

Annotated catalogue of the Haliplidae of China with the description of a new species and new records from China (Coleoptera, Adepfaga)

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Abstract

A revised checklist of Haliplidae (Coleoptera: Adepfaga) of China is presented. A new species *Haliplus* (*Haliplus*) *latreillei* sp. n. is described from Guizhou, China. Three species, *Haliplus* (*Haliplidius*) *confinis* Stephens, *Haliplus* (*Haliplus*) *ruficollis* (De Geer) and *Haliplus* (*Haliplus*) *sibiricus* Motschulsky are reported from China for the first time. *Haliplus dalmatinus* Müller is excluded from the list of Chinese species. A number of new provincial records from China is presented.

Keywords

Coleoptera, Haliplidae, *Haliplus*, new species, new records, China

Introduction

Haliplidae is a very small family of Coleoptera. A total of five genera and 238 species (Vondel 2005, 2007, 2009, 2010, Vondel and Spangler 2008, Watts and McRae 2010) have been described in the world of which only *Haliplus* Latreille, 1802 (with subgenera *Liaphlus* Guignot, 1928, *Haliplidius* Guignot, 1928 and *Haliplus* s. str.) and

Peltodytes Régimbart, 1879 (subgenus *Peltodytes* s.str.) are known in China. Wu (1937) reported two genera and 13 species from China, of which only 10 species are valid now. Since the description of *Halipilus diruptus* Balfour-Browne, 1947 from Tianjin, no new species were described from China until Vondel (1990) described *Halipilus harminae* Vondel, 1990 from Hubei. Subsequently Vondel (1991, 1992, 1995, 1998, 2003a) described five new species from China and revised all known Chinese species. Makhan (1999) described further three new species from China, *Peltodytes aschmae* Makhan, 1999, *Halipilus rishwani* Makhan, 1999 and *Halipilus amrishi* Makhan, 1999, which were all treated as synonyms of *Peltodytes sinensis* (Hope, 1845), *Halipilus japonicus* Sharp, 1873 and *Halipilus sharpi* Wehncke, 1880 respectively by Vondel (2003b). Štátný and Boukal (2003) described *Halipilus rejseki* Štátný & Boukal, 2003 from Sichuan, being the first representative of the subgenus *Haliplidius* in China. Jia (2003) reported *Halipilus (Liaphlus) dalmatinus* Müller, 1900 (which identification is changed to *H. abbreviatus* Wehncke, 1880 in this paper) and Jia (2003) and Vondel (2003b) reported *Peltodytes (Peltodytes) caesus* (Duftschmid, 1805) from China.

The studies of the material of the Haliplidae deposited in the Coleoptera collection of the Sun Yat-sen University in Guangzhou, China and in several European collections result in a considerable extension on the knowledge of Chinese Haliplidae. This justifies a review of the species known so far from China, specified to the provinces in which they are found. In the present paper one new species of *Halipilus* is described and other three species of *Halipilus* are reported as new for China. Including this study 29 species are now known from China.

Material and methods

The present paper is based predominantly on 600 specimens of the family Haliplidae deposited in the Coleoptera collection of the Sun Yat-sen University (SYSU) in Guangzhou (Guangdong, China). All these specimens were identified by the first author and 25 specimens were re-examined by the second author. The second author examined another 210 specimens from the National Museum Prague, Czech Republic (NMPC); Naturhistorisches Museum Basel, Switzerland (NHMB), the Snow Entomological Collections of the University of Kansas, Lawrence, Kansas, USA (SEMC), the collection of F. Angelini, Brindisi, Italy (CA), the collection of H. Fery, Berlin, Germany (CF), the collection of A. Nilsson, Umeå, Sweden (CN) and second author's own collection (CV).

Details on distribution are partly adopted from Vondel (2005, 2007). The genera *Halipilus* and *Peltodytes* were redescribed in detail by Holmen (1987). The key to genera was given by Vondel (1995). Morphological terminology largely follows Holmen (1987), Vondel (1991, 1992, 1993) and Vondel et al. (2006). Photographs were taken using a Zeiss Axioskop 40 compound microscope and a Leica M205C stereomicroscope combined with AutoMontage software.

Systematics

Haliplus (Haliplus) latreillei sp. n.

urn:lsid:zoobank.org:act:1C3B87DA-E87E-40CA-B74D-2E537338AFEB

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_latreillei](http://species-id.net/wiki/Haliplus_(Haliplus)_latreillei)

Figs 1–6

Type material. Holotype ♂, China, Guizhou, Guiyang, 6.x.1940, lgt. Zhe-long Pu (translation, labeled in Chinese) (SYSU). Paratypes (2 exs.): 1 ♂, same data as holotype (SYSU); 1 ♂, same data as holotype (NMW).

Description. Length 2.9–3.0 mm, width 1.6–1.7 mm. Body oval, tapering backwards, widest before the middle (Fig. 1).

Head. Dark brown, somewhat lighter between eyes, anterior margin of clypeus densely punctured, but with much stronger and sparser punctures between eyes. Labrum yellowish brown with dark spot in the middle. Distance between eyes 1.6× width of one eye. Antennae light yellowish brown, not darkened apically. Palpi yellowish brown.

Pronotum. Yellow to yellowish brown. Without basal plicae, strongly and densely punctured. Lateral sides margined, straight to slightly convex. Base a little narrower than elytra at base.

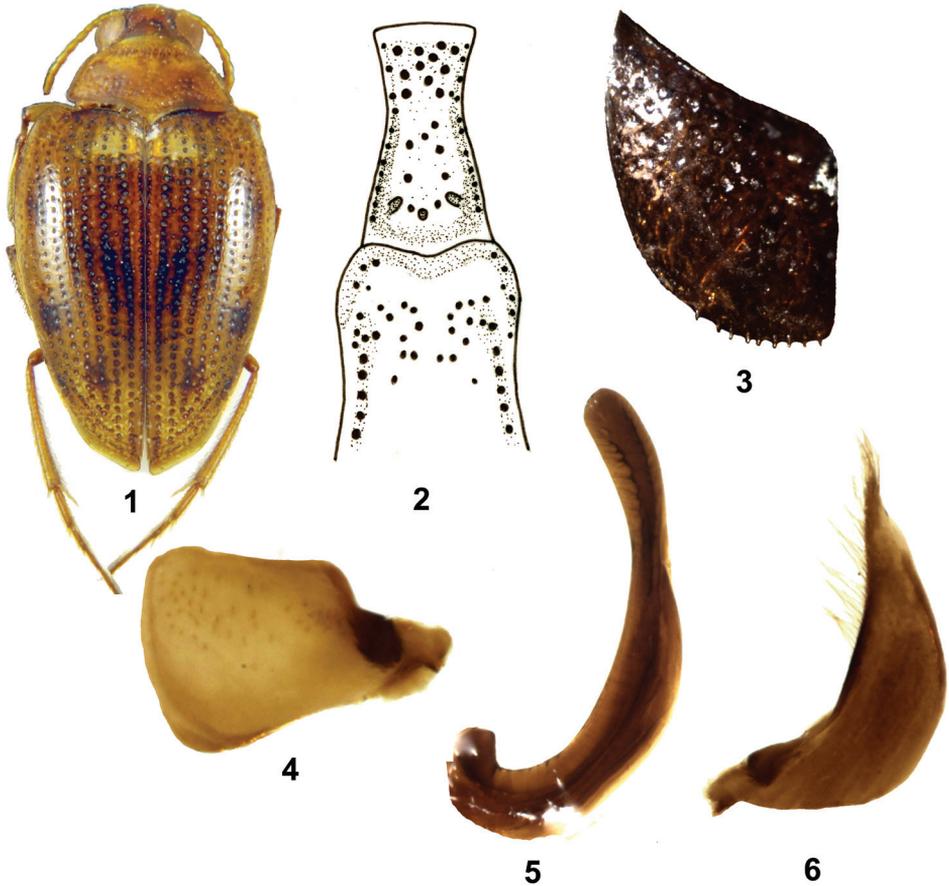
Elytra. Yellowish brown, with dark interrupted lines on primary puncture rows, darkened along suture, with vague dark marks connecting primary puncture rows, without dark band basally. Completely margined. Primary puncture rows moderately strong and dense, 38–39 punctures in row 1. Secondary punctures moderately strong and dense along suture, moderately strong and much sparse on intervals. All punctures darkened.

Ventral side. Brown red, with legs and anterior 1/fifth of prosternal process yellow brown; elytral epipleura yellowish brown with strong darkened punctures, reaching to abdominal sternite 6. Prosternal process narrowed between coxae, grooved along each side, anterior edge not margined, with moderately strong punctation. Metaventral process slightly bulbous with a row of strong punctures on each side that is slightly impressed, else moderately punctured (Fig. 2). Metacoxal plates reaching to fifth sternite, moderately strongly punctured, near suture weakly punctured, row of setae on posterior edge (Fig. 3). Fifth and sixth abdominal sternite each with sparse transverse puncture row. Last abdominal sternite weakly punctured in apical portion. No setiferous striole present on dorsal face of hind tibia, longer tibial spur of hind legs with dense teeth on inner side, about 2/3× length of first metatarsomere.

Males. Pro- and mesotarsomeres moderately widened and provided with suctionpads. Mesotarsomere 1 not very strongly excised. Penis and parameres as Figs 4. 5. 6.

Female. Unknown.

Etymology. The species is named in honour of Pierre André Latreille (1762–1833), a French entomologist who firstly used *Haliplus* as the genus name in 1802.



Figures 1–6. *Haliplus latreillei* sp. n. **1** habitus **2** prosternal and metaventral process **3** metacoxal plate **4** left paramere **5** penis **6** right paramere.

Differential diagnosis. This species is close to *H. japonicus* Sharp, 1873 and *H. regimbarti* Zaitzev, 1908 in body size and shape, arrangement of elytral dark spots and black lines, punctuation and the row of setae on posterior edge of the metacoxal plates. However, the new species lacks pronotal basal plicae, its pronotum lacks the transverse basal rim and it differs from the above species in the shape of the median lobe and parameres of the aedeagus. Despite the absence of pronotal plicae this species clearly belongs to the subgenus *Haliplus* s. str. due to the absence of the metatibial setiferous striole.

Distribution. Only known from the type locality.

List of Chinese Haliplidae

Only valid names are given in this list. For complete synonymy and distribution outside China see Vondel (2005)

1. *Haliplus (Haliplidius) confinis* Stephens, 1828

[http://species-id.net/wiki/Haliplus_\(Haliplidius\)_confinis](http://species-id.net/wiki/Haliplus_(Haliplidius)_confinis)

Figs 7–10

Material examined. Xinjiang: 1♂, Kashi, 1.viii.2006. lgt. Ling Zhao.

Distribution. Widely distributed western and north-eastern Palaearctic species reaching the utmost north-west of China: Xinjiang. New to China.

2. *Haliplus (Haliplidus) rejseki* Štátný et Boukal, 2003

[http://species-id.net/wiki/Haliplus_\(Haliplidus\)_rejseki](http://species-id.net/wiki/Haliplus_(Haliplidus)_rejseki)

Distribution. Endemic to China: Sichuan.

3. *Haliplus (Haliplus) aliae* Vondel, 2003

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_aliae](http://species-id.net/wiki/Haliplus_(Haliplus)_aliae)

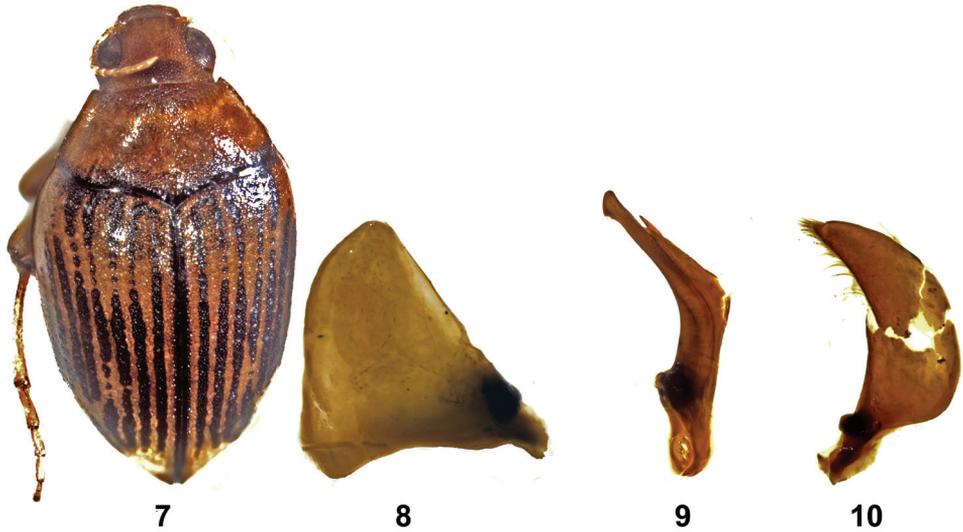
Distribution. Endemic to China: Tianjin.

4. *Haliplus (Haliplus) furcatus* Seidlitz, 1887

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_furcatus](http://species-id.net/wiki/Haliplus_(Haliplus)_furcatus)

Material examined. Heilongjiang: 2 exs., , Mishan, 26.viii.1964, lgt. De-ai Deng & Shou-fa Hou. **Inner Mongolia:** 12 exs., Hailar, 23–26.vii.2003, lgt. Feng-long Jia (2 exs. CV); 1 ex., Huhenuor, 21–25.vii.2005, lgt. Feng-long Jia.

Distribution. Western and north-eastern Palaearctic species reaching China in the north-east: Heilongjiang, Inner Mongolia. New record for Inner Mongolia.



Figures 7–10. *Haliplus confinis* **7** habitus **8** left paramere **9** penis **10** right paramere.

5. *Haliplus (Haliplus) harminae* Vondel, 1990

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_harminae](http://species-id.net/wiki/Haliplus_(Haliplus)_harminae)

Material examined. Hunan: 1 ♀, Nanyue Mt., 2.ix.1941, lgt. Zhe-long Pu; **Shaanxi:** 1 ♀, Chang'an, Weiqu, 12.viii.1984, lgt. Zhi-he Huang.

Distribution. Endemic to China: Hubei, Hunan, Shaanxi. New records for Hunan and Shaanxi.

6. *Haliplus (Haliplus) japonicus* Sharp, 1873

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_japonicus](http://species-id.net/wiki/Haliplus_(Haliplus)_japonicus)

Material examined. Guizhou: 4 exs., , Guiyang, 15.viii.1982, lgt. Zhi-he Huang; 1 ex., Guiyang, 6.x.1940, lgt. Zhe-long Pu; 1 ex., Guiyang, Pingba Horse farm, 13.viii.1982, lgt. Zhi-he Huang; 8 exs., Guiyang, Huaxi, 12.viii.1982, lgt. Zhi-he Huang (1 ex. CV). **Sichuan:** 3 exs., Emei Mt., 31.viii.1982, lgt. Zhi-he Huang (1 ex. CV). **Zhejiang:** 1 ex., Tianmushan Mt., 27–28.vii.2007, lgt. Feng-long Jia.

Additional material examined by Vondel: **Sichuan:** 1♂, Wenjian Distr., Guanxian Co., 56 km NW Changdu, Qingcheng Shan, 975 m, 30°53,8N, 103°32,8E, 13.vii.1999.lgt. A. Putz (CF). **Yunnan:** 15 exs., E. Weishan Mt., 1800–2500 m, 25°10'N, 100°21'E, 22–25.vi.1992, lgt. Vitkubáň (CV, NHMB); 36 exs. Shizong, 9–15.ix.2000, lgt. J. Bergsten (CN, CV).

Distribution. Eastern Palaearctic species, known from several provinces in the east and south of China: Beijing, Chongqing, Guizhou, Hunan, Jiangsu, Shanghai, Sichuan, Yunnan, Zhejiang. New records for Sichuan and Zhejiang.

7. *Haliplus (Haliplus) latreillei* sp. n.

urn:lsid:zoobank.org:act:1C3B87DA-E87E-40CA-B74D-2E537338AFEB

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_latreillei](http://species-id.net/wiki/Haliplus_(Haliplus)_latreillei)

Figs 1–6

Material examined. See type material in Systematics chapter.

Distribution. Endemic to China: Guizhou.

8. *Haliplus (Haliplus) regimbarti* Zaitzev, 1908

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_regimbarti](http://species-id.net/wiki/Haliplus_(Haliplus)_regimbarti)

Material examined. Fujian: 1 ex., Nanjing County, Hexi town (in pool), 13.vii.2010, lgt. Feng-long Jia; 2 exs., Fuzhou, 14.vii.1958, lgt. Zhe-long Pu; 1 ex., same locality, 4.ix.1941. **Guangdong:** 15 exs., Guangzhou, Luogang, 20.iv.1958 (3 exs. CV); 11 exs., Danxiashan Mt., 27.v.2007, lgt. Feng-long Jia. **Guangxi:** 1 ex., Wuming, 17.vi.1977, lgt. Zhihe Huang; 2 exs., Yangshuo, 1985, lgt. Shou-jian Chen. **Henan:** 6 exs., Xinyang, Jigongshan Mt., viii.1936; **Hubei:** 1 ex., Wuchang, 17.v.1961, lgt. Zhe-long Pu. **Hunan:** 4 exs., Nanyue Mt., 4.ix.1941, lgt. Zhe-long Pu; 1 ex., Liyuan, 6.iii.1941, lgt. Zhe-long Pu; 2 exs., Shaanxi, Chang'an, Wei-qu, 21.viii.1984, Zhi-he Huang. **Jiangxi:** 1 ex., Jinggangshan, Ciping, 18.ix.2010, lgt. Shuang Zhao; 1 ex., Jiangxi, Jinggangshan, Jingzhushan Mt., 4.x.2010, lgt. Feng-long Jia; 24 exs., same locality, 25.iv.2011, lgt. Fenglong Jia & Shuang Zhao; 11 exs. Lushan, 10.viii.1963, lgt. Zhe-long Pu; 2 exs., Lushan, 10.viii.1963, lgt. Zhe-long Pu. **Yunnan:** 3 exs., Pohui, 9.x.1940, lgt. Zhe-long Pu.

Additional material examined by Vondel: **Guizhou:** 1 ex., Fodingshan, ganshi, 25 km S Shiquian, 1300 m, 5–9.vi.1997, lgt. Bolm; 4 exs. Leigongshan, Xijiang, 1200–1900 m, 29.v-2.vi.1997, lgt. Bolm (CV, NHMB). **Jiangxi:** 1♀, “Sharp; China, Kia Kiang; Dr. Régimbart vidit 1898; **Shaanxi:** 1 ex., without precise locality data; 1♀, Süd Schensi [no further locality data] (NMPC).

Distribution. Endemic and widespread in the south-eastern part of China: Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Shaanxi, Taiwan, Yunnan, Zhejiang. New records for Guangxi, Hubei, Shaanxi and Yunnan.

9. *Haliphus (Haliphus) ruficollis* (De Geer, 1774)

[http://species-id.net/wiki/Haliphus_\(Haliphus\)_ruficollis](http://species-id.net/wiki/Haliphus_(Haliphus)_ruficollis)

Figs 11–14

Material examined. Xinjiang: 2♂♂, Yining, Yili river valley, 28.vii.2005, lgt. Ling Zhao (1 ex., CV); 2♂♂, Kanasi lake, 8.viii.2005, lgt. Ling Zhao; 1♂, 2♀♀, Tacheng, Hardun river bank, 4.viii.2005, lgt. Ling Zhao.

Distribution. A widespread western Palaearctic species reaching China in the utmost north-western part: Xinjiang. New to China.

10. *Haliphus (Haliphus) sibiricus* Motschulsky, 1860

[http://species-id.net/wiki/Haliphus_\(Haliphus\)_sibiricus](http://species-id.net/wiki/Haliphus_(Haliphus)_sibiricus)

Figs 15–18

Material examined. Xinjiang: 32 exs., Yili Agricultral School, 3.viii.1964, lgt. Zhihe Huang (3 exs., CV); 9 exs., suburb of Wulumuqi, 16.vii.1984, lgt. Zhihe Huang; 6 exs., Wulumuqi, Liudaowan, 3.vii.1984, lgt. Zhihe Huang; 19 exs., Hongxing Farm, 6.viii.2005; 19 exs., Hot Spring, Swamp, 24.vii.2005, lgt. Ling Zhao; 3 exs., Gongnaisigou, 30.vii.2005; 7 exs., Altai, Xiaodonggou, 10.viii.2005, lgt. Ling Zhao; 5 exs. Tacheng, Hardun river bank, 4.viii.2005, lgt. Ling Zhao; 5 exs., Huocheng, river weir and river bank, 4.viii.2005, lgt. Ling Zhao; 4 exs., Kanasi lake, 8.viii.2005, lgt. Ling Zhao (2 exs., CV); 2 exs., Nalati steppe, 30.vii.2005, lgt. Ling Zhao.

Additional material examined by Vondel: **Qinghai:** 6 exs. prov. Huangzhong env. Taer [lamasery], 36°28.8–29.5'N, 101°34.0–34.1'E, 2665–2780 m, 17.vii.2005, lgt. J. Hájek, D. Král & J. Růžička leg. (CV, NMPC)

Distribution. A widely spread western and north-eastern Palaearctic species, reaching the west of China: Qinghai, Xinjiang. New to China.

11. *Haliphus (Haliphus) simplex* Clark, 1863

[http://species-id.net/wiki/Haliphus_\(Haliphus\)_simplex](http://species-id.net/wiki/Haliphus_(Haliphus)_simplex)

Material examined. Heilongjiang: 1 ex., Liangshui, last third of July, 1977; 3 exs., Harbin, swampland, 29.vii.1962, lgt. Zhe-long Pu; 22 exs., same locality, 23.vii.1962; 1 ex., Harbin, 26.viii.1962, lgt. Zhe-long Pu; 3 exs., Wudalianchi, 6–10.viii.2008, lgt. Feng-long Jia. **Inner Mongolia:** 1 ex., Hailar, 23–26.vii.2003. **Jilin:** 2 exs., Gongzhuling, 5.viii.1962, lgt. Zhe-long Pu. **Shaanxi:** 16 exs., Chang'an, Wei-qu, 21.viii.1984, lgt. Zhi-he Huang.

Additional material examined by Vondel: **Anhui:** 1 ex., [no further locality data], lgt. P. Brinck (CN). **Inner Mongolia:** 3 exs., North Manchuria, Djalantun St. [Buth Qi], 6.v.1939, lgt. P. Brinck (CN).



Figures 11–14. *Haliplus ruficollis* 11 habitus 12 left paramere 13 penis 14 right paramere.



Figures 15–18. *Haliplus sibiricus* 15 habitus 16 left paramere 17 penis 18 right paramere.

Distribution. Eastern Palearctic species, known from several provinces in the eastern part of China: Anhui, Beijing, Guangdong, Heilongjiang, Inner Mongolia, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Zhejiang. New records for Anhui, Inner Mongolia and Jilin.

12. *Haliplus (Haliplus) steppensis* Guignot, 1954

[http://species-id.net/wiki/Haliplus_\(Haliplus\)_steppensis](http://species-id.net/wiki/Haliplus_(Haliplus)_steppensis)

Material examined. Heilongjiang: 1 ex, Liangshui, last third of July 1977. **Inner Mongolia:** 7 exs., Jining suburb, autumn, 1975 (2 exs., CV); 1 ex., Linhe, autumn, 1975; 3 exs., Hailar, 23–26.vii.2003, lgt. Feng-long Jia.

Additional material examined by Vondel: **Gansu:** 15 exs., Dacanglhamo [=Langmusi] env., 34°04.7'N, 102°38.1'E, 3465 m alt, 23–25.vi.2005, leg. J. Hájek, D. Král & J. Růžička (CV, NMPC). **Qinghai:** 4 exs., Haibu env. 3190–3270 m. 36°48.4–49.8'N, 100°45.4–49.7'E, 13–15.vii.2005, leg. J. Hájek, D. Král & J. Růžička; 8exs., 7 km NE Ulan, 3020 m alt. 36°57.6'N, 98°30.6'E, 7.vii.2005, leg. J. Hájek, D. Král & J. Růžička (CV, NMPC).

Distribution. North-eastern Palaearctic species, known from the north of China: Gansu, Heilongjiang, Inner Mongolia, Qinghai. New records for Gansu, Inner Mongolia and Qinghai.

13. *Haliphus (Liaphlus) abbreviatus* Wehncke, 1880

[http://species-id.net/wiki/Haliphus_\(Liaphlus\)_abbreviatus](http://species-id.net/wiki/Haliphus_(Liaphlus)_abbreviatus)

Material examined. **Xinjiang** 1♂, , Kuerle, Shayidong, 22.vii.1984, lgt. Zhihe Huang; 1♂, Kashi, 1.VIII.2006, lgt. Ling Zhao; 1♀, Hetian, 16.vii.2006, lgt. Ling Zhao; 4♂♂, 5♀♀, Shule, 12.viii.2006, lgt. Ling Zhao (1♂, 1♀, CV).

Note. The specimen from Kuerle was identified as *Haliphus dalmatinus* Müller, 1900 and reported as new to China by Jia (2003). The reexamination of this specimen shows that its previous identification was incorrect. *Haliphus dalmatinus* is removed from the Chinese list

Distribution. Southern Palaearctic reaching the western part of China: Xinjiang.

14. *Haliphus (Liaphlus) basinotatus* Zimmermann, 1924

[http://species-id.net/wiki/Haliphus_\(Liaphlus\)_basinotatus](http://species-id.net/wiki/Haliphus_(Liaphlus)_basinotatus)

Material examined. **Heilongjiang:** 3 exs., Mishan, 26.viii.1964, lgt. De-ai Deng & Shou-fa Hou; 1 ex., Harbin, 28.vii.1962, lgt. Zhe-long Pu.

Additional material examined by Vondel: 1 ex. Djalantun St., 6.v.1939. lgt. P. Brinck [Butha Qi, Inner Mongolia] (CN)

Distribution. North-eastern Palaearctic species, reaching China in the north-east: Heilongjiang, Inner Mongolia, Jilin, Liaoning.

15. *Haliphus (Liaphlus) chinensis* Falkenström, 1932

[http://species-id.net/wiki/Haliphus_\(Liaphlus\)_chinensis](http://species-id.net/wiki/Haliphus_(Liaphlus)_chinensis)

Material examined. **Guizhou:** 1 ex., Pingba Horse Farm, 13.vii.1982, lgt. Zhi-he Huang. **Sichuan:** 4 exs., , Dakang, 14.viii.2001, lgt. Ling Zhao.

Additional material examined by Vondel: **Xinjiang:** 1♀, Chingkiang, xi.1877 (NMPC). **Yunnan:** 5 exs., Shizong, 11–15.ix.2000, lgt. J. Bergsten (CN, CV)

Note. The older records of *H. ovalis* Sharp, 1884 from China likely concern *H. chinensis* (for details see Vondel 1991, 2005)

Distribution. Endemic to China, known from several provinces from west to east: Beijing, Fujian, Guizhou, Inner Mongolia, Jiangsu, Shandong, Shanghai, Sichuan, Shanxi, Xinjiang, Yunnan, Zhejiang.

16. *Haliplus (Liaphlus) davidi* Vondel, 1991

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_davidi](http://species-id.net/wiki/Haliplus_(Liaphlus)_davidi)

Material examined. Tianjin: 1 ex., Nanda, iv.1956.

Distribution. Eastern Palearctic and Oriental species, known from the north and south of China: Beijing, Heilongjiang, Tianjin, Yunnan. New record for Tianjin.

17. *Haliplus (Liaphlus) diruptus* J. Balfour-Browne, 1947

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_diruptus](http://species-id.net/wiki/Haliplus_(Liaphlus)_diruptus)

Material examined. Guizhou: 1 ex., Guiyang, 9.x.1940, lgt. Zhe-long Pu. **Heilongjiang:** 1 ex., Wudalianchi, 6–10.viii.2008, lgt. Feng-long Jia. **Hunan:** 3 exs., Yizhang, 1.iv.1942, lgt. Zhe-long Pu; 2 exs., same locality, 10.ii.1941. **Shaanxi:** 1 ex., Chang'an, Wutaishan Mt., 23.viii.1984.

Additional material examined by Vondel: **Anhui:** 1 ex. Anhui [without further locality data], lgt. P. Brinck (CN). **Guizhou:** 1 ex., Fodingshan, Ganshi, 25 km S. Shiquian, 1300 m, 5–9.vi.1997, lgt. Bolm (NHMB). **Yunnan:** 1♂, 25 km E Zhongdian, 3300–4000 m, 12–14.vii.1995, lgt. Bolm (NHMB); 9 exs. Shizong, 10–13.ix.2000, lgt. J. Bergsten (CN, CV).

Distribution. Eastern Palearctic and Oriental species, widely spread in the eastern part of China: Anhui, Beijing, Fujian, Guizhou, Hainan, Heilongjiang, Hong Kong, Hubei, Hunan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanghai, Taiwan, Tianjin, Yunnan. New records for Anhui and Shaanxi.

18. *Haliplus (Liaphlus) excoffieri* Vondel, 1991

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_excoffieri](http://species-id.net/wiki/Haliplus_(Liaphlus)_excoffieri)

Material examined. Guizhou: 1 ex., , Pingba Horse Farm, 13.vii.1982, lgt. Zhi-he Huang. **Yunnan:** 1 ex., Pohui, 9.x.1940, lgt. Zhe-long Pu.

Additional material examined by Vondel: **Yunnan:** 5 exs. Shizong, 12–13.ix.2000, lgt. J. Bergsten (CN, CV).

Distribution. Endemic species in the south of China: Guizhou, Yunnan. New record for Guizhou.

19. *Haliplus (Liaphlus) eximius* Clark, 1863

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_eximius](http://species-id.net/wiki/Haliplus_(Liaphlus)_eximius)

Material examined. Guangdong: 2 exs., Xingning, Luofu, Tieshan, 1.vii.2004, lgt. Feng-long Jia. **Guizhou:** 3 exs., Guiyang, Huaxi, 12.viii.1982, lgt. Zhi-he Huang. **Xinjiang:** 1 ex., Shule, 12.viii.2006, lgt. Ling Zhao. **Yunnan:** 1 ex., Lufeng village, 26.iii.1940, lgt. Zhe-long Pu.

