



Revision of the genus *Hormoserphus* Townes, 1981 (Hymenoptera: Proctotrupidae), with description of *Trachyserphus* gen. n. and a new species

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Abstract

Revision of the genus *Hormoserphus* Townes, 1981 has shown that its type species, *Proctotrupes clypeatus* Ashmead, 1893 belongs to *Oxyserphus* Masner, 1961 (*Oxyserphus clypeatus* (Ashmead, 1893), **comb. n.** [= *Hormoserphus transgressus* Townes, 1981, **syn. n.**]) thus making *Hormoserphus* a junior synonym of the latter genus. *Trachyserphus* Kolyada, **gen. n.** is described to accommodate Oriental *Trachyserphus segregatus* (Townes, 1981), **comb. n.** (from *Hormoserphus*), Central American *Trachyserphus defrictus* (Townes, 1981), **comb. n.** (from *Sminthoserphus* Townes, 1981) and South American *Trachyserphus masneri* Kolyada, **sp. n.** *Hormoserphus chinensis* He & Fan, 1991 and *Hormoserphus striatus* He & Xu, 2015 are treated as junior synonyms of *T. segregatus*. An identification key to the species of *Trachyserphus* is provided.

Key words: Hymenoptera, Proctotrupidae, Neotropical, Oriental, parasitic wasps, new genus, new species, new synonymy, new combination, identification key

Resumen

La revisión del género *Hormoserphus* Townes, 1981 ha demostrado que su especie tipo *Proctotrupes clypeatus* Ashmead, 1893 pertenece al género *Oxyserphus* Masner, 1961 (*Oxyserphus clypeatus* (Ashmead, 1893), **comb. n.** [= *Hormoserphus transgressus* Townes, 1981, **syn. n.**]) haciendo así *Hormoserphus* un sinónimo menor de este último género. Un nuevo género *Trachyserphus* Kolyada, **gen. n.** se describe para dar cabida a las especies orientales *Trachyserphus segregatus* (Townes, 1981), **comb. n.** (de *Hormoserphus*) y latinoamericanas *Trachyserphus defrictus* (Townes, 1981), **comb. n.** (de *Sminthoserphus* Townes, 1981) y *Trachyserphus masneri* Kolyada, **sp. n.** *Hormoserphus chinensis* He & Fan, 1991 y *Hormoserphus striatus* He & Xu, 2015 son tratados como sinónimos menores de *T. segregatus*. Este artículo presenta una clave para el reconocimiento de las especies de *Trachyserphus*.

Palabras clave: Himenópteros, Proctotrupidae, Neotrópico, Oriental, avispas parásitas, nuevo género, nuevos sinonimos, nuevas combinaciones, clave para la identificación

Introduction

The Proctotrupidae is a relatively small world-wide family of parasitic wasps, found mostly in regions with a temperate and humid climate. Proctotrupids are larval endoparasites of at least a dozen of beetle families, as well as the dipteran families Mycetophilidae and Sciaridae, the lepidopteran family Oecophoridae, and centipedes of the family Lithobiidae (e.g. Townes & Townes 1981; Early & Dugdale 1994; Abuin & López 2016 and references cited therein). The extant proctotrupid fauna consists of about 600 species in 30 genera (Townes & Townes 1981; Johnson 1992; He & Xu 2015; Choi *et al.* 2016; Kolyada 2016).

The genus *Hormoserphus* was erected by Henry Townes (Townes & Townes 1981) for the North American *Proctotrupes clypeatus* Ashmead, 1893, as the type species, and *Hormoserphus segregatus* Townes, 1981, from Nepal. Our examination of material identified as *H. clypeatus* has confirmed that the species belongs to *Oxyserphus* Masner, 1961, which is distributed globally, except for Africa, and is especially speciose in Australia, New Zealand and in the Oriental Region. The remaining species, *Hormoserphus segregatus*, is now treated as the type species for the newly described genus—*Trachyserphus* gen. n.—that also includes *Sminthoserphus defrictus* Townes, 1981, from Mexico and a new species from Chile.

Material and methods

The following material has been studied: the female holotype of *Hormoserphus segregatus* Townes, 1981, from Nepal, two males from Vietnam and China (Sichuan Province), and a female from Taiwan; male holotype of *Sminthoserphus defrictus* Townes, 1981 from Mexico; and a series of specimens of *Hormoserphus clypeatus* (Ashmead, 1893) from Canada, USA, Japan and Russia. The holotype of *Proctotrupes clypeatus* Ashmead, 1893 [USNM 11711 (USNMENT 01223753)] (Fig. 1C) has been examined from photographs kindly taken by Dr E.J. Talamas (USNM). The new species has been described from a series of males and females from Chile.

Most photographs were obtained using a Leica M165 stereomicroscope equipped with a Leica DFC450 camera. The montage of the image layers was prepared using Helicon Focus 5.0. Some pictures of the general appearance and details of the body structures were taken with Canon Powershot S50 camera, using PSRemote software. Morphology was studied using light microscopy and environmental scanning electron microscopy (ESEM) with a maximum magnification of 450×.

The studied material is deposited in the Canadian National Collection of Insects, Ottawa, Canada (CNCI) and the National Museum of Natural History, Washington, DC, USA (USNM).

Family Proctotrupidae Latreille, 1802

Subfamily Proctotrupinae Latreille, 1802

Tribe Cryptoserphini Kozlov, 1970

Genus *Oxyserphus* Masner, 1961

Hormoserphus Townes, 1981, **syn. n.** (Type species: *Proctotrupes clypeatus* Ashmead, 1893).

Type species. *Proctