lighter than metanotum and mixed of pink; T2–7 pinkish white, bronze on posterior margins and central line, and translucent gray at lateral margins (Fig. 7A); T8 translucent gray; ventral side pink, brightly so on thorax and pale on abdomen; S8 with a pair of milky white photogenic organs; S8–9 translucent yellowish brown. Head spherical, about 1/3 as broad as pronotum; vertex concave along central line; frons about as broad as clypeus-labrum; antennal sockets widely separated from each other; antenna (Fig. 2) 11-segmented, weakly serrate and rod-like; antennomere 1 largest and 3 slightly smaller than it; clypeus-labrum (Fig. 3) not fused with frons, shell shape; mandibles partially sclerotized, thick in basal 2/3 and slender and somewhat curved at apex; maxillary palpus 4-segmented; labial palpus 3-segmented. Pronotum bell-shape, strongly convex on central disc and weakly so in windows, reflexed at margins; windows on apical 1/3 and divided by central carina. PL/PW = 0.85. Mesonotum as broad as central disc of pronotum, with elytral rudiments abbreviated and round at sides, not extending beyond pronotum; mesoscutel-



Figures 2–6. *Pyrocoelia prolongata* Jeng and Lai, female **2** Antenna **3** Partial head in frontal aspect (frons, antennal sockets, clypeus-labrum, and mandibles), antennae removed **4** Hind leg (metatrochanter–metatarsus) **5** Thoracic segments (TH1–3), coxae (CX1–3), and first abdominal segment (AB1), lateral aspect; sp (#) = spiracle on #th segment **6** Abdominal segments 6–8, ventral aspect, T#, P#, and S# = abdominal tergite, pleurite, and sternite of #th segment; PO = photogenic organs.

lum transverse, broader than long by 2 times, with apex slightly notched. Metanotum broader than pronotum, transversely elliptical, with a concave central line. Metepisternum fused with metasternum (Fig. 5). Legs (Fig. 4) moderate in width and length, 5th tarsomere slightly longer than preceding tarsomere. Abdomen broadest at T2, T1 about as broad as T3 and diminishing in width accordingly toward apex; T1–8 each with short but clear hind angles; T1–7 with a paler central line; T8 (Fig. 6) transverse and subquadrate, sinuate at sides and central apex. P1–7 folded on inner margins, each bearing a spiracle at center. S8 deeply notched centrally, with a pair of photogenic organs at sides (= PO, Fig. 6, Fig. 7B).

Material examined. 1♀, S. Taiwan: Kaohsiung County (now Kaohsiung City), Yako logging trail (abandoned), 120°57'E, 23°16'N, 2700m above sea level, 8.VII.2004 around midday, M. Satô leg.; specimen deposited in the collection of the senior author, National Museum of Natural Science, Taiwan.



Figure 7. Photos of female of *Pyrocoelia prolongata* Jeng & Lai **A** Dorsal aspect **B** Ventrolateral oblique aspect. Note the pink and bronze luster on the dorsum as well as the distinct photogenic organs (PO) on the venter.



Figure 8. Habitat of *Pyrocoelia prolongata* Jeng & Lai female **A** General locality in Yako logging trail, a dry streambed at 2700 m above sea level, southern Taiwan **B** Close-up, indicating where the female was discovered (arrow).

Sexual dimorphism. Females differ from males by (generic level differences) **1**, having shorter and less serrate antennae, much smaller compound eyes, and smaller palpi; **2**, the mesoscutellum as broad as long; **3**, the highly abbreviated elytra and absence of hind wings; **4**, the fusion of metepisternum and metasternum; **5**, having an intact abdominal S1; **6**, having the hind angles of abdominal T1–7 not very acute; **7**, S8 being deeply emarginate (cf., Jeng et al. 1999b); **8**, (remainder are species-level differences) the bronze on the metanotum and abdominal T1; and **9**, the narrower dark margins on the pronotum. In contrast to known females of *Pyrocoelia*, the female of *P. prolongata* is smaller than its respective males. We are not sure if this is simply individual variation or universal to the species.

Habitat and phenology. The female was found in a small, shady, and damp dry streambed at the edge of a mixed forest dominant with Taiwan Red False Cypress [*Chamaecyparis formosensis* Matsumura (Cupressaceae)] (Fig. 8A). It stayed on the substrate mixed of gravel and sand under a slate stone (Fig. 8B). An Alishan salamander (*Hynobius arisanensis* Maki) was also found in the microhabitat. Only a few species of Lampyrinae such as *Diaphanes nubilis* Jeng & Lai, *Pyrocoelia formosana* Olivier, and *P. prolongata* have ever been recorded from localities at such high elevations in Taiwan (Jeng et al. 1999a, some of the species denoted as “sp.” at that time). No living male of *P. prolongata* was found in or around the locality during the 3-day duration of our collecting trip, except for an already dead individual. This suggests that the mating season might have come to an end. At that time, a population of the species in central Taiwan (Anmashan, Taichung County, alt. 2300m) was in a peak season of activity (C.F. Lee, pers. comm.).

Behavioral remarks. A male of *P. formosana* collected from the same locality was put together with the female in a transparent plastic container to observe their interaction. At first the male did not show interest in the female. Later it attempted to copulate with the female but failed due to the female’s resistance. They eventually copulated after one day of captivity. The male perished soon after copulation, while the female survived the following week and laid three or four eggs before she died. All eggs failed to hatch and decomposed. The female glowed in darkness via a pair of photogenic organs on abdominal sternite 8. When wagging a finger around the female’s head in a dusky environment, the female responded by powerfully raising her abdomen vertically to the body axis then laid down. It was found to be a one-to-one response after several repetitions. Apparently the female can detect the nearby moving subject and the action could be an intimidation to predators.

Key to the females of *Pyrocoelia* species of Taiwan

- 1 Elytral rudiments clearly extending beyond pronotum in width.....**2**
- Elytral rudiments short, not or slightly extending beyond pronotum in width.....**4**
- 2 Elytral rudiments broad, lobe-like, extending posterolaterally and covering part of metanotum.....**3**

- Elytral rudiments narrow, sword-like, extending laterally and not covering any part of metanotum *P. sanguiniventer* Olivier
- 3 Elytral rudiments longer than broad by 1.5 times; mesoscutellum about as broad as long; pronotal windows ambiguous..... *P. analis* (F.)
- Elytral rudiments longer than broad by 3 times; mesoscutellum transverse; pronotal windows clear *P. praetexta* Olivier
- 4 Abdomen without morphologically recognizable photogenic organs; metanotum milky white; pronotum semicircular, translucent gray in explanate area...
..... *P. formosana* Olivier
- Abdomen with a pair of photogenic organs on sternite 8; metanotum bronze; pronotum more-or-less projecting forward, dark in margins and central carina between windows..... *P. prolongata* Jeng & Lai

Discussion

The photogenic organs of females *Pyrocoelia* vary in number and position. Among the known taxa from Japan and Taiwan, *P. analis*, *P. praetexta*, *P. rufa* Olivier, *P. miyako* Nakane, and *P. atripennis* Lewis each have two pairs of morphologically recognizable lanterns on sternites 6 and 7 (Ohba 1983, 2004; Ho 1997, 2003; Chen 1999, 2003); *P. prolongata* has a significant pair on sternite 8; while *P. formosana*, *P. sanguiniventer*, *P. discicollis* Kiesenwetter, *P. matsumurai* Nakane, and *P. abdominalis* Nakane do not have visible lanterns if not glowing (Ohba 1993). However, females of *P. praetexta* are able to emit six spots of light on sternites 6–8 and at least some species in the last group are confirmed to glow weakly in two spots on sternite 8 (Ho and Chu 2002; Chen 2003; Ohba 2004). It is therefore somewhat risky to interpret glowing behavior based solely on the external morphology of dead, and sometimes dried, specimens.

Both sexes of *P. prolongata* can emit green light from a pair of lanterns on sternite 8. The males are active during the daytime to locate mates by raising their heads and elevating the antennae in a V-shaped position, used to detect female pheromones, as observed for many other diurnal species (Ohba 1983, 1997a, 1997b, 2004). Occasionally they can be found at night owing to their bioluminescence. Ohba (1983, 2004) classified the diurnal species of *Pyrocoelia* from Japan into the CR system in which males find mates relying mainly on chemical signals and with the aid of relatively weak luminescent signals from mates over a short distance. However, the females of the diurnal species of *Pyrocoelia*, though able to glow, are extremely rarely seen in the field at night (Ohba 1983). The function of the female bioluminescence is thus questionable. Lall and Lloyd (1989) studied a day-active species, *Lucidota luteicollis* LeConte, and found that the electroretinographic sensitivity of the male (lambda-maximum= 530 nm) did not match its emission spectrum (lambda-maximum= 562 nm). These authors concluded that the male does not rely on light signals to find a mate, and suggested that the flightless female might be the light receiver. The female could use the male bioluminescence to recognize a mate in the shady, dusky microhabitat in which such

long-wavelength light can be transmitted more so than short wavelengths, and thus be detectable by the female. The bioluminescent spectrum and electroretinographic sensitivity of *Pyrocoelia* are scarcely studied except for a few cases (Eguchi et al. 1984; Ohmiya et al. 1996). The night-active *P. miyako* Nakane emits green light with a lambda-maximum at 550 nm by males (Ohmiya et al. 1996). The electroretinograph of *P. atripennis* Nakane, a day-active species from Japan, shows a broad green sensitivity with the lambda-maximum around 540 nm in the male (Eguchi et al. 1984). There is not yet any study on the bioluminescence and visual sensitivity in both sexes of a diurnal species of *Pyrocoelia*. Whether the bioluminescence is truly functional or merely an evolutionary residual remains open for future study.

Acknowledgments

We are grateful to the late Dr. M. Satô (1937–2006) for providing us the rare female specimen of *P. prolongata* available for this study. Thanks are also due to C.-L. Li (Taiwan University, Taipei) and C.-F. Lee (Taiwan Agricultural Research Institute, Taichung) for their assistance during the collecting trip; and to H.-Y. Lee for photographs of the female of *P. prolongata*. This study was supported financially by the National Science Council of the Republic of China, grant Nr. NSC99-2621-M-002-027.

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Four new species of the genus *Philanthaxia* Deyrolle, 1864 from Southeast Asia and comments on *P. iris* Obenberger, 1938 (Coleoptera, Buprestidae, Thomassetiini)

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Academic editor: *Charles Bellamy* | Received 18 April 2011 | Accepted 20 May 2011 | Published 6 July 2011

[urn:lsid:zoobank.org:pub:36AD3925-F20B-482A-A6B9-F79D16AC7B94](https://zoobank.org/pub/36AD3925-F20B-482A-A6B9-F79D16AC7B94)

Citation: Bílý S, Nakládal O (2011) Four new species of the genus *Philanthaxia* Deyrolle, 1864 from Southeast Asia and comments on *P. iris* Obenberger, 1938 (Coleoptera, Buprestidae, Thomassetiini). ZooKeys 116: 37–47. doi: 10.3897/zookeys.116.1403

Abstract

Descriptions of four new species of the genus *Philanthaxia* Deyrolle, 1864: *P. pseudoaenea* **sp. n.** (Thailand), *P. jakli* **sp. n.** (Indonesia, Sumatra), *P. chalcogenioides* **sp. n.** (Indonesia, Sabah) and *P. lombokana* **sp. n.** (Indonesia, Lombok) are given. The new species and male genitalia are illustrated and compared with the most similar congeners. Sexual dimorphism of *P. iris* Obenberger, 1938 is described and discussed.

Keywords

Taxonomy, Coleoptera, Buprestidae, Thomassetiini, *Philanthaxia*, new species, sexual dimorphism, Oriental region

Introduction

The genus *Philanthaxia* was described by Deyrolle (1864) with *Philanthaxia curta* Deyrolle, 1864 as a type species (by monotypy). The genus was revised by Bílý (1993)

and a further five species later described by Bílý (1997). Novak (1994) described the male of *P. rufimarginata* (Saunders, 1866). The genus was placed to the tribe Thomasetiini Bellamy, 1987 by Bílý (2000). Additional species were subsequently described by Bílý (2001, 2006). Currently the genus is comprised of 61 species with primarily Oriental distribution except for two species extending into the Australasian region (Bellamy 2008). This study describes another four species and the genus now contains 65 species.

An Olympus SZX 12 microscope with a fixed camera was used to capture the colour images and a MBS-10 stereoscopic microscope for drawings. Data from locality labels are cited “verbatim”. The following codens of institutional and private collections are used in the text:

NMPC	National Museum, Prague, Czech Republic
NSMT	National Science Museum Tokyo, Japan
SJCP	Stanislav Jákl collection, Prague, Czech Republic
SOCT	Sadahiro Ohmomo collection, Tsukuba, Japan

Taxonomy

Philanthaxia pseudoaenea sp. n.

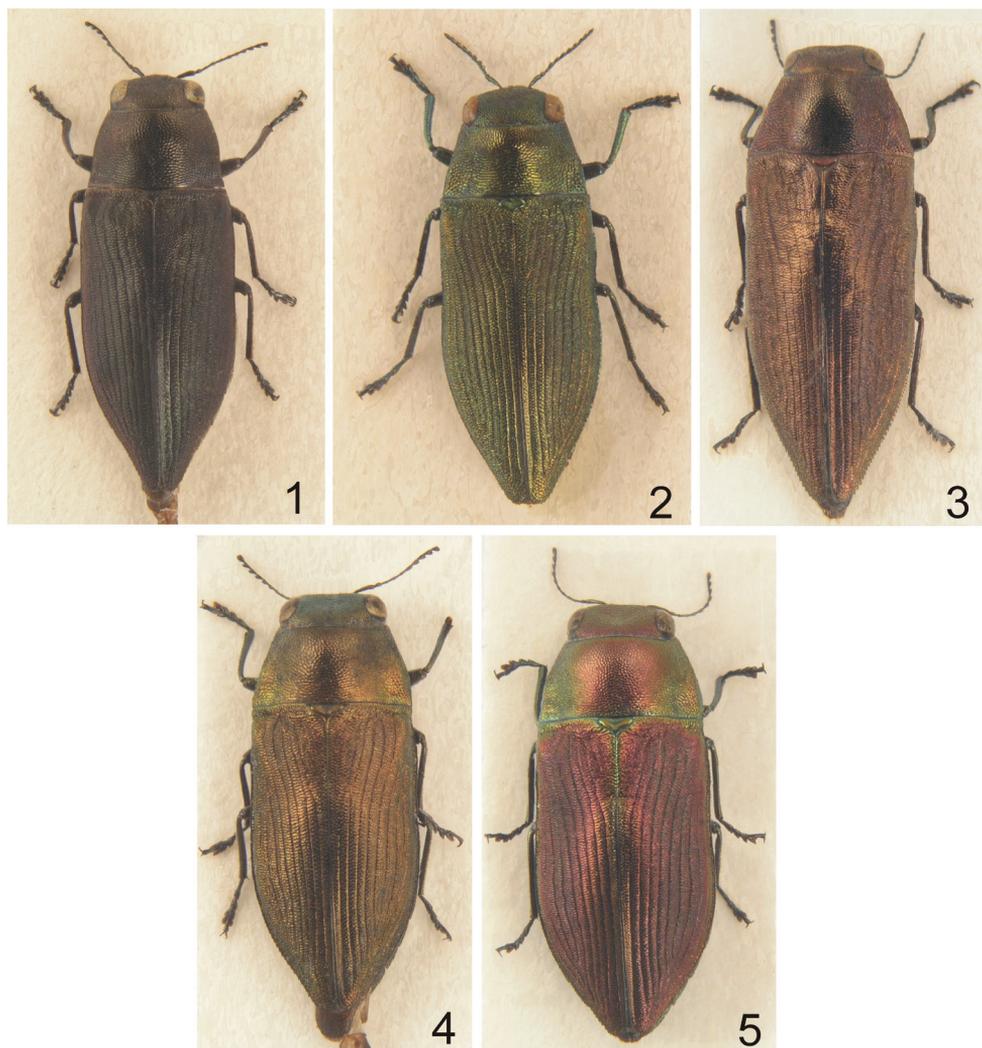
urn:lsid:zoobank.org:act:A524A437-87D3-4354-B46A-4177C0BAA7BE

http://species-id.net/wiki/Philanthaxia_pseudoaenea

Figs 1, 6

Diagnosis. Medium-sized (6.2–9.8 mm), subelliptical, moderately convex; dorsal surface black-bronze (male Fig. 1) or black-bronze with violet tinge more distinct along lateral margins, at basal portion of elytra and along anterior half of elytral suture (female); frons, antennae and legs black-violet; ventral surface black-violet, abdominal ventrites bronze; dorsal surface entirely asetose, ventral surface with very fine, sparse, recumbent, white pubescence which is somewhat denser at posterior angles of abdominal ventrites; lateral margin of metacoxae with small patch of white tomentum.

Description of the holotype. Head large, distinctly wider than anterior pronotal margin; frontoclypeus widely, shallowly emarginate separated from frons by rather deep, transverse impression; frons flat with shallow, triangular depression and wide, rounded tubercle above frontoclypeal line; vertex very slightly convex, 3.5 times as wide as width of eye; eyes relatively small, nearly elliptical, slightly projecting beyond outline of head; antennae long, slender, reaching posterior third of lateral pronotal margins when laid alongside; scape 4.5 times as long as wide, slightly claviform, nearly straight; pedicel ovoid, 1.5 times as long as wide; third antennomere very small, nearly cylindrical, 1.5 times as long as wide; antennomeres 4–10 obtusely triangular, 1.2–1.5



Figures 1–5. *Philanthaxia*, habitus, dorsal view **1** *Philanthaxia pseudoaenea* sp. n., holotype, 8.1 mm **2** *P. jakli* sp. n., holotype, 7.5 mm **3** *P. chalcogenoides* sp. n., holotype, 10.0 mm **4** *P. lombokana* sp. n., holotype – male, 8.0 mm **5** *P. lombokana* sp. n., paratype – female, 10.0 mm.

times as long as wide; terminal antennomere rhomboid, slightly longer than wide; sculpture of frons consisting of small, very dense oval cells without central grains, that of vertex much finer.

Pronotum distinctly bell-shaped, 1.7 times as wide as long, regularly convex; lateroposterior depressions indistinct; anterior margin shallowly biarcuate, posterior margin nearly straight; lateral margins S-shaped, posterior angles sharp; maximum pro-

notal width at base; lateral pronotal keel S-shaped, not visible from above, its middle portion straight; sculpture consisting of small, very dense, polygonal cells which are transversely widened at prescutellar portion and fused in lateroposterior depressions. Scutellum small, flat, obtusely pentagonal, twice as wide as long.

Elytra regularly convex, subparallel at anterior three fourths, 1.9 times as long as wide; apical fourth sinuously tapering posteriorly, slightly caudiform, very finely serrate; humeral swellings small; basal, transverse depression deep at humeral swellings, shallow towards scutellum; elytral epipleura well-developed, tapering posteriorly, reaching posterior fifth of elytra; each elytron with eight fine striae; interstices with fine, dense, transverse rugae.

Ventral surface finely, densely punctato-ocellate, abdominal ventrites rather lustrous, very finely ocellate; prosternal process weakly convex, subparallel, obtusely pointed apically; anal ventrite narrowly rounded apically, very finely serrate laterally with weak medial, longitudinal elevation at apical half. Legs long, slender, meso- and metatibiae not modified. Tarsal claws robust, strongly hook-shaped with large, basal tooth.

Aedeagus (Fig. 6) flat, subparallel, parameres somewhat enlarged and swollen on apical fourth, strongly narrowed apically.

Sexual dimorphism. Female differs from male only by the somewhat more robust body and more distinct violet tinge along the anterior and lateral margins of elytra.

Variability. Except for the size and sexual dimorphism only a slight variability was observed in colouration: some specimens are nearly black only with very weak bronze tinge.

Measurements. Length: 6.2–9.8 mm (holotype 8.1 mm); width: 2.3–3.4 mm (holotype 2.8 mm).

Type specimens. Holotype (male, NSMT): “NE Thailand, Pak Chong, Korate, Kasetsart Farm, 13.v.2008, S. Ohmomo leg.”; paratypes (30 males, 17 females, NMPC, NSMT, SOCT): the same data (24 males, 12 females); “NE Thailand, Saraburi, Phra Buddaha Chai, 14.v.2008, S. Ohmomo leg.” (6 males, 4 females).

Type locality. Northeastern Thailand, Pak Chong, Korate, Kasetsart Farm.

Etymology. The specific epithet “*pseudoaenea*” expresses the similarity with the sympatric species, *P. aenea* (Saunders, 1867).

Distribution. Central and northeastern Thailand, Pak Chong province.

Differential diagnosis. *Philanthaxia pseudoaenea* sp. n. belongs to the group of species with flat or impressed frons; wide scutellum and strongly toothed tarsal claws. From the very similar *P. aenea* it differs by the characters given in Table 1.

***Philanthaxia jakli* sp. n.**

urn:lsid:zoobank.org:act:CF3AD301-A880-40BC-9879-DBE355FC7F74

http://species-id.net/wiki/Philanthaxia_jakli

Figs 2, 8

Diagnosis. Medium-sized (7.5–8.0 mm), regularly convex, subparallel; dorsal surface golden green, matt; elytral margins and posterior pronotal angles and frons sometimes

Table 1. Comparison between *Philanthaxia pseudoaenea* sp. n. and *P. aenea*.

<i>Philanthaxia pseudoaenea</i> sp. n.	<i>Philanthaxia aenea</i> (Saunders, 1866)
Darker, less aeneous often with violet tinge	More aeneous without violet tinge
Pronotum distinctly bell-shaped, finely emarginate before posterior angles	Pronotum not bell-shaped, nearly straight before posterior angles
Elytra subparallel at anterior three fourths, nearly sinuously tapering at posterior fourth, slightly caudiform apically	Elytra regularly, tapering posteriorly, not caudiform apically
Aedeagus (Fig. 6) shorter, parameres somewhat enlarged and swollen at apical fourth	Aedeagus (Fig. 7) longer, parameres not enlarged at apical fourth

with red lustre; legs and scutellum green; ventral surface dark golden-green; dorsal surface asetose, ventral surface with short, recumbent, rather dense, white pubescence; lateral margins of abdominal ventrites with small patches of white tomentum.

Description of the holotype. Head large, distinctly wider than anterior pronotal margin; frontoclypeus widely, shallowly emarginate, separated from frons by shallow, transverse depression; frons flat, vertex very wide, 5 times as wide as width of eye; eyes small, nearly elliptical, strongly projecting beyond outline of head; antennae long, slender, reaching posterior third of lateral pronotal margins when laid alongside; scape slender, slightly claviform, 5 times as long as wide; pedicel ovoid, slightly longer than wide; third antennomere weakly enlarged apically, 1.5 times as long as wide; antennomeres 4–10 obtusely triangular, about 1.3 times as long as wide; terminal antennomere rhomboid, nearly twice as long as wide; sculpture consisting of very fine, dense, polygonal to oval cells with lustrous bottom.

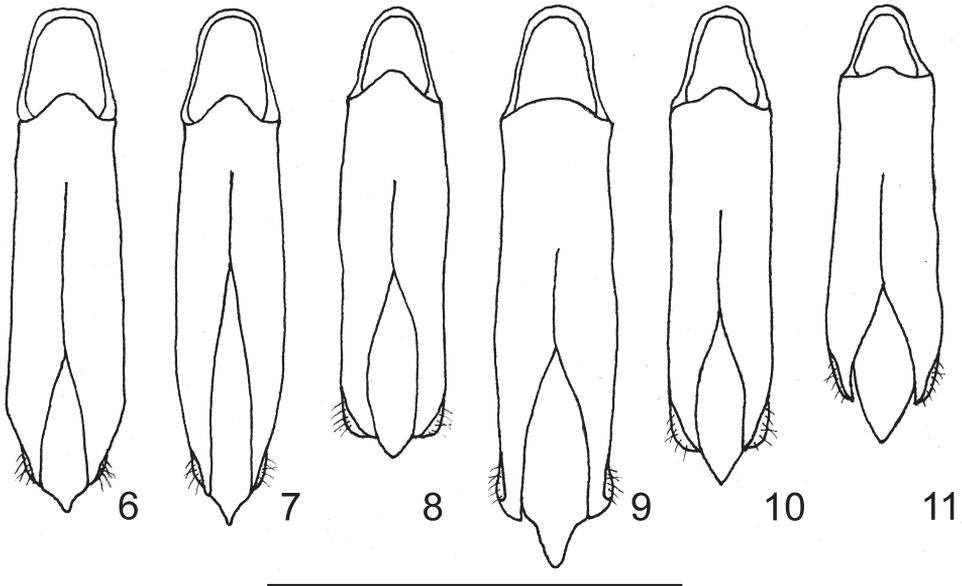
Pronotum regularly convex with wide, shallow lateroposterior depressions, twice as wide as long; anterior margin shallowly biarcuate, posterior margin nearly straight; lateral margins nearly straight, very weakly emarginate anteriorly sharp lateroposterior angles; maximum pronotal width at base; sculpture consisting of deep, dense punctures at posterior angles, fine, dense polygonal cells at anterior third and fine, dense, transverse rugae on disc and prescutellar portion. Scutellum lustrous, widely pentagonal, 2.2 times as wide as long.

Elytra regularly convex, subparallel at anterior two thirds, narrowly tapering at posterior third, 2.1 times as long as wide; posterior third only indistinctly caudiform, very finely serrate; humeral swellings small; basal transverse depression developed only on humeri; elytral epipleura narrow, reaching posterior third of elytra; each elytron with eight fine striae, interstices with fine, dense, transverse rugae.

Ventral surface lustrous, finely, densely ocellate; prosternal process flat, obtusely pointed apically; anal ventrite nearly flat, obtusely truncate apically, without distinct lateral serration. Legs long, slender, meso- and metatibiae straight. Tarsal claws thin, strongly hook-shaped, slightly enlarged at base.

Aedeagus (Fig. 8) wide, flattened, parallel-sided; apical portion of parameres angulately rounded, median lobe widely pointed.

Female unknown.



Figures 6–11. Male genitalia **6** *Philanthaxia pseudoaenea* sp. n., holotype **7** *P. aenea* (Saunders, 1866), (Thailand, Petchaburi) **8** *P. jakli* sp. n., holotype **9** *P. chalcogenoides* sp. n., holotype **10** *P. lombokana* sp. n., holotype **11** *P. iris* Obenberger, 1938 (Java, Watu Ulo). Scale bar: 2 mm.

Variability. The paratype possesses a more distinct golden tinge along the elytral margins, at the posterior pronotal angles and on the frons than the holotype.

Measurements. Length 7.5 mm (holotype) and 8.0 mm (paratype); width: 2.6 mm (holotype), 2.9 mm (paratype).

Type specimens. Holotype (male, NMPC): “Indonesia, West Sumatra, Harau valley env., 500–800m, cca 20km N of Payakumbuh, iv.-v.2006, St. Jákl leg.”; 1 paratype (male, NMPC): the same data except for “600m, v.2007”.

Type locality. Indonesia, West Sumatra, Harau valley, 500–800 m, cca 20 km N of Payakumbuh.

Etymology. This species is dedicated to the collector, S. Jákl (Prague, Czech Republic).

Distribution. Western Sumatra, prov. Aceh.

Differential diagnosis. *Philanthaxia jakli* sp. n. belongs to the group of species with flat or impressed frons, wide scutellum, simple tarsal claws and golden green dorsal colouration. Accordingly to the key (Bílý 2001), *P. jakli* sp. n. should stand in one couplet with *P. similis* Bílý, 2001 from Laos but it differs from it by having a much more slender body, darker colouration, pentagonal scutellum (cordiform in *P. similis*), flat frons (roundly impressed in *P. similis*) and by the shape of male genitalia (aedeagus regularly tapering posteriorly and parameres regularly rounded apically in *P. similis*). It is similar to *P. acuminata* Bílý, 1993 from Borneo (Sabah) but it differs from this species by the colouration (reddish-coppery with golden-red frons in *P. acuminata*), shape

of scutellum (wider and deeply impressed in *P. acuminata*) and by the shape of male genitalia (aedeagus longer, not parallel-sided with slightly enlarged parameres at apical third in *P. acuminata*). From the sympatric species, *P. sumatrensis* Bílý, 1993 it differs by the absence of golden-purple elytral stripes, slender body and by the different male genitalia (spindle shaped aedeagus in *P. sumatrensis*).

***Philanthaxia chalcogenoides* sp. n.**

urn:lsid:zoobank.org:act:D61A7895-186A-408B-BE14-2CA8396CA981

http://species-id.net/wiki/Philanthaxia_chalcogenoides

Figs 3, 9

Diagnosis. Large (10.0 mm) lustrous, convex; dorsal surface bright bronze, medial portion of pronotum somewhat darkened, elytra lustrous along suture with distinct mirror-effect (Fig. 3); scutellum with purple lustre; ventral surface bronze, prosternal process and middle portion of metasternum lustrous; dorsal surface entirely asetose, ventral surface with extremely fine, sparse, white pubescence.

Description of the holotype. Head as wide as anterior pronotal margin; frontoclypeus widely, shallowly emarginate, separated from frons by deep, transverse impression; frons flat with shallow, rounded impression at middle; vertex 4 times as wide as width of eye; eyes small, elliptical, slightly projecting beyond outline of head; antennae long and slender, reaching posterior fourth of lateral pronotal margins when laid alongside; scape nearly straight, slightly claviform, 5 times as long as wide; pedicel ovoid, 1.6 times as long as wide; third antennomere very small, slender, nearly twice as long as wide; antennomeres 4–10 obtusely triangular to trapezoidal, 1.3–1.6 times as long as wide; terminal antennomere rhomboid, slightly longer than wide; sculpture consisting of small, very dense, oval cells with lustrous bottom; cells in frontal impression slightly prolonged vertically.

Pronotum rather convex, flattened at prescutellar portion, twice as wide as long; both anterior and posterior margins very weakly biarcuate; lateral margins very slightly rounded, nearly straight, posterior angles sharp; lateroposterior depressions indistinct, maximum pronotal width at base; sculpture consisting of small, fine, simple punctures on disc and small, rather deep, dense, polygonal cells on lateral sides. Scutellum subtriangular, very lustrous, twice as wide as long.

Elytra convex, twice as long as wide, subparallel at anterior two thirds; posterior third regularly acuminate posteriorly with finely, densely serrate margins; humeral swellings well-developed; basal, transverse depression developed only on lateral half of elytra; elytral epipleura very narrow, reaching posterior third of elytra; each elytron with eight, very fine striae; interstices flat with fine, dense, transverse rugae.

Ventral surface very densely, finely ocellate, prosternal process flat, weakly enlarged posteriad procoxae, obtusely pointed apically; anal ventrite weakly convex, without distinct lateral serration, shortly truncate to emarginate apically. Legs long, slender, meso- and metatibiae straight. Tarsal claws small, strongly hook-shaped, only weakly enlarged at base.

Aedeagus (Fig. 9) short, robust, flattened, widely spindle-shaped; median lobe sharply pointed apically.

Female unknown.

Measurements. Length: 10.0 mm; width: 3.6 mm.

Type specimen. Holotype (male, NMPC): “Malaysia, Sabah, Crocker Range, vic. of Mt. Trus-Madi, iii.-iv.2002, local collector”.

Type locality. Malaysia, Sabah, Crocker Range, vic. of Mt. Trus-Madi.

Distribution. Borneo: Sabah province.

Etymology. The specific epithet refers to the superficial similarity to species of the genus *Chalcogenia* Saunders, 1871.

Differential diagnosis. *Philanthaxia chalcogenoides* sp. n. resembles some species of the genus *Chalcogenia* (Anthaxiini) by the body-shape, colouration and by distinct elytral mirror effect. It differs from its congeners by the strange pronotal sculpture (deeply rugate or exceptionally deeply ocellate in other species) and by the conspicuous mirror effect along the elytral suture. With the shape and colouration, it resembles *P. akiyamai* Bílý, 1993 described from the Peninsular Malaysia (but recently collected in Sabah). The latter species differs from *P. chalcogenoides* sp. n. by the rough, rugose pronotal sculpture; matt dorsal surface; wider scutellum and by the shape of male genitalia (Fig. 9).

***Philanthaxia lombokana* sp. n.**

urn:lsid:zoobank.org:act:000A3B8D-6886-4890-A6CA-B94F8A5D23B6

http://species-id.net/wiki/Philanthaxia_lombokana

Figs 4, 5, 10

Diagnosis. Rather large (6.7–10.1 mm), robust, strongly convex with silky lustre; dorsal surface of male (Fig. 4) bronze with feeble purple lustre; elytra with slightly developed mirror effect at posterior half; frons golden-green, vertex bronze; dorsal surface of female (Fig. 5) purple-bronze, lateral portion of elytra dark blue-violet; scutellum golden green, narrow postscutellar, sutural stripe golden; antennae and legs black with weak bronze lustre in both sexes; ventral surface black with brass tinge; dorsal surface asetose; ventral surface with sparse, fine, recumbent, white pubescence; prosternal process with rather dense, erect, grey pubescence; distal portion of metacoxae and lateral portions of abdominal ventrites with patches of white tomentum.

Description of the holotype. Head large, distinctly wider than anterior pronotal margin; frontoclypeus widely, shallowly emarginate; frons flat with shallow, rounded, medial impression; vertex flat, 5 times as wide as width of eye; eyes relatively small, elliptical, rather strongly projecting beyond outline of head; antennae slender, reaching posterior third of lateral pronotal margins when laid alongside; scape very slender, slightly curved, 6 times as long as wide; pedicel small, ovoid, 1.8 times as long as wide; third antennomere small, slightly claviform, 1.6 times as long as wide; antennomeres 4–10 obtusely triangular, 1.2–1.8 times as long as wide; terminal antennomere

rhomboid, 1.8 times as long as wide; sculpture consisting of small, very dense, oval or rounded cells without central grains which are larger and more prolonged in frontal impression, smaller and rounded on remainder of head.

Pronotum strongly convex, nearly bell-shaped, 1.9 times as wide as long; lateroposterior depressions nearly indistinct; anterior margin shallowly biarcuate, posterior margin nearly straight; lateral margins straight, tapering anteriorly at anterior half, regularly arched at posterior half; posterior angles nearly rectangular; maximum pronotal width at base; sculpture consisting of small, dense, rounded cells without central grains on anterior half; prescutellar portion with rather rough, long, transverse rugae, posterior angles with short, transverse rugae. Scutellum widely pentagonal, slightly impressed medially, 2.5 times as wide as long.

Elytra regularly, strongly convex, 1.8 times as long as wide with maximum width at posterior third, slightly caudiform; humeral swellings well-developed; basal, transverse depression short, wide, not reaching scutellum; elytral epipleura narrow, reaching posterior third of elytral length; posterior third of elytral margins weakly serrate; each elytron with eight fine striae; interstices with fine, short, transverse rugae at posterior half; basal half of elytra with rough, deep, transverse rugae.

Ventral surface rather lustrous, finely ocellate, prosternum roughly ocellate; prosternal process very weakly convex, obtusely pointed apically, not enlarged posteriad procoxae; anal ventrite apically obtusely rounded, without lateral serration. Legs relatively long, slender; meso- and metatibiae finely bent outwards at posterior half. Claws slender, hook-shaped, slightly enlarged at base.

Aedeagus (Fig. 10) short, flat, nearly spatulate, parameres subparallel at basal half, slightly enlarged and regularly rounded towards apex at posterior half; median lobe simply pointed apically.

Sexual dimorphism. Except for the colouration (see above) female differs from male only by more robust and larger body.

Variability. Pronotum 1.9–2.1 times as wide as long; elytra 1.7–1.9 times as long as wide. No variability in colouration was observed in males; several female paratypes possess darker lateral portion of elytra (nearly black with slight metallic tinge) and darkened medial portion of pronotum (black with intensive blue-green tinge).

Measurements. Length 6.7–10.1 mm (holotype 8.0 mm); width: 2.6–4.0 mm (holotype 3.0 mm).

Type specimens. Holotype (male, NMPC): “Indonesia, Lesser Sundas, Lombok Isl., xi.2008, S slopes of Mt. Rinjani, 800 m, local collectors”; paratypes (19 males, 23 females, NMPC, SJCP): the same data.

Type locality. Indonesia, Lesser Sundas, Lombok Isl., S slopes of Mt. Rinjani, 800 m.

Etymology. This species is named after the locality of the type specimens, Lombok Island.

Distribution. Indonesia, Lombok Island

Differential diagnosis. *Philanthaxia lombokana* sp. n. belongs to the group of species with simple tarsal claws, wide depressed frons and wide scutellum. It is the third species distributed eastwards of the Wallace Line. This species is very similar to *P. iris*

Obenberger, 1938 (see below) from Java from which it differs by the different colouration, less lustrous body, more flattened frons which is only slightly medially impressed and by the different male genitalia (Figs 10 vs. 11).

***Philanthaxia iris* Obenberger, 1938**

http://species-id.net/wiki/Philanthaxia_iris

Fig. 11

Remarks. This species was described by Obenberger (1938) from the single female specimen labeled “Java, Popoh, Kediri Res.”. At the time of the last revision of *Philanthaxia* (Bílý 2001), the male of *P. iris* was unknown. Quite recently we have studied two specimens of *P. iris* (male and female) from “Watu Ulo” (Java, local collector) so it was possible to study the sexual dimorphism.

Description. The male is much smaller (6.7 mm) and nearly completely dark (black with blue-green tinge and golden green scutellum); aedeagus as in Fig. 11. The female is much larger and more robust (9.5–12.0 mm), dark golden-green elytra with longitudinal purple stripe extending from humeri to apex and purple lateral margin; the pronotum is dark reddish-purple with large, black-green spot on anterior half.

Distribution. Java.

Acknowledgements

We are very obliged to our colleagues S. Jákl (Prague, Czech Republic) and S. Ohmomo (Tsukuba, Japan) who supplied us with the material for this study. We are also very obliged to our colleague C. L. Bellamy (Sacramento, California, USA) for his critical comments and the English revision of the text and to V. Kubáň (Prague, Czech Republic) for his help with colour images. This contribution was partially supported by the project of the Ministry of Agriculture of Czech Republic QH 81136.

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Pictorial key for females of *Decevania* Huben (Hymenoptera, Evaniidae) and description of a new species

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Academic editor: *Norman Johnson* | Received 03 May 2011 | Accepted 24 June 2011 | Published 7 July 2011

urn:lsid:zoobank.org:pub:C966B837-596B-4D8C-AB2E-670DD93A5C10

Citation: Kawada R (2011) Pictorial key for females of *Decevania* Huben (Hymenoptera, Evaniidae) and description of a new species. ZooKeys 116: 59–84. doi: 10.3897/zookeys.116.1473

Abstract

Decevania Huben currently comprises 13 species, the females of which are known for only four. Herein an additional Neotropical *Decevania* is newly described: *Decevania feitosa* Kawada, **sp. n.** from Colombia. The description and identification key were made using the DELTA program. A pictorial key to females of *Decevania* is provided. Anatomical terminology follows the Hymenoptera Anatomy Ontology project with an atlas for terminologies used for recognition of *Decevania* species. The distribution maps can be accessed in Google Maps or through of Dryad (repository of data).

Keywords

Evanioidea, taxonomy, new species

Introduction

Decevania Huben¹ is a small genus of Neotropical Evaniidae with 13 species recognized so far. Kawada and Azevedo (2007) recently revised the genus, providing redescriptions of *Decevania parva*² (Enderlein, 1901) and *D. striatigena*³ (Kieffer, 1910), descriptions

of 11 new species, an identification key, illustrations of all species, and increased the geographical distribution known for the genus, which ranges from Mexico to Bolivia, east to Brazil.

Species in this genus are characterized by having 8 flagellomeres, relatively reduced eyes (usually females), wings frequently large and floppy with reduced venation (C, Sc, M+CU, 1CUa, 1CUB and 2CU only present), fore wing with only one cell enclosed by tubular veins (costal), and hind tarsomeres 1-3 elongated posteriorly into spines. According to Kawada and Azevedo (2007), *Decevania* resembles *Hyptia* Illiger⁴ by having one closed cell in the fore wing always with M+CU, 1CU, and 2CU veins combined (a Caribbean group of *Hyptia* has a close configuration). However, *Decevania* has the stigmal vein wide (narrow in *Hyptia*), 1R1 vein shorter (longer in *Hyptia*) and body with sparse punctures (usually dense punctures in *Hyptia*).

Decevania species are sexually dimorphic (antenna, eye, color, facial sculpture, and others) and this complicates association of the sexes and description of new taxa. The head in females is distinctly sculptured and eyes flattened. The antenna is enlarged progressively from the fourth flagellomere apically, antennal pubescence is considerably reduced in flagellomeres IV–X (flattened area) and the posterior region of the metasoma is expanded dorso-ventrally with the ovipositor usually concealed. Males generally have a larger bulging eye, all flagellomeres are equal in diameter, antennal pubescence is evenly distributed with long setae interspersed and the posterior region of the metasoma is constricted dorsoventrally with genitalia protracted, depending on preservation.

The goal of this paper is to disseminate the pictorial key for females of *Decevania* and describe a new species of this genus from Colombia.

Material and methods

Material. The material examined is presented in a list of museums with respective acronyms and countries: CNCI (Canadian National Collection of Insects⁵) and IAVH (Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Colombia⁶). The holotypes are unambiguously identifiable by mean of a red holotype label. The type-material of newly described species are deposited in the IAVH and MZSP (Museu de Zoologia da Universidade de São Paulo, Brazil⁷).

Images. The best characters for distinguishing species were photographed under a stereomicroscope Leica M205C, magnifying glass attached to video camera Leica DFC 295. The equipment responsible for storing and processing data was a desktop computer with Windows 7 Professional and high-capacity processor Intel (R) Xeon (R) CPU and the software used to combine the images was Leica LAS (Leica Application

Suite V3.6.0) Microsystems by Leica⁸ (Switzerland) Limited. Photos were edited in PhotoShop[®] using the adjustments (e.g., levels, shadows/highlights), tools (e.g., healing brush, clone stamp) and filters (e.g., unsharp mask).

Distribution map. Google maps⁹ provides a powerful tool for fast, collaborative research, with some advantages listed below: (1) steady inclusion of data even after publication; (2) use of the same map in other publications, enabling a comparison with previous work; (3) fast inclusion of data through a network of collaboration; (4) accuracy and standardization of data among researchers; (5) the use of the same map, resulting from a publication, elsewhere in the network (blog's, discussion list, meetings). The locality data reported for all analyzed specimens are a literal transcription of the label. Details on the data associated with these specimens may be accessed at the following link, using Google url shortener¹⁰: *Decevania* Distribution¹¹ in © 2011 Google - Map data © Google or downloaded through the Dryad¹², an international repository of data underlying peer-reviewed articles.

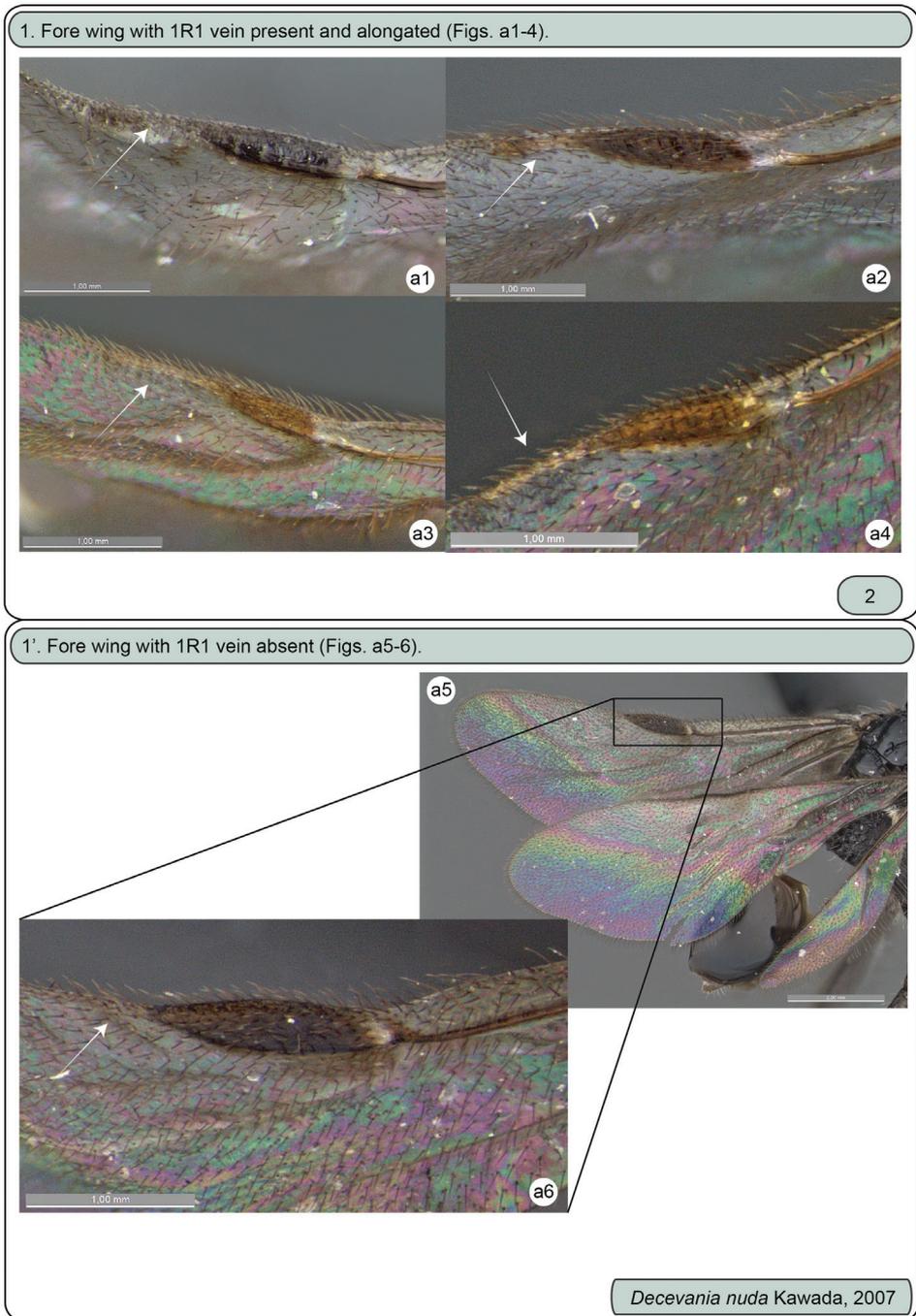
Taxonomic procedures. The taxonomic treatment method follows Winston (1999). The description and identification key were made using the DELTA program. Morphological characters for species of *Decevania* were imported to the DELTA editor (Description Language for Taxonomy¹³) (Dallwitz 1980, Dallwitz et al. 1999). The species description was generated by DELTA <tonart> with output in the format of "character: character state(s)"; Identification key by DELTA <key> (Dallwitz 1980, Dallwitz et al. 1993). The dichotomous, pictorial identification key follows the procedures of Winston (1999). For the purpose of this description, the new species are diagnosable by putative autapomorphies or by a unique combination of fixed character states.

General terminology. Anatomical terminology follows the Hymenoptera Anatomy Ontology project (HAO¹⁴) using the proofing tool available through the Hymenoptera Glossary¹⁵ (Yoder et al. 2010). Some terms are also included from Deans and Huben (2003) and Kawada and Azevedo (2007). The list of terminology is illustrated and labeled to facilitate their use (see table 1).

Pictorial key for females of *Decevania*

(Unknown female for *D. brevis* Kawada, 2007; *D. deansi* Kawada, 2007; *D. destituta* Kawada, 2007; *D. elongata* Kawada, 2007; *D. glabra* Kawada, 2007; *D. hemisphaerica* Kawada, 2007; *D. nigra* Kawada, 2007; *D. polita* Kawada, 2007; *D. striatigena* (Kieffer, 1910))

Fig. a1–25



Figures a1–6. Females. **a1** *Decevania feitosai* sp. n., left fore wing: 1R1 vein **a2** *Decevania parva* (Enderlein, 1901), left fore wing: 1R1 vein **a3** *Decevania reticulata* Kawada, 2007, left fore wing: 1R1 vein **a4** *Decevania unidentata* Kawada, 2007, holotype, left fore wing: 1R1 vein **a5-6** *Decevania nuda* Kawada, 2007 **a5** wings and **a6** left fore wing: 1R1 vein.

(From 1) 2. Outer face of hind femur unsculptured (nitid) (Fig. a7).



Decevania feitosai Kawada, sp. n.

2'. Outer face of hind femur sculptured (colliculate, imbricate or rugulose) (Fig. a8-10).



3

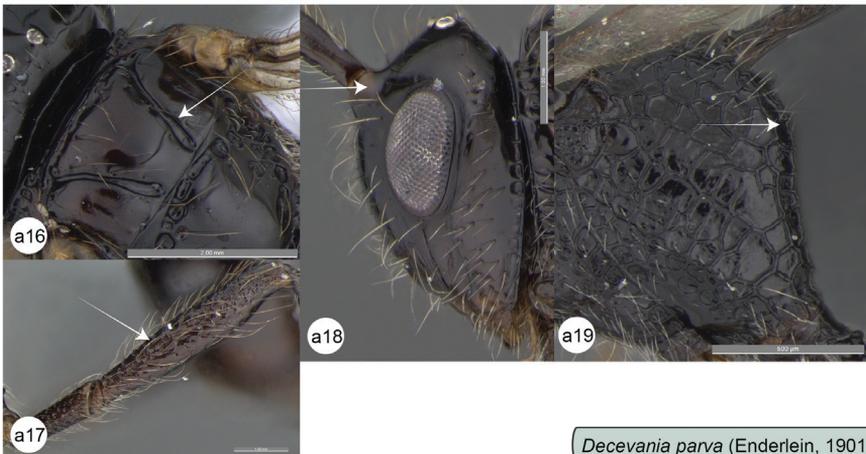
Figures a7–10. Females. **a7** *Decevania feitosai* sp. n., left hind femur in lateral view **a8** *Decevania unidentata* Kawada, 2007, holotype, left hind femur in lateral view **a9** *Decevania reticulata* Kawada, 2007, left hind femur in lateral view **a10** *Decevania parva* Kawada, 2007, left hind femur in lateral view.

(From 2') 3. Outer face of hind femur with regular or irregular sculpture (imbricate or rugulose) (Figs. a12–13); posterior edge of metapectal-complex straight (lateral view) (Fig. a15); notaulus present as series of foveae (subcircular or elongated) (Fig. a11 and a14); antennal foramen inserted above the level as the top of eye orbit (Fig. a15).



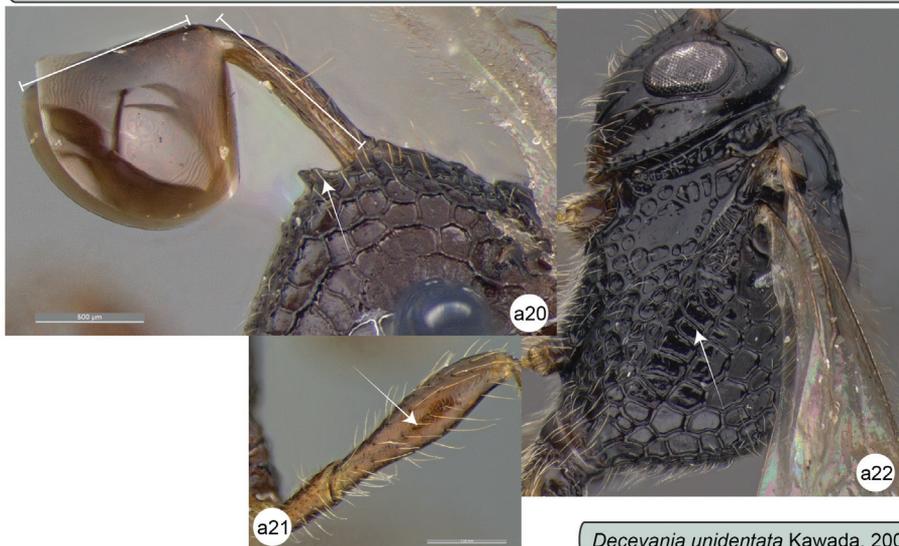
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3'. Outer face of hind femur with protuberant sculpture (colliculate) (Fig. a17); posterior edge of metapectal-complex curved (lateral view) (Fig. a19); notaulus present as continuous furrows (Fig. a16); antennal foramen inserted at the same level as the top of eye orbit (Fig. a18).

*Decevania parva* (Enderlein, 1901)

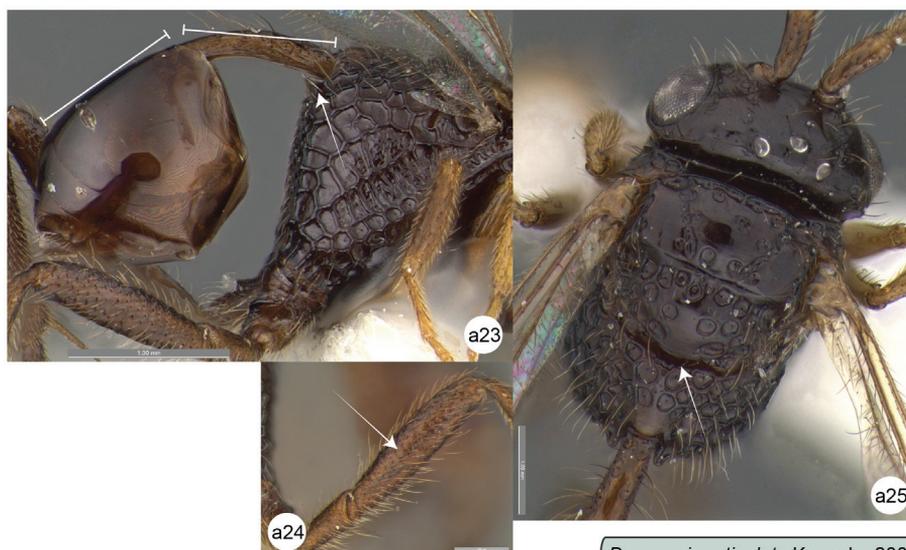
Figures a11–19. Females. **a11** *Decevania reticulata* Kawada, 2007, mesoscutum in dorsal view **a12** *Decevania reticulata* Kawada, 2007, left hind femur in lateral view **a13** *Decevania unidentata* Kawada, 2007, holotype, left hind femur in lateral view **a14** *Decevania unidentata* Kawada, 2007, holotype, mesoscutum in dorsal view **a15** *Decevania reticulata* Kawada, 2007, head and mesosoma in lateral view **a16–19** *Decevania parva* (Enderlein, 1901) **a16** mesoscutum in dorsal view **a17** left hind femur in lateral view **a18** head in lateral view and **a19** metapectal-propodeal complex in lateral view.

(From 3) 4. Outer face of hind femur regularly sculptured (imbricate) (Fig. a21); metanotum not concealed by mesoscutellum (dorsal view) (Fig. a22); dorsal area of propodeal declivity (ventral to nucha) with projection present and longer than base (Fig. a20); petiole longer than or as long as dorsal margin of tergite 1 (Fig. a20).



Decevania unidentata Kawada, 2007

4'. Outer face of hind femur irregularly sculptured (rugulose) (Fig. a24); metanotum concealed by mesoscutellum (dorsal view) (Fig. a25); dorsal area of propodeal declivity (ventral to nucha) with projection present, shorter than base or as long as wide (Fig. a23); petiole shorter than tergite 1 (Fig. a23).



Decevania reticulata Kawada, 2007

Figures a20–25. Females. **a20–22** *Decevania unidentata* Kawada, 2007, holotype **a20** propodeum and metasoma in lateral view **a21** left hind femur in lateral view **a22** head and mesosoma in dorsal view **a23–25** *Decevania reticulata* Kawada, 2007 **a23** propodeum and metasoma in lateral view **a24** left hind femur in lateral view and **a25** head and mesosoma in dorsal view.

***Decevania feitosai* Kawada, sp. n.**

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http://species-id.net/wiki/Decevania_feitosai

Fig. 1–12

Description. Female body length: 1.6 mm (head to propodeum). Head color: black. Mesosoma color: black. Legs color: fore leg: trochanter, trochantellus, tibia, tarsus light-castaneous; femur dark-castaneous. Wings: fore and hind wing hyaline. Metasoma: petiole light-castaneous; tergites: dark-castaneous.

Head (Fig. 1-2, 5-7, 9). Head: long and stiff setae present evenly distributed; close to mesosoma. Vertex: slightly convex in lateral view; nitid with some small and sparse punctures. Ocelli: equal in size; arranged in obtuse isosceles triangle; anterior ocellus: separated from posterior ocellus by one ocellar diameter; anterior ocellus: not reaching the imaginary line between the anterior margin of posterior ocelli; posterior ocelli: separated by three ocellar diameters. Upper face: nitid with some sparse punctures. Eye: subovoid (lateral view); detached from dorsal profile of head; height of eye: as high as anterior margin of mesopleuron. Circumocular sulcus: absent. Postorbital carina: present; extending from anterior base of mandible to $3/4$ the height of eye; strongly sinuous; narrower than postgenal sulcus. Antennal foramen: positioned at the same level as the top of the eye orbit; separated by one antennal foramen diameter; antennal rim: elevated laterally. Scape: long and stiff setae present evenly distributed; as long as F8. Pedicel + flagellomere 1: longer than wide; pedicel: as long as F1; flagellum: evenly and densely setose with some sparse and long setae. Median process of lower face: very weak in lateral view (difficult to see). Orbital band: strong, narrow and straight striae to the ventral margin of antennal foramen. Malar sulcus: present and conspicuous, differs from orbital band striae. Malar space: 0.64 times the height of eye (greater length). Clypeus: projecting medially; apical margin dilated and convex laterally. Mandible: two visible teeth, apical tooth longer and sharper than basal tooth.

Mesosoma (Fig. 1-2, 9, 11-12). Pronotum: long and stiff setae present evenly distributed. Pronotal neck: obscured. Dorsal pronotal area: concealed medially. Dorsolateral area of pronotum: expanded posteriorly into a lobe. Pronotal suprahumeral sulcus: scrobiculate, with a large fovea anterior to the lobe. Transverse pronotal carina: acuminate and extending along the anterior margin of pronotum. Mesothoracic spiracular incision: strongly curved and almost closed into an orifice. Lateral and dorsolateral pronotal area: not clearly separated by a carina (inconspicuous). Lateral pronotal area: narrow, same width between the upper eye orbit and occipital carina (widest point); vertical and covered by a row of fovea (transverse pronotal sulcus). Mesonotum: slightly raised (lateral view: compared with propodeum). Mesoscutum: 2.0 times wider than long; nitid with a few, sparse and regular foveae. Anterior mesoscutal sulcus: present as continuous furrow. Notaulus: present as continuous furrow, slightly curved towards the middle and not reaching the posterior margin. Median lobe of mesoscutum: slightly curved anteriorly (lateral

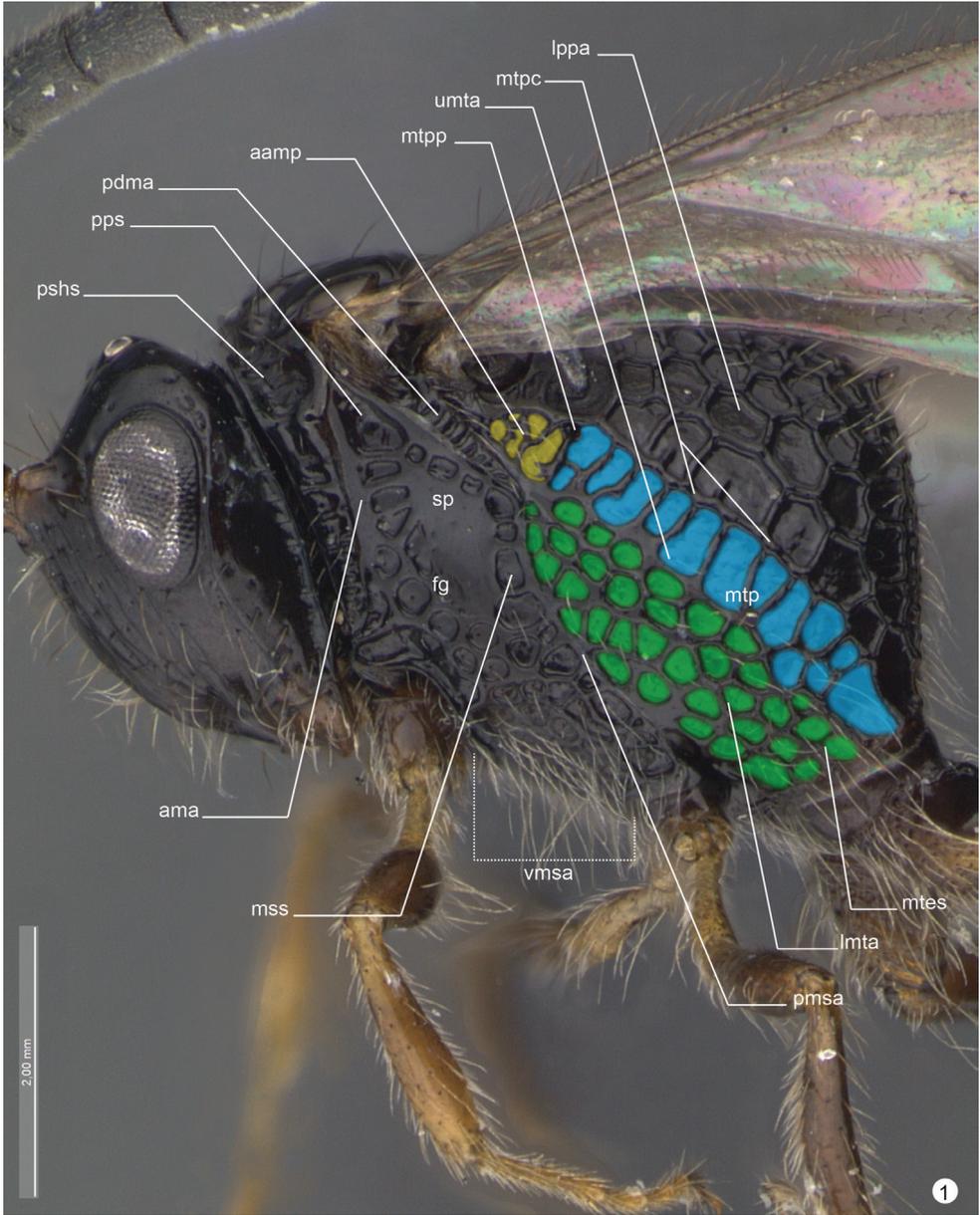


Figure 1. *Decevania feitosa* sp. n. Holotype, female. Head and mesosoma in lateral view. For terminology see the list in Material and methods. Scale in the figure.

view: difficult to see). Parascutal carina: present at posterior half; sulcus: following the parascutal carina and opening posteriorly. Parapsidal line: conspicuous suture, same length of parascutal carina and reaching the posterior margin of mesoscutum. Transscutal articulation: open in the middle and closing to lateral, near the parapsidal line. Mesoscutellum: long and stiff setae present, evenly distributed laterally;

nitid in the middle with closed fovea laterally; bulging posteromedially; with a delicate median convexity on the posterior margin, but without overlap on metanotum. Scutoscutellar sulcus: not reaching the transscutal articulation, covered by a large and subcircular fovea. Metanotum: dorsolateral area covered by moderate (cuticle visible) layer of setae. Metanotum and metascutellum: form a continuous structure. Metascutellum: as a flat and nitid structure. Epicnemial carina: without median process (continuous shape). Prespecular sulcus: composed of one fovea. Anterior mesopleural area: covered by a row of rectangular impressions to femoral groove. Speculum: slightly dilated just above the middle of femoral groove. Mesepimeral sulcus: present as a row of irregular and subcircular foveae from posterodorsal mesepimeral area to mesocoxal foramen. Posterodorsal mesepimeral area: scrobiculate (narrow and shallow). Posterior mesepimeral area: curve and elongated posteriorly (closer to metacoxal foramen). Femoral groove: weakly concave; unsculptured medially. Mesopleural pit: absent. Ventral mesopleural area: covered by a subcircular and adjacent fovea; long and stiff setae present evenly distributed. Mesosternum: higher compared to metasternum; mesosternum foveate (irregular) with an open area (punctate) laterally. Mesodiscrimen: present as a flat and inconspicuous sulcus. Mesocoxa: distant 2.5 times (width of mesocoxa) from procoxa; adjacent to metacoxa. Meso- and metacoxa: without a pair of processes between coxae. Metapleuron (metapleural arm to metacoxal foramen): at least 3 times longer than wide. Metapleural carina: straight and parallel with concave lower metapleural area. Upper metapleural area: covered by a row of rectangular foveae. Lower metapleural area: lower region covered by an irregular polygonal fovea; long and stiff setae present, evenly distributed. Metapleural pit: present. Anterior area of metapleural pit: acute isosceles triangle shaped and covered by an irregular fovea. Metapleural epicoxal sulcus: present as a row of large and subrectangular foveae. Metanotum and propodeum: form a continuous structure. Propodeum: irregular foveae (dorsal) to regularly areolate (lateral). Dorsal propodeal area: long and stiff setae present, evenly distributed. Lateral propodeal carina: absent. Lateral propodeal area (upper region): long and stiff setae present evenly distributed. Adpetiolar strip: longer than wide. Nucha: slightly elevated (lateral view). Upper region of propodeal declivity (ventral to nucha): projection present and longer than base. Middle area of propodeal declivity: with long and stiff setae present evenly distributed. Posterior edge of metapectal-complex: curved (lateral view).

Legs (Fig. 4, 10). Protibial spur: apex of calcar longer than apex of velum. Hind leg: long and stiff setae present evenly distributed (longer than outer spur); nitid with sparse punctures (trochanter, trochantellus, femur and tibia). Trochanter: 3.6 times longer (longer point) than wide (widest point). Hind femur: dorsal and ventral margin slightly dilated medially. Hind tibia: longer than hind femur; apical incision of hind tibia: sinuous. Tibial spurs: slightly sinuous; inner tibial spur: extending past the mid length of basitarsus; outer tibial spur: 1.8 times the length of hind basitarsus. Tarsus: minute striae (interspace) and more closer punctures; projections: conspicuous in tarsus 1–3; basitarsus: as long as tarsus 2–4 combined; basitarsus projection: longer than

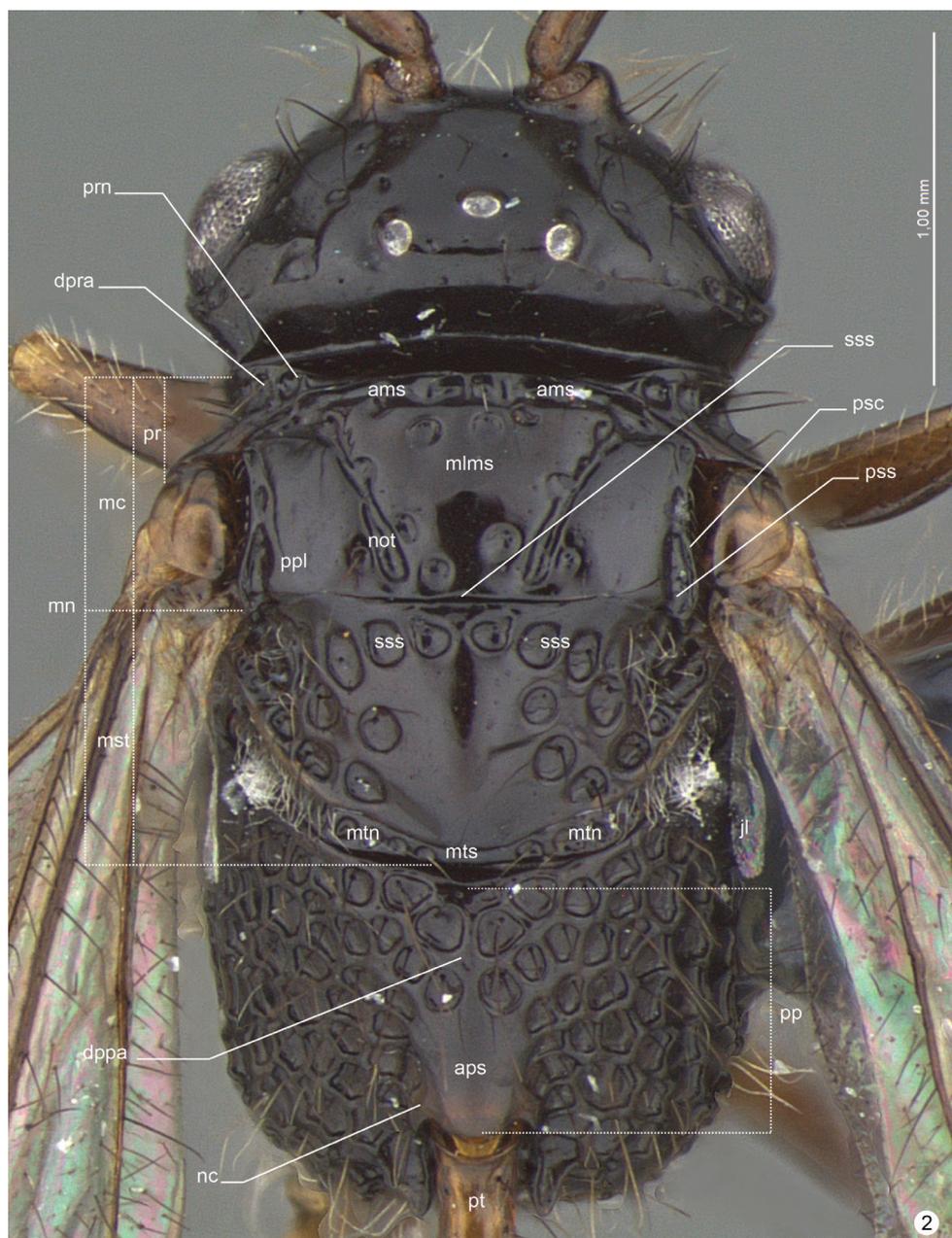


Figure 2. *Decevania feitosai* sp. n. Holotype, female. Head and mesosoma in dorsal view. For terminology see the list in Material and methods. Scale in the figure.

apex of basitarsus (widest point). Tarsal claw: hook-shaped, medially with a minute ventral spine.

Wings (Fig. 8). Apex of fore wing: bordered by long setae. Costal cell: the same length as head + mesosoma combined (dorsal view). Stigmal vein: as wide as costal

cell. 1R1 vein: as long as stigmal vein, with slightly dilated apex. M+CU, 1CU and 2CU veins combined: extending past the propodeal declivity. 1Cub and 2CU vein: combined to form an angulated angle (45 degrees). 2CU vein: present with a slight dilatation distally. Hind wing: three hook-shaped hamuli of equal size; fusiform and three times longer than wide. Jugal lobe: present, slender and extending past the propodeal spiracle.

Metasoma (Fig. 11). Petiole: shorter than propodeal declivity; 6–7 times longer than wide; slightly curved distally. Transverse carina on petiole: as a narrow and acuminate rim. Dorsal petiolar area: nitid. Lateral petiolar area: some sparse and elongated punctures; long and stiff setae present, evenly distributed. Ventral petiolar area: fine and delicate longitudinal carina. Metasoma: subovoid (lateral view) with ovipositor concealed; without setae except T6–7 on posterior edge. Tergite 1: longer than petiole.

Diagnosis. Eye: 1.8–2.0 times higher than wide. Postorbital carina: present and complete; conspicuously outlined; detached from the margin of lower eye orbit; sinuous (see malar space); reaching the top of eye orbit (some foveae may also be present and are part of carina). Antennal foramen: inserted at the same level as the top of eye orbit; antennal rim: conspicuously elevated laterally (head lateral view). Median lobe of mesoscutum: slightly curved or flat (lateral view). Notaulus: present as continuous furrow. Metanotum: not concealed by mesoscutellum (dorsal view). Sculpture of hind femur: unsculptured (nitid, autapomorphy for *D. feitosa* sp. n.). Posterior edge of metapectal complex: curved (lateral view). Dorsal area of propodeal declivity (ventral to nucha): projection present and longer than base. Petiole: longer than or as long as dorsal margin of tergite 1. 1R1 vein: present and elongate.

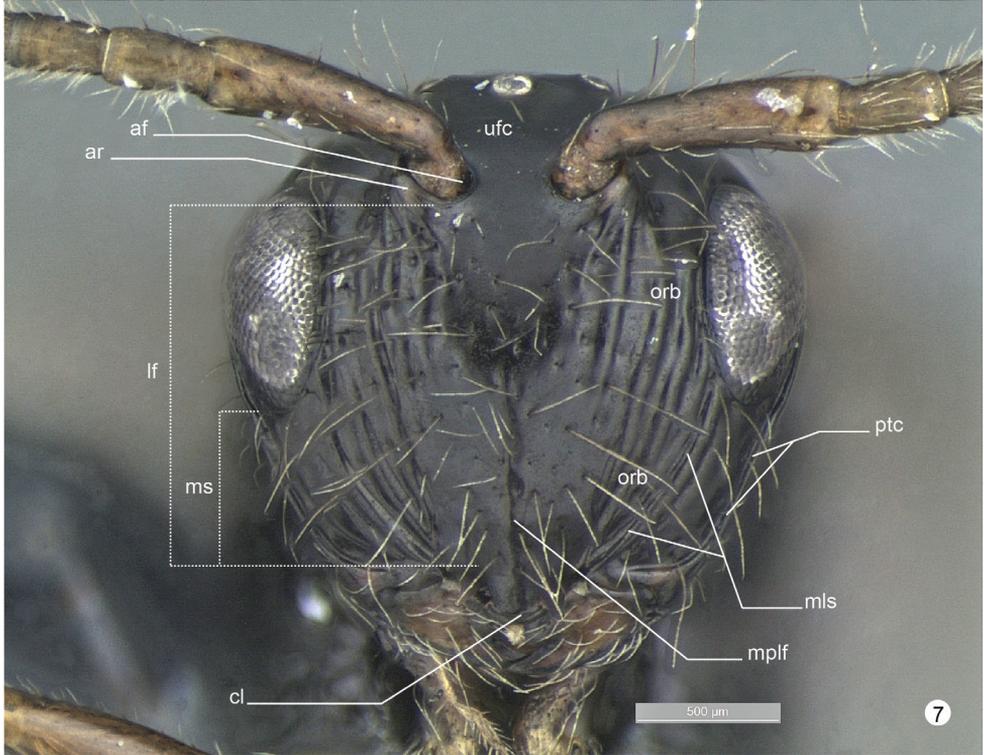
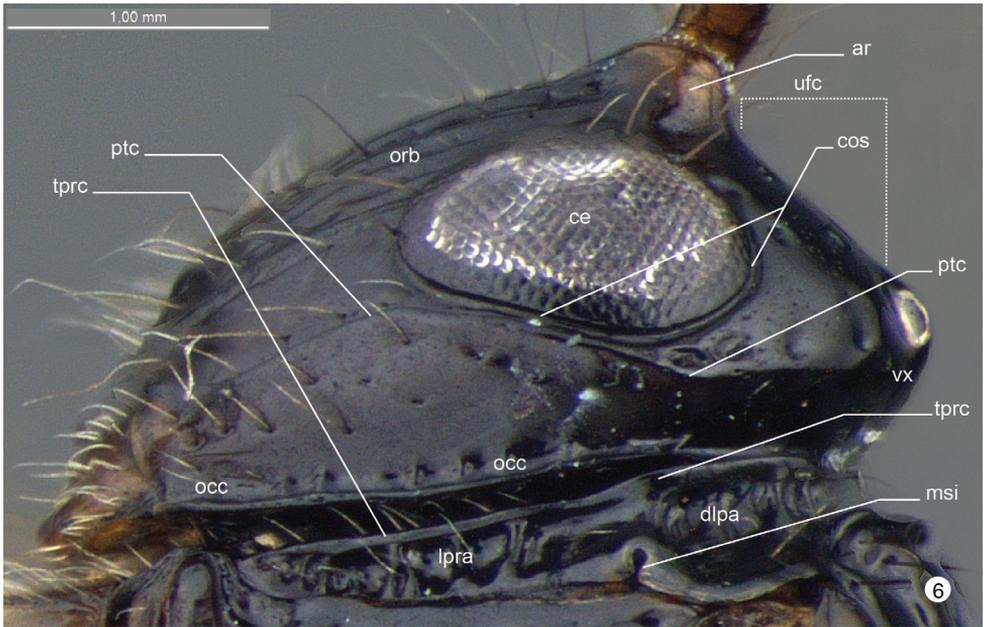
Etymology. The specific epithet is a patronymic honoring Rodrigo M. Feitosa, colleague and researcher of Formicidae from MZSP.

Link to distribution map. Decevania Distribution¹⁶.

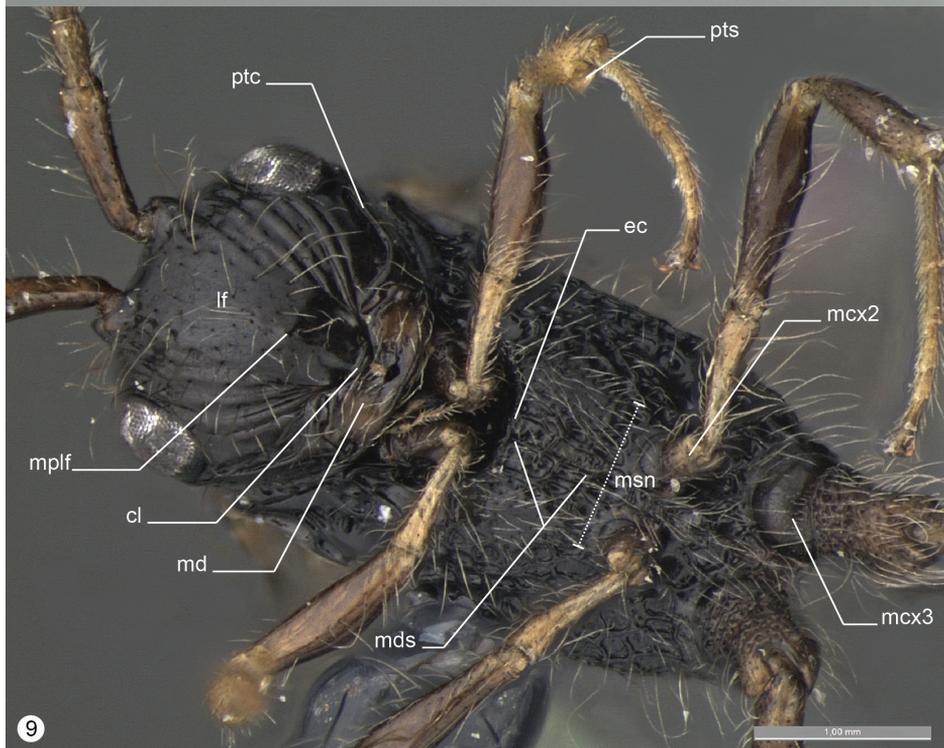
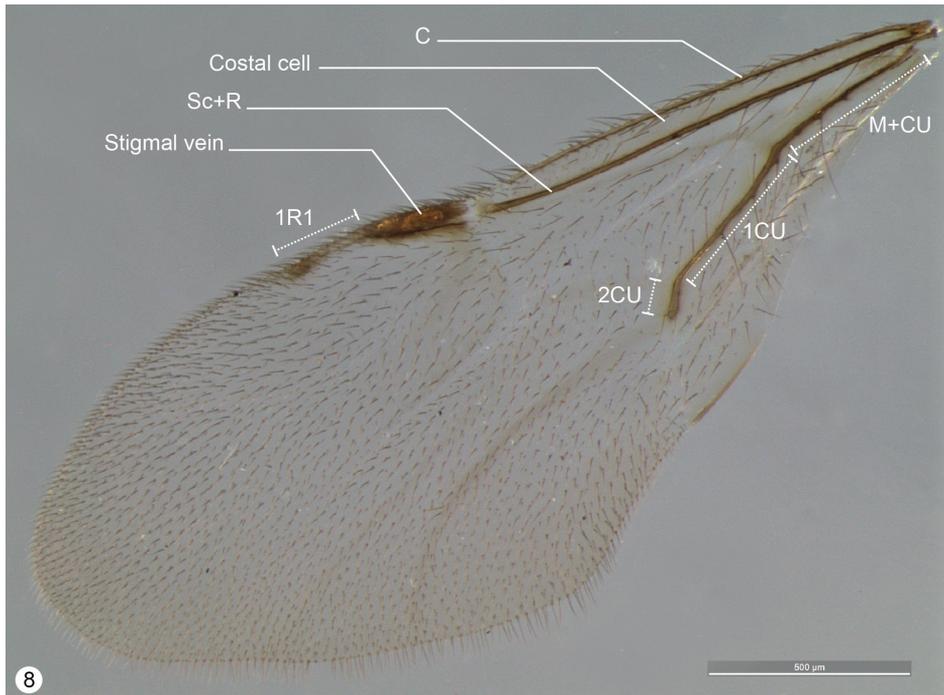
Material examined. Holotype. Female. **COLOMBIA:** Risaralda, SFF Otún Quimbaya, El Molinillo, 4°43'N, 75°34'W, 2220 m, Malaise, 17.ii–04.iii.2003, G. López leg., M.3696 (IAVH). Paratypes. 3 females. **COLOMBIA:** Magdalena, PNN Sierra Nevada de Santa Marta, San Lorenzo, 10°48'N, 73°39'W, 2200 m, Malaise, 09–24.vi.2000, J. Cantillo leg. M. 205 (IAVH 65814); 09–24.vi.2000, J. Cantillo leg. M. 205 (IAVH 65815); 24–30.vi.2000, J. Cantillo leg. M. 211 (IAVH 65816). 4 females. Risaralda, SFF Otún Quimbaya, El Molinillo, 4°43'N, 75°34'W, 2220 m, 03–17.xii.2002, Malaise, G. Walker leg., M. 2972 (IAVH 65827); 4°43'N, 75°34'W, 2220 m, 17.xii.2002–03.i.2003, Malaise, G. Walker leg., M. 2971 (IAVH 65828). Cuchilla Camino, 4°43'N, 75°35'W, 2050 m, 04–17.ii.2003, Malaise, G. López leg., M. 3680 (IAVH). Cuchilla Camino, 4°44'N, 75°35'W, 1960 m, 04–21.iii.2003, Malaise, G. López leg., M. 3669 (IAVH 65826).



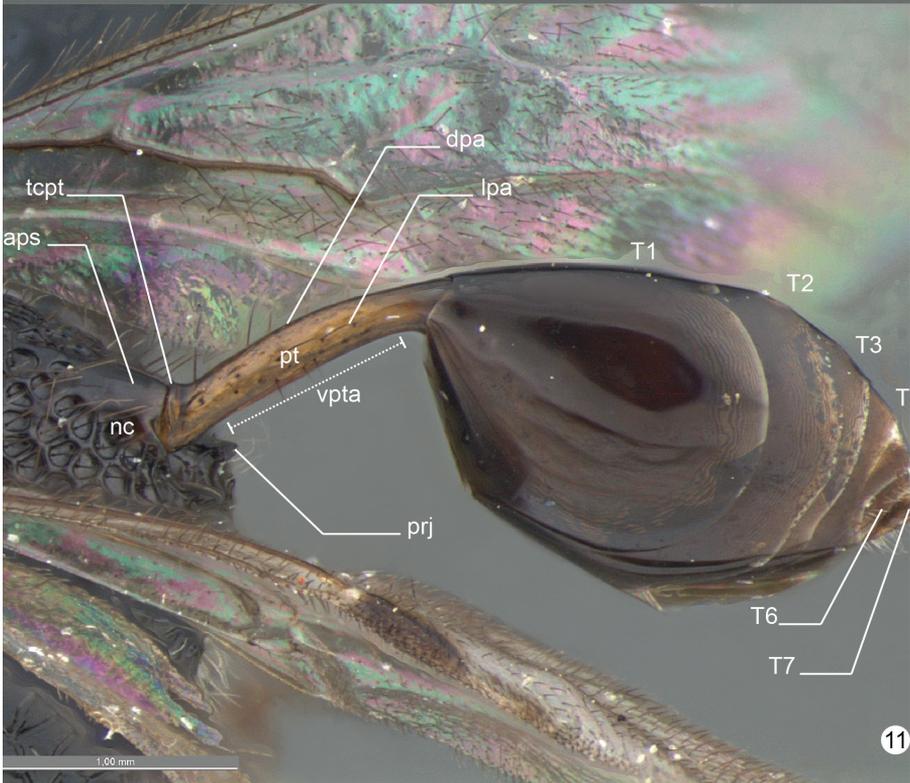
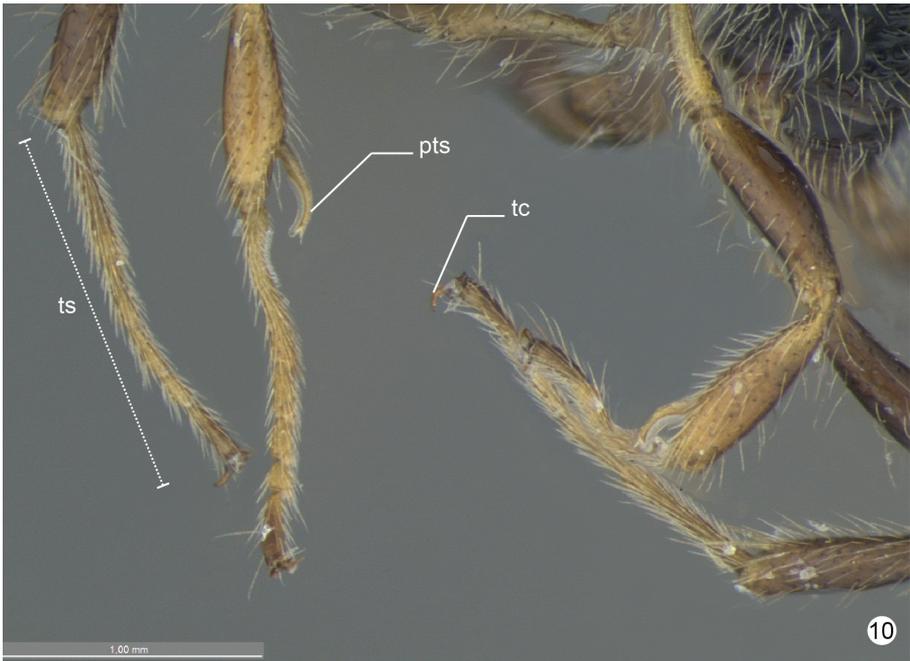
Figures 3–5. *Decevania feitosai* sp. n. Holotype, female. **3** right antenna in dorsal view **4** hind legs in lateral view **5** head in dorsal view. For terminology see the list in Material and methods. Scale in the figures.



Figures 6–7. *Decevania feitosa* sp. n. Holotype, female. **6** head in lateral view **7** head in frontal view. For terminology see the list in Material and methods. Scale in the figures.



Figures 8–9. *Decevania feitosa* sp. n. Holotype, female. **8** left fore wing **9** head and mesosoma in ventral view. For terminology see the list in Material and methods. Scale in the figures.



Figures 10–11. *Decevania feitosa* sp. n. Holotype, female. **10** fore and mid leg in frontal view **11** metasoma in laterodorsal view. For terminology see the list in Material and methods. Scale in the figures.



Figure 12. *Decevania feitosai* sp. n. Holotype, female. **10** habitus in lateral view. Scale in the figure.

Additional diagnoses for females of *Decevania*

D. nuda Kawada, 2007. Eye: 1.8–2.0 times higher than wide. Postorbital carina: present and complete; conspicuously outlined; closer to the margin of lower eye orbit; slightly sinuous (see malar space); reaching the top of eye orbit (some foveae may also be present and are part of carina). Antennal foramen: positioned above the level of the top of eye orbit; antennal rim: inconspicuously elevated laterally (head lateral view). Median lobe of mesoscutum: curved (lateral view). Notaulus: present as series of elongate foveae. Metanotum: not concealed by mesoscutellum (dorsal view). Sculpture of hind femur: protuberant sculpture (colliculate). Posterior edge of metapectal complex: angulated (lateral view). Dorsal area of propodeal declivity (ventral to nucha): projection present, shorter than base or as long as wide. Petiole: shorter than tergite 1. 1R1 vein: absent.

Material examined. Paratype. Female. **ECUADOR:** Napo, Sierra Azul, 0.67°S, 77.92°W, 2300 m, 21–22.iv.1996, PT, P.J. Hibbs col. (CNCI).

D. parva (Enderlein, 1901). Eye: 1.8–2.0 times higher than wide. Postorbital carina: present and complete; inconspicuously outlined; detached from the margin of lower eye orbit; sinuous (see malar space); not reaching the top of eye orbit. Antennal foramen: positioned at the same level as the top of eye orbit; antennal rim: conspicuous elevated laterally (head lateral view). Median lobe of mesoscutum: curved (lateral view). Notaulus: present as continuous furrow. Metanotum: not concealed by mesoscutellum (dorsal view). Sculpture of hind femur: protuberant sculpture (colliculate). Posterior edge of metapectal complex: curved (lateral view). Dorsal area of propodeal declivity (ventral to nucha): projection present, shorter than base or as long as wide. Petiole: longer than or as long as dorsal margin of tergite 1. 1R1 vein: present and elongated.

Material examined. Female. **COLOMBIA:** Cundinamarca, PNN Chingaza Bosque, Palacio, 4°31'N, 73°45'W, 2930 m, Malaise, 20.xii.2000–05.i.2001, L. Cifuentes leg., M. 1223 (IAVH 65781).

D. reticulata Kawada, 2007. Eye: 1.8–2.0 times higher than wide. Postorbital carina: present and complete; conspicuously outlined; detached from the margin of lower eye orbit; slightly sinuous (see malar space); reaching the top of eye orbit (some foveae may also be present and are part of carina). Antennal foramen: positioned above the level as the top of eye orbit; antennal rim: inconspicuously elevated laterally (head lateral view). Median lobe of mesoscutum: curved (lateral view). Notaulus: present as series of subcircular foveae. Metanotum: concealed by mesoscutellum (dorsal view). Sculpture of hind femur: irregular sculpture (rugulose). Posterior edge of metapectal complex: angulated (lateral view). Dorsal area of propodeal declivity (ventral to nucha): projection present, shorter than base or as long as wide. Petiole: shorter than tergite 1. 1R1 vein: present and elongated.

Material examined. Paratype. Female. **COLOMBIA:** Chocó, PNN Utría Cocalito Dosel, 6°1'N, 77°20'W, 20 m, Malaise, 04–19.vii.2000, J. Pérez leg., M. 339 (IAVH 65778).

D. unidentata Kawada, 2007. Eye: 1.6 times higher than wide. Postorbital carina: present, but some portion not visible; inconspicuously outlined; closer to the margin of lower eye orbit; reaches the top of eye orbit (some foveae may also be present and are part of carina). Antennal foramen: positioned above the level as the top of eye orbit; antennal rim: conspicuous elevated laterally (head lateral view). Median lobe of mesoscutum: slightly curved or flat (lateral view). Notaulus: present as series of subcircular foveae. Metanotum: not concealed by mesoscutellum (dorsal view). Sculpture of hind femur: regular sculpture (imbricate). Posterior edge of metapectal complex: angulated (lateral view). Dorsal area of propodeal declivity (ventral to nucha): projection present and longer than base. Petiole: longer than or as long as dorsal margin of tergite 1. 1R1 vein: present and elongate.

Material examined. Holotype observed. Access through: Evanioidea online¹⁷.

Acknowledgments

Thanks to A. Bennett (CNCI) and C. A. M. Uribe (IAVH) for the loan of material for this study. Julia C. Almeida (MZSP) and Maurício M. da Rocha (MZSP) for discussion and to Antonio C. C. Macedo, Cleide Costa (MZSP), Gabriel Biffi (MZSP), Patricia Mullins (NCSU) and Rodrigo M. Feitosa (MZSP) for constructive comments on the manuscript. This material is based upon work supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (process 2008/04661-3 to Ricardo Kawada).

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- Winston JE (1999) Describing Species. xxi+ 518 pp. New York: Columbia University Press.²¹

Appendix I

Abbreviations used on figures

abbreviation	description	detail	Fig.
aamp	anterior area of metapleural pit	area anterior to metapleural pit, after posterodorsal mesepimeral area and below the propodeal spiracle	1
af	antennal foramen		7
ar	antennal rim		6, 7
aiht	apical incision of hind tibia	distal margin of hind tibia, site of insertion of inner and outer tibia spurs	4
ama	anterior mesopleural area		1
ams	anterior mesoscutal sulcus		2
ao	anterior ocellus		5
aps	adpetiolar strip		5
bt	basitarsus		4
btp	basitarsus projection	projection of the apex of tarsus (at least tarsus 1-3)	4
ce	compound eye		6
cl	clypeus		7, 9
cos	circumocular sulcus	furrow that surrounds the compound eye	6
dlpa	dorsolateral pronotal area		6
dpa	dorsal petiolar area		11
dppa	dorsal propodeal area		2
dpra	dorsal pronotal area		2
ec	epicnemial carina		9
fg	femoral groove		1
fl	flagellum		3
F1, F2...	flagellomere		3
hf	hind femur		4
ht	hind tibia		4
its	inner tibial spur		4
jl	jugal lobe		2
lf	lower face		7, 9
lmta	lower metapleural area		1
lpa	lateral petiolar area		11
lppa	lateral propodeal area		1
lpra	lateral pronotal area		6
mc	mesoscutum		2
mcx2	mesocoxa		9
mcx3	metacoxa		9
md	mandible		9
mds	mesodiscrimen		9
mlms	median lobe of mesoscutum		2
mls	malar sulcus		7

abbreviation	description	detail	Fig.
mn	mesonotum		2
mplf	median process of lower face		7, 9
ms	malar space		7
msi	mesothoracic spiracular incision		6
msn	mesosternum		9
mss	mesepimeral sulcus		1
mst	mesoscutellum		2
mtes	metapleural epicoxal sulcus		1
mtn	metanotum		2
mtp	metapleuron	divided into two regions by difference of sculpture and flatness: upper metapleural area (usually flat/areolate) and lower metapleural area (usually concave/foveolate)	1
mtpc	metapleural carina		1
mtp	metapleural pit		1
mts	metascutellum		2
nc	nucha		2, 11
not	notaulus		2
orb	orbital band		6, 7
ots	outer tibial spur		4
pd	pedicel		3, 5
pdma	posterodorsal mesepimeral area		1
occ	occipital carina		6
pmsa	posterior mesepimeral area		1
poc	posterior ocelli		5
pp	propodeum		2
ppl	parapsidal line		2
pps	prespecular sulcus		1
pr	pronotum		2
prj	projection of propodeum		11
prn	pronotal neck		2
psc	parascutal carina		2
pshs	pronotal suprahumeral sulcus		1
pss	parascutal sulcus		2
pt	petiole		11
ptc	postorbital carina		6, 7
pts	protibial spur		10
sc	scape		3, 5
sp	speculum		1
sss	scutoscutellar sulcus		2
T1, T2...	tergite		11

abbreviation	description	detail	Fig.
tc	tarsal claw		4, 10
tcpt	transverse carina on petiole		11
tprc	transverse pronotal carina		6
tr	trochanter		4
trll	trochantellus		4
ts	tarsus		4, 10
tsa	transcutal articulation		2
ufc	upper face		6, 7
umta	upper metapleural area		1
vmsa	ventral mesopleural area		1
vpta	ventral petiolar area		11
vx	vertex		5, 6

Appendix II

Links

1	http://evanioidea.info/public/taxon_name/show/25686	introduction
2	http://evanioidea.info/public/taxon_name/show/25752	introduction
3	http://evanioidea.info/public/taxon_name/show/25753	introduction
4	http://evanioidea.info/public/taxon_name/show/25692	introduction
5	http://www.canacoll.org/	material and methods
6	http://www.humboldt.org.co/iavh/inicio	material and methods
7	http://www.mz.usp.br/	material and methods
8	http://www.leica-microsystems.com	material and methods
9	http://maps.google.com/	material and methods
10	http://goo.gl/	material and methods
11	http://goo.gl/LJ1hd	material and methods
12	http://datadryad.org/	material and methods
13	http://delta-intkey.com/	material and methods
14	http://purl.bioontology.org/ontology/HAO	material and methods
15	http://goo.gl/LJ1hd	material and methods
16	http://purl.oclc.org/NET/hymontology/proof	results
17	http://evanioidea.info/public/taxon_name/show/29154	results
18	http://www.mapress.com/zootaxa/2007f/z01496p030f.pdf	references
19	http://dx.doi.org/10.1371/journal.pone.0015991	references
20	http://purl.oclc.org/NET/hymontology	references
21	http://geomag.geoscienceworld.org/cgi/content/extract/137/4/472-a	references
22	http://api.hymao.org/projects/32/public/ontology_class/show/5025	terminology
23	http://api.hymao.org/projects/32/public/ontology_class/show/1080	terminology
24	http://api.hymao.org/projects/32/public/ontology_class/show/3191	terminology
25	http://api.hymao.org/projects/32/public/ontology_class/show/611	terminology
26	http://hymglossary.tamu.edu/projects/32/public/ontology_class/show/1069	terminology
27	http://api.hymao.org/projects/32/public/ontology_class/show/3836	terminology
28	http://api.hymao.org/projects/32/public/ontology_class/show/4502	terminology
29	http://api.hymao.org/projects/32/public/ontology_class/show/4160	terminology
30	http://api.hymao.org/projects/32/public/ontology_class/show/1084	terminology
31	http://api.hymao.org/projects/32/public/ontology_class/show/1779	terminology
32	http://api.hymao.org/projects/32/public/ontology_class/show/5973	terminology
33	http://api.hymao.org/projects/32/public/ontology_class/show/1118	terminology
34	http://api.hymao.org/projects/32/public/ontology_class/show/1076	terminology
35	http://api.hymao.org/projects/32/public/ontology_class/show/470	terminology
36	http://api.hymao.org/projects/32/public/ontology_class/show/516	terminology
37	http://api.hymao.org/projects/32/public/ontology_class/show/4001	terminology
38	http://api.hymao.org/projects/32/public/ontology_class/show/3172	terminology
39	http://api.hymao.org/projects/32/public/ontology_class/show/522	terminology
40	http://api.hymao.org/projects/32/public/ontology_class/show/1196	terminology
41	http://api.hymao.org/projects/32/public/ontology_class/show/484	terminology
42	http://api.hymao.org/projects/32/public/ontology_class/show/526	terminology
43	http://api.hymao.org/projects/32/public/ontology_class/show/8063	terminology
44	http://api.hymao.org/projects/32/public/ontology_class/show/615	terminology

45	http://api.hymao.org/projects/32/public/ontology_class/show/1228	terminology
46	http://api.hymao.org/projects/32/public/ontology_class/show/853	terminology
47	http://api.hymao.org/projects/32/public/ontology_class/show/7261	terminology
48	http://api.hymao.org/projects/32/public/ontology_class/show/3270	terminology
49	http://api.hymao.org/projects/32/public/ontology_class/show/3241	terminology
50	http://api.hymao.org/projects/32/public/label/show_via_name/mesoscutum	terminology
51	http://api.hymao.org/projects/32/public/ontology_class/show/1711	terminology
52	http://api.hymao.org/projects/32/public/ontology_class/show/1708	terminology
53	http://api.hymao.org/projects/32/public/ontology_class/show/488	terminology
54	http://api.hymao.org/projects/32/public/ontology_class/show/3274	terminology
55	http://api.hymao.org/projects/32/public/ontology_class/show/1417	terminology
56	http://api.hymao.org/projects/32/public/ontology_class/show/1635	terminology
57	http://api.hymao.org/projects/32/public/ontology_class/show/492	terminology
58	http://api.hymao.org/projects/32/public/ontology_class/show/1075	terminology
59	http://api.hymao.org/projects/32/public/label/show_via_name/malar%20space	terminology
60	http://api.hymao.org/projects/32/public/label/show_via_name/mesosternum	terminology
61	http://api.hymao.org/projects/32/public/ontology_class/show/3173	terminology
62	http://api.hymao.org/projects/32/public/ontology_class/show/622	terminology
63	http://api.hymao.org/projects/32/public/ontology_class/show/3181	terminology
64	http://api.hymao.org/projects/32/public/ontology_class/show/532	terminology
65	http://api.hymao.org/projects/32/public/label/show_via_name/metapleuron	terminology
66	http://api.hymao.org/projects/32/public/ontology_class/show/3332	terminology
67	http://api.hymao.org/projects/32/public/ontology_class/show/623	terminology
68	http://api.hymao.org/projects/32/public/ontology_class/show/1698	terminology
69	http://api.hymao.org/projects/32/public/ontology_class/show/601	terminology
70	http://api.hymao.org/projects/32/public/ontology_class/show/3255	terminology
71	http://api.hymao.org/projects/32/public/ontology_class/show/541	terminology
71	http://api.hymao.org/projects/32/public/ontology_class/show/1597	terminology
73	http://api.hymao.org/projects/32/public/ontology_class/show/3232	terminology
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75	http://api.hymao.org/projects/32/public/label/show_via_name/propodeum	terminology
76	http://api.hymao.org/projects/32/public/ontology_class/show/1699	terminology
77	http://api.hymao.org/projects/32/public/ontology_class/show/3174	terminology
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82	http://api.hymao.org/projects/32/public/ontology_class/show/4542	terminology
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85	http://api.hymao.org/projects/32/public/ontology_class/show/550	terminology
86	http://api.hymao.org/projects/32/public/label/show_via_name/speculum	terminology
87	http://api.hymao.org/projects/32/public/label/show_via_name/scutoscutellar%20sulcus	terminology
88	http://api.hymao.org/projects/32/public/ontology_class/show/583	terminology
89	http://api.hymao.org/projects/32/public/ontology_class/show/580	terminology
90	http://api.hymao.org/projects/32/public/ontology_class/show/4382	terminology
91	http://api.hymao.org/projects/32/public/ontology_class/show/3458	terminology
92	http://api.hymao.org/projects/32/public/ontology_class/show/610	terminology
93	http://api.hymao.org/projects/32/public/ontology_class/show/612	terminology

94	http://api.hymao.org/projects/32/public/ontology_class/show/579	terminology
95	http://api.hymao.org/projects/32/public/label/show_via_name/articulation	terminology
96	http://api.hymao.org/projects/32/public/ontology_class/show/655	terminology
97	http://api.hymao.org/projects/32/public/ontology_class/show/7242	terminology
98	http://api.hymao.org/projects/32/public/ontology_class/show/608	terminology