Additional material examined by Vondel: **Xinjiang:** 1 ♂, Chingkiang, xi.1877 [no further data] (NMPC).

Distribution. Eastern Palaearctic and Oriental species, known from the west, east and south-east of China: Beijing, Fujian, Guangdong, Guizhou, Hunan, Jiangsu, Liaoning, , Shanghai, Sichuan, Xinjiang, Yunnan, Zhejiang. New record for Yunnan.

20. *Haliplus (Liaphlus) holmeni* Vondel, 1991

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_holmeni](http://species-id.net/wiki/Haliplus_(Liaphlus)_holmeni)

Distribution. Endemic to China: Yunnan.

21. *Haliplus (Liaphlus) kotoshonis* Kano & Kamiya, 1931

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_kotoshonis](http://species-id.net/wiki/Haliplus_(Liaphlus)_kotoshonis)

Distribution. Eastern Palaearctic/Oriental species, known from the Ryukyu Islands (Japan) and Taiwan.

22. *Haliplus (Liaphlus) pulchellus* Clark, 1863

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_pulchellus](http://species-id.net/wiki/Haliplus_(Liaphlus)_pulchellus)

Material examined. Guangxi: 2 exs., Nanning, 22.vi.1958, lgt. Zhe-long Pu.

Distribution. Oriental species, reaching China in the south: Fujian, Guangxi. New record for Guangxi.

23. *Haliplus (Liaphlus) sharpi* Wehncke, 1880

[http://species-id.net/wiki/Haliplus_\(Liaphlus\)_sharpi](http://species-id.net/wiki/Haliplus_(Liaphlus)_sharpi)

Material examined. (examined by Vondel): **Anhui:** 3 exs., Anhui, lgt. P. Brinck [no further data] (CN). **Guizhou:** 1 ♂, Fodingshan, Ganshi, 25 km A Shiquian, 1300 m, 5–9.vi.1997, lgt. Bolm (NHMB). **Yunnan:** 6 exs., Shizong, 10–13.ix.2000, lgt. J. Bergsten (CN, CV)

Distribution. Eastern Palaearctic species, known from several provinces in the east and south of China: Anhui, Chongqing, Fujian, Guizhou, Liaoning, Shanghai, Taiwan, Yunnan.

24. *Peltodytes (Peltodytes) caesus* (Duftschmid, 1805)

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_caesus](http://species-id.net/wiki/Peltodytes_(Peltodytes)_caesus)

Material examined. Xinjiang: 1 ex., Yili Agriculture School, 3.viii.1984, lgt. Zhi-he Huang; 1 ex., Yining, Yili river valley, 28.vii.2005; 1 ex., Emin, Hongxing Farmland, 6.viii.2005, lgt. Ling Zhao (1 ex., CV); 1 ex., Tacheng, Hardun river bank, 4.viii.2005, lgt. Ling Zhao.

Distribution. Widely spread Palaearctic species, reaching to China in the utmost north-west: Xinjiang.

25. *Peltodytes (Peltodytes) coomani* Peschet, 1923

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_coomani](http://species-id.net/wiki/Peltodytes_(Peltodytes)_coomani)

Material examined. Guangdong: 1 ex., Guangzhou, Kangle (Sun Yat-sen University campus), iv.1959, lgt. Ping Lin; 1 ex., same locality, 24.vii.1964, lgt. Jiu-ru Zhang. **Guangxi:** 1 ex., Nanning, iv.1959, lgt. Zhe-long Pu; 2 ex., Nanning, vi.1958, lgt. Zhe-long Pu (2 ex., CV). **Hainan:** 1 ex., Dongfang, Huangliu, 25.xii.1963, lgt. Tong-xu Peng; 2 exs., Tongshi, 27.xii.1963, lgt. Tong-xu Peng; 1 ex., Wanning County, Xin-glong, 3.i.1964, lgt. Tong-xu Peng; 2 exs., Jianfengling Mt., 19.xii.1963, lgt. Tong-xu Peng.

Distribution. Oriental species, reaching to China in the south-east: Guangdong, Guangxi, Hainan. New record for Guangxi.

26. *Peltodytes (Peltodytes) dauricus* Zimmermann, 1924

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_dauricus](http://species-id.net/wiki/Peltodytes_(Peltodytes)_dauricus)

Material examined. Heilongjiang: 1♂, Mishan, 1.x.1959.

Additional material examined by Vondel: **Inner Mongolia:** 5 exs., Djalantun [Buth Qi], 6.v.1939, lgt. P. Brinck (CN). **Heilongjiang:** 3 exs., Harbin, Manchoukuo, 4.x.1937, lgt. M.A. Weymarn; 1 ex., Harbin, Manchuria, 1938, lgt. M.I. Nikitin (SEMC). **Liaoning:** 1 ex., Korea, Daireu [=Dalian Shi, Liaoning], 1–15.ix.1937, lgt. Weymarn (CN).

Distribution. North-eastern Palaearctic species, reaching to China in the north-east: Heilongjiang, Inner Mongolia, Liaoning.

27. *Peltodytes (Peltodytes) intermedius* (Sharp, 1873)

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_intermedius](http://species-id.net/wiki/Peltodytes_(Peltodytes)_intermedius)

Material examined. Sichuan: 1 ♂, Emeishan Mt., 6.viii.1982, lgt. Zhi-he Huang. **Guangdong:** 1 ♂, Guangzhou, Luogang cave, 12.x.1932, lgt. Y.W. Diou.

Distribution. Eastern Palaearctic species, known from the south-east of China: Beijing, Fujian, Guangdong, Shanghai, Sichuan, Taiwan, Zhejiang. New records for Sichuan and Guangdong.

28. *Peltodytes (Peltodytes) pekinensis* Vondel, 1992

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_pekinensis](http://species-id.net/wiki/Peltodytes_(Peltodytes)_pekinensis)

Material examined. Guangdong: 1 ex., the second worker's culture palace, x.1955. **Shaanxi:** 4 exs. Xi'an Chanba river, 11.v.2011, lgt. Fenglong Jia; 6 exs. same locality, lgt. Hájek (NMPC). **Tianjin:** 1 ex., Nanda, iii.1956.

Distribution. Eastern Palaearctic species, known from the most-eastern part of Russia and several provinces in the east of China: Beijing, Fujian, Guangdong, Hebei, Liaoning, Shaanxi, Shandong, Tianjin. New records for Guangdong, Shaanxi and Tianjin.

29. *Peltodytes (Peltodytes) sinensis* (Hope, 1845)

[http://species-id.net/wiki/Peltodytes_\(Peltodytes\)_sinensis](http://species-id.net/wiki/Peltodytes_(Peltodytes)_sinensis)

Material examined. Chongqing: 1 ex., Nanchuan, Tianxing, 27.vii.2003, lgt. Jianhua Huang. **Fujian:** 1 ex., Fuzhou, 14.vii.1956, lgt. Zhe-long Pu; 1 ex., Fuzhou, Gushan, 14.vii.1956, lgt. Li-zhong Hua; 7 exs., Fuzhou, Xihu, 3.xi.1963, lgt. Shanxiang Lin. **Guangdong:** 1 ex., Lianxian, vi.1945, lgt. Zhe-long Pu; 1 ex., Shaoguan, Yingde, 4.viii.1962, lgt. Ping Lin; 1 ex., Sihui, Dasha, 6.iii.1998, lgt. Feng-long Jia; 1 ex., Heshan, 18.3.1994, lgt. Feng-long Jia; 1 ex., Lianshan County, Shangshuai, 4.v.2000, lgt. Feng-long Jia; 1 ex., Honan Island, 19.iii.1938, lgt. Chiu-an Wang; 1 ex., Zhaoqing, 12.x.1974, Meiying Wang; 1 ex., Qujiang, date for collection could not be read, lgt. Zhe-long Pu; 1 ex., Guangzhou, Ershatou, 11.iv.1958; 2 exs., Fengkai, Heishiding Mt., 29.v.1984, lgt. Zhi-he Huang; 3 exs., Lianxian, Dadongshan Mt., 16.ix.1993, lgt. Feng-long Jia; 11 exs., Xingning, Luofu, Tieshan, 1.vii.2004, lgt. Feng-long Jia; 1 ex., Danxiashan Mt., 23.v.2008, lgt. Feng-long Jia; 1 ex., Puning, 1958, lgt. Zhe-long Pu; 15 exs., Huaxian (Huadu) Dabuling, 26.viii.1983, lgt. Zhi-he Huang; 2 exs., Guangzhou, Baiyunshan, 18.iv.1958, lgt. Zhe-long Pu. **Guangxi:** 6 exs., Yangshuo, 1958, lgt. Shoujian Chen et. al.; 1 ex., Longlin, 22.v.1977, lgt. Zhi-he Huang; 4 exs., Wuming, 7.vi.1977, lgt. Zhi-he Huang; 1 ex. m Shangsi, 24.vii.1977, lgt. Zhi-he Huang; 1 ex., Huaping, 25.vi.1974, lgt. De-xiang Gu; 1 ex., Jingxi, Ban-

gliang, 31.vii.2010, lgt. Jian-hua Huang. **Guizhou:** 1 ex., Guiyang, 6.x.1940, lgt. Zhe-long Pu; 3 exs., Guiyang, 12.viii.1982, lgt. Zhi-he Huang; 3 exs., Pingba Horse Farm, 13.viii.1982, lgt. Zhi-he Huang (1 ex., CV); 1 ex., Guiyang, 15.viii.1982, lgt. Zhi-he Huang; 1 ex., Fanjingshan, half of mount, 29.vii.2001, lgt. Hong Pang; 1 ex., Rongxian County, Pingyang, Xiaodanjiang river, 685m, 15.ix.2005, lgt. Shuang Zhao; 2 exs., , Guiyang, 6.x.1940, lgt. Zhe-long Pu. **Hubei:** 18 exs., Zigui, Jiutouling, 150m, 20.vii.1993, lgt. Xing-ke Yang & Wen-zhu Li; 2 exs., Badong, Sanxia Forest workshop, 160m, 30.vii.1993, lgt. Xing-ke Yang & Wen-zhu Li; 1 ex., Wuchang, vi.1958, lgt. Jieyue Hu. **Hunan:** 2 exs., Nanyue Mt., 4.ix.1941, lgt. Zhe-long Pu; 16 exs., Daotong, 19.viii.1982, lgt. Zhi-he Huang; 1 ex., Huaihua, 17.viii.1982, lgt. Zhi-he Huang; 1 ex., Yizhang, 8.x.1941, lgt. Zhe-long Pu; 1 ex., same locality, 10.ii.1941; 10 exs., Huaihua, Yushuwan, 17.vi.1965, lgt. Zhen-yao Chen; 4 exs., Qingjiang, Anjiang, 20.vi.1956, lgt. Zhen-yao Chen. **Jiangxi:** 2 exs., Jingu County, 22.viii.1974; 6 exs., Nanchang, viii.1957, lgt. Xi-wen Chen; 2 exs., samelocality, 26.viii.1963, lgt. Zhe-long Pu; 2 exs., Shangrao, Sanqingshan Mt., 15–20.iv.2007, lgt. Feng-long Jia; 2 exs., Longnan, Jiulianshan Mt., 12–13.vii.2008, lgt. Feng-long Jia; 3 exs., Jiujiang, Changdu, Linshan, 15–20.viii.2010, lgt. Yan Mei; 1 ex., Lushan, Poyang Lake, 10.viii.1963, lgt. Zhe-long Pu; 1 ex., Nanchang, no other data; 9 exs., Yongxin County, 19.viii.1974; 3 exs., Fuzhou, 16–18.viii.1974; 1 ex., , Ji'an, 13.viii.1974; 1 ex., Jinggangshan, 16–18.viii.1974; 2 exs., Jinggangshan, Shuangxikou, 13.x.2010, lgt. Feng-long Jia; 4 exs. Jinggangshan, Baiyinhu, 800 m, 27.iv.2011. **Shaanxi:** 17 exs., Chang'an Weiqu, 21.viii.1984, lgt. Zhi-he Huang; 1 ex., Xi'an Wujiafen, 17.viii.1984, lgt. Zhi-he Huang; 2 exs., South of Chang'an, Wutai, 23.viii.1984, lgt. Zhi-he Huang; 1 ex., Zhenba, 20.vii.1975, lgt. Shuzhi Ren. **Sichuan:** 3 exs., Qingchengshan Mt., 8.viii.1982, lgt. Zhi-he Huang; 7 exs., Wanxian, Longju, 450m, 14.vii.1993, lgt. Wen-zhu Li; 4 exs., Wanxian, Wang'erbao, 1200m, 9.vii.1993, lgt. Wen-zhu Li; 1 ex., Fengdu, 200m, 1.vi.1994, You-wei Zhang; 8 exs., Emeishan Mt., 31.vii.1983, lgt. Zhi-he Huang (3 exs., CV); 2 exs., Dakang, 14.viii.2001, lgt. Ling Zhao; 1 ex. Xi'an, Chanba river, 11.iv.2011, lgt. Fenglong Jia; 3 exs. same data, but J. Hájek lgt. (NMPC). **Tianjin:** 1 ex., Nanda, iv.1956. **Yunnan:** 4exs., Pohui, 9.x.1940, lgt. Zhe-long Pu; 1 ex., Lijiang, v.2007, lgt. Run-lin Xu.

Additional material examined by Vondel: **Anhui:** 3 exs., Anhui [no further data], lgt. P. Brinck (CN). **Fujian:** Kuatun, 1946 (NHMB). **Guangxi:** 1 ex., 20 km N Lingchuan, 500 m, 21–24.vi.1997, lgt. Bolm (NHMB). **Jiangxi:** 1 ex., 5 km N Daduan town, 114°35'53"E, 28°36'30"N, ca 450 m, 29.iii.2003, lgt. Schönmann, Komarek & Wang (NMW). **Shanghai:** 1 ex., Kiangsee Jangtzi, Shanghai Xanthus [no further data] (CA). **Yunnan:** 73 exs. Shizong, 9–15.ix.2000, lgt. J. Bergsten (CN, CV)

Distribution. Eastern Palearctic and Oriental species, widely spread in the eastern and south-eastern part of China: Anhui, Beijing, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jilin, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanghai, Sichuan, Taiwan, Yunnan, Zhejiang. New records for Chongqing, Hubei and Shaanxi.

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Three new species and reassessment of the rare Neotropical ant genus *Leptanilloides* (Hymenoptera, Formicidae, Leptanilloidinae)

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Abstract

We describe three new species of the Neotropical ant genus *Leptanilloides*: *L. gracilis* **sp. n.** based on workers from Mexico and Guatemala, *L. erinys* **sp. n.** based on workers and a gyne from Ecuador, and *L. femoralis* **sp. n.** based on workers from Venezuela. The description of *L. gracilis* is a northern extension of the known range of the genus, now numbering eleven described species. We also describe and discuss three unassociated male morphotypes from Central America. We report the occurrence of a metatibial gland in *Leptanilloides* and a fused promesonotal connection (suture) in some species. We provide a modified, detailed diagnosis of the genus and a revised key to the worker caste of the known species.

Keywords

dorylomorphs, doryline section, army ants, taxonomy, systematics, metatibial gland, morphology

Introduction

Leptanilloides Mann, 1923 is a genus of rarely collected Neotropical ants with army ant-like habits, convergently similar to the Old World genus *Leptanilla* Emery, 1870.

Little is known about their biology (Brandão et al. 1999b), but a number of papers on taxonomy and phylogenetic affinities has been published. In 1923 Mann described *Leptanilloides biconstricta* from Bolivia and placed it in the subfamily Dorylinae (Mann 1923). Subsequently the genus was considered a member of the Cerapachyinae (Brown 1975, Bolton 1990a, 1990b) and then placed in its own subfamily Leptanilloidinae (Baroni Urbani et al. 1992, Bolton 1994). Brandão et al. (1999a) revised the subfamily, adding the new genus *Asphinctanilloides* Brandão et al., 1999, describing three new species of *Leptanilloides*, and proposing a morphology-based phylogeny. Bolton (2003) provided a detailed taxonomic history of the genus and subfamily. Longino (2003) and Donoso et al. (2006) described further species, the latter also providing information on hitherto unknown gyne and male castes. Ward (2007) used molecular data to associate a male from Costa Rica with workers described by Longino (2003). Also with the aid of molecular methods, Ward and Brady (2009) established that the male-based genus *Amyrmex* Kusnezov, 1953, previously placed in Dolichoderinae, is in fact a member of Leptanilloidinae and a potential senior synonym of *Asphinctanilloides*. There is no doubt that Leptanilloidinae represents a group within a larger clade of the so called dorylomorph ants, as evidenced by a multitude of morphological (Bolton 1990b, Brady and Ward 2005) and molecular (Brady 2003, Moreau et al. 2006, Brady et al. 2006, Ward and Brady 2009) data. The genus level taxonomy, however, is still unsettled, and names are expected to change in the future due to the unresolved affinity of *Amyrmex* (Ward & Brady 2009) and the uncertain distinction between *Leptanilloides* and *Asphinctanilloides* (Longino 2003, Donoso et al. 2006, Ward and Brady 2009). New species will also undoubtedly continue to be discovered, as the ratio of distinct species to collecting events remains high.

Below we describe three new species, mostly collected by leaf litter sifting and extraction with the Winkler apparatus, with the exception of the type series of *L. erinys*, where workers were initially collected from the forest floor by sifting and later extensive search revealed an entire colony. The newly described species are incorporated into a key to all the known species of *Leptanilloides*. In addition we describe three male morphotypes from Central America. These are males from Malaise trap samples and thus unassociated with workers. We expect future molecular work to associate males and workers, although we hypothesize the association of one of the male morphotypes with *L. gracilis* based on geographic overlap. We also provide evidence for the occurrence of metatibial glands in *Leptanilloides*, discuss the structure of the promesonotal suture, and give a detailed diagnosis of the genus based on the worker caste.

Methods

Measurements were made using a Wild M5A stereomicroscope at 50× magnifications with a dual-axis Nikon micrometer wired to a digital readout. Color photographs were prepared using a Leica MZ 16 stereomicroscope with a JVC digital video camera. The scanning electron micrographs were prepared using a Zeiss/LEO 1450VP SEM at the

California Academy of Sciences. All images were processed using Syncroscopy Auto-montage and Zerene Systems Zerene Stacker software and cleaned and adjusted using Adobe Photoshop.

The description of wing venation is based on an unpublished scheme by Bolton (pers. comm.), including description of veins as tubular, nebulous, and spectral. Recommendations for illustration of veins follow Mason (1986). For male genitalia, we adopt the terminology of Yoshimura and Fisher (2011). All specimen data along with images have been deposited on the AntWeb public database (<http://www.antweb.org/>).

In lists of material examined and other reporting of specimen data an error term may occur after latitude and longitude values. This error term is the sum of GPS error and spatial extent of the sampling area around the point where latitude and longitude were recorded.

The following measurements and indices are used:

- HW** head width: maximum width in full face view. HW for males includes eyes (workers are eyeless).
- HL** head length: maximum length along midline in full face view, measured medially from the anteriormost part of the head (anterior edge of frontal lobes) to the center of posterior margin. Excavation of posterior head margin reduces HL.
- SL** scape length: maximum length measured without condyle and neck.
- LAI, LAII, LAIII, LAIV, LAXIII** (male only): length of second, third, fourth and terminal (13th) antennal segments, respectively.
- EL** eye length (male only): measured in full face view, maximum length of eye parallel to midline.
- MH** mesosoma height: in lateral view, maximum height measured from the lowest point of mesopleuron (in front of middle coxa) to dorsal edge of mesosoma, measured perpendicular to long axis of mesosoma.
- ML** mesosoma length: in lateral view, maximum longitudinal distance from farthest point on anterior face of pronotum, excluding the neck, to posteroventral corner of mesosoma.
- PrW** pronotal width: maximum width in dorsal view.
- PW** petiole width: maximum width of abdominal segment II in dorsal view.
- PL** petiole length: maximum length of abdominal segment II in dorsal view, measuring only the length of the petiolar posttergite.
- AIIIW** third abdominal tergite width: maximum width in dorsal view.
- AIIIL** third abdominal tergite length: maximum length in dorsal view measured medially, measuring only the length of the posttergite, excluding pretergite III (helcium).
- AIVW** fourth abdominal tergite width: maximum width in dorsal view.
- AIVL** fourth abdominal tergite length: maximum length in dorsal view measured medially, excluding pretergite.
- FFeW** front femur width: maximum width in lateral view.

All leg measurements below are taken as maximum length measured along extensor (outer) surface:

- FFeL** fore femur length.
HFeL hind femur length.
HTiL hind tibia length.
CI cephalic index: HW/HL×100.
MI mesosomal index: MH/ML×100.
PI petiolar index: PW/PL×100.

All measurements are given in mm.

Depositories

- AMNH** American Museum of Natural History, New York, NY, USA.
BMNH Natural History Museum, London, United Kingdom.
CASC California Academy of Sciences, San Francisco, CA, USA.
EAPZ Escuela Agrícola Panamericana, Tegucigalpa, Honduras.
ECOSCE Colección Entomológica de El Colegio de la Frontera Sur, Unidad San Cristóbal, Chiapas, Mexico.
FMNH Field Museum of Natural History, Chicago, IL, USA.
LACM Los Angeles County Museum of Natural History, CA, USA.
MCZC Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.
MIZA Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay, Venezuela.
MLBC Marek Borowiec personal collection, Davis, CA, USA.
MZSP Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
NMNH Smithsonian Institution, National Museum of Natural History, Washington, DC, USA.
QCAZ Museo de Zoología de la Pontificia Universidad Católica del Ecuador, Quito, Ecuador.
UCDC The Bohart Museum of Entomology, University of California, Davis, CA, USA.
UVGC Colección de Artrópodos, Universidad del Valle de Guatemala, Guatemala City, Guatemala.

Results

During our study we have had a chance to examine type material of most species of Leptanilloidinae and carry out a detailed SEM study of *L. erinys*, *L. gracilis*, *L. femoralis* and *L. nubecula*. We have found that, contrary to previous studies (Brandão et al. 1999a, Longino 2003, Donoso et al. 2006), at least some species of *Leptanilloides* do possess a metatibial gland and have the promesonotal connection fused and immobile.

The metatibial gland was first recognized and considered a synapomorphy of dorylomorph ants (=doryline section) by Bolton (1990b) and subsequently described in detail by Hölldobler et al. (1996). It has been claimed to be absent from hitherto described *Leptanilloides* (Brandão et al. 1999a, Longino 2003, Donoso et al. 2006). With the aid of SEM we have been able to observe small differentiated patches of porous cuticle and granulate secretion on the hind tibia of *L. erinys* and *L. nubecula* (Figures 1A–D). We believe these represent vestigial pore plates of the metatibial gland. It is possible other species of *Leptanilloides* possess it, although due to positioning of legs in our specimens we were unable to find it in *L. gracilis* and *L. femoralis*. Since the pore plate is extremely small and *Leptanilloides* ants themselves are tiny, the gland is impossible to discern with a stereomicroscope under magnifications of about 100×. Also, due to its position on the flexor (inner, ventral) surface of the tibia, it is easily overlooked even under SEM.

The promesonotal connection has also been described as universally unfused and flexible in workers of the genus (Brandão et al. 1999a, Longino 2003, Donoso et al. 2006). We have found that this character is in fact very variable in *Leptanilloides*, ranging from completely unfused and apparently flexible in *L. biconstricta*, *L. caracola*, *L. erinys*, *L. femoralis*, *L. gracilis*, *L. improvisa* and *L. sculpturata* (Figure 1F) and gradually increasing in fusion in *L. legionaria* through *L. mckennae* to *L. nubecula* and *L. nomada* (Figure 1E), where the connection seems to be completely fused dorsally, barely visible as a faint groove. The fusion of the promesonotal connection correlates with other morphological features: the lateroclypeal teeth are reduced, abdominal segment III is small in relation to segment IV, and the spiracles of abdominal segment III are shifted posteriorly. The latter three characters had already been noticed by Donoso et al. (2006) and interpreted as blurring the distinction between *Asphinctanilloides* and *Leptanilloides*. The segregation of *Leptanilloides* into two natural species groups seems to be supported by molecular data, although taxon sampling is still unsatisfactory (Phil Ward, pers. comm.). Adding somewhat intermediate species to the dataset, like *L. legionaria* that has a small abdominal segment III but only weakly fused promesonotal suture, or *L. biconstricta* with apparently complete promesonotal connection but intermediate abdominal segment III, may blur this distinction.

Given the new morphological findings, coupled with comparative character investigation (Marek Borowiec, unpublished) for other dorylomorph lineages, we feel it useful to provide a detailed and revised definition of *Leptanilloides* based on the worker caste.

The known leptanilloidine males show substantial variation (see Donoso et al. 2006, Ward 2007, Ward and Brady 2009, descriptions below) and the lack of definite worker-male associations prevents us from characterizing the male caste of the genus in a structured way. Ward and Brady (2009) enumerated differences between the known *Amyrmex* morphotypes and the then known males of *Leptanilloides*, *mckennae* and *nubecula*, pointing out that the distinction is weak and that undescribed Leptanilloidinae material weakens it even further. If the three Central American males described here turn out to belong to *Leptanilloides*, then for the following characters the distinction is weakened further still: small body size of Leptanilloidinae male 1 (HW on

average < 0.30), short scapes of Leptanilloidinae male 3 (SL/LAI 1.4–1.9), relatively short legs of the Central American males (HTiL/HL 1.2–1.4), parameres shorter than petiole in male 3, veins M and Cu diverging at cu-a in all the below described morphotypes, and the absence of free abscissae of M joining R in Leptanilloidinae male 3. The only character from their list differentiating *Amyrmex* from *Leptanilloides* that seems to hold is the more narrow and elongate submarginal cell of fore wing in the former.

Diagnosis of *Leptanilloides* based on worker caste

Antennae with 12 segments.

Apical antennal segment slender, not swollen; round in cross-section.

Clypeus with well developed, translucent lamella (apron).

Lateroclypeal teeth (same as “genal” teeth in Donoso et al. 2006) present or absent.

Parafrontal ridges absent or weakly developed.

Preocular grooves absent.

Frontal carinae vertical, very reduced and fused, completely exposing antennal sockets.

Antennal scrobes absent.

Maxillary palps two-segmented, except in *gracilis*, where apparently weakly fused and forming one segment; labial palps two-segmented (palp formula 1,2 or 2,2) (in situ count in *gracilis*, *femoralis* and *legionaria*, also reported by Brandão et al. 1999a).

Mandibles subtriangular, edentate or with small, blunt teeth on both masticatory and basal margins.

Eyes absent.

Ocelli absent.

True occipital margin concealed behind vertex in full face view.

Ventrolateral margins of head with carina encircling the foramen only.

Head ventrally with carina complete around foramen magnum, evenly rounded.

Pronotal flange not separated from collar by distinct ridge.

Promesonotal connection complete and apparently flexible (*biconstricta*, *caracola*, *erinys*, *femoralis*, *gracilis*, *improvisa*, *sculpturata*) or partly to almost completely fused and not flexible (*legionaria*, *mckennae*, *nomada*, *nubecula*).

Propleura and mesopleura distinctly separated, the connection continuous with promesonotal portion.

Mesometapleural sulcus usually visible, weakly impressed and running towards metanotal sulcus, anepisternum not delineated dorsally or posteriorly.

Transverse mesopleural sulcus absent.

Posterior head, mesosoma, petiole and abdominal segment III immarginate.

Petiole laterally above spiracle immarginate.

Petiole anterodorsally immarginate.

Helcium narrow, posterior face of petiole and anterior face of abdominal segment III well-developed.

Abdominal segment III smaller or much smaller than succeeding segment IV, which is constricted at the presegmental portion.

Abdominal segment III anterodorsally immarginate.

Abdominal segment IV not conspicuously the largest segment.

Abdominal tergite IV not folding over sternite, and anterior portions of sternite and tergite are equally well visible in lateral view.

Cinctus of abdominal segment IV simple, not cross-ribbed.

Girdling constriction posterior to abdominal segment IV present on sternites V and VI

Abdominal tergite VII (pygidium) reduced and short, unarmed.

Abdominal sternite VII (hypopygium) unarmed.

Mid tibia with one simple spur, hind tibia with single pectinate spur (most species) or both tibiae with two simple spurs (only *gracilis*) (spur formula 1s,1p or 2s,2s).

Middle and hind basitarsus not widening distally, circular in cross-section.

Posterior flange of hind coxa not produced as raised lamella.

Metatibial gland present, reduced (observed in *erinys* and *nubecula*).

Metabasitarsal sulcus absent.

Pretarsal claws simple.

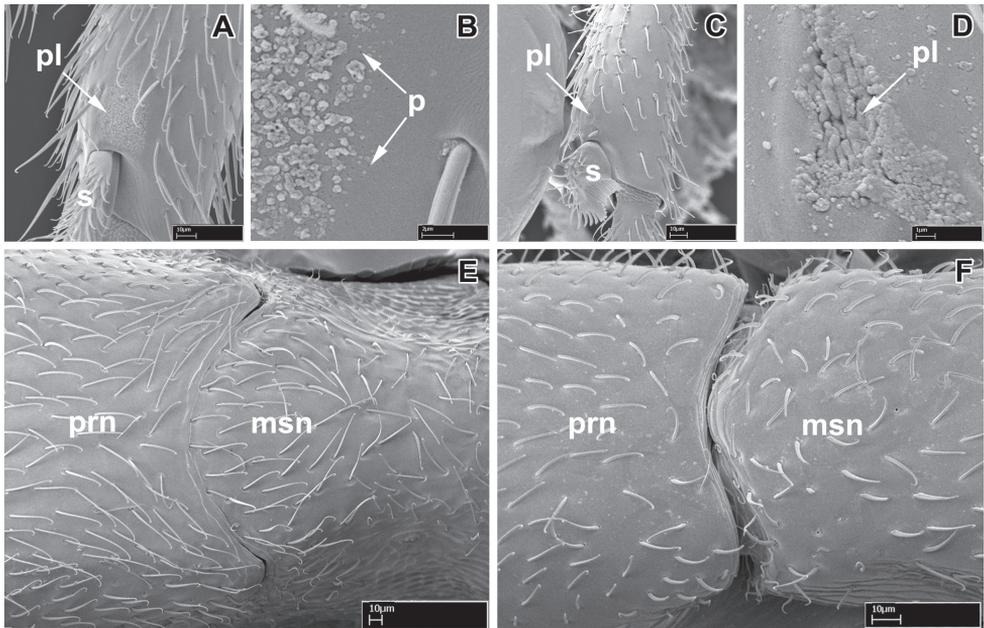


Figure 1. Scanning electron micrographs of selected characters. **A–B, E** *Leptanilloides nubecula* worker (CASENT0234587) **A** apex of hind tibia showing metatibial gland pore plate (*pl*) and tibial spur (*s*) **B** pore plate of metatibial gland showing pores (*p*) **C–D** *Leptanilloides erinys* worker (CASENT0234584) **C** apex of hind tibia showing metatibial gland pore plate (*pl*) and tibial spur (*s*) **D** pore plate (*pl*) of metatibial gland magnified **E** pronotum (*prn*) and mesonotum (*msn*) in dorsal view showing partly fused promesonotal connection **F** *Leptanilloides gracilis* (CASENT0234585) pronotum (*prn*) and mesonotum (*msn*) in dorsal view showing complete promesonotal connection.

Although originally the genus *Asphinctanilloides* had been differentiated from *Leptanilloides* by several characters (Brandão et al. 1999a), subsequent descriptions of new taxa somewhat blurred this distinction. At present at least presence of a deep metanotal groove and absence of a constriction between abdominal pre- and postsegments V and VI can be regarded synapomorphic for *Asphinctanilloides*. Ward and Brady (2009) discussed the subject in detail and noted that differentiation of *Asphinctanilloides* may render *Leptanilloides* paraphyletic.

Key to workers of *Leptanilloides*

- 1 Abdominal segment III (postpetiole) in lateral view much smaller than adjoining fourth abdominal segment (Figure 2A). Spiracle of segment III shifted posteriad on anteromedian side of tergite (Figure 2A). Body size relatively large, HL 0.68–0.75 **2**
- Abdominal segment III in lateral view nearly as high as abdominal segment IV (Figure 2B–D). Spiracle of segment III situated forward on the tergite (Figures 2B–D). Body size relatively small, HL 0.31–0.50 **5**
- 2 Head subquadrate, CI 85–88; lateral margins nearly straight and parallel (Figure 2E). Propodeal declivity short and vertical, propodeum with dorsal and posterior faces clearly differentiated (Figure 2A) (Ecuador)... ***L. nomada***
- Head subrectangular, CI 75–83; lateral margins convex (Figure 2F). Propodeal declivity usually rounded without clear distinction between dorsal and posterior face (cf. Figure 2B, Figure 4 in Donoso et al. 2006) **3**
- 3 Head sculpture less dense, at most 10–12 shallow foveolae across face at midlength. Lateral margins of the head distinctly convex. Posterior margin of the head slightly concave (Figure 2F) (Colombia) ***L. legionaria***
- Head sculpture more dense, with at least 15 foveolae across face at midlength. Lateral margins of the head slightly convex. Posterior margin of the head deeply concave. (cf. Figure 2F, Figure 3 in Donoso et al. 2006)..... **4**
- 4 Legs shorter, HW/HTiL×100 > 78. Hypostomal teeth present (Figure 2H) (Ecuador)..... ***L. nubecula***
- Legs longer, HW/HTiL×100 < 78. Hypostomal teeth absent (Figure 2I) (Costa Rica)..... ***L. mckennae***
- 5 Lateroclypeal teeth absent. Masticatory margin of mandibles edentate (Figure 5 in Donoso et al. 2006) (Ecuador) ***L. caracola***
- Lateroclypeal teeth present. Masticatory margin of mandibles with teeth (Figure 4D)..... **6**
- 6 In lateral view, sternite of abdominal segment III (postpetiole) distinctly bulging anteriorly, making the sternal portion of the segment deeper than tergite (Figure 2D). Abdominal segment IV narrowly attached to the preceding segment III, and broadly to succeeding segment V, so that there is a

- contrast between widths of anterior and posterior articulation of the segment IV in lateral view (Colombia, Bolivia).....***L. biconstricta***
- In lateral view, sternite of abdominal segment III rather evenly rounded, and making the sternal and tergal portions subequal (Figures 2B, 2C). Abdominal segment IV relatively broadly attached to the preceding segment III, so that there is little contrast between widths of anterior and posterior articulations of segment IV in lateral view (Figures 4E, 5E)7
 - 7 In lateral view, petiolar sternite distinctly bulging medially (Figure 2C) **8**
 - In lateral view, petiolar sternite bulging anteriorly (Figures 2B, 2D)..... **9**
 - 8 Hind tibia with two very small, simple spurs, without pectinate spur clearly visible under 50× magnification (Figure 2J). Petiolar spiracle opening in an excavation distinctly larger than propodeal spiracle (Figure 5G, 5H). Flange over the metapleural gland opening sharply pointed posteriorly (Figure 5G) (Mexico, Guatemala)..... ***L. gracilis***
 - Hind tibia with a large pectinate spur, clearly discernable under 50× magnification. Petiolar spiracle not in excavation, similar and subequal to or smaller in diameter than propodeal spiracle (Figures 4G, 4H). Flange over metapleural gland opening rounded posteriorly (Figure 4G) (Venezuela) ***L. femoralis***
 - 9 Smaller species, HW < 0.30. Slender with narrow head, CI < 70 (Figure 2G) (Colombia) ***L. sculpturata***
 - Larger species, HW > 0.30. Head broader, CI > 70..... **10**
 - 10 Size larger, HW = 0.38 on single known specimen. Petiolar sternite conspicuously excavated anteroventrally in lateral view (Figure 2B). Flange over metapleural gland opening rounded posteriorly (Figure 22 in Brandão et al. 1999a) (Ecuador)..... ***L. improvisa***
 - Smaller, HW < 0.35. Petiolar sternite not conspicuously excavated anteroventrally in lateral view (Figure 3E, 3J). Flange over metapleural gland opening sharply pointed posteriorly (Figure 3J) (Ecuador) ***L. erinys***

***Leptanilloides erinys* sp. n.**

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

Figures 1C–D, 3A–L

Type material. Holotype worker: ECUADOR, *Napo*: Yanayacu Biological Station, -0.60° -77.88°, 2200m, secondary cloud forest, 9 December 2009 (*M. L. Borowiec* #MLB091209.01) [unique specimen identifier CASENT0234603] [QCAZ]. Paratype gyne and workers: about a hundred specimens with the same data as holotype, point-mounted and in alcohol [AMNH, BMNH, CASC, FMNH, LACM, MCZC, MZSP, NMNH, QCAZ, UCDC].

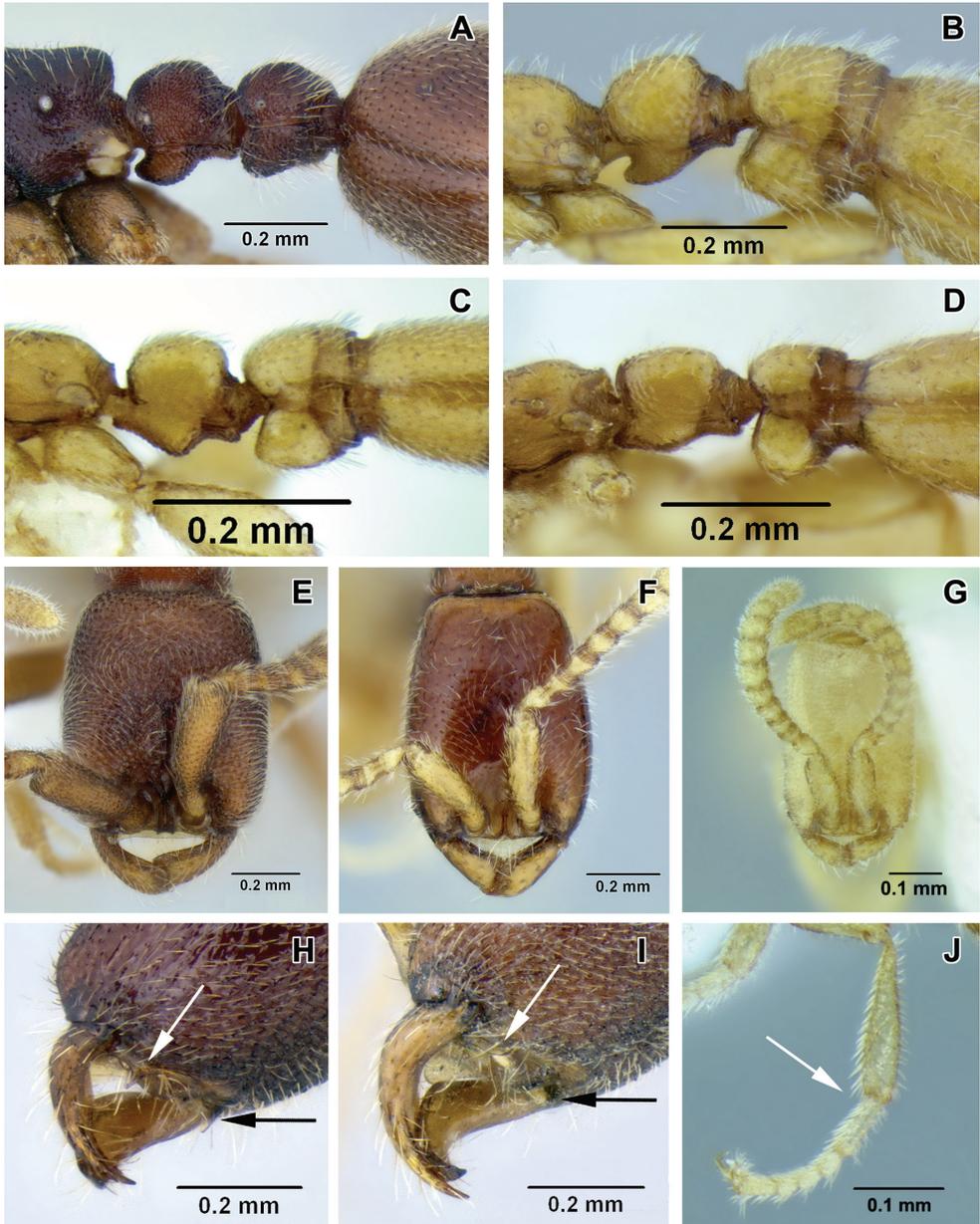


Figure 2. **A–D** lateral view focusing on propodeum, petiole and abdominal segment III **A** *Leptanilloides nomada* worker (CASENT0234620) **B** *Leptanilloides improvisa* holotype worker (MCZ type 35284) **C** *Leptanilloides femoralis* holotype worker (CASENT0106180) **D** *Leptanilloides biconstricta* paralectotype worker (NMNH type 25705) **E–G** head in full-face view **E** *Leptanilloides nomada* worker (CASENT0234620) **F** *Leptanilloides legionaria* worker (CASENT0234619) **G** *Leptanilloides sculpturata* holotype worker (USNM ENT 00533059) **H, I** ventrolateral view of head capsule focusing on hypostoma **H** *Leptanilloides nubecula* worker (CASENT0234621) **I** *Leptanilloides mckennae* paratype worker (INBI-OCRI001281144) **J** hind leg of *Leptanilloides gracilis* worker (CASENT0612940).

Non-type material examined: 6 workers with the same data as holotype, except collection date 1 December 2009, sifted leaf litter (*M. L. Borowiec* #MLB091209.04) [MLBC].

Worker measurements (holotype): HW 0.31, HL 0.41, SL 0.20, MH 0.19, ML 0.50, PrW 0.22, PW 0.11, PL 0.15, AIIIW 0.20, AIIIL 0.16, AIVW 0.33, AIVL 0.24, FFeW 0.09, FFeL 0.23, HFeL 0.22, HTiL 0.26, CI 76, PI 75, MI 38.

Worker measurements and indices (11 measured): HW 0.31–0.32, HL 0.41–0.43, SL 0.19–0.21, MH 0.18–0.20, ML 0.49–0.53, PrW 0.20–0.23, PW 0.12–0.14, PL 0.15–0.17, AIIIW 0.19–0.22, AIIIL 0.14–0.18, AIVW 0.31–0.33, AIVL 0.21–0.25, FFeW 0.09–0.10, FFeL 0.23–0.25, HFeL 0.23–0.24, HTiL 0.26–0.28, CI 74–78, PI 74–82, MI 36–41.

Diagnosis. Worker can be distinguished by combination of relatively small size, promesonotal articulation complete and articulated, abdominal segment III large relative to petiole, presence of lateroclypeal teeth, relatively heavy sculpturing, parafrenal ridges absent, flange overhanging metapleural gland opening pointed posteriorly. It is most similar to *Leptanilloides sculpturata* from Colombia, but can be distinguished by significantly larger size (HW ≥ 0.31 in *erinys* versus 0.20–0.26 in *sculpturata*), relatively broader head (CI >70 vs. 58–67) and shorter petiole (PI >74 vs. PI=70 measured in holotype). *Leptanilloides erinys* also differs in weaker sculpturation of head dorsum, with small foveolae separated by about their diameter (Figure 1G), while in *L. sculpturata* the foveolae are separated by much less than their diameter, often contiguous (Figure 7 in Brandão et al. 1999a).

Worker description. With characters of *Leptanilloides* (see Diagnosis of *Leptanilloides* based on worker caste, above). Head elongate and subquadrate with lateral margins nearly straight and parallel. Posterior corners rounded and posterior border weakly concave. Parafrenal ridge absent. Clypeus laterally with blunt tooth pointing outwards. Mandible short, masticatory margin with three distinct blunt teeth basally and basal margin crenulate. Basal and masticatory margin distinct, but separated by a rounded angle. Palp formula unknown. Scape short and clavate. Antennal joints submoniliform, gradually increasing in size toward apex but not forming an antennal club. Mesosoma long, slender and flattened. Pronotum with a flexible promesonotal suture. Metanotal groove absent. Propodeum unarmed. Propodeal declivity very short and rounding into the dorsal face. Propodeal spiracle round, situated posteriorly on the sclerite. Metapleural gland flange conspicuous, translucent and posteriorly pointed. Femur not conspicuously enlarged, relatively slender. Mid tibia with one simple and hind tibia with one pectinate spur. Metatibial gland absent. Petiole smaller than abdominal segment III (postpetiole) in dorsal view. Petiole rectangular, uniformly wide across its length in dorsal view and with straight sides and abdominal segment III dilating posteriorly. In lateral view, petiolar tergite posteriorly sloping, without well differentiated posterior face and without long tubulated portion posteriorly. Petiolar sternite bulging anteriorly. Abdominal sternite III evenly rounded. Metasoma relatively robust. Abdominal segments IV–VI subequal in length in dorsal view and separated by strong constrictions. Segment VII (pygidium) small and mostly concealed by the preceding segment, U-shaped.

Head with abundant deep punctures and smooth interspaces on average about equal to puncture diameter, except on sides where punctures sparser, separated by more than their diameter. Mesosoma and abdomen more finely and sparsely punctate. Laterally on lower pronotum, entire mesopleuron, propodeum and petiole fine microreticulate sculpture present. Head, body and appendages with abundant, rather coarse, short and erect hairs. Body color yellowish to brownish.

Gyne measurements and indices (1 measured): HW 0.41, HL 0.46, SL 0.20, MH 0.24, ML 0.63, PrW 0.25, PW 0.24, PL 0.20, AIIIW 0.40, AIIIL 0.23, AIVW 0.45, AIVL 0.35, FFeW 0.11, FFeL 0.26, HFeL 0.27, HTiL 0.30, CI 88, PI 118, MI 38.

Gyne description. Subdichthadiigyne. Head rectangular, lateral borders weakly convex and posterior border distinctly concave. Compound eyes present and comprised of about ten weakly defined ommatidia, situated behind head midlength. Mandible subtriangular, masticatory margin crenulate, basal margin edentate. Clypeal apron present, small. Wingless, without any wing sclerites or wing buds. Petiole enlarged, taller than in worker and wider than long in dorsal view. Abdominal segment III broadly attached to following segments, tergosternal fusion not assessed. Petiolar and abdominal segment III spiracles located as in workers. Girdling constriction of abdominal segments IV–VI weakly developed and conspicuous only on segment IV. Tergite of abdominal segment VII (pygidium) large, not U-shaped and mostly concealed by preceding segment as in workers. Promesonotal connection present, articulated. Entire body covered with dense pubescence, more erect than in worker.

Male. unknown.

Biology. This species was collected in montane cloud forest habitat. Workers were first located in sifted leaf litter. After scraping leaf litter and removing root mat in an area of about 3m², a colony was discovered ca. 5cm below ground in a single soil cavity adjacent to a root. In a mass of workers a single gyne could be seen, as well as many slender larvae. The gyne did not have an extended gaster, there were no eggs visible in the nest, and all the larvae were of approximately the same size, suggesting synchronized brood production.

Leptanilloides femoralis sp. n.

urn:lsid:zoobank.org:act:17523937-4A7E-4C76-8E33-5067E5089300

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

Figures 2C, 4A–I

Type material. Holotype worker: VENEZUELA, *Aragua*: Pico Periquito, PN Henri Pittier, 10.339° –67.706°, 1500m, sifted litter (leaf mold, rotten wood) 17 August 2008 (*P. S. Ward*#16198.06) [unique specimen identifier CASENT0106180] [MIZA]. Paratype workers: 22 workers with the same data as holotype, point-mounted and in alcohol [AMNH, BMNH, CASC, FMNH, LACM, MCZC, MIZA, MZSP, NMNH, QCAZ, UCDC].

Worker measurements (holotype): HW 0.25, HL 0.32, SL 0.14, MH 0.12, ML 0.42, PrW 0.15, PW 0.09, PL 0.12, AIIIW 0.13, AIIIL 0.11, AIVW 0.22, AIVL 0.18, FFeW 0.09, FFeL 0.19, HFeL 0.19, HTiL 0.22, CI 78, PI 75, MI 29.

Measurements in mm and indices (7 measured): HW 0.23–0.25, HL 0.32–0.34, SL 0.14–0.16, MH 0.12–0.14, ML 0.41–0.44, PrW 0.15–0.17, PW 0.08–0.10, PL 0.12, AIIIW 0.12–0.14, AIIIL 0.11–0.14, AIVW 0.22–0.23, AIVL 0.17–0.19, FFeW 0.08–0.09, FFeL 0.18–0.19, HFeL 0.19–0.20, HTiL 0.20–0.22, CI 71–78, PI 67–80, MI 29–32.

Diagnosis. Worker relatively slender and small compared to most species in the genus, promesonotal connection complete and articulated, abdominal segment III (postpetiole) large relative to petiole, lateroclypeal teeth present, sculpturing moderate, parafrenal ridges present, flange overhanging metapleural gland opening rounded posteriorly. In general habitus and size it is most similar to *Leptanilloides gracilis* but can be distinguished by the small opening of petiolar spiracle (situated in large depression in *gracilis*), the pointed flange over the metapleural gland (rounded in *gracilis*), single pectinate spur on hind tibia (two simple spurs in *gracilis*), and relatively broader femur (FFeW 0.08–0.09 in *femoralis*, 0.06–0.07 in *gracilis*). Both *femoralis* and *gracilis* are similar to *biconstricta* from Bolivia and *improvisa* from Ecuador, but can be distinguished by the distinctly bulging sternite of the petiole, with the bulge most prominent medially (versus indistinctly broadened anteriorly in *biconstricta* and *improvisa*).

Worker description. With characters of *Leptanilloides* (see Diagnosis of *Leptanilloides* based on worker caste, above). Head elongate and rectangular with lateral margins nearly straight and parallel. Posterior corners rounded and posterior border concave. Parafrenal ridge distinct. Clypeus laterally with blunt tooth distinctly pointing outwards. Mandible short, masticatory margin with small teeth and basal margin crenulate. Basal and masticatory margins distinct, but separated by a rounded angle. Maxillary palp two-segmented. Labial palp two-segmented (in situ count). Scape short and clavate. Antennal joints submoniliform, gradually increasing in size toward apex but not forming an antennal club. Mesosoma long, slender and flattened. Pronotum with a flexible promesonotal suture. Metanotal groove absent. Propodeum unarmed. Propodeal declivity very short and rounding into the dorsal face. Propodeal spiracle round, situated posteriorly on the sclerite. Metapleural gland flange conspicuous, translucent and posteriorly blunt. Femur enlarged, broad. Mid tibia with one simple and hind tibia with one pectinate spur. Petiole smaller than abdominal segment III (postpetiole) in dorsal view. Petiole rectangular, uniformly wide across its length in dorsal view and with straight sides and abdominal segment III dilating posteriorly. In lateral view, petiolar tergite with differentiated anterior and posterior faces, posterior tubulated portion short. Petiolar sternite distinctly bulging medially. Abdominal sternite III evenly rounded. Metasoma long and slender. Abdominal segments IV–VI subequal in length in dorsal view and separated by strong constrictions. Pygidium small and mostly concealed by the preceding segment, U-shaped.

Head with abundant punctures with smooth interspaces on average equaling puncture diameter, except on sides where punctures sparser. Mesosoma and abdomen

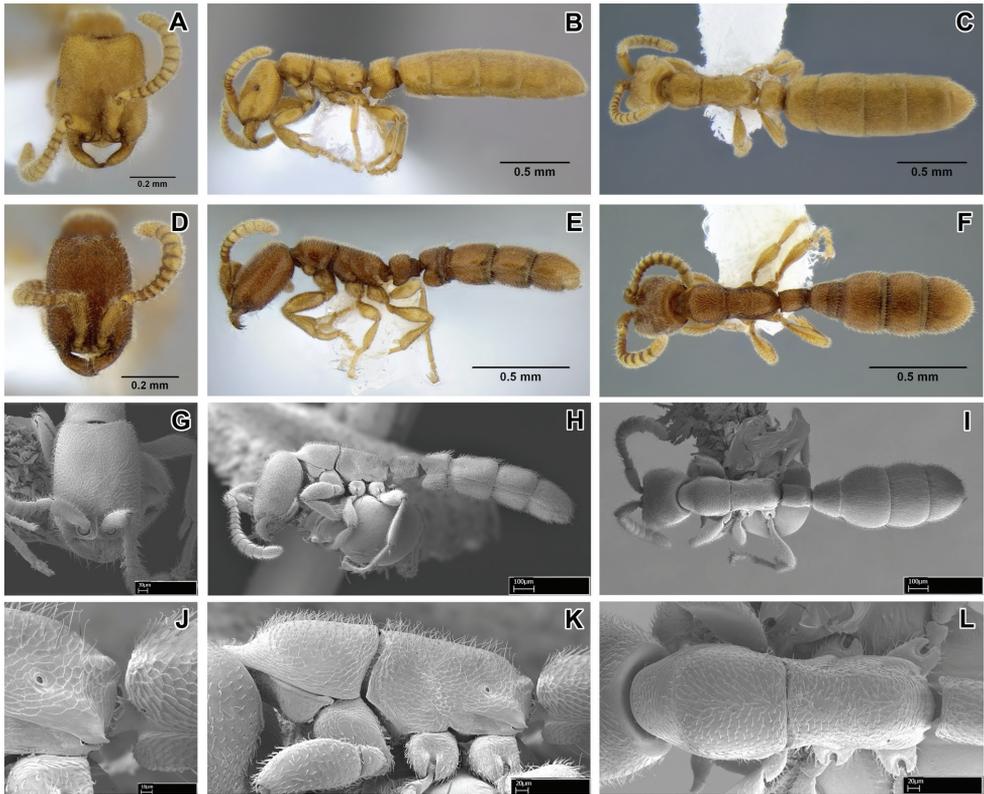


Figure 3. *Leptanilloides erinys*, new species **A–C** paratype gyne (CASENT0234616) **A** head in full-face view, **B**: body in lateral view **C** body in dorsal view. **D–F** paratype worker (CASENT0234596) **D** head in full-face view **E** body in lateral view **F** body in dorsal view **G–L** paratype worker (CASENT0234584) **G** head in full-face view **H** body in lateral view **I** body in dorsal view **J** propodeum and anterior petiole in lateral view **K** mesosoma in lateral view **L** mesosoma in dorsal view.

more finely and sparsely punctate. Laterally on mesopleuron, propodeum and petiole fine microreticulate sculpture present. Head, body and appendages with abundant, rather coarse, short and erect hairs. Body color yellowish.

Gyne and male. Unknown.

Biology. *Leptanilloides femoralis* is known to occur in montane cloud forest habitat. The single collection was from a Winkler sample of sifted litter and rotten wood from the forest floor.

Discussion. This species is superficially very similar to *L. gracilis* and at first sight might be considered an allopatric population of that species. However, molecular data obtained for ten nuclear gene regions from both morphotypes shows a very large

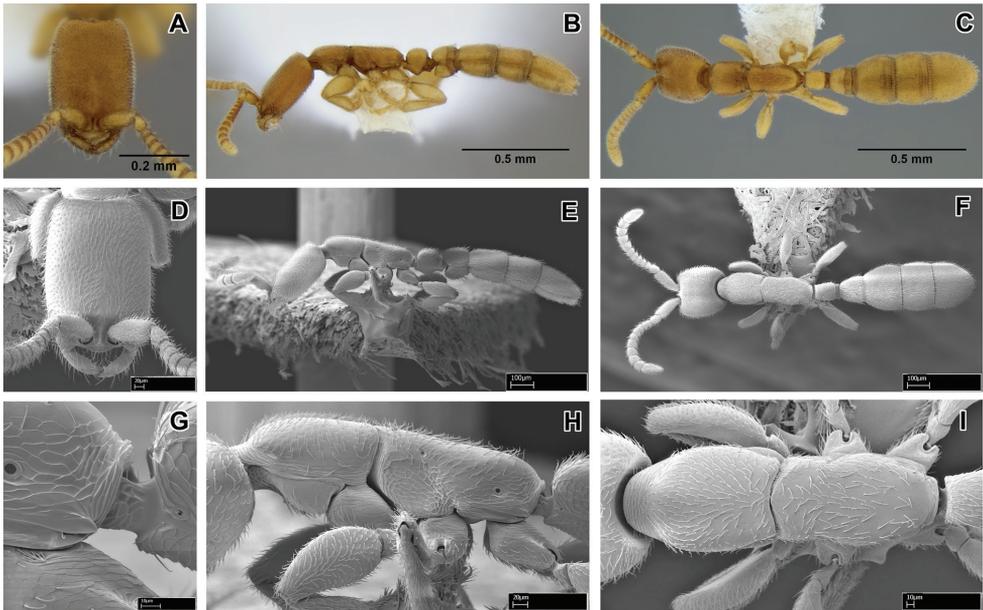


Figure 4. *Leptanilloides femoralis*, new species **A–C** holotype worker (CASENT0106180) **A** head in full-face view **B** body in lateral view **C** body in dorsal view **D–I** paratype worker (CASENT0234586) **D** head in full-face view **E** body in lateral view **F** body in dorsal view **G** propodeum and anterior petiole in lateral view **H** mesosoma in lateral view **I** mesosoma in dorsal view.

amount of sequence divergence, making it extremely unlikely that the ants belong to the same species (Phil Ward, unpublished data).

***Leptanilloides gracilis* sp. n.**

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

Figures 1F, 2J, 5A–I

Type material. Holotype worker: MEXICO, *Chiapas*: Sierra Morena, 16.15224° –93.60068° ±50m, 1330m, 12 May 2008 (Project LLAMA Wa-A-01-2-22) [unique specimen identifier CASENT0234574] [MCZC]. Paratype workers: 10 workers with the same data as holotype [AMNH, BMNH, CASC, EAPZ, ECOSCE, FMNH, LACM, MZSP, NMNH, UCDC, UVGC].

Non-type material examined: workers: MEXICO, *Chiapas*: Sierra Morena, 16.15971° –93.60512° ±50m, 1360m, 12 May 2008 (Project LLAMA Wa-A-01-1-24);

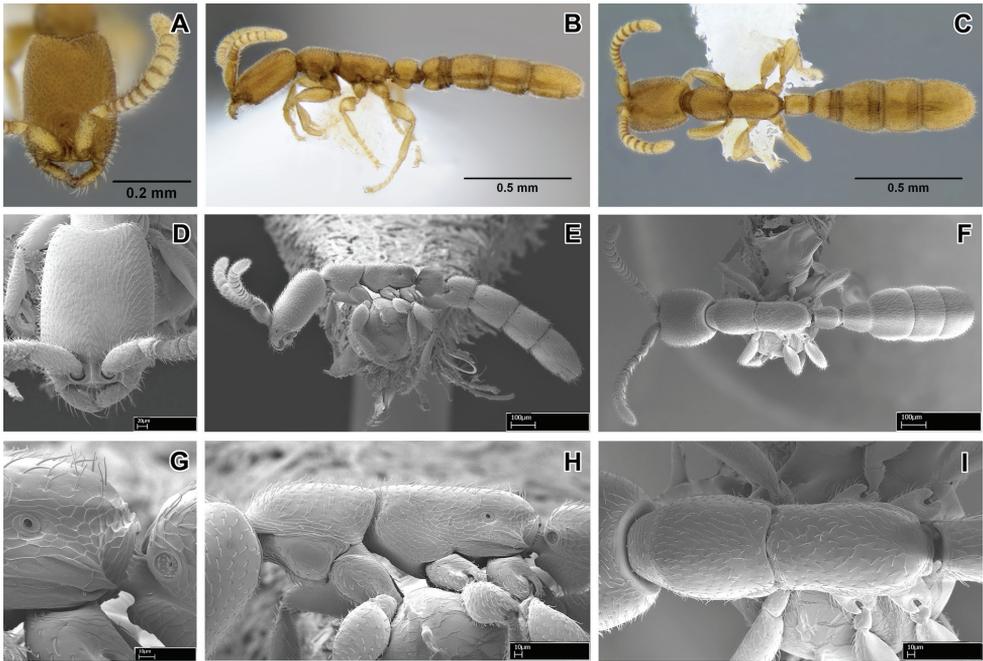


Figure 5. *Leptanilloides gracilis*, sp. n. **A–C** holotype worker (CASENT0234574) **A** head in full-face view **B** body in lateral view **C** body in dorsal view **D–I** paratype worker (CASENT0234585) **D** head in full-face view **E** body in lateral view **F** body in dorsal view **G** propodeum and anterior petiole in lateral view **H** mesosoma in lateral view **I** mesosoma in dorsal view.

workers: GUATEMALA, *Suchitepéquez*: 4km S Vol. Atitlán, 14.55288° -91.19316° ±50m, 1750m, 15 June 2009 (Project LLAMA, Wa-B-09-2-43).

Worker measurements (holotype): HW 0.25, HL 0.33, SL 0.15, MH 0.15, ML 0.44, PrW 0.17, PW 0.10, PL 0.13, AIIIW 0.15, AIIIL 0.12, AIVW 0.24, AIVL 0.19, FFeW 0.07, FFeL 0.19, HFeL 0.18, HTiL 0.21, CI 77, PI 76, MI 34.

Worker measurements (11 measured): HW 0.23–0.25, HL 0.31–0.33, SL 0.14–0.15, MH 0.12–0.15, ML 0.40–0.44, PrW 0.14–0.17, PW 0.09–0.10, PL 0.12–0.14, AIIIW 0.12–0.15, AIIIL 0.11–0.13, AIVW 0.21–0.24, AIVL 0.16–0.19, FFeW 0.06–0.07, FFeL 0.17–0.19, HFeL 0.17–0.19, HTiL 0.20–0.21, CI 70–81, PI 69–79, MI 29–34.

Diagnosis. Worker relatively slender and small compared to most species in the genus, promesonotal connection complete and articulated, abdominal segment III large relative to petiole, lateroclypeal tooth present, sculpturing moderate, parafrenal ridge present, flange overhanging metapleural gland opening pointed posteriorly. *L. gracilis* is unique in the modified petiolar spiracle, opening to a conspicuous pit larger in diameter than propodeal spiracle opening (Figure 3G), maxillary palpus with only one segment and mid and hind tibia with two simple spurs. In general habitus and size it is most similar to *Leptanilloides femoralis* but can be distinguished (in addition to traits mentioned above) by the pointed flange over the metapleural gland (blunt in *L.*

femoralis) and relatively slender femur. Both *L. gracilis* and *L. femoralis* are similar to *L. biconstricta* from Bolivia and *L. improvisa* from Ecuador, but can be distinguished by the distinctly bulging sternite of the petiole, with the bulge most prominent medially (versus indistinctly broadened anteriorly in *L. biconstricta* and *L. improvisa*).

Worker description. With characters of *Leptanilloides* (see Diagnosis of *Leptanilloides* based on worker caste, above). Head elongate and rectangular with lateral margins nearly straight and parallel. Posterior corners rounded and posterior border concave. Parafrontal ridge distinct. Clypeus laterally with blunt tooth distinctly pointing outwards. Mandible short, masticatory margin with small teeth and basal margin crenulate. Basal and masticatory margins distinct, but separated by a rounded angle. Maxillary palp apparently fused to form one segment, although weakly constricted and similar in length to two-segmented labial palp (in situ count). Scape short and clavate. Antennal joints submoniliform, gradually increasing in size toward apex but not forming an antennal club. Mesosoma long, slender and flattened, with a flexible promesonotal suture. Metanotal groove absent. Propodeum unarmed. Propodeal declivity very short and rounding into the dorsal face. Propodeal spiracle round, situated posteriorly on the sclerite. Metapleural gland flange conspicuous, translucent and posteriorly pointed. Femur not conspicuously enlarged, relatively slender. Mid and hind tibia each with two small and simple spurs. Metatibial gland absent. Petiolar spiracle opening to conspicuous depression, in diameter exceeding propodeal spiracle. Petiole smaller than abdominal segment III (postpetiole) in dorsal view. Petiole rectangular, uniformly wide across its length in dorsal view and with straight sides and abdominal segment III dilating posteriorly. In lateral view, petiolar tergite with differentiated anterior and posterior faces, posterior tubulated portion short. Petiolar sternite distinctly bulging medially. Abdominal sternite III evenly rounded. Metasoma long and slender. Abdominal segments IV–VI subequal in length in dorsal view and separated by strong constrictions. Pygidium small and mostly concealed by the preceding segment, U-shaped.

Head with abundant punctures with smooth interspaces on average equaling puncture diameter, except on sides where punctures sparser. Mesosoma and abdomen more finely and sparsely punctate. Laterally on mesopleuron, propodeum and petiole fine microreticulate sculpture present. Head, body and appendages with abundant, rather coarse, short and erect hairs. Body color yellowish.

Gyne. Unknown.

Male. See discussion under *Leptanilloidinae* male 1.

Biology. The type series was collected in second growth mesophyll cloud forest. A few dozen workers were in a single “miniWinkler” sample, which is litter sifted from a 1m² plot on the forest floor. Two additional workers were collected in a similar mini-Winkler sample approximately 1 km distant. The species occurred in two of 100 mini-Winkler samples taken at the site. The Guatemala collection was made under similar circumstances, in which a small series of workers occurred in one of 100 miniWinkler samples from a mature cloud forest habitat.

Discussion. *L. gracilis* is similar in general habitus to some other small species of the genus, especially *L. femoralis*. It is unique, however, in some traits that may be

considered autapomorphies of this species. It has the segments of the maxillary palpus fused to form one, instead of the two-segmented palpus seen in other species where the palp formula is known. The petiolar spiracle opening is situated in a conspicuous pit of diameter larger than the propodeal spiracle opening; in all other species of *Leptanilloides* the petiolar spiracle opening is simple and subequal or smaller than that of propodeal spiracle. There are two minute, simple spurs on the mid and hind tibia, while other species of the genus are known to have one simple spur on the mid tibia and a single conspicuously pectinate spur on hind tibia.

Leptanilloidinae male 1

Figure 6A–F

Material examined. MEXICO, *Chiapas*: 2km SE Custepec, 15.72099° –92.95106° ±5m, 1495m, 17–24 May 2008 (LLAMA#Ma-A-02-1-02); Nahá, 16.94917° –91.59476° ±11m, 960m, 9–13 June 2008 (LLAMA#Ma-A-07-2-02); GUATEMALA, *Izabal*: 5km NW Morales, 15.51341° –88.86616° ±8m, 245m, 16–20 May 2009 (LLAMA#Ma-B-04-2-01); 5km NW Morales, 15.51351° –88.86647° ±7m, 245m, 16–20 May 2009 (LLAMA#Ma-B-04-2-02); *Petén*: Cerro Cahuí, 17.00044° –89.70346° ±5m, 140m, 22–25 May 2009 (LLAMA#Ma-B-05-1-02); Parq. Nac. Tikal, 17.24433° –89.62201° ±6m, 270m, 22–25 May 2009 (LLAMA#Ma-B-05-2-02); 13km NW Machaquilá, 16.44491° –89.55136° ±6m, 380m, 27–30 May 2009 (LLAMA#Ma-B-06-1-01); 13km NW Machaquilá, 16.44661° –89.54939° ±8m, 400m, 27–30 May 2009 (LLAMA#Ma-B-06-1-02); 4.5km WNW Machaquilá, 16.40112° –89.48697° ±13m, 415m, 27–30 May 2009 (LLAMA#Ma-B-06-2-02); *Sacatepéquez*: 5km SE Antigua, 14.53725° –90.69475° ±4m, 2125m, 10–13 June 2009 (LLAMA#Ma-B-08-1-01); 5km SE Antigua, 14.53650° –90.69483° ±4m, 2145m, 10–13 June 2009 (LLAMA#Ma-B-08-1-02); 5km SE Antigua, 14.52846° –90.68874° ±6m, 2335m, 10–13 June 2009 (LLAMA#Ma-B-08-2-01); *Suchitepéquez*: 4km S Vol. Atitlán, 14.54804° –91.19108° ±7m, 1580m, 15–18 June 2009 (LLAMA#Ma-B-09-1-01); 4km S Vol. Atitlán, 14.54807° –91.19188° ±4m, 1575m, 14–18 June 2009 (LLAMA#Ma-B-09-1-02); 4km S Vol. Atitlán, 14.54852° –91.19331° ±7m, 1590m, 14–18 June 2009 (LLAMA#Ma-B-09-2-01); HONDURAS, *Olancho*: PN La Muralla, 15.09490° –86.73987° ±10m, 1410m, 2–5 May 2010 (LLAMA#Ma-C-01-2-02); PN La Muralla, 15.09721° –86.73840° ±30m, 1480m, 2–5 May 2010 (LLAMA#Ma-C-01-3-01); *Comayagua*: PN Cerro Azul Meambar, 14.86987° –87.89885° ±10m, 1150m, 20–23 May 2010 (LLAMA#Ma-C-04-2-01); *Cortés*: PN Cusuco, 15.48898° –88.23707° ±10m, 1260m, 30 May–3 June 2010 (LLAMA#Ma-C-06-1-01); PN Cusuco, 15.48839° –88.23592° ±10m, 1260m, 30 May–3 June 2010 (LLAMA#Ma-C-06-1-02). COSTA RICA, *Guanacaste*: Santa Rosa Nat. Park, 10.85° –85.62° ±2km, 300m, 21 February 2003 (*J. S. Noyes*) [JTLC000004338].

Measurements (9 measured): HW 0.25–0.31, HL 0.18–0.24, EL 0.09–0.12, SL 0.09–0.012, LAII 0.05–0.07, LAIII 0.04–0.06, LAIV 0.04–0.07, LAXIII 0.10–0.14, MH

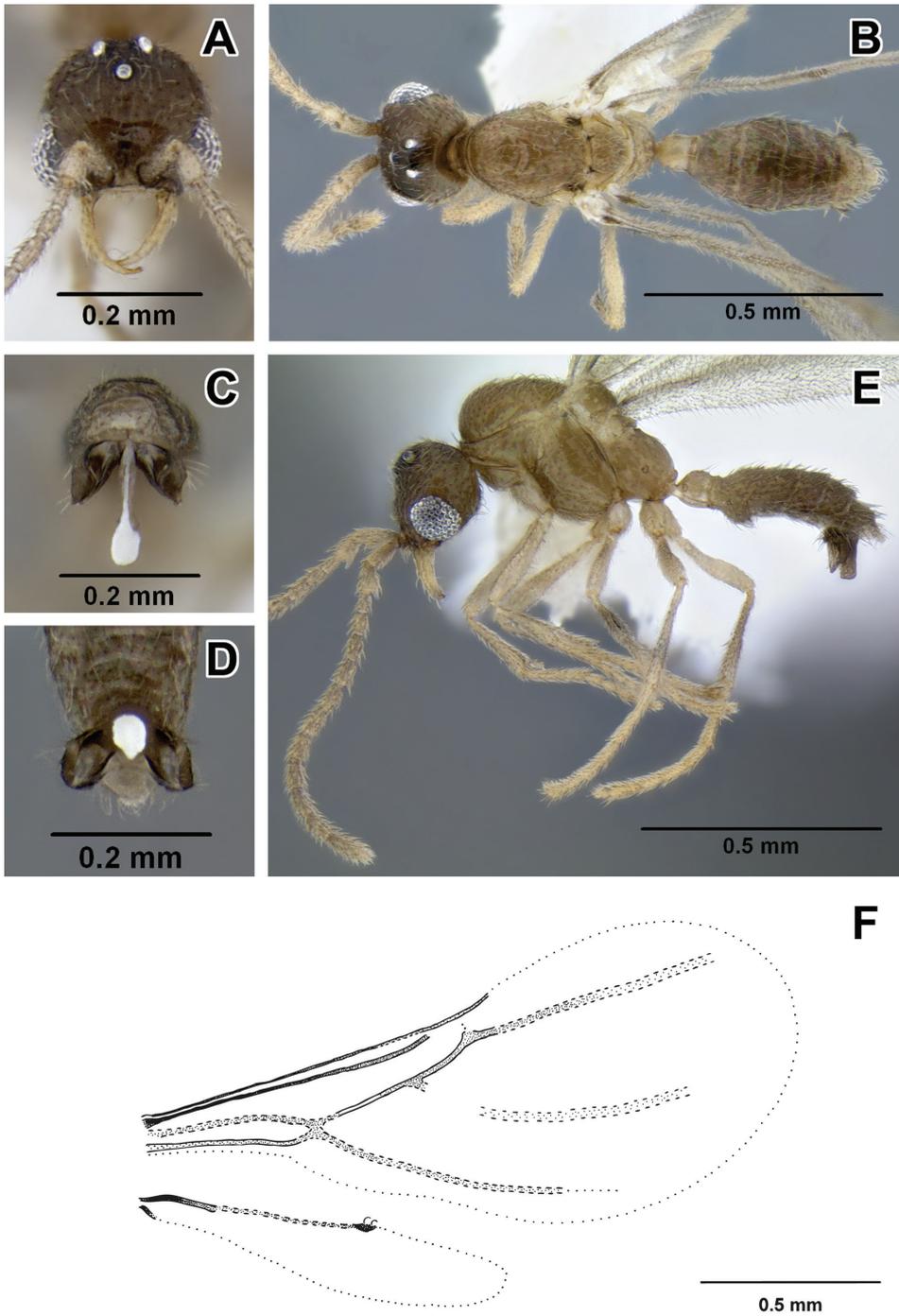


Figure 6. Leptanilloidinae male 1 **A–D** male (CASENT0234558) **A** head in full-face view **B** body in dorsal view **C** genitalia in posterior view **D** genitalia in ventral view **E** male (CASENT0234561) body in lateral view **F** wing venation.

0.23–0.37, ML 0.38–0.54, PrW 0.18–0.26, PW 0.07–0.10, PL 0.07–0.10, AIIIW 0.16–0.21, AIIIL 0.07–0.12, AIVW 0.15–0.23, AIVL 0.10–0.12, FFeW 0.04–0.06, FFeL 0.20–0.29, HFeL 0.22–0.30, HTiL 0.23–0.34, CI 115–130, PI 82–121, MI 60–71.

Description. Head broader than long, with large convex eyes that occupy almost half of the sides of head. Mandible slender and falcate with blunt apex, without differentiated masticatory margin, edentate. External margin of mandible more or less evenly curved along its length. Mandible tips crossing at closure, mandible longer than eye length. Lateroclypeal teeth and hypostomal teeth lacking, clypeus short and transverse, without visible clypeal lamella (apron). Antennal sockets horizontal and exposed, located at the anterior clypeal margin that is projecting anteriorly beyond ventral articulation with labrum. Antenna 13-segmented, each segment longer than wide, with second, third and fourth segments subequal in length. Scape of moderate length, subequal to the length of ultimate antennal segment. Scape about twice the length of the second antennal segment, and about the combined length of the second and third antennal segments. Lateral ocellus separated from median ocellus by little more than its diameter. Distance between lateral ocelli little greater than between median and lateral ocellus and ocelli forming almost equilateral triangle. Mesosoma with distinctive pronotum: U-shaped in dorsal view and reduced anteromedially to a thin horizontal strip, set below the level of the dorsally protruding mesonotum and triangular in lateral view, with pointed posterior apex directed towards the wing base. Mesoscutum lacking notauli and parapsidal lines not discernable. Axillae depressed, not meeting medially, connected by a narrow furrow. Tegula very small and inconspicuous. Mesopleuron lacking oblique transverse sulcus and hence not divided into anepisternum and katepisternum. Mesoscutellum prominently bulging, as seen in lateral view. Metapleural gland not discernable. Propodeum with dorsal and declivous surfaces not differentiated, evenly rounded. Propodeal spiracle small, circular, positioned slightly below midheight of propodeum and slightly posterior to the midlength. Legs slender, mesotibia and metatibia each with two simple spurs, pretarsal claw lacking preapical tooth. Wing with extremely reduced venation. Fore wing with C present, tubular and weakly pigmented. Sc+R very closely approximated to the wing margin, very narrow, compressed vertically, the most apparent vein on forewing. Sc+R1 region not differentiated in absence of Rs-f1 but differing from rest of vein by not being conspicuously vertically compressed; in line with Sc+R, nebulous. Pterostigma not marked. R1-f3 absent. M+Cu nebulous and inconspicuous, slightly curved towards posterior wing margin before division. Rs-f1 absent. M-f1, Rs+M, Rs-f2 and Rs-f3 all joined, not differentiated, tubular or partially nebulous. 1r-rs absent. 2r-rs present, spectral. Rs-f4 and Rs-f5 joined and not differentiated in the absence of 2rs-m. Rs-f4&f5 nebulous and poorly visible, terminating before wing margin. Free abscissae of M absent. Abscissae of Cu joined, initially nebulous, continuing throughout most of the length as spectral. Vein A tubular, joining cu-a at a very obtuse angle and confluent with Rs+M, apparently absent beyond cu-a, although weak flexion at the posterior wing margin can be interpreted as spectral A-f2&f3. Posterior margin of fore wing with narrow, conspicuous fold where hamuli attach. Hind wing with C present, tubular, reaching about fourth of wing length. Anterior margin of hind wing past midlength with a

conspicuous dark stigma. Two hamuli originate in the region of the stigma. Jugal lobe absent. Metasoma slender in lateral view, obovate in dorsal view, widest at abdominal segment IV. Petiole (abdominal segment II) subquadrate in lateral view, about as long as high or wide, and only weakly constricted posteriorly, the helcium thus apparently quite broad. Petiolar spiracle located on anterior third of the segment, near anterodorsal extremity; abdominal segment III larger than petiole, and not developed as postpetiole nor separated from abdominal segment IV by a marked constriction. Abdominal spiracle III located on anterior third of tergite. Petiole and abdominal segment III with tergo-sternal fusion. Abdominal segment IV and succeeding segments lacking tergo-sternal fusion. Segment IV with weakly differentiated presclerites. Spiracle present on anterior third of tergite IV. Abdominal segments V and VI lacking well differentiated presclerites, and not separated from succeeding segments by constrictions. Abdominal spiracles V and VI not discernable in specimens examined but possibly present at anterior margins of respective tergites. Abdominal tergite VIII (pygidium) small and simple but visible dorsally, not wholly covered by abdominal tergite VII. Pygostyli absent. Abdominal sternite IX (subgenital plate) with posterior margin broadly and deeply concave but not bifurcate. Basal ring present, not hypertrophied. Paramere small and slender with pointed, slightly outcurved apex of harpago. Paramere little longer than petiole length. Volsella a simple, narrow and elongate lobe, lacking differentiated cuspis, distally pointed and slightly outcurved. Aedeagus little longer than paramere and volsella, simple, narrow, distally spatulate. Body size very small. Integument mostly smooth and shiny, with scattered piligerous punctures. Pilosity common on most of body, suberect to decumbent. Color light yellowish-brown, head and posterior margins of abdominal segments IV–VII darker, appendages (antennae, mandibles, legs) lighter.

Discussion. Project LLAMA (Leaf Litter Arthropods of MesoAmerica) is an arthropod biodiversity inventory project carrying out a structured sampling program at sites from southern Mexico (Chiapas) to Nicaragua. The focus is on mature mesophyll forest at multiple elevations. Four days are spent sampling at each study site, and one of the methods is to erect four Malaise traps for the four days. Sampling has been carried out in May and June, 2008 to 2010. The diminutive *Leptanilloides* male described here is surprisingly common in the Malaise samples, occurring at many of the study sites and across a great range of elevations (these specimens temporarily reside in the personal collections of Borowiec and Longino, ultimately to be deposited in major institutional collections). They have been found in the Sierra de Chiapas (near the type locality of *L. gracilis*), in the lower elevation Lacandón rainforests of northern Chiapas, in the Petén region of Guatemala, in both lowland and montane regions of central Guatemala, and in montane regions of Honduras. When they occur at a site, they are typically found in more than one of the Malaise traps, but usually no more than about five males per trap in a 4-day sample. They are very easily overlooked because of their similarity, in both size and degree of sclerotization, to small nematoceran Diptera that are often abundant in Malaise samples.

From hitherto described males of *Leptanilloides* (Donoso et al. 2006, Ward 2007, Ward & Brady 2009, this study) and *Amyrmex* (Ward & Brady 2009) this morphos-

pecies can be differentiated by a combination of falcate mandibles, small size and extremely reduced wing venation with Rs-f1 and pterostigma absent in fore wing and hind wing venation restricted to a short C stub, as well as the external structure of the genitalia. The falcate mandibles are similar in shape to mandibles of males of *L. nubecula*, but the specimens of male 1 are smaller than the males of *L. nubecula* and apparently have less well developed wing venation. Although Donoso et al. (2006) did not describe wing venation in detail for *L. nubecula*, and we have not examined the male specimens of that species, from the picture given in their treatment (Fig. 26, p. 55) it is clear that the wing venation is much better developed in *L. nubecula*. Rs-f1 can be seen in fore wing and hind wing has a conspicuous Sc+R running almost three fourths of the wing length, while in male 1 both these veins are apparently absent.

The largely sympatric distribution, two simple spurs on mid and hind tibia, overall small size, and relative abundance make these specimens good candidates for the male caste of *L. gracilis*.

Leptanilloidinae male 2

Figure 7A–F

Material examined. COSTA RICA, *Puntarenas*: 5km S San Vito, 8.78333° –82.96667° ±2km, 1200m, 22–26 August 2010, montane wet forest, ex pan trap (*M. Pollet* & *A. De Braekeleer*) [MLBC].

Measurements in mm and indices (2 measured): HW 0.37–0.40, HL 0.30–0.31, EL 0.14–0.15, SL 0.13–0.14, LAII 0.07–0.08, LAIII 0.07, LAIV 0.06–0.07, LAX-III 0.14–0.15, MH 0.36–0.41, ML 0.65–0.68, PrW 0.31–0.33, PW 0.10–0.11, PL 0.16, AIIIW 0.19–0.20, AIIIL 0.15–0.19, AIVW 0.28–0.29, AIVL 0.20–0.22, FFeW 0.08, FFeL 0.32–0.36, HFeL 0.36–0.38, HTiL 0.37–0.40, CI 125–127, PI 65–67, MI 56–59.

Description. Head broader than long, with large convex eyes that occupy almost half of the sides of head. Mandible slender, tapering to pointed apex, without differentiated masticatory margin, edentate. External margin of mandible more or less straight along its length. Mandible tips crossing at closure, mandible slightly longer than eye length. Lateroclypeal teeth and hypostomal teeth lacking, clypeus short and transverse, without visible clypeal lamella (apron). Antennal sockets horizontal and exposed, located at the anterior clypeal margin that is not projecting anteriorly beyond ventral articulation with labrum. Antenna 13-segmented, each segment longer than wide, with second, third and fourth segments subequal in length. Scape of moderate length, subequal to the length of ultimate antennal segment. Scape length about twice the length of the second antennal segment, and about the combined length of the second and third antennal segments. Lateral ocellus separated from median ocellus by lit-

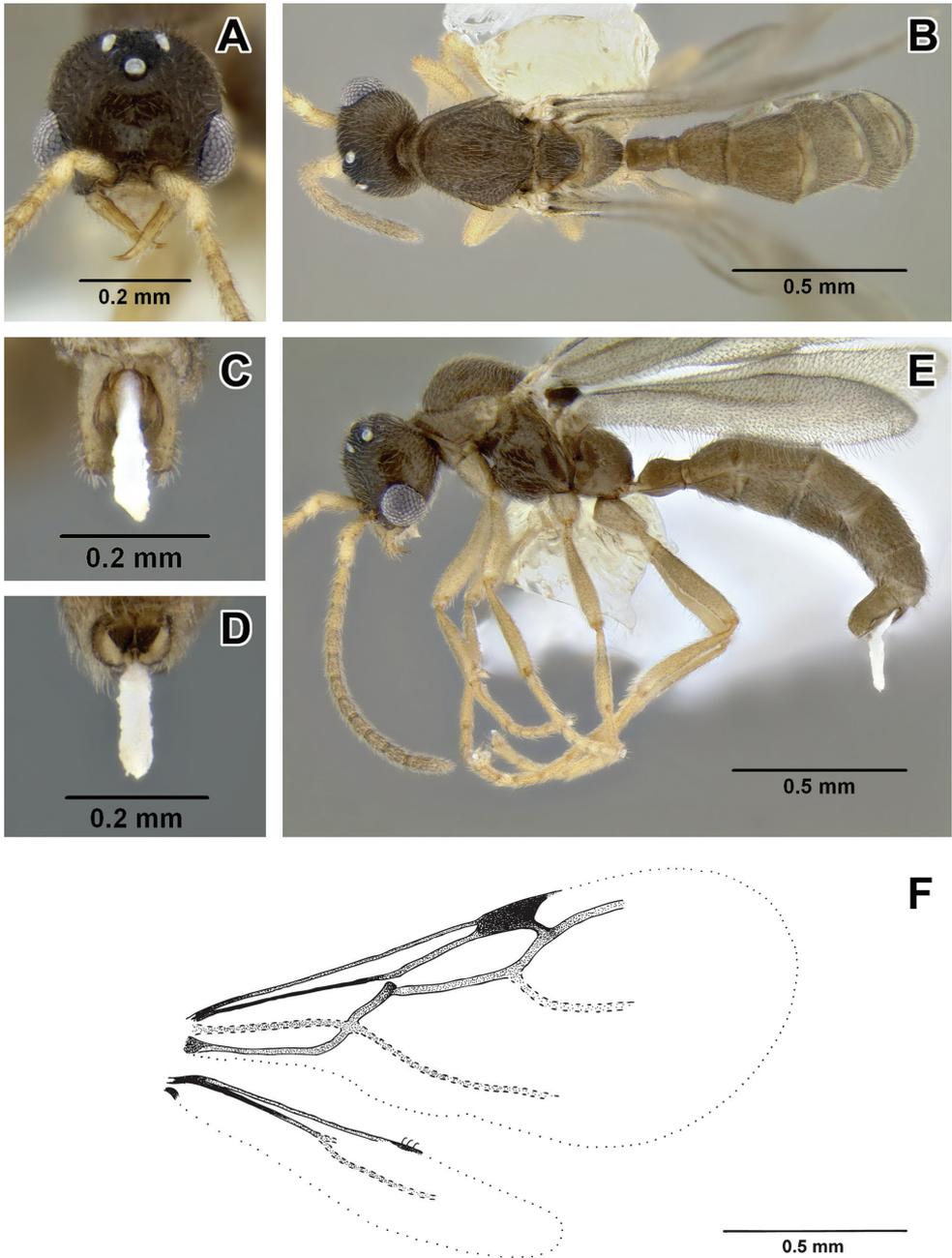


Figure 7. Leptanilloidinae male 2 **A–E** male (CASENT0234556) **A** head in full-face view **B** body in dorsal view **C** genitalia in posterior view **D** genitalia in ventral view **E** body in lateral view **F** wing venation.

tle more than its diameter. Distance greater between lateral ocelli than between median and lateral ocellus and ocelli forming isosceles triangle. Mesosoma with distinctive pronotum: U-shaped in dorsal view and reduced anteromedially to a thin horizontal strip, set below the level of the dorsally protruding mesonotum and triangular in lateral view, with pointed posterior apex directed towards the wing base. Mesoscutum lacking notauli and parapsidal lines present, weakly marked but long, running about two thirds of mesoscutum length. Axillae depressed, not meeting medially, connected by a narrow furrow; tegula very small and inconspicuous. Mesopleuron lacking oblique transverse sulcus and hence not divided into anepisternum and katepisternum. Mesoscutellum raised above level of mesoscutum but not prominently bulging, as seen in lateral view. Metapleural gland not discernable. Propodeum with dorsal surface clearly shorter than declivous. Propodeal spiracle small, circular, positioned at midheight of propodeum and slightly posterior to the metanotum. Legs slender, mid tibia with one simple and hind tibia with one pectinate spur, pretarsal claw lacking preapical tooth. Wing with relatively well developed venation (for *Leptanilloides*). Fore wing with C present, tubular and weakly pigmented. Sc+R very closely approximated to the wing margin, very narrow, compressed vertically. Sc+R1 region joining Sc+R at obtuse angle, tubular. Pterostigma well marked. R1·f3 absent. M+Cu nebulous but conspicuous, slightly curved towards posterior wing margin before division. Rs·f1 stub present, tubular but not reaching Sc+R. M·f1 pigmented, tubular. Rs+M tubular and pigmented, straight. Rs·f2 and Rs·f3 joined, not differentiated, tubular and pigmented. 1r-rs absent. 2r-rs present, tubular and pigmented. Rs·f4 and Rs·f5 joined and not differentiated in the absence of 2rs-m. Rs·f4&f5 partly tubular and partly nebulous, terminating before wing margin. Free abscissae of M present, nebulous and very weakly visible. Abscissae of Cu joined, nebulous throughout most of the length and continuing as spectral. Vein A tubular, joining cu-a at obtuse angle and confluent with Rs+M, apparently absent beyond cu-a. Posterior margin of fore wing with narrow, conspicuous fold where hamuli attach. Hind wing with C absent. Rc+R present, tubular but compressed, reaching about third of wing length. Anterior margin of hind wing with little differentiated pigmentation. Three hamuli originate in the pigmented region. Jugal lobe absent. Metasoma slender in lateral view, obovate in dorsal view, widest at abdominal segment IV. Petiole (abdominal segment II) ovate in lateral view, longer than high or wide, and weakly constricted posteriorly, the helcium thus apparently quite broad. Petiolar spiracle located on anterior third of the segment, near anterodorsal extremity. Abdominal segment III larger than petiole, and not developed as postpetiole nor separated from abdominal segment IV by a marked constriction. Abdominal spiracle III located on anterior third of tergite. Abdominal segments II and III with tergo-sternal fusion. Abdominal segment IV and succeeding segments lacking tergo-sternal fusion. Segment IV with weakly differentiated presclerites. Spiracle present on anterior third of tergite IV. Abdominal segments V and VI lacking well differentiated presclerites, and not separated from succeeding segments by constrictions. Abdominal spiracles V and VI not discernable in specimens examined but possibly present at anterior margins of respective tergites. Pygostyli absent. Abdominal sternite IX (subgenital plate) was hidden

and not observed. Basal ring present, not hypertrophied. Paramere relatively broad, not tapering, apically harpago truncated. Paramere little longer than petiole length. Volsella simple, lacking differentiated cuspis, tapering suddenly at midlength and distally pointed, forming ventrally directed hooks. Aedeagus apparently very short, could not be observed directly without dissection. Body size moderate. Integument mostly smooth and shiny, with scattered piligerous punctures. Pilosity common on most of body, suberect to decumbent. Color light brown, head, and mesoscutellum darker. Antennal segments I–III light, the rest light brown. Other appendages (mandibles, legs) lighter.

Discussion. These two males are from 1200m elevation wet forest, at the Wilson Botanical Garden in southern Costa Rica. They were collected by Marc Pollet in yellow pan traps on the forest floor, in late August, 2010.

These large male specimens can be recognized by sublinear, evenly tapering mandible without differentiated basal and masticatory margins, moderate size and relatively well developed wing venation. From *Leptanilloidinae* male 3 they differ in subequal dorsal and declivous faces of propodeum (dorsal surface shorter in male 3), shorter petiole and free abscissae of M joining Rs+M. From *L. mckenna*e they can be distinguished by arched propodeum (flattened in *mckenna*e) and sublinear mandibles (subtriangular in *mckenna*e).

Leptanilloidinae male 3

Figure 8A–F

Material examined. MEXICO, *Chiapas*: Lago Metzabok, 17.12681° -91.63094° ±6m, 570m, 5–8 June 2008 (LLAMA#Ma-A-06-1-02); GUATEMALA, *Petén*: Cerro Cahuí, 17.00044° -89.70346° ±5m, 140m, 22–25 May 2009 (LLAMA#Ma-B-05-1-02); 4.5km WNW Machaquilá, 16.40112° -89.48697° ±13m, 415m, 27–30 May 2009 (LLAMA#Ma-B-06-2-02).

Measurements in mm and indices (3 measured): HW 0.42–0.43, HL 0.32–0.33, EL 0.16, SL 0.13–0.14, LAII 0.08–0.09, LAIII 0.07–0.09, LAIV 0.10–0.11, LAX-III 0.17–0.19, MH 0.45–0.48, ML 0.66–0.70, PrW 0.32–0.35, PW 0.08–0.10, PL 0.18–0.20, AIIIW 0.20–0.25, AIIIL 0.20–0.25, AIVW 0.25–0.34, AIVL 0.20, FFeW 0.06–0.07, FFeL 0.37, HFeL 0.41–0.43, HTiL 0.40–0.43, CI 127–136, PI 41–54, MI 65–72.

Description. Head broader than long, with large convex eyes that occupy almost half of the sides of head. Mandible slender, widest at midlength but without differentiated masticatory margin, tapering to pointed apex, edentate. External margin of mandible more or less straight along its length. Mandible tips crossing at closure, mandible length subequal to eye length. Lateroclypeal teeth and hypostomal teeth lacking, clypeus short and transverse, with narrow clypeal lamella (apron). Antennal sockets horizontal and exposed, located at the anterior clypeal margin that is not projecting anteriorly beyond ventral articulation with labrum. Antenna 13-segmented, each seg-

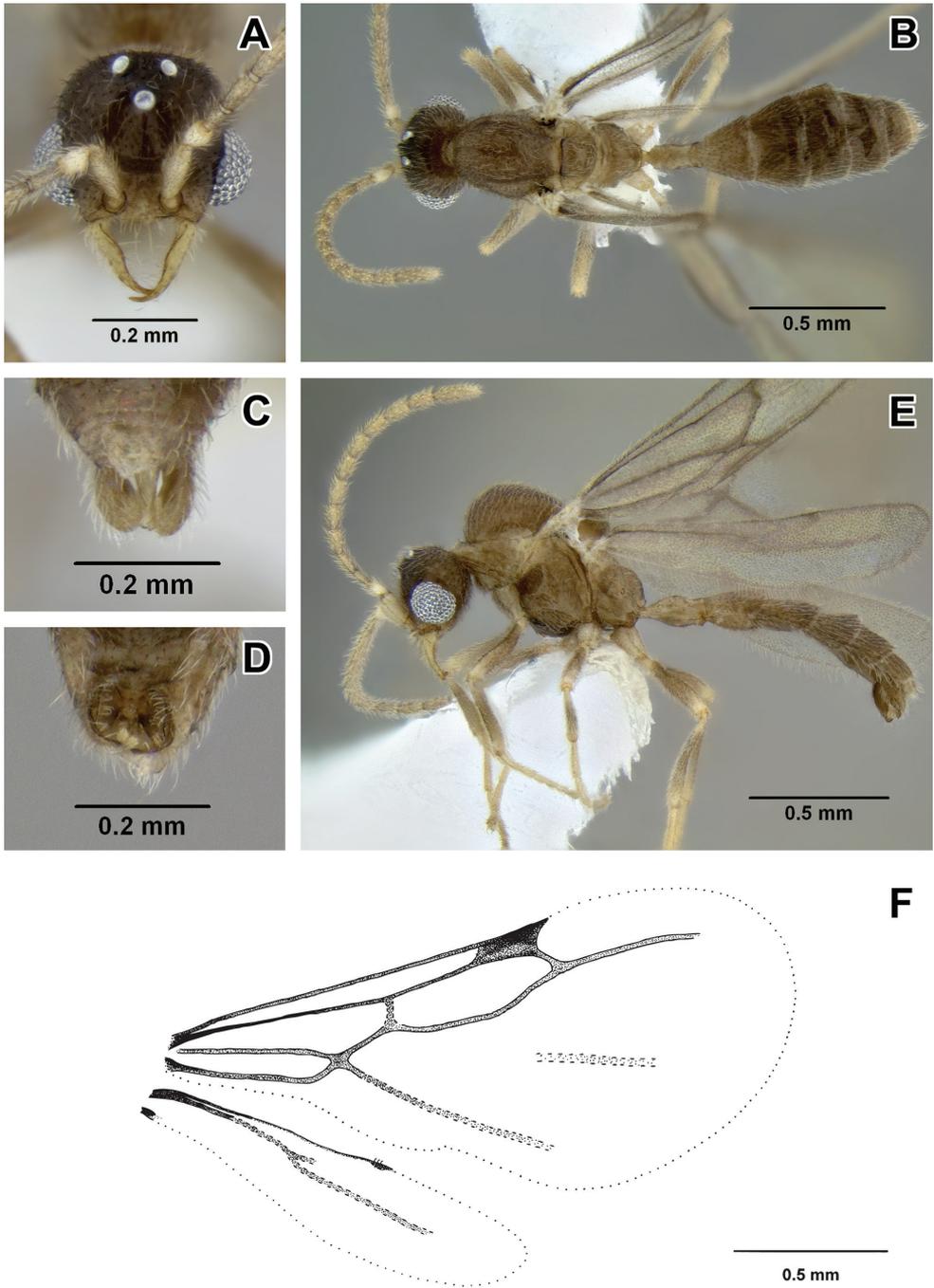


Figure 8. Leptanilloidinae male 3 **A–E** male (CASENT0617071) **A** head in full-face view **B** body in dorsal view **C** genitalia in posterior view **D** genitalia in ventral view **E** body in lateral view **F** wing venation.

ment longer than wide, with third segment the shortest. Scape of moderate length, subequal to the length of ultimate antennal segment. Scape length less than twice the length of the second antennal segment, and less than the combined length of the second and third antennal segments. Lateral ocellus separated from median ocellus by more than its diameter. Distance greater between lateral ocelli than between median and lateral ocellus and ocelli forming isosceles triangle. Mesosoma with distinctive pronotum: U-shaped in dorsal view and reduced anteromedially to a thin horizontal strip, set below the level of the dorsally protruding mesonotum and triangular in lateral view, with pointed posterior apex directed towards the wing base. Mesoscutum lacking notauli. Parapsidal lines present, long, running about the third of mesoscutum length. Axillae depressed, not meeting medially, connected by a narrow furrow; tegula very small and inconspicuous. Mesopleuron lacking oblique transverse sulcus and hence not divided into anepisternum and katepisternum. Mesoscutellum raised above level of mesoscutum and prominently bulging, as seen in lateral view. Metapleural gland not discernable. Propodeum with dorsal surface somewhat shorter than declivous. Propodeal spiracle small, circular, positioned slightly above midheight of propodeum and slightly posterior to the metanotum. Legs slender, mid tibia with one simple and hind tibia with one pectinate spur, pretarsal claw lacking preapical tooth. Wing with relatively well developed venation. Fore wing with C present, tubular and pigmented. Sc+R approximated to the wing margin, very narrow, compressed vertically. Sc+R1 in line with Sc+R, tubular. Pterostigma well marked. R1·f3 absent. M+Cu tubular, slightly curved towards posterior wing margin before division. Rs·f1 present, nebulous. M·f1 pigmented, tubular. Rs+M&Rs·f2&Rs·f3 tubular and pigmented. 1r-rs absent. 2r-rs present, tubular and pigmented. Rs·f4&Rs·f5 tubular, terminating before wing margin. Free abscissae of M nebulous, very weakly visible and not joining to Rs+M&Rs·f2&Rs·f3. Abscissae of Cu joined, nebulous throughout most of the length and continuing as spectral. Vein A tubular, joining cu-a at obtuse angle and confluent with Rs+M, apparently absent beyond cu-a. Posterior margin of fore wing with fold where hamuli attach narrow, conspicuous. Hind wing with C apparently present, narrow and faint except basal fourth of wing length. Sc+R present, tubular along fourth of wing length, continuing as nebulous. Sc+R1 a short nebulous stub. Rs·f1&Rs·f2 nebulous, terminating at about three fourth of wing length. Anterior margin of hind wing with little differentiated pigmentation. Three hamuli originate in the pigmented region. Jugal lobe absent. Metasoma slender in lateral view, obovate in dorsal view, widest at abdominal segment IV. Petiole (abdominal segment II) elongate-ovate in lateral view, more than two times longer than high or wide, and weakly constricted posteriorly, the helcium thus apparently quite broad. Petiolar spiracle located on anterior fourth of the segment, near anterodorsal extremity. Abdominal segment III larger than petiole, and not developed as postpetiole nor separated from abdominal segment IV by marked constriction. Abdominal spiracle III located on anterior third of tergite. Abdominal segments II and III with tergosternal fusion. Abdominal segment IV and succeeding segments lacking tergosternal fusion. Segment IV with weakly differentiated presclerites. Spiracle present on anterior third of tergite IV. Abdominal segments

V and VI lacking well differentiated presclerites, and not separated from succeeding segments by constrictions. Abdominal spiracles V and VI not discernable in specimens examined but possibly present at anterior margins of respective tergites. Abdominal tergite VIII (pygidium) small and simple but visible dorsally, not wholly covered by abdominal tergite VII. Pygostyli absent. Abdominal sternite IX (subgenital plate) with posterior margin broadly and deeply concave but not bifurcate. Basal ring present, not hypertrophied. Paramere relatively broad, harpago evenly rounded at apex; paramere shorter than petiole length. Volsella a simple, broad and elongate lobe, lacking differentiated cuspis, distally pointed. Aedeagus about equal in length to paramere and volsella, simple, narrow, distally spatulate. Body size moderate. Integument mostly smooth and shiny, with scattered piligerous punctures. Pilosity common on most of body, suberect to decumbent. Color light brown, head and metasoma past abdominal segment III darker. Antennal segment II light, the rest light brownish. Other appendages (mandibles, legs) lighter than body.

Discussion. This form has been collected at two sites in the Petén region of Guatemala and one locality in Chiapas, Mexico.

This relatively large male differs from Leptanilloidinae male 2 and *L. mckennae* in the dorsal face of the propodeum being shorter than the declivity (subequal in male 2 and flattened in *mckennae*), longer petiole, and free abscissae of M not connected to Rs+M. Additionally, from *mckennae* it differs by the slender mandibles without well differentiated masticatory and basal margins (subtriangular in *mckennae*). We have examined an additional specimen from Barro Colorado Island, Panama (“Leptanilloidine genus 1 PM01”; CASENT0106194), already mentioned by Ward & Brady (2009) that may belong here. It is larger (ML 0.74) with wider head (HW 0.43) and larger eyes (EL 0.20) but with relatively shorter petiole (PW 0.10, PL 0.15). The wing venation is similar, except veins of radial sector being more approximated to the anterior wing margin and thus making the closed veins of the wing appear more flattened. There is also a stub of free abscissae of M, completely absent in the three males from Mexico and Guatemala. Genitalia in this specimen are retracted and partly obscured, but seem similar to the genitalia present in Leptanilloidinae male 3. In the absence of collections of males of similar morphotypes between Guatemala and Panama, we are unable to tell whether this form represents a geographical variant or a distinct species.

Conclusions

The leptanilloidine ants, apparently due to their presumably subterranean habits, represent a serious challenge to sampling. The ratio of collecting events to number of worker-based morphospecies continues to be high, and number of male morphotypes present in the collections from recent efforts in Central America (LLAMA project) exceeds the number of the known worker-based species from the same region. This makes it certain that new species will continue to be discovered. When molecular data become available for more workers and unassociated males of *Leptanilloides* and work-

ers of *Asphinctanilloides*, it seems most probable that one of the genera is identical to *Amyrmex*. Given the unsatisfactory state of knowledge of the subfamily, future efforts documenting the diversity, biology, morphology, internal phylogeny, as well as phylogenetic position of Leptanilloidinae within dorylomorphs are much needed.

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Revision of the *Paridris nephta* species group (Hymenoptera, Platygastroidea, Platygastriidae)

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Abstract

The *Paridris nephta* group is revised (Hymenoptera: Platygastriidae). Fifteen species are described, 14 of which are new: *Paridris atrox* Talamas, **sp. n.** (Yunnan Province, China), *P. bunun* Talamas, **sp. n.** (Taiwan), *P. ferus* Talamas, **sp. n.** (Thailand), *P. kagemono* Talamas, **sp. n.** (Japan), *P. minator* Talamas, **sp. n.** (Laos, Thailand), *P. mystax* Talamas, **sp. n.** (Laos, Thailand), *P. nephta* (Kozlov) (Japan, North Korea, South Korea, Far Eastern Russia), *P. nilaka* Talamas, **sp. n.** (Thailand), *P. reptilis* Talamas, **sp. n.** (Taiwan), *P. rugulosus* Talamas, **sp. n.** (Laos, Vietnam), *P. solaris* Talamas, **sp. n.** (Laos, Thailand, Vietnam), *P. teres* Talamas, **sp. n.** (Vietnam), *P. toketoki* Talamas, **sp. n.** (Taiwan), *P. verrucosus* Talamas, **sp. n.** (Guangdong Province, China), *P. yak* Talamas, **sp. n.** (Thailand).

Keywords

Egg-parasitoid, Platygastroidea, key, species description, taxonomic revision

Introduction

In 1978, M. Kozlov described a new genus of scelionine wasps based on material from the Russian Far East, with *Tuora nephta* Kozlov as its sole species. No major taxonomic changes occurred in this group until Kononova and Kozlov (2008) treated *Tuora* as a junior synonym of *Paridris* Kieffer, a huge cosmopolitan group. Examination of material from East and Southeast Asia has brought to light many new species that are morphologically close to *Paridris nephta*, constituting a rather homogenous group that may be readily separated from the remainder of *Paridris*.

The goals of this paper are to define the *Paridris nephta* group and describe its species. This work is conducted as part of the Platygastroidea Planetary Biodiversity Inventory and represents a step toward revision of Scelionini sensu lato and resolution of the relationships between its constituent genera. The contributions of the authors are as follows: E.J. Talamas: character definition, species group concept development, species concept development, imaging, key development, manuscript preparation; N.F. Johnson: species concept development, key development, manuscript preparation; L. Masner: species group concept development, manuscript preparation.

Materials and methods

Specimens: This work is based upon specimens deposited in the following collections, with abbreviations used in the text: CNCI, Canadian National Collection of Insects, Ottawa, Canada¹; IEBR, Institute of Ecology and Biological Resources, Hanoi, Vietnam²; IZCAS, Chinese Academy of Sciences, Institute of Zoology, Beijing, China³; OSUC, C.A. Triplehorn Insect Collection, Columbus, OH⁴; QSBG, Queen Sirikit Botanic Garden, Chiang Mai, Thailand⁵; ROME, Royal Ontario Museum, Ontario, Canada⁶; RMNH, Leiden Nationaal Natuurhistorische Museum, Netherlands⁷.

Morphology: Abbreviations and morphological terms used in text: A1, A2, ... A12: antennomere 1, 2, ... 12; claval formula: distribution of the multiporous basiconic sensilla on the underside of apical antennomeres of the female, with the antennomere interval specified followed by the number of sensilla per segment (Bin 1981); palpal formula: number of maxillary and labial palpal segments, respectively; S1, S2, ... S6: metasomal mediosternite 1, 2, ... 6; T1, T2, ... T7: metasomal mediotergite 1, 2, ... 7.; posterior vertex: area between the posterior ocelli and the occipital carina. Morphological terminology largely follows Mikó et al. 2007; the following are illustrated and labeled to facilitate their use.

- Axillular carina (axc; Figs 15–16)
- Epomial carina (epc; Fig. 7)
- Lateral ocellus (loc; Figs 10–11)
- Metapleural sulcus (mtps; Fig. 36)
- Paracoxal sulcus (pcxs; Fig. 36)

Transverse carina of T2 (trc; Fig. 12)

Transverse pronotal carina (tpc; Fig. 7)

Morphological terms used in this revision were matched to the Hymenoptera Anatomy Ontology (HAO, Yoder et al. 2010) (Appendix I). Identifiers (URIs) in the format http://purl.obolibrary.org/obo/HAO_XXXXXXX represent anatomical concepts in HAO version <http://purl.obolibrary.org/obo/hao/2011-05-18/hao.owl>. They are provided to enable readers to confirm their understanding of the anatomical structures being referenced. To find out more about a given structure, including, images, references, and other metadata, use the identifier as a web-link, or use the HAO:XXXXXXX (note colon replaces underscore) as a search term at <http://glossary.hymao.org>. Notable changes in term usage from a previous taxonomic work (Talamas et al. 2011) are given in Appendix I.

The description of surface sculpture is presented in two formats. Areas of the exoskeleton in which the sculptural elements are inseparable are described simply as “sculpture”. For areas in which the sculptural elements vary independently, sculpture is divided into three categories: punctation: round depressions associated with setae; macrosculpture: raised or sunken patterns of texture that are oriented linearly or radially with respect to punctation or the axes of the body; microsculpture: unoriented, very fine wrinkles or pustulations that occur on, in, or between elements of macrosculpture and punctation.

Information Management: The locality data reported for primary types are not literal transcriptions of the labels: some abbreviations are expanded; additional data from the collectors are also included. The holotypes should be unambiguously identifiable by means of the unique identifier or the red holotype label. The numbers prefixed with “OSUC ” and “CASENT ” are unique identifiers for the individual specimens (note the blank space after the acronyms). Details on the data associated with these specimens may be accessed at the following link, purl.oclc.org/NET/hymenoptera/ol, and entering the identifier in the form. This monograph also features simultaneous publication and distribution of taxonomic and occurrence records through the Global Biodiversity Information Facility (GBIF) using DarwinCore Archives as in Talamas et al. (2011). All new species have been prospectively registered with Zoobank (Polaszek et al. 2005) and other taxonomic names have been retrospectively registered therein. All names are also registered in the Hymenoptera Name Server (hns.osu.edu). Life sciences identifiers, lsids, may be resolved at the URLs specified in the footnotes or at lsid.tdwg.org.

Cybertools: The species descriptions are generated by a database application, vSysLab (purl.oclc.org/NET/hymenoptera/vSysLab), designed to facilitate the generation of taxon by character data matrices, to integrate these with the existing taxonomic and specimen-level database, and to export the data both as text and as input files for other applications. The output is in the format of “Character: Character state(s).”

Imaging: Images were produced using Combine ZP and AutoMontage extended-focus software. The individual images are archived at the image database at The Ohio

State University (purl.oclc.org/NET/hymenoptera/specimage) and with MorphBank (www.morphbank.net). The latter also contains collections of images organized by plate.

Species Concept: For the purpose of this revision, species are defined as taxa diagnosable by putative autapomorphies or a unique combination of fixed character states.

Comments on *Paridris* Kieffer

The genus *Idris* was described by Arnold Förster in 1856, and the name has been used as the root for a number of generic names in Platygastridae. Wheeler (1935) proposed that it would be a useful root for names within the Formicidae, relieving the stress on roots such as *-mymex* and *-myrma*. According to Wheeler, the name is a substantive noun, derived from classical Greek, meaning “the knowing or provident one.” As such, it may be either masculine or feminine in grammatical gender. While workers in Platygastridae have treated the name and its derivatives as masculine, myrmecologists have used names with this root as feminine nouns. Here, we continue our tradition and use *Paridris* as a masculine noun.

The Nearctic *Paridris brevipennis* Fouts has one documented host association with *Gryllus pennsylvanicus* Burmeister (label data of a specimen in the USNM reported by Masner and Muesebeck, 1968). Based on this information, we speculate that the species of the *P. nephta* group are also parasitoids of gryllid eggs.

With the exception of Masner (1976), previous workers treated *Paridris* within only a restricted geographical context (Mani and Sharma 1982, Galloway and Austin 1984, Kozlov and Kononova 1985, Kozlov and Kononova 1990, Kononova and Petrov 2000, Lê 2000, Mineo 2005, Rajmohana 2006, Kononova and Kozlov 2008). Perhaps unsurprisingly, the characters they used for identification of the genus are insufficient when the world fauna is considered: the length of R1 (postmarginal vein) is variable; the shape of the metascutellum is highly variable, and in females may be entirely obscured by the horn of T1; the lateral ocellus is often close to the inner orbit of the compound eye; and the horn of T1 is missing in some members of the *P. nephta* species group.

Previous authors have mentioned that *Paridris* may be confused with *Probaryconus* (Galloway and Austin 1984) and *Anteris* Förster (Masner 1976). Masner (1976) indicated that *Anteris* and Neotropical *Paridris* are close to each other, and indeed they are highly similar in most of the external characters typically used for identification. Based on a yet unpublished phylogeny, we consider many of the similarities between these two genera to be convergent and not indicative of close relationship.

Separation of *Paridris* from *Probaryconus* is a more complicated matter because both are polytypic. *Probaryconus* has neither notauli (Fig. 9–10) nor an externally developed metascutellum (Figs 9–10), and always has spines, points, or dense tufts of setae on the propodeum (Figs 9–10). The epomial carina (Fig. 7) is present in *Probaryconus* (always absent in *Paridris*), with the exception of one widespread species group (Fig. 8) that also has setose eyes and a strongly reduced postmarginal vein. The

transverse carina of T2 (Fig. 12) unambiguously identifies *Paridris* but is not present in all species (e.g. the *P. nephta* species group). In some Neotropical and Oceanic species of *Paridris*, the lateral propodeal carinae form two points lateral to the metasomal depression, similar to the propodeal points in *Probaryconus* Kieffer. The following key separates *Probaryconus* and *Anteris* from *Paridris* with the fewest characters possible.

Key to separate *Paridris*, *Probaryconus* and *Anteris*

- 1 Palpal formula 2-1 (Fig. 1); female T7+8, when extruded with ovipositor, connected to T6 by short, unsegmented conjunctiva (Fig. 3) ***Anteris***
- Palpal formula 4-2 (Fig. 2); female T7+8, when extruded with ovipositor, connected to T6 by long, segmented conjunctiva (Fig. 4) **2**
- 2 Metanotum visible medially and unaltered by horn of T1, or horn absent (Figs 10, 12) **3**
- Metanotum obscured medially by horn of T1 (Figs 9, 11) **4**
- 3 Metascutellum visible externally, shape variable (Fig. 12) ***Paridris***
- Metascutellum not visible externally (Fig. 10) ***Probaryconus***
- 4 Lateral ocellus remote from inner orbit, separated by distance of at least one ocellar diameter (Fig. 11) ***Paridris***
- Lateral ocellus contiguous with inner orbit or separated by distance less than one ocellar diameter (Fig. 10) ***Probaryconus***

Diagnosis of *nephta* species group

The *P. nephta* species group can be separated from the remainder of *Paridris* by the combination of the following characters: occipital carina reaching base of mandible; mesoscutal suprahumeral sulcus absent mesal to notaulus; scutoscutellar and posterior scutellar sulci comprised of deep cells; metascutellum bispinose, glabrous; mesepisternum below femoral groove with coarse rugose sculpture; paracoxal and metapleural sulci not fused in dorsal half of metapleuron (Fig. 32); posterior margin of metapleuron with triangular point above metapleural sulcus; propodeum coarsely punctate rugose; plica indistinguishable or poorly distinguished from background sculpture of propodeum; anterior T2 without transverse carina; T6 evenly rounded, without dense microsculpture; felt field on S2 punctate, present throughout length of sternite.

Sexual dimorphism combined with the small number of males prevented us from associating males with females for all but two species, *P. mystax* and *P. nephta*. Consequently, only females are treated in the key and descriptions. Males for *P. mystax* and *P. nephta* have been entered as determined material, but not as paratypes for *P. mystax*. Four other male morphotypes have been imaged and can be found online at specimage.osu.edu and www.morphbank.net^{8,9,10,11}.

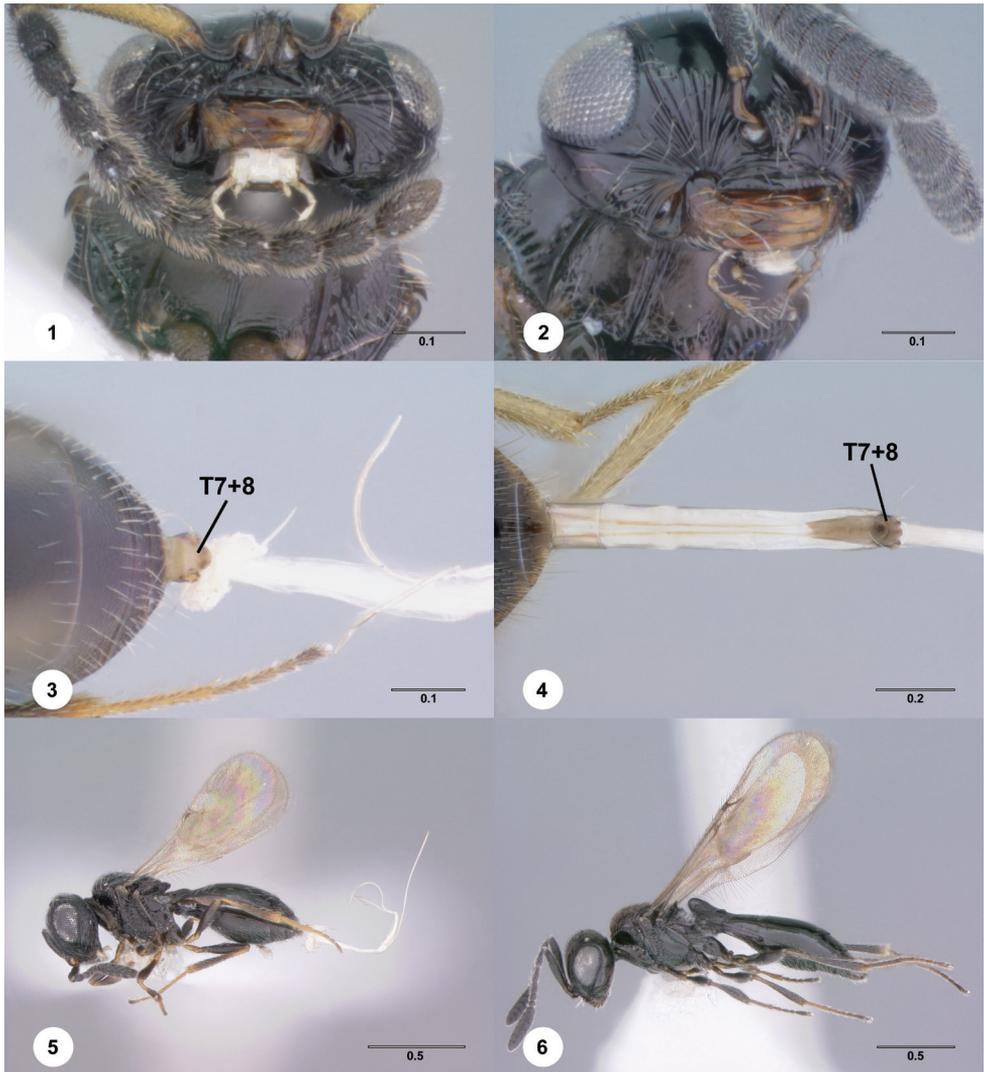
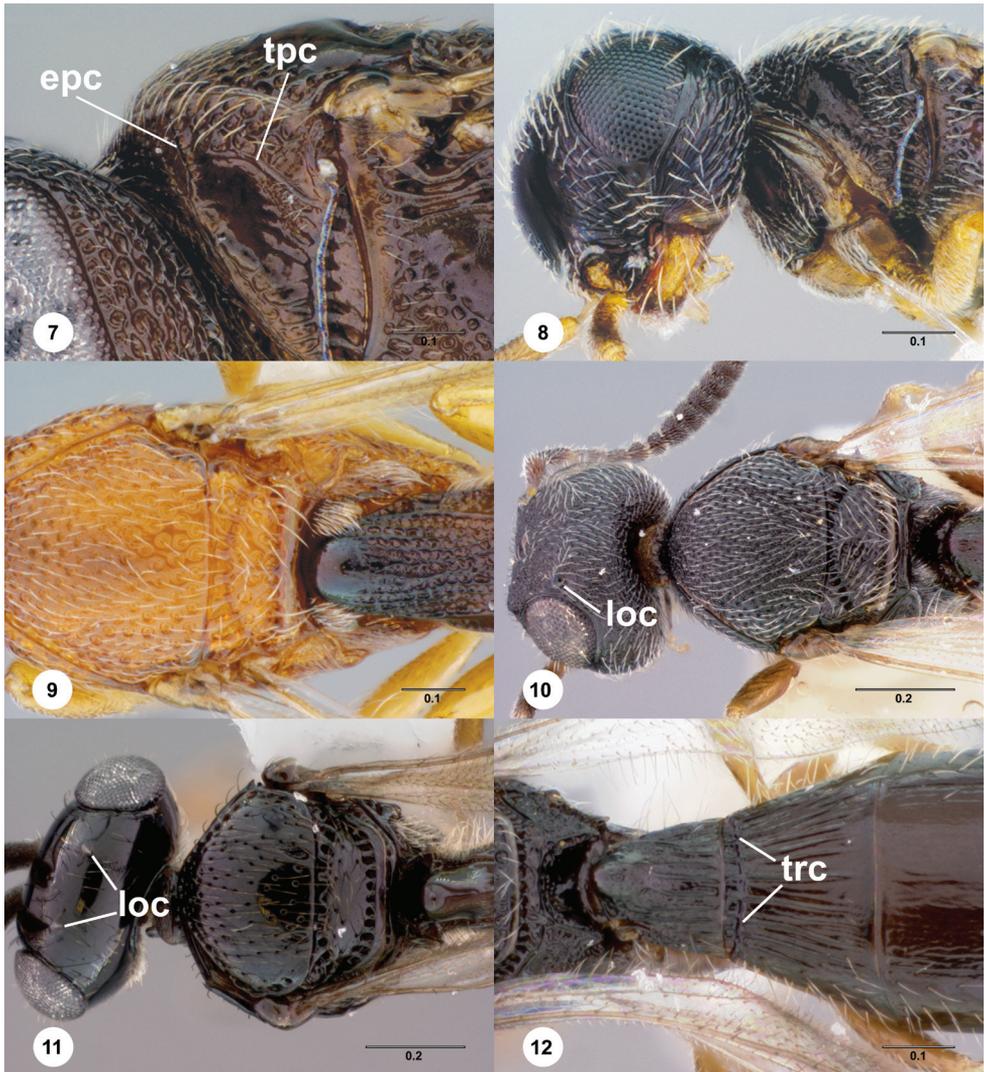


Figure 1–6.⁶² **1** *Anteris* sp., head, mouthparts, ventral view, male (OSUC 241115) **2** *Paridris* sp., head, mouthparts, anteroventral view, female (OSUC 190976) **3** *Anteris* sp., T5–T7, ovipositor, female (OSUC 261917) **4** *Paridris nilaka*, T6–T7, ovipositor, female (OSUC 266165) **5** *Anteris* sp., lateral habitus, female (OSUC 261917) **6** *Paridris* sp., lateral habitus, female (OSUC 191490). Scale bar in millimeters.

Key to females of the *Paridris nephta* species group (a Lucid key is included as a Appendix II).

- 1 Brachypterous, forewing not reaching apex of metasoma in repose (Figs 31, 33, 67, 69).....**2**
- Macropterous, forewing extending beyond apex of metasoma in repose.....**3**

- 2 A7 with basiconic sensillum (Fig. 14); sculpture of T3 reduced medially (Fig. 33); metapleural sulcus simple dorsally (Fig. 36) *Paridris ferus* Talamas, sp. n.
- A7 without basiconic sensillum (Fig. 13); sculpture of T3 not reduced medially (Fig. 72); metapleural sulcus foveolate dorsally (Fig. 68) *Paridris reptilis* Talamas, sp. n.
- 3 Ventral clypeal margin edentate (Fig. 89); T3 covered in finely reticulate microsculpture (Fig. 90) *Paridris teres* Talamas, sp. n.
- Ventral clypeal margin serrate (Figs 53, 101, 107); sculpture of T3 variable ... 4
- 4 Ventral metapleural area entirely setose (Fig. 50); frons densely setose ventrolaterally (Fig. 53); head and metasoma black (Fig. 49) *Paridris mystax* Talamas, sp. n.
- Ventral metapleural area with glabrous area (Fig. 62); frons moderately to sparsely setose ventrolaterally (Fig. 107); body color variable 5
- 5 Notaulus absent or indicated only at posterior margin of mesoscutum (Figs 22, 106) 6
- Notaulus present through posterior half of mesoscutum, usually reaching mesoscutal suprahumeral sulcus as smooth furrow or row of punctures (Figs 58, 76) 8
- 6 T1–T5, S3 with microsculpture throughout (Figs 17, 102); T3 evenly reticulate in medial third (Fig. 102) *Paridris verrucosus* Talamas, sp. n.
- Metasoma without microsculpture (Figs 18, 105); T3 longitudinally strigose (Figs 12, 105) 7
- 7 Frons immediately below median ocellus smooth (Fig. 23); axillular carina rounded dorsally (Fig. 16); S3 with longitudinal striae (Fig. 18) *Paridris atrox* Talamas, sp. n.
- Frons immediately below median ocellus rugose, with setigerous foveae (Fig. 107); axillular carina pointed dorsally (Fig. 15); S3 without longitudinal striae *Paridris yak* Talamas, sp. n.
- 8 A7 with basiconic sensillum (Fig. 14) 9
- A7 without basiconic sensillum (Fig. 13) 10
- 9 R1 (postmarginal vein) distinctly shorter than r-rs (stigmal vein) (Fig. 109); T3 smooth with weakly impressed longitudinal striae laterally (Fig. 30), microsculpture absent; punctuation of head fine (Fig. 29) *Paridris bunun* Talamas, sp. n.
- R1 (postmarginal vein) about as long as r-rs (stigmal vein) (Fig. 111); T3 with prominent longitudinal strigae laterally, often strigose throughout, microsculpture usually present (Fig. 48); punctuation of head variable, often coarse (Fig. 47) *Paridris minor* Talamas, sp. n.
- 10 Mesoscutellum punctate, interspaces between punctures smooth and usually broad (Figs. 58, 82) 11
- Mesoscutellum rugulose to areolate (Figs 40, 63, 76, 94) 12



Figures 7–12.⁶³ **7** *Probaryconus* sp., pronotum, lateral view, female (OSUC 146809) **8** *Probaryconus* sp., head and pronotum, female (OSUC 58741) **9** *Probaryconus* sp., mesosoma and T1, dorsal view, female (OSUC 404933) **10** *Probaryconus rufipes* (Kieffer), head and mesosoma, dorsal view, female (OSUC 396820) **11** *Paridris* sp., head, mesosoma, T1, dorsal view, female (OSUC 262120) **12** *Paridris* sp., metascutellum, propodeum, T1–T2, dorsal view, female (OSUC 265183). Scale bar in millimeters.

- 11 Frons evenly striate throughout, striae directly above interantennal process sometimes effaced (Fig. 59); interstitial punctation on frons very fine (Fig. 59)..... *Paridris nephta* (Kozlov)

- Frons directly below median ocellus coarsely strigose to rugose; frons always with smooth area above interantennal process; interstitial punctation on frons coarse (Fig. 83) *Paridris solaris* Talamas, sp. n.
- 12 Frons evenly striate throughout, with microsculpture present interstitially (Fig. 41).....*Paridris kagemono* Talamas, sp. n.
- Striae of frons, if present, not uniform throughout, microsculpture absent (Figs 65, 77, 95) **13**
- 13 Pronotum with uniform, fine, white setae along transverse pronotal carina (Fig. 66); body dark brown to black (Fig. 61)
..... *Paridris nilaka* Talamas, sp. n.
- Pronotum with dark, bristlelike setae along transverse pronotal carina (Figs 77, 94); body color variable **14**
- 14 Pronotum below transverse pronotal carina mostly smooth, with sparse rugulae (Fig. 77) *Paridris rugulosus* Talamas, sp. n.
- Pronotum below transverse pronotal carina densely punctate (as in Fig. 66)....
..... *Paridris toketoki* Talamas, sp. n.

***Paridris atrox* Talamas, sp. n.**

urn:lsid:zoobank.org:pub:BCD3BD6E-5E29-447F-AEB6-176C19EEF3E8

urn:lsid:biosci.ohio-state.edu:osuc_concepts:275737

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

Figures 16, 19–24; Morphbank¹²

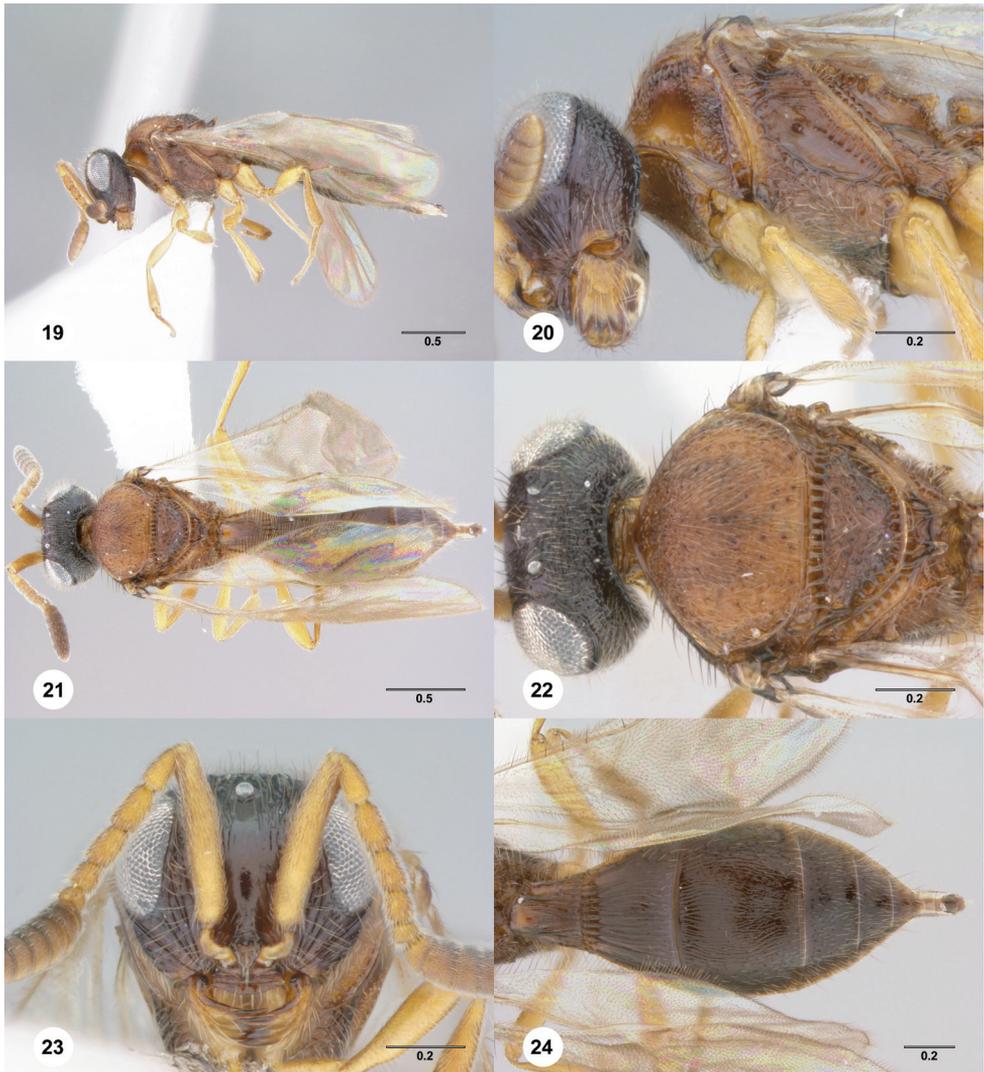
Description. Female body length: 2.73 mm (n=1). Color of head: reddish brown. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose laterally. Microsculpture of frons: absent. Sculpture of posterior vertex: irregularly rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs. Notaulus: absent. Color of mesosoma: variably orange to brown. Sculpture of mesoscutum medially: areolate rugulose. Sculpture of mesoscutellum: areolate rugulose. Dark bristlelike setae along transverse pronotal carina: present. Sculpture ventral of transverse pronotal carina: rugulose posteriorly. Sculpture of femoral groove: striate below mesopleural pit. Sculpture of ventral half of posterior mesepimeral area: rugulose. Fine setigerous punctures on dorsal half of posterior mesepimeral area: absent. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.



Figures 13–18.⁶⁴ **13** *Paridris nilaka*, sp. n., antennal clava, ventral view, female (OSUC 334247) **14** *Paridris minator*, sp. n., antennal clava, ventral view, female holotype (OSUC 237531) **15** *Paridris yak*, sp. n., scuto-axillary complex, lateral view, female holotype (OSUC 237530) **16** *Paridris atrox*, sp. n., scuto-axillary complex, lateral view, female holotype (OSUC 241473) **17** *Paridris verrucosus*, sp. n., S2–S3, ventrolateral view, female holotype (OSUC 334249) **18** *Paridris atrox*, sp. n., S3, ventrolateral view, female holotype (OSUC 241473). Scale bars in millimeters.

Color of metasoma: reddish brown. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly rugulose. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: absent.



Figures 19–24.⁶⁵ *Paridris atrox* sp. n., female holotype (OSUC 241473) **19** Lateral habitus **20** Head and mesosoma, lateral view **21** Dorsal habitus **22** Head and mesosoma, dorsal view **23** Head, anterior view **24** Metasoma, dorsal view. Scale bars in millimeters.

Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: weakly longitudinally strigose.

Diagnosis. *Paridris atrox* may be separated from the other members of the *P. nephta* species group by the absence of notauli and the presence of striation on S3.

Etymology. *Paridris atrox* is named for the severe appearance of its head, its mandibles in particular. The specific epithet is adjectival, and means “fearsome” in Latin.

Link to Distribution Map.¹³

Material Examined. Holotype, female: **CHINA:** Yunnan Prov., Baoshan City, 28 km (air)SE Tengyue (Teng Chong), pass over Gaoligong Mts., clearing / natural forest, Luoshuidong, 24°57'N 98°45'E, 2300m, 26.X–31.X.1998, flight intercept trap, C. Griswold, D. Kavanaugh & C. L. Long, OSUC 241473 (deposited in IZCAS).

***Paridris bunun* Talamas, sp. n.**

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urn:lsid:biosci.ohio-state.edu:osuc_concepts:273886

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

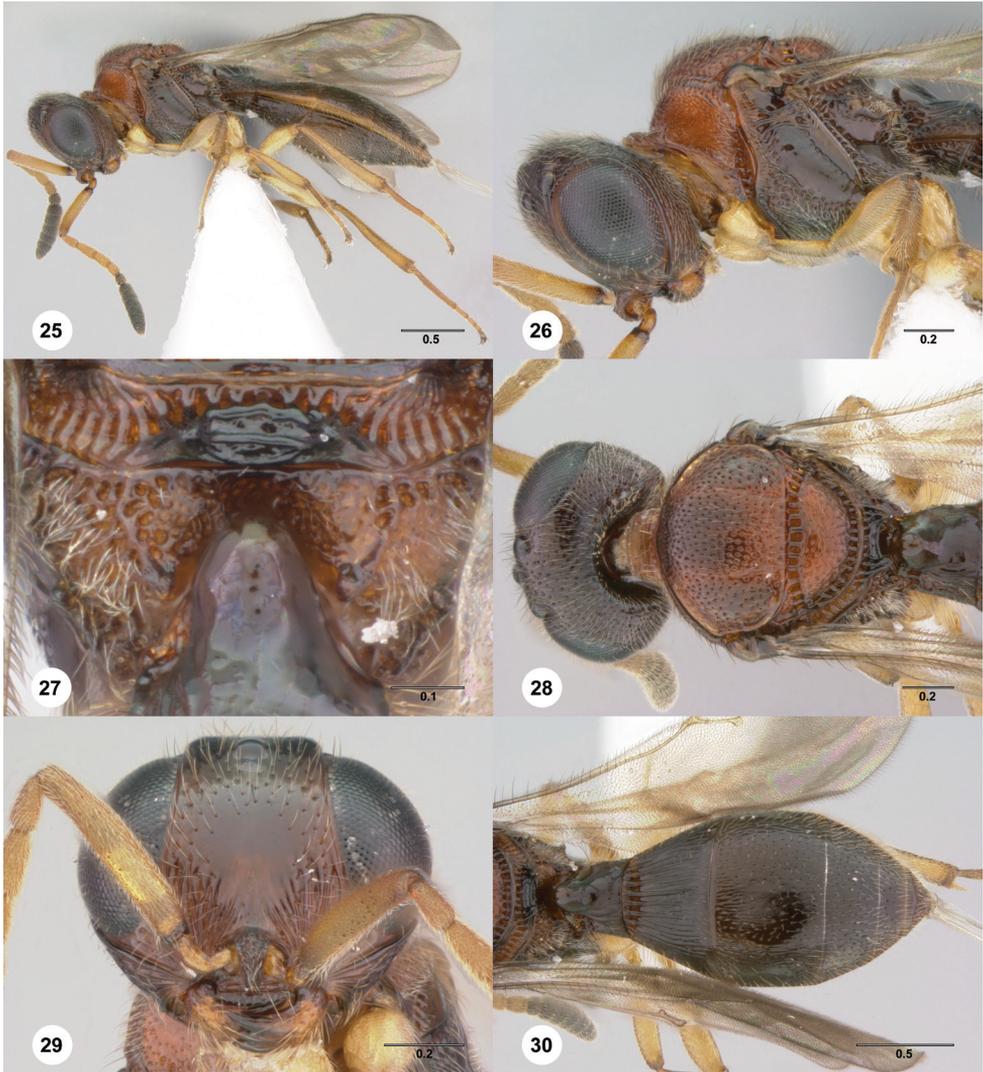
Figures 25–30; Morphbank¹⁴

Description. Female body length: 3.41 mm (n=1). Color of head: dark red, becoming darker dorsally. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose laterally. Microsculpture of frons: absent. Sculpture of posterior vertex: finely punctate. Sculpture of gena: densely and finely punctate. Basiconic sensillum on A7: present.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: less than r-rs. Notaulus: present in posterior half of mesoscutum. Color of mesosoma: variably red to black. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: densely punctate. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present along anterior half of femoral groove. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

Color of metasoma: reddish brown. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: absent. Macrosculpture of T3 laterally: weakly longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly longitudinally strigose. Punctuation of T4: sparse in medial third, moderately dense laterally. Macrosculpture of T5: absent. Punctuation of T5: absent in medial third, moderately dense laterally. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris bunun* is most similar to *P. minorator*, though the two have widely disjunct distributions, Taiwan and Southeast Asia, respectively. The two may be separated by the medially smooth T3 and short R1 (postmarginal vein) of *P. bunun* and the longer setation of the body in *P. minorator*. *P. bunun* is a much larger species than *P. minorator*, but it is known from a single specimen and thus we are not able to assess its size variation. Some species of the *P. nephta* group are known to exhibit significant size variation (e.g. *P. nilaka*) and thus size should be used cautiously.



Figures 25–30.⁶⁶ *Paridris bunun* sp. n., female holotype (OSUC 262237) **25** Lateral habitus **26** Head and mesosoma, lateral view **27** Propodeum, posterodorsal view **28** Head and mesosoma, dorsal view **29** Head, anterior view **30** Metasoma, dorsal view. Scale bars in millimeters.

Etymology. The species is named for the Bunun tribe of Taiwan that historically occupied the region where it was collected. The name is treated as a noun in apposition.

Link to Distribution Map.¹⁵

Material Examined. Holotype, female: **TAIWAN:** Taiwan Prov., Pingtung Co., T'eng-chih (Tengchi) Medium-Altitude Experiment Station, 23°05.75'N 120°47.37'E, 1660m, 3.VI–5.VI.2008, yellow pan trap, L. Masner, OSUC 262237 (deposited in CNCI).

***Paridris ferus* Talamas, sp. n.**

urn:lsid:zoobank.org:act:6B7296C1-4E71-4A35-B937-ABB1949B7DBE

urn:lsid:biosci.ohio-state.edu:osuc_concepts:241281

http://species-id.net/wiki/Paridris_ferusFigures 31–36; Morphbank¹⁶

Description. Female body length: 2.89 mm (n=1). Color of head: black throughout. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally striate throughout. Microsculpture of frons: absent. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: dorsoventrally strigose. Basiconic sensillum on A7: present.

Wings: brachypterous, apex of forewing ending before T4. Notaulus: percurrent. Color of mesosoma: variably orange to brown. Sculpture of mesoscutum medially: densely punctate, with longitudinal rugae in posterior half. Sculpture of mesoscutellum: smooth along midline, otherwise punctate rugulose. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present along anterior half of femoral groove. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: dense. Color of legs: pale brown throughout.

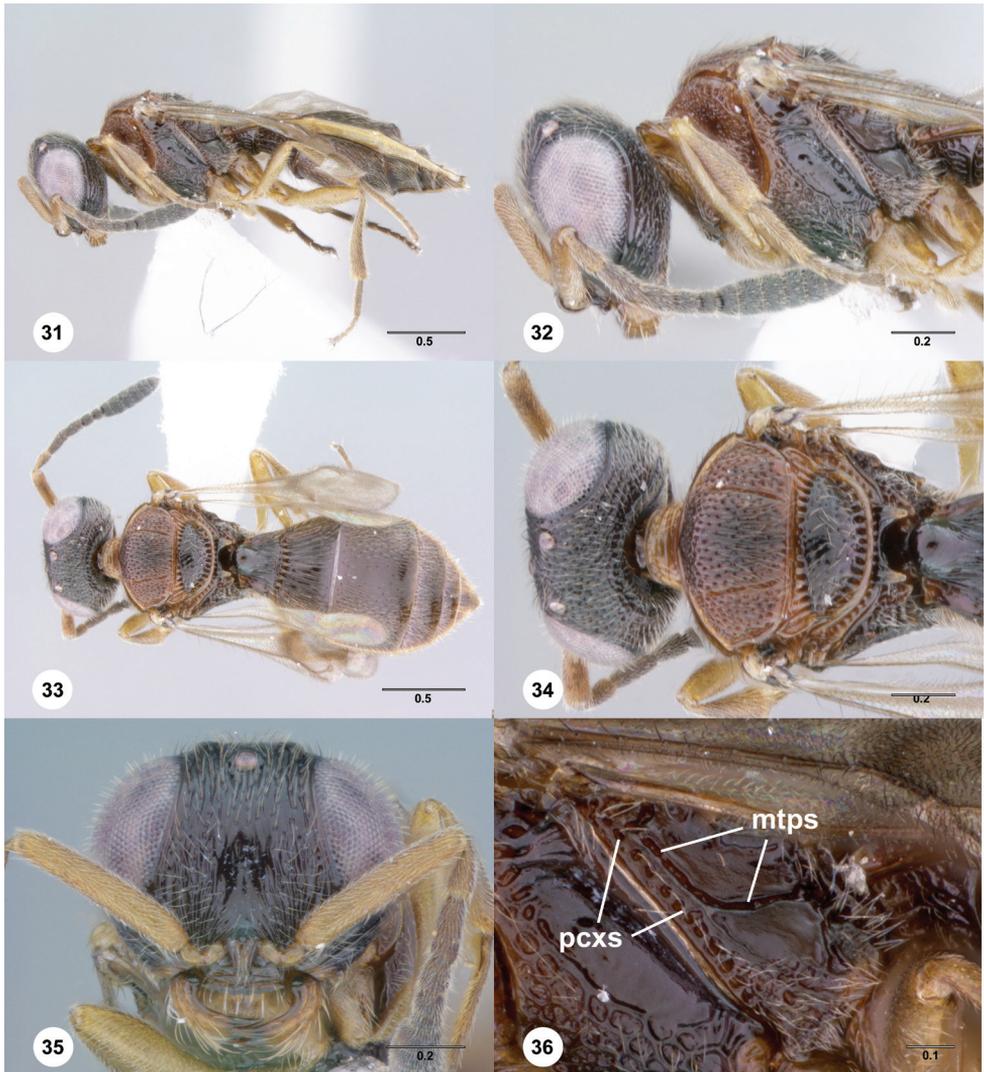
Color of metasoma: orange to brown. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: absent. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: absent. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: absent. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: longitudinally strigose.

Diagnosis. *Paridris ferus* and *P. reptilis* are the only brachypterous species known in the *P. nephta* group. Aside from this character, these two species are not particularly similar and may be separated by the presence of a basiconic sensillum on A7, the smooth form of the metapleural sulcus and longitudinal striation of S3 in *P. ferus*.

Etymology. The adjectival epithet “ferus” means “wild” or “untamed” in Latin and refers to the “savage” appearance of this species.

Link to Distribution Map.¹⁷

Material Examined. Holotype, female: **THAILAND:** Chiang Mai Prov., summit forest, T178, Doi Inthanon National Park, 18°35.361'N 98°29.157'E, 2500m, 9.VIII–16.VIII.2006, malaise trap, Y. Areeluck, OSUC 192426 (deposited in QSBG).



Figures 31–36.⁶⁷ *Paridris ferus* sp. n., female holotype (OSUC 192426) **31** Lateral habitus **32** Head and mesosoma, lateral view **33** Dorsal habitus **34** Head and mesosoma, dorsal view **35** Head, anterior view **36** Metapleuron, lateral view. Scale bars in millimeters.

***Paridris kagemono* Talamas, sp. n.**

urn:lsid:zoobank.org:act:59410F97-5DD7-4E7E-A7C3-2F25DD7665AE

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273916

http://species-id.net/wiki/Paridris_kagemonoFigures 37–42; Morphbank¹⁸

Description. Female body length: 2.65 mm (n=1). Color of head: dark orange, becoming brown at vertex. Ventral clypeal margin: serrate. Sculpture of frons medially: dorsoventrally striate. Sculpture of frons immediately ventral of median ocellus: dorsoventrally striate throughout. Microsculpture of frons: present. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: less than r-rs. Notaulus: percurrent. Color of mesosoma: orange throughout. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: punctate rugulose throughout. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: punctate rugulose. Sculpture of femoral groove: striate below mesopleural pit. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: absent. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

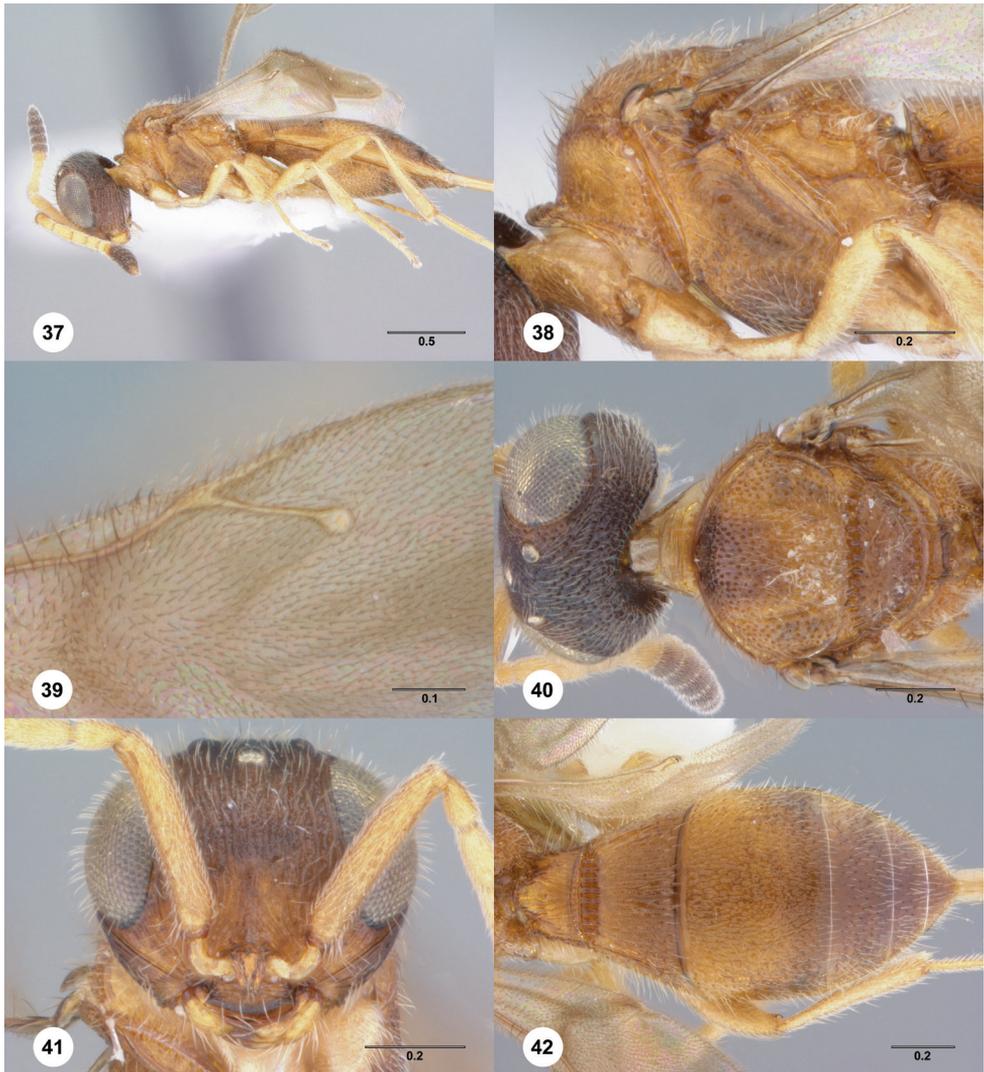
Color of metasoma: orange throughout. Horn of T1: absent. Microsculpture of T2: present. Microsculpture on T3: present. Macrosculpture of T3 medially: reticulate rugose. Macrosculpture of T3 laterally: reticulate rugose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly rugulose. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: absent. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris kagemono* is most similar to *P. nephta*. It may be separated from it, and all other members of the *P. nephta* species group, by the presence of microsculpture between the striae of the frons.

Etymology. The epithet “kagemono” means “supernatural creature of the night” in Japanese. It is used as a noun in apposition.

Link to Distribution Map.¹⁹

Material Examined. Holotype, female: **JAPAN:** Fukuoka Pref., Kyushu Isl., primary evergreen forest, Mount Tachibana, 1.VII–6.VII.1979, yellow pan trap, K. Yamagishi, OSUC 262193 (deposited in CNCI).



Figures 37–42.⁶⁸ *Paridris kagemono* sp. n., female holotype (OSUC 262193) **37** Lateral habitus **38** Mesosoma, lateral view **39** Forewing, dorsal view **40** Head and mesosoma, dorsal view **41** Head, anterior view **42** Metasoma, dorsal view. Scale bars in millimeters.

***Paridris minator* Talamas, sp. n.**

urn:lsid:zoobank.org:act:6A07840D-7470-4B42-89E2-7012B99C6C8F

urn:lsid:biosci.ohio-state.edu:osuc_concepts:241284

http://species-id.net/wiki/Paridris_minatorFigures 14, 43–48; Morphbank²⁰

Description. Female body length: 2.27–2.53 mm (n=9). Color of head: uncertain, reddish brown. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout; rugose. Microsculpture of frons: absent. Sculpture of posterior vertex: finely punctate; punctate rugulose. Sculpture of gena: punctate rugulose; densely and finely punctate. Basiconic sensillum on A7: present.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs; longer than r-rs. Notaulus: percurrent. Color of mesosoma: variably red to black. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: densely punctate. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: pale brown throughout; yellow throughout.

Color of metasoma: dark brown to black throughout; reddish brown. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: present. Macrosculpture of T3 medially: reticulate; longitudinally strigose; weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly rugulose; absent. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: absent. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris minator* is similar to *P. solaris* in size, habitus and distribution and to *P. bunun* in its diagnostic characters. It is best separated from *P. solaris* by the presence of a basiconic sensillum on A7 and from *P. bunun* by the coarse punctuation of the head and prominent striae of lateral T3.

Etymology. The Latin epithet “minator” means “threatener” and is given to this species for its fierce appearance.

Link to Distribution Map.²¹

Material Examined. Holotype, female: **THAILAND:** Chiang Mai Prov., checkpoint 2, T73, Doi Inthanon National Park, 18°31.559'N 98°29.941'E, 1700m,



Figures 43–48.⁶⁹ *Paridris minator* sp. n., female holotype (OSUC 237531) **43** Lateral habitus **44** Head and mesosoma, lateral view **45** Dorsal habitus **46** Head and mesosoma, dorsal view **47** Head, anterior view **48** Metasoma, dorsal view. Scale bars in millimeters.

15.VII–22.VII.2006, malaise trap, Y. Areeluck, OSUC 237531 (deposited in QSBG).
Paratypes: (8 females) **LAOS**: 1 female, OSUC 334241 (CNCI). **THAILAND**: 7 females, OSUC 262239, 334245, 396845 (CNCI); OSUC 334205 (OSUC); OSUC 334005, 334215, 334246 (QSBG).

***Paridris mystax* Talamas, sp. n.**

urn:lsid:zoobank.org:act:67E77FD7-4ECC-494F-B7B0-497E4B82AB59

urn:lsid:biosci.ohio-state.edu:osuc_concepts:241282

http://species-id.net/wiki/Paridris_mystaxFigures 49–54, 111; Morphbank²²

Description. Female body length: 2.53–3.26 mm (n=20). Color of head: black throughout. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout. Microsculpture of frons: absent. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs; less than r-rs. Notaulus: percurrent. Color of mesosoma: orange to dark red anteriorly, brown posteriorly, mesoscutellum black. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: punctate rugulose throughout; smooth along midline, otherwise punctate rugulose. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth; striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present along anterior half of femoral groove. Setation of ventral metapleural area: present throughout. Setation of metapleural triangle: dense. Color of legs: yellow throughout.

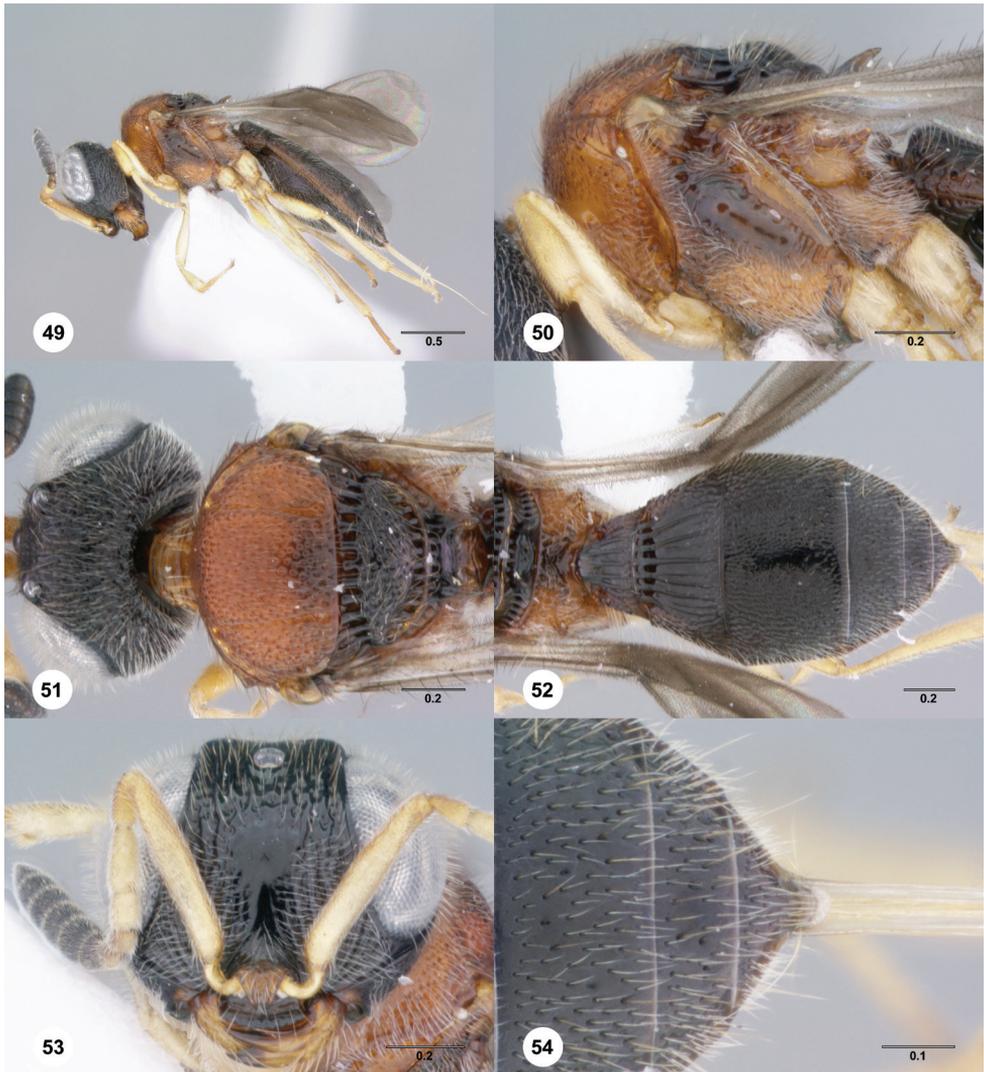
Color of metasoma: orange to black. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: present. Macrosculpture of T3 medially: reticulate; absent. Macrosculpture of T3 laterally: reticulate rugose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: dense throughout; moderately dense throughout. Macrosculpture of T5: weakly rugulose laterally; absent. Punctuation of T5: dense throughout; moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris mystax* is one of the most distinctive species and can be easily identified by the dense setation throughout the ventral metapleural area and on the ventrolateral frons.

Etymology. The epithet “mystax”, meaning “hair on the upper lip” in Greek, is given to this species for the conspicuous setation of the ventral frons.

Link to Distribution Map.²³

Material Examined. Holotype, female: **THAILAND:** Loei Prov., Pong Neep Forest Unit, dry evergreen forest, T783, Phu Kradung National Park, 16°56.589'N 101°42.074'E, 273m, 14.X–21.X.2006, malaise trap, S. Glong-lasae, OSUC 237667 (deposited in QSBG). *Paratypes:* (19 females) **LAOS:** 1 female, OSUC 265072 (CNCI). **THAILAND:** 18 females, OSUC 396840–396841, 396846 (CNCI); OSUC



Figures 49–54.⁷⁰ *Paridris mystax* sp. n. **49** Lateral habitus, female holotype (OSUC 237667) **50** Mesosoma, lateral view, female holotype (OSUC 237667) **51** Head and mesosoma, dorsal view, female holotype (OSUC 237667) **52** Metasoma, dorsal view, female (OSUC 262229) **53** Head, anterior view, female (OSUC 237533) **54** T4–T6, dorsal view, female holotype (OSUC 237667). Scale bars in millimeters.

254570, 254594–254595, 334210, 381817, 396837 (OSUC); OSUC 237533, 254569, 265198–265199, 334209, 334224–334226, 334228 (QSBG). *Other material:* **THAILAND:** 18 males, OSUC 181202, 181292, 237529, 396844, 396847 (CNCI); OSUC 254552, 265200, 334208, 334211, 334216 (OSUC); OSUC 237666, 261871, 265201, 266164, 334202–334203, 334212, 334227 (QSBG).

***Paridris nephta* (Kozlov)**

urn:lsid:zoobank.org:act:C8471114-0E15-44FB-BFA4-2FE3A0E7EAE8

urn:lsid:biosci.ohio-state.edu:osuc_concepts:243854

http://species-id.net/wiki/Paridris_nephtaFigures 55–60; Morphbank²⁴

Tuora nephta Kozlov, 1976: 98 (original description); Kozlov & Kononova, 1990: 263 (description of male and female); Kononova, 1995: 86 (keyed).

Paridris nephta (Kozlov): Kononova & Kozlov, 2008: 279, 281 (description, keyed, generic transfer).

Description. Female body length: 2.53–3.10 mm (n=20). Color of head: dark brown to black. Ventral clypeal margin: serrate. Sculpture of frons medially: dorsoventrally striate. Sculpture of frons immediately ventral of median ocellus: dorsoventrally striate throughout. Microsculpture of frons: absent. Sculpture of posterior vertex: densely punctate. Sculpture of gena: finely punctate strigose; irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs; less than r-rs. Notaulus: percurrent. Color of mesosoma: variably orange to brown. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: densely punctate. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: striate below mesopleural pit. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: sparse. Color of legs: yellow throughout.

Color of metasoma: orange to brown. Horn of T1: bulge smooth, at least anteriorly; present as a small bulge. Microsculpture of T2: present. Microsculpture on T3: present. Macrosculpture of T3 medially: reticulate rugose. Macrosculpture of T3 laterally: reticulate rugose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: dense throughout. Macrosculpture of T5: absent. Punctuation of T5: dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent; weakly longitudinally strigose.

Diagnosis. *Paridris nephta* is best distinguished by the uniform striation of the frons below the median ocellus, absence of microsculpture on the head and the smooth interspaces of the mesoscutellum. Color patterns are highly variable in this species and should be avoided entirely for identification.

Link to Distribution Map.²⁵

Material Examined. *Other material:* (129 females, 95 males) **JAPAN:** 73 females, 71 males, OSUC 181186–181189, 181191–181196, 181203–181209, 181213–181214, 181216–181218, 181221, 262145–262186, 262194–262199, 262225–262233, 262240–262247, 265063–265068, 265070–265071, 265073–265085,



Figures 55–60.⁷¹ *Paridris nephta* **55** Lateral habitus, female (OSUC 265087) **56** Head and mesosoma, lateral view, female (OSUC 265087) **57** Dorsal habitus, female (OSUC 265150). **58**, Head and mesosoma, dorsal view, female (OSUC 262229) **59** Head, anterolateral view, female (OSUC 143437) **60** Metasoma, dorsal view, female (OSUC 265195). Scale bars in millimeters.

265087–265089, 265093–265099, 265122–265132, 265134, 265139–265145, 265150–265152, 265155, 265195–265196 (CNCI). **RUSSIA:** 3 females, 3 males, OSUC 143437, 241513, 241655–241657, 404916 (OSUC). **SOUTH KOREA:** 53 females, 21 males, OSUC 181190, 181197, 181210, 181215, 181222–181225, 262187–262192, 262210–262219, 262221–262224, 262234, 262248–262258, 262260–262262, 265069, 265100–265121, 265136–265138, 265146–265149, 265197 (CNCI).

***Paridris nilaka* Talamas, sp. n.**

urn:lsid:zoobank.org:act:EC0F912C-9AA2-4401-9251-4906A7B2BD1A

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273890

http://species-id.net/wiki/Paridris_nilakaFigures 13, 61–66, 109; Morphbank²⁶

Description. Female body length: 2.60–4.00 mm (n=7). Color of head: black throughout. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout; rugose. Microsculpture of frons: absent. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: punctate rugulose. Basiconic sensillum on A7: absent.

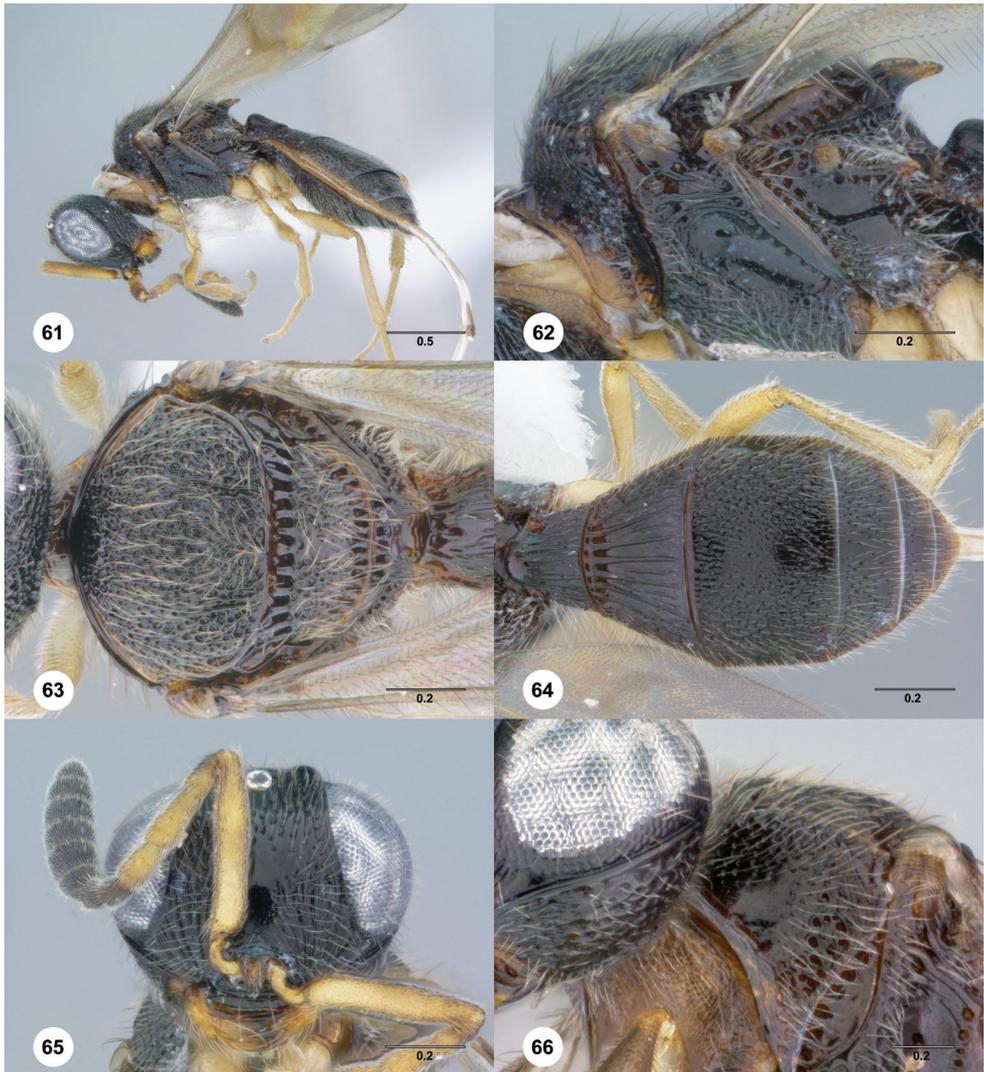
Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: less than r-rs. Notaulus: percurrent. Color of mesosoma: dark brown to black. Sculpture of mesoscutum medially: densely punctate, with longitudinal rugae in posterior half; areolate rugulose. Sculpture of mesoscutellum: punctate rugulose throughout. Dark bristle-like setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth; striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present along anterior half of femoral groove. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: dense. Color of legs: yellow throughout.

Color of metasoma: dark brown to black throughout. Horn of T1: bulge smooth, at least anteriorly; absent. Microsculpture of T2: absent. Microsculpture on T3: present. Macrosculpture of T3 medially: weakly longitudinally strigose. Macrosculpture of T3 laterally: reticulate rugose; longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: sparse along midline, otherwise dense; dense throughout; moderately dense throughout. Macrosculpture of T5: absent; rugulose laterally. Punctuation of T5: dense throughout; sparse medially, dense laterally. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. The rugulose sculpture of the dorsal mesoscutum and mesoscutellum in *P. nilaka* is shared with *P. rugulosus* and *P. toketoki*; it may be separated from both by the dense, fine setation of the pronotal shoulder. Additionally, the typically black color of the body may be useful for identification, but should be used with caution given the color plasticity seen in many species.

Etymology. The epithet “nilaka” means “black” in Thai, and is used as a noun in apposition.

Link to Distribution Map.²⁷



Figures 61–66.⁷² *Paridris nilaka* sp. n. **61** Lateral habitus, female holotype (OSUC 266165) **62** Mesosoma, lateral view, female holotype (OSUC 266165) **63** Mesosoma, dorsal view, female (OSUC 254613). **64**, Metasoma, dorsal view, female holotype (OSUC 266165) **65** Head, anterior view, female holotype (OSUC 266165) **66** Pronotum, anterolateral view, female (OSUC 334223). Scale bars in millimeters.

Material Examined. Holotype, female: **THAILAND:** Chiang Mai Prov., checkpoint 2, T1909, Doi Inthanon National Park, 18°31.554'N 98°29.940'E, 1700m, 14.XI–15.XI.2006, pan trap, Y. Areeluck, OSUC 266165 (deposited in QSBG). *Paratypes:* **THAILAND:** 6 females, OSUC 334247 (CNCI); OSUC 254613, 381811 (OSUC); OSUC 334223, 334295, 396843 (QSBG).

***Paridris reptilis* Talamas, sp. n.**

urn:lsid:zoobank.org:act:519CC4FD-EC66-48EA-9652-ECB6FDF14FC9

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273878

http://species-id.net/wiki/Paridris_reptilisFigures 67–72; Morphbank²⁸

Description. Female body length: 2.35–2.40 mm (n=2). Color of head: reddish brown. Ventral clypeal margin: serrate. Sculpture of frons medially: mostly smooth with faint dorsoventral striation. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose laterally. Microsculpture of frons: absent. Sculpture of posterior vertex: irregularly rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: brachypterous, apex of forewing ending before T4. Notaulus: percurrent. Color of mesosoma: variably yellow to brown. Sculpture of mesoscutum medially: areolate rugulose. Sculpture of mesoscutellum: areolate rugulose. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: rugulose posteriorly. Sculpture of femoral groove: striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

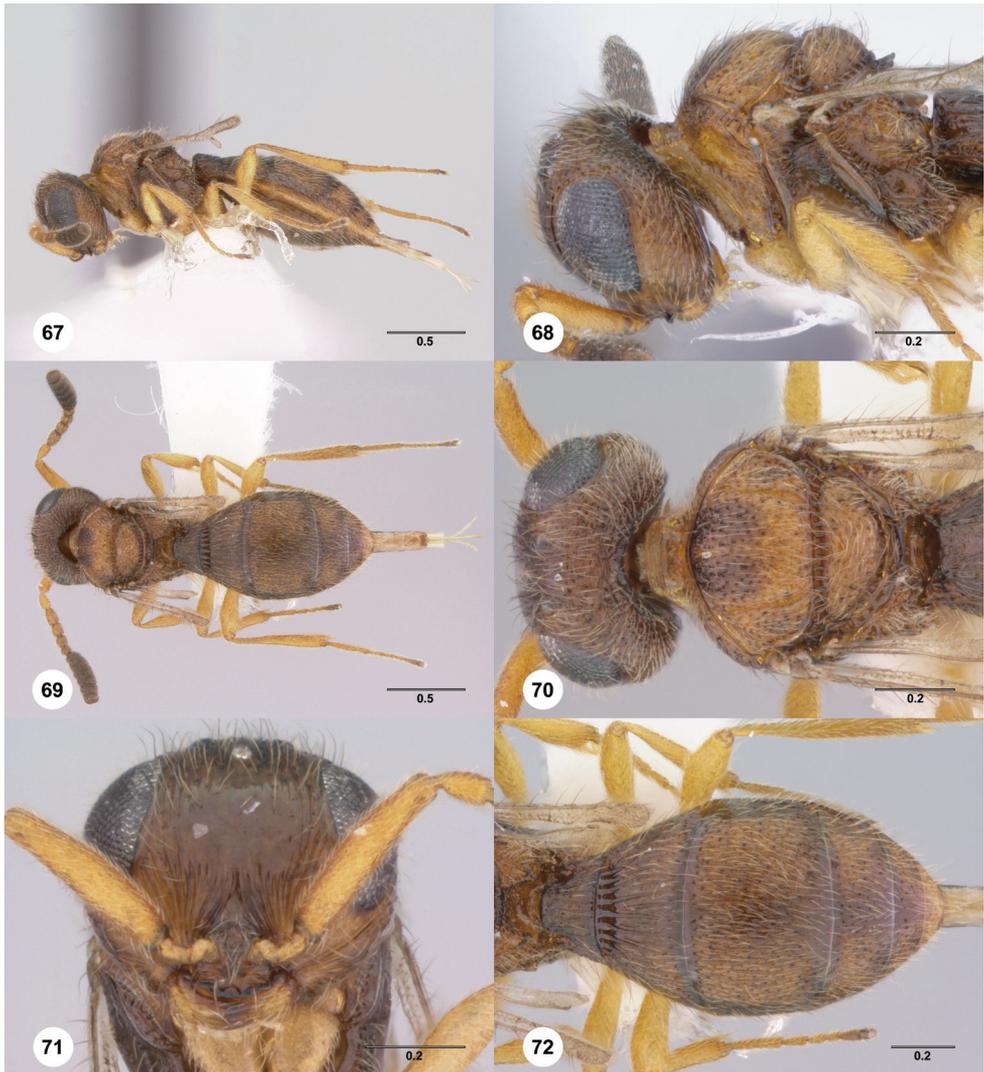
Color of metasoma: reddish brown. Horn of T1: bulge smooth, at least anteriorly; absent. Microsculpture of T2: present. Microsculpture on T3: absent. Macrosculpture of T3 medially: longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: sparse along midline, otherwise dense. Macrosculpture of T5: absent. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris reptilis* and *P. ferus* are the only known brachypterous species in the *P. nephta* group. *Paridris ferus* has a basiconic sensillum on A7 and lacks interstitial microsculpture on T2. *Paridris reptilis* does not have a sensillum on A7 and T2 is densely microsculptured.

Etymology. The adjectival epithet “reptilis”, meaning “crawling” in Latin, refers to the reduced wing size in this species.

Link to Distribution Map.²⁹

Material Examined. Holotype, female: **TAIWAN:** Taiwan Prov., Pingtung Co., Kuai-Ku Hut, T-103, Pei-ta-wu (Peitawushan) Mountain, 2125m, 26.IV–30.IV.1992, A. Smetana, OSUC 181211 (deposited in CNCI). *Paratype:* **TAIWAN:** 1 female, OSUC 265153 (CNCI).



Figures 67–72.⁷³ *Paridris reptilis* sp. n., female holotype (OSUC 181211) **67** Lateral habitus **68** Head and mesosoma, lateral view **69** Dorsal habitus **70** Head and mesosoma, dorsal view **71** Head, anterior view **72** Metasoma, dorsal view. Scale bars in millimeters.

***Paridris rugulosus* Talamas, sp. n.**

urn:lsid:zoobank.org:act:8B3B767C-6BC7-40D8-B531-9DD8ED1B57EF

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273914

http://species-id.net/wiki/Paridris_rugulosusFigures 73–78; Morphbank³⁰

Description. Female body length: 2.48–2.56 mm (n=2). Color of head: yellow, becoming darker dorsally; black throughout. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose laterally; dorsoventrally strigose throughout. Microsculpture of frons: absent. Sculpture of posterior vertex: irregularly rugulose; punctate rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs. Notaulus: percurrent. Color of mesosoma: variably yellow to brown. Sculpture of mesoscutum medially: areolate rugulose. Sculpture of mesoscutellum: punctate rugulose throughout; areolate rugulose. Dark bristlelike setae along transverse pronotal carina: present. Sculpture ventral of transverse pronotal carina: smooth. Sculpture of femoral groove: smooth; striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: absent. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: sparse. Color of legs: yellow throughout.

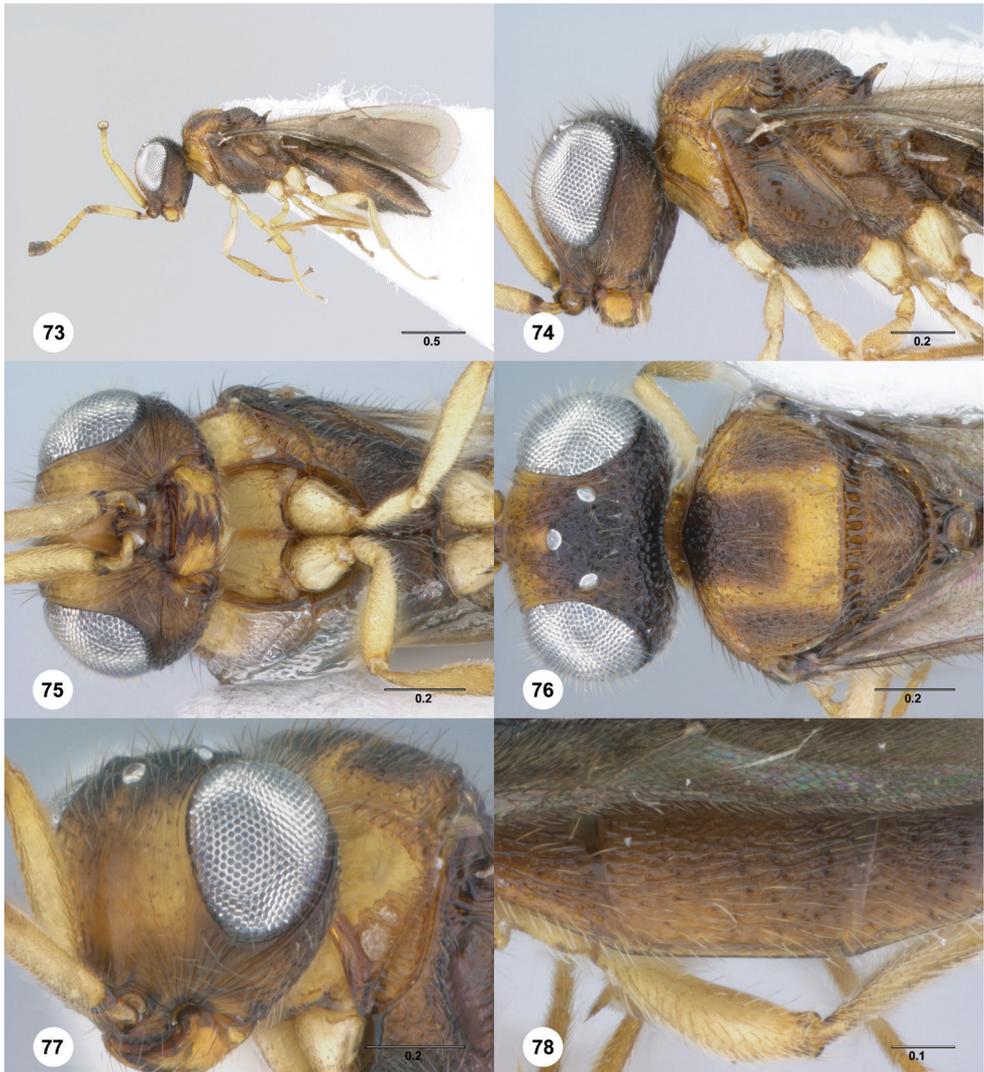
Color of metasoma: reddish brown. Horn of T1: absent. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly rugulose. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: absent. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris rugulosus* is most similar to *P. toketoki* and may be separated by the smooth surface of the lateral pronotum.

Etymology. The Latin adjectival epithet “rugulosus” refers to the rugulose sculpture of the head and dorsal mesosoma in this species.

Link to Distribution Map.³¹

Material Examined. Holotype, female: **VIETNAM:** Vinh Phuc Prov., Tam Dao, 1050–1175m, 14.VI–17.VI.2007, malaise trap, C. v. Achterberg & R. de Vries, OSUC 265238 (deposited in RMNH). *Paratype:* **LAOS:** 1 female, OSUC 262200 (CNCI).



Figures 73–78.⁷⁴ *Paridris rugulosus* sp. n., female holotype (OSUC 265238) **73** Lateral habitus **74** Head and mesosoma, lateral view **75** Head and mesosoma, ventral view **76** Head and mesosoma, dorsal view **77** Head and pronotum, anterolateral view **78** T2–T4, dorsolateral view. Scale bars in millimeters.

***Paridris solaris* Talamas, sp. n.**

urn:lsid:zoobank.org:act:B2878DA2-1E8F-4B6E-96C4-86B571C11F04

urn:lsid:biosci.ohio-state.edu:osuc_concepts:241280

http://species-id.net/wiki/Paridris_solarisFigures 79–84, 110; Morphbank³²

Description. Female body length: 1.96–3.43 mm (n=19). Color of head: reddish brown; orange throughout; dark brown to black; yellow. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout; rugose. Microsculpture of frons: absent. Sculpture of posterior vertex: finely punctate; moderately punctate; punctate rugulose. Sculpture of gena: punctate rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs; longer than r-rs. Notaulus: percurrent. Color of mesosoma: variably orange to brown; yellow throughout; orange throughout. Sculpture of mesoscutum medially: densely punctate, with longitudinal rugae in posterior half; densely punctate throughout. Sculpture of mesoscutellum: smooth medially, moderately punctate laterally; densely punctate. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth; striate in ventral end. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: dense; moderately dense; sparse. Color of legs: yellow throughout.

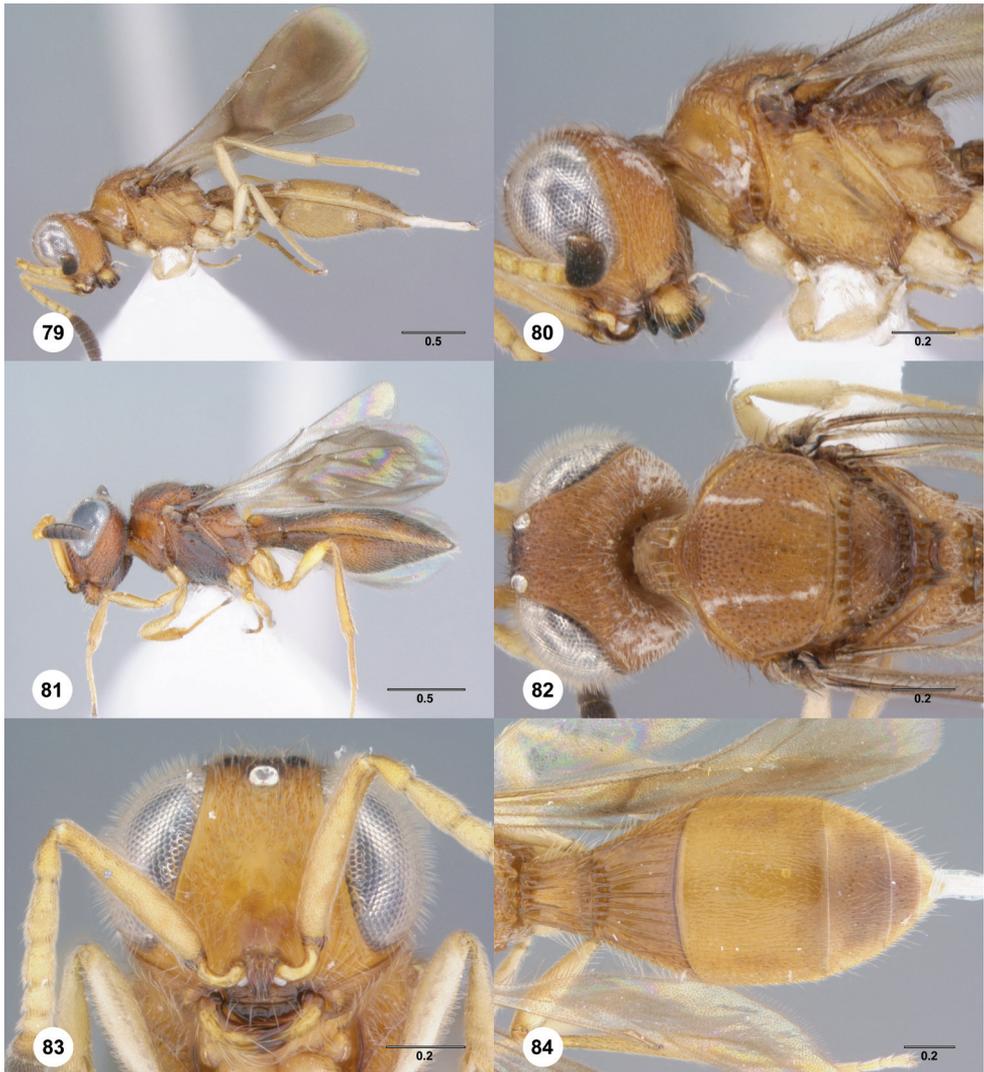
Color of metasoma: yellow; orange to brown. Horn of T1: bulge smooth, at least anteriorly; absent. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: longitudinally strigose; weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: absent. Punctuation of T4: dense throughout. Macrosculpture of T5: absent. Punctuation of T5: dense throughout; moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: weakly longitudinally strigose.

Diagnosis. *Paridris solaris* is most similar to *P. minor*. It may be separated from it by the absence of a basiconic sensillum on A7.

Etymology. The adjectival epithet “solaris” means “of the sun” in Latin and references the bright yellow-orange color present in many individuals of this species.

Link to Distribution Map.³³

Material Examined. Holotype, female: **VIETNAM:** Thua Thien-Hue Prov., ~1.5km NE along trail behind upper guesthouse, light gap / semi-tropical evergreen forest, ROM 2000512, Bach Ma National Park, 16°11'50.3"N 107°51'17.7"E, 1200m, 6.VI–17.VI.2000, malaise trap/pan trap, B. Hubley, OSUC 240944 (deposited in ROME). *Paratypes:* (21 females) **LAOS:** 3 females, OSUC 334242–334243,



Figures 79–84.⁷⁵ *Paridris solaris* sp. n. **79** Lateral habitus, female holotype (OSUC 240944) **80** Head and mesosoma, lateral view, female holotype (OSUC 240944) **81** Lateral habitus, female (OSUC 237532). **82**, Head and mesosoma, dorsal view, female holotype (OSUC 240944) **83** Head, anterior view, female (OSUC 240948) **84** Metasoma, dorsal view, female (OSUC 240946). Scale bars in millimeters.

334248 (CNCI). **THAILAND:** 5 females, OSUC 334144, 396849 (OSUC); OSUC 237532, 265212, 334207 (QSBG). **VIETNAM:** 13 females, OSUC 240940 (IEBR); OSUC 240945, 404917–404918 (OSUC); OSUC 265234–265236, 277369, 281520 (RMNH); OSUC 240946, 240948, 266180, 404919 (ROME).

Comments. The color of specimens of *P. solaris* varies significantly according to geographical location. Those from Vietnam are typically yellow throughout (Fig. 79) and those from Thailand are variably orange, red, and black (Fig. 81).

***Paridris teres* Talamas, sp. n.**

urn:lsid:zoobank.org:act:8A24D695-8FC0-4921-8885-B8FC3493FBE3

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273893

http://species-id.net/wiki/Paridris_teresFigures 85–90; Morphbank³⁴

Description. Female body length: 2.42 mm (n=1). Color of head: yellow. Ventral clypeal margin: smooth. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout. Microsculpture of frons: absent. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: punctate rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs. Notaulus: percurrent. Color of mesosoma: yellow throughout. Sculpture of mesoscutum medially: densely punctate, with longitudinal rugae in posterior half. Sculpture of mesoscutellum: smooth along midline, otherwise punctate rugulose. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

Color of metasoma: yellow. Horn of T1: absent. Microsculpture of T2: absent. Microsculpture on T3: present. Macrosculpture of T3 medially: absent. Macrosculpture of T3 laterally: absent. Microsculpture of T4: absent. Macrosculpture of T4 laterally: weakly rugulose. Punctuation of T4: dense throughout. Macrosculpture of T5: rugulose laterally. Punctuation of T5: moderately dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: weakly longitudinally strigose.

Diagnosis. *Paridris teres* may be easily identified by the smooth ventral margin of the clypeus.

Etymology. The epithet “teres”, meaning smooth in Latin, refers to the smooth margin of the clypeus and is used as a noun in apposition.

Link to Distribution Map.³⁵

Material Examined. Holotype, female: **VIETNAM:** Vinh Phuc Prov., Tam Dao, 1050–1175m, 14.VI–17.VI.2007, malaise trap, C. v. Achterberg & R. de Vries, OSUC 265237 (deposited in RMNH).

Comments. The sole specimen of this species was damaged during examination after it was imaged. The head, propleuron and forelegs are now mounted on the point separate from the remainder of the body; A7–12 of the right antenna are lost.



Figures 85–90.⁷⁶ *Paridris teres* sp. n., female holotype (OSUC 265237) **85** Lateral habitus **86** Head and mesosoma, lateral view **87** Dorsal habitus **88** Head and mesosoma, dorsal view **89** Head, anterior view **90** Metasoma, dorsal view. Scale bars in millimeters.

***Paridris toketoki* Talamas, sp. n.**

urn:lsid:zoobank.org:act:628BBEF3-C3BA-4EE4-A905-3334CBD8ED7F

urn:lsid:biosci.ohio-state.edu:osuc_concepts:273915

http://species-id.net/wiki/Paridris_toketokiFigures 91–96; Morphbank³⁶

Description. Female body length: 2.54 mm (n=1). Color of head: dark orange, becoming brown at vertex. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose laterally. Microsculpture of frons: absent. Sculpture of posterior vertex: punctate rugulose. Sculpture of gena: punctate rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: less than r-rs. Notaulus: smooth furrow incomplete, reaching supra-humeral sulcus as row of punctures. Color of mesosoma: variably orange to brown. Sculpture of mesoscutum medially: densely punctate throughout. Sculpture of mesoscutellum: punctate rugulose throughout. Dark bristlelike setae along transverse pronotal carina: present. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present along anterior half of femoral groove. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

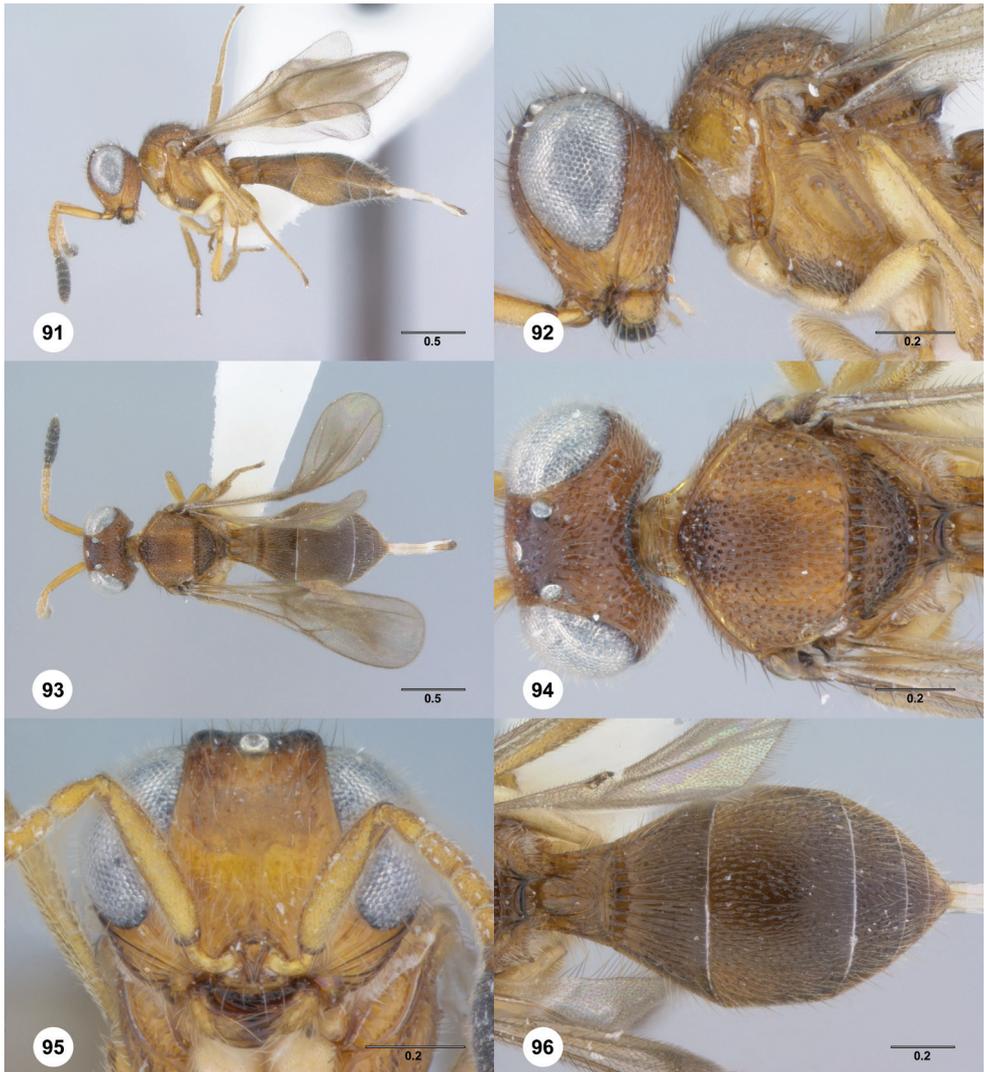
Color of metasoma: orange to brown. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: uncertain, absent. Macrosculpture of T3 medially: weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally rugulose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: dense throughout. Macrosculpture of T5: rugulose laterally. Punctuation of T5: sparse medially, dense laterally. Microsculpture of S3: absent. Macrosculpture of S3 laterally: weakly longitudinally strigose.

Diagnosis. *Paridris toketoki* is most similar to *P. rugulosus*. It differs most conspicuously in having the lateral face of the pronotum densely punctate along its dorsal margin.

Etymology. This species is named for the great Paiwan chief, Toketok.

Link to Distribution Map.³⁷

Material Examined. Holotype, female: **TAIWAN:** Taiwan Prov., Nantou Co., Jih-yüeh (Sun Moon) Lake, H025, Te-hua-she (Tehuache), 800m, 5.VI.1980, J. Heraty, OSUC 181200 (deposited in CNCI).



Figures 91–96.⁷⁷ *Paridris toketoki* sp. n., female holotype (OSUC 181200) **91** Lateral habitus **92** Head and mesosoma, lateral view **93** Dorsal habitus **94** Head and mesosoma, dorsal view **95** Head, anterior view **96** Metasoma, dorsal view. Scale bars in millimeters.

***Paridris verrucosus* Talamas, sp. n.**

urn:lsid:zoobank.org:act:CCEB3258-CADF-4F0F-B2E2-983F94AF5372

urn:lsid:biosci.ohio-state.edu:osuc_concepts:275741

http://species-id.net/wiki/Paridris_verrucosusFigures 17, 97–102; Morphbank³⁸

Description. Female body length: 1.97 mm (n=1). Color of head: dark brown to black. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: dorsoventrally strigose throughout. Microsculpture of frons: uncertain, absent. Sculpture of posterior vertex: irregularly rugulose. Sculpture of gena: irregularly rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs. Notaulus: absent. Color of mesosoma: variably orange to brown. Sculpture of mesoscutum medially: areolate rugulose. Sculpture of mesoscutellum: areolate rugulose. Dark bristlelike setae along transverse pronotal carina: present. Sculpture ventral of transverse pronotal carina: rugulose posteriorly. Sculpture of femoral groove: striate below mesopleural pit. Sculpture of ventral half of posterior mesepimeral area: rugulose. Fine setigerous punctures on dorsal half of posterior mesepimeral area: absent. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

Color of metasoma: reddish brown. Horn of T1: absent. Microsculpture of T2: present. Microsculpture on T3: present. Macrosculpture of T3 medially: reticulate. Macrosculpture of T3 laterally: longitudinally rugulose. Microsculpture of T4: present. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: moderately dense throughout. Macrosculpture of T5: rugulose laterally. Punctuation of T5: moderately dense laterally and along anterior margin. Microsculpture of S3: present. Macrosculpture of S3 laterally: longitudinally strigose.

Diagnosis. *Paridris verrucosus* is the only species in the *P. nephta* group with microsculpture on S3.

Etymology. The adjectival epithet “verrucosus” means “full of warts” in Latin; it is given to this species for the dense microsculpture of the metasoma.

Link to Distribution Map.³⁹

Material Examined. Holotype, female: **CHINA:** Guangdong Prov., creek, Nankunshan, 23°37.287'N 113°51.267'S, 581m, 29.X–31.X.2009, yellow pan trap, L. Masner, OSUC 334249 (deposited in CNCI).



Figures 97–102.⁷⁸ *Paridris verrucosus* sp. n., female holotype (OSUC 334249) **97** Lateral habitus **98** Head and mesosoma, lateral view **99** Head and mesosoma, dorsal view **100** Metasoma, dorsal view **101** Head, anterior view **102** T3–T6, dorsolateral view. Scale bars in millimeters.

***Paridris yak* Talamas, sp. n.**

urn:lsid:zoobank.org:act:37D0E197-226E-4EB5-B367-76F0C5D46276

urn:lsid:biosci.ohio-state.edu:osuc_concepts:241283

http://species-id.net/wiki/Paridris_yakFigures 15, 103–108; Morphbank⁴⁰

Description. Female body length: 4.15–4.16 mm (n=3). Color of head: dark orange, becoming brown at vertex. Ventral clypeal margin: serrate. Sculpture of frons medially: smooth. Sculpture of frons immediately ventral of median ocellus: rugose. Microsculpture of frons: absent. Sculpture of posterior vertex: areolate rugulose. Sculpture of gena: punctate rugulose. Basiconic sensillum on A7: absent.

Wings: macropterous, apex of forewing extending beyond posterior margin of T3. Length of R1: equal to r-rs; less than r-rs. Notaulus: absent; indicated only at posterior margin of mesoscutum. Color of mesosoma: orange to dark red anteriorly, brown posteriorly, mesoscutellum black; variably red to black. Sculpture of mesoscutum medially: areolate rugulose. Sculpture of mesoscutellum: areolate rugulose. Dark bristlelike setae along transverse pronotal carina: absent. Sculpture ventral of transverse pronotal carina: finely punctate. Sculpture of femoral groove: smooth. Sculpture of ventral half of posterior mesepimeral area: smooth. Fine setigerous punctures on dorsal half of posterior mesepimeral area: present. Mesopleural carina: present. Setation of ventral metapleural area: absent in area immediately below metapleural sulcus. Setation of metapleural triangle: moderately dense. Color of legs: yellow throughout.

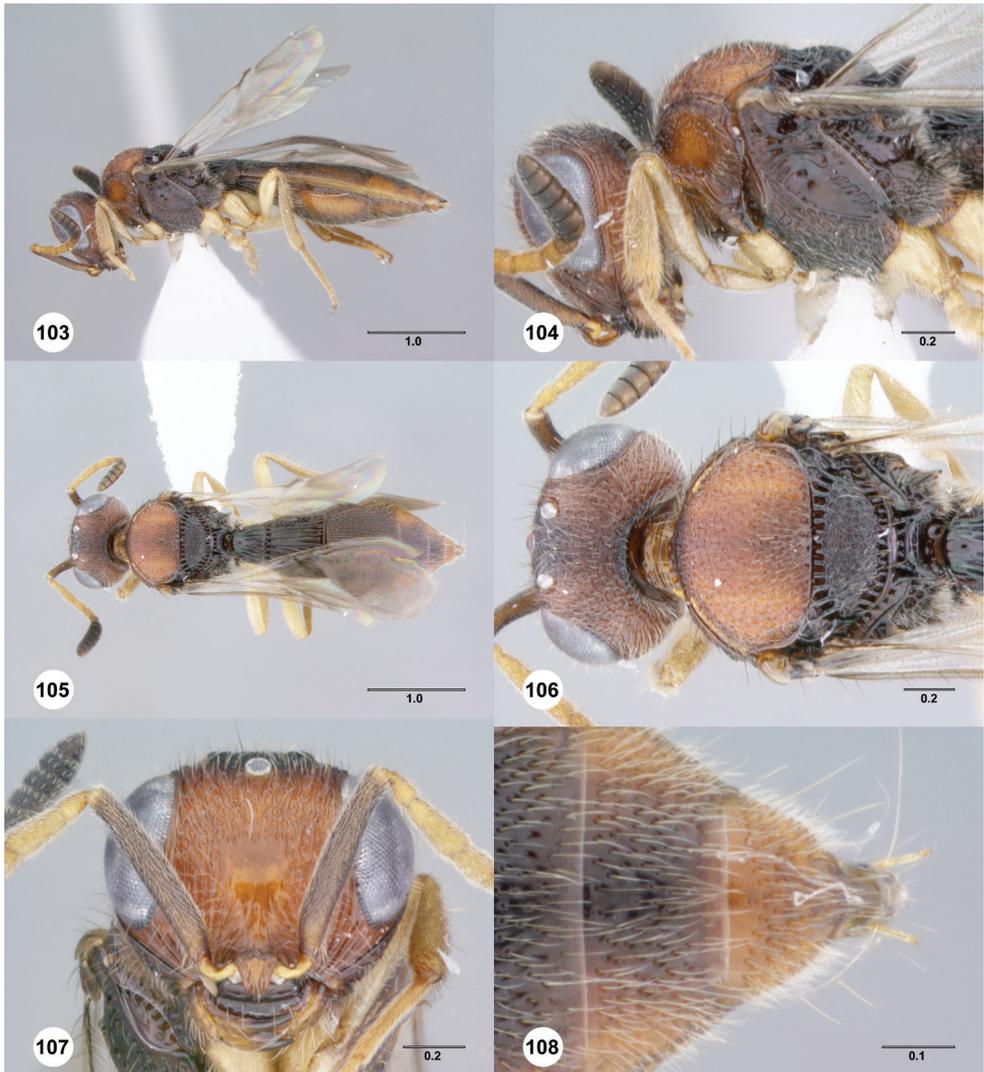
Color of metasoma: orange to black. Horn of T1: bulge smooth, at least anteriorly. Microsculpture of T2: absent. Microsculpture on T3: absent. Macrosculpture of T3 medially: longitudinally strigose; weakly longitudinally strigose. Macrosculpture of T3 laterally: longitudinally strigose. Microsculpture of T4: absent. Macrosculpture of T4 laterally: rugulose. Punctuation of T4: dense throughout. Macrosculpture of T5: rugulose laterally. Punctuation of T5: dense throughout. Microsculpture of S3: absent. Macrosculpture of S3 laterally: absent.

Diagnosis. *Paridris yak* is a large distinctive species best identified by its reduced or absent notaulus, dorsally rugose frons and dorsally pointed axillular carina.

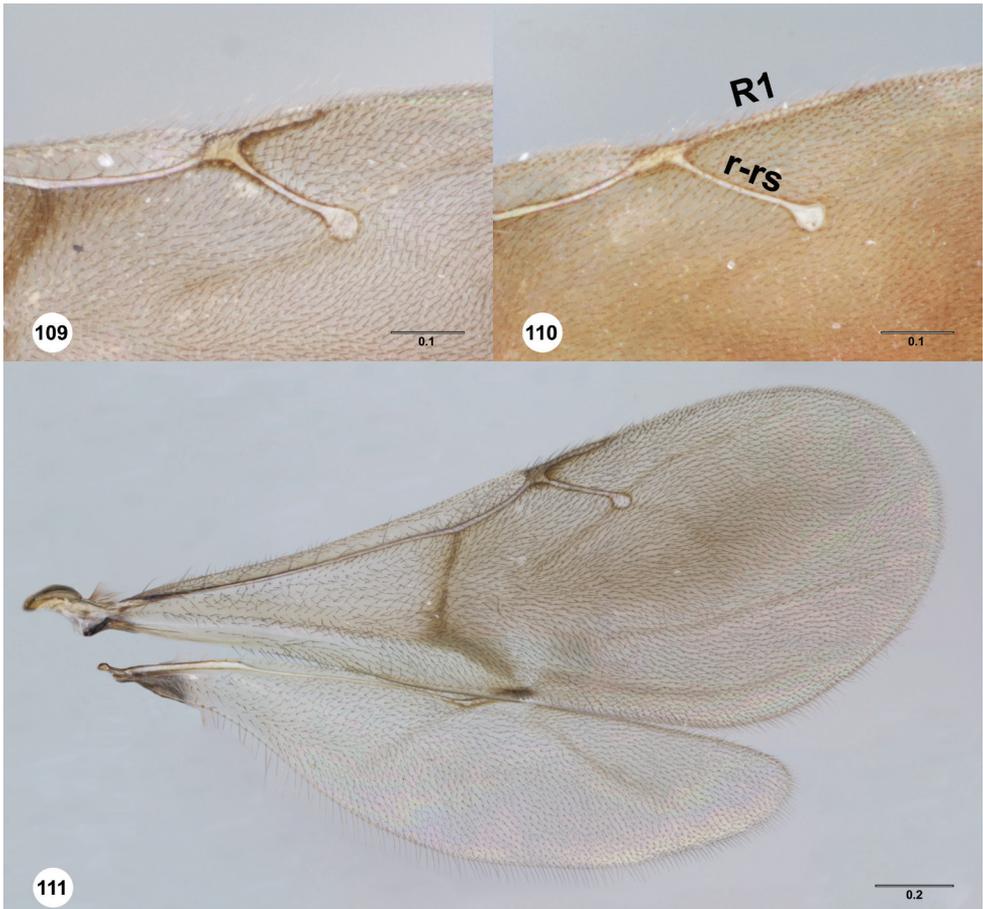
Etymology. The word “yak” is Thai for a mythological ogre. It is treated as a noun in apposition.

Link to Distribution Map.⁴¹

Material Examined. Holotype, female: **THAILAND:** Trang Prov., forest research center, Khao Chong Mountain, 07°33.2'N 99°47.22'E, 75m, XI–2005, malaise trap, D. Lohman, OSUC 237530 (deposited in QSBG). *Paratypes:* **THAILAND:** 3 females, OSUC 396848 (OSUC); OSUC 266085, 334214 (QSBG).



Figures 103–108.⁷⁹ *Paridris yak* sp. n., female holotype (OSUC 237530) **103** Lateral habitus **104** Head and mesosoma, lateral view **105** Dorsal habitus **106** Head and mesosoma, dorsal view **107** Head, anterior view **108** T5–T6, dorsal view. Scale bars in millimeters.



Figures 109–111.⁸⁰ **109** *Paridris nilaka* sp. n., R1 (postmarginal vein) and r-rs (stigmal vein), dorsal view, female holotype (OSUC 266165) **110** *Paridris solaris*, sp. n., R1 (postmarginal vein) and r-rs (stigmal vein), dorsal view, female holotype (OSUC 240944) **111** *Paridris mystax*, sp. n., fore and hind wing, dorsal view, male (OSUC 265200). Scale bars in millimeters.

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Endnotes

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- 2 <http://biocol.org/urn:lsid:biocol.org:col:35284>
- 3 <http://biocol.org/urn:lsid:biocol.org:col:33578>
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80 <http://morphbank.net/?id=592401>

Appendix I

Abbreviations Label Used in Text Unique Identifier of HAO class Label Used in Talamas et al. 2011

axc	axillular carina	http://purl.obolibrary.org/obo/HAO_0000161	
	basiconic sensillum	http://purl.obolibrary.org/obo/HAO_0001729	
	body	http://purl.obolibrary.org/obo/HAO_0000182	
	compound eye	http://purl.obolibrary.org/obo/HAO_0000217	
	conjunctiva	http://purl.obolibrary.org/obo/HAO_0000221	
epc	epomial carina	http://purl.obolibrary.org/obo/HAO_0000307	vertical epomial carina
	felt field	http://purl.obolibrary.org/obo/HAO_0000322	
	femoral groove	http://purl.obolibrary.org/obo/HAO_0000326	femoral depression
	frons	http://purl.obolibrary.org/obo/HAO_0001044	
	gena	http://purl.obolibrary.org/obo/HAO_0000371	
	horn of T1		
	inner orbit of compound eye	http://purl.obolibrary.org/obo/HAO_0000419	
	interantennal process	http://purl.obolibrary.org/obo/HAO_0000422	
loc	lateral ocellus	http://purl.obolibrary.org/obo/HAO_0000481	
	lateral propodeal carina	http://purl.obolibrary.org/obo/HAO_0000486	
	leg	http://purl.obolibrary.org/obo/HAO_0000494	
	mandible	http://purl.obolibrary.org/obo/HAO_0000506	
	median ocellus	http://purl.obolibrary.org/obo/HAO_0000526	
	mesepisternum	http://purl.obolibrary.org/obo/HAO_0000541	
	mesoscutal suprahumeral sulcus	http://purl.obolibrary.org/obo/HAO_0000570	
	mesoscutellum	http://purl.obolibrary.org/obo/HAO_0000574	
	mesoscutum	http://purl.obolibrary.org/obo/HAO_0000575	
	mesosoma	http://purl.obolibrary.org/obo/HAO_0000576	
mtps	metapleural sulcus	http://purl.obolibrary.org/obo/HAO_0000614	
	metapleural triangle	http://purl.obolibrary.org/obo/HAO_0000615	
	metapleuron	http://purl.obolibrary.org/obo/HAO_0001869	
	metascutellum	http://purl.obolibrary.org/obo/HAO_0000625	
	metasoma	http://purl.obolibrary.org/obo/HAO_0000626	
	metasomal depression	http://purl.obolibrary.org/obo/HAO_0000627	
	notaulus	http://purl.obolibrary.org/obo/HAO_0000647	
	occipital carina	http://purl.obolibrary.org/obo/HAO_0000653	
	ovipositor	http://purl.obolibrary.org/obo/HAO_0000679	
pcxs	paracoxal sulcus	http://purl.obolibrary.org/obo/HAO_0000685	
	plica	http://purl.obolibrary.org/obo/HAO_0000735	
	posterior mesepimeral area	http://purl.obolibrary.org/obo/HAO_0000751	
	posterior scutellar sulcus	http://purl.obolibrary.org/obo/HAO_0000757	
	pronotum	http://purl.obolibrary.org/obo/HAO_0000853	
	posterior propodeal projection	http://purl.obolibrary.org/obo/HAO_0000763	
	propodeum	http://purl.obolibrary.org/obo/HAO_0001249	

	S2	http://purl.obolibrary.org/obo/HAO_0000035	
	scutoscuteellar sulcus	http://purl.obolibrary.org/obo/HAO_0000920	
	T2	http://purl.obolibrary.org/obo/HAO_0001147	
	T3	http://purl.obolibrary.org/obo/HAO_0001151	
	T6	http://purl.obolibrary.org/obo/HAO_0001468	
trc	transverse carina on T2		
tpc	transverse pronotal carina	http://purl.obolibrary.org/obo/HAO_0001031	dorsal epomial carina
	ventral clypeal margin	http://purl.obolibrary.org/obo/HAO_0001767	
	ventral metapleural area	http://purl.obolibrary.org/obo/HAO_0001062	
	vertex	http://purl.obolibrary.org/obo/HAO_0001077	

Appendix II

Lucid key to females of the *Paridris nephta* species group. (doi: 10.3897/zookeys.133.1613.app)

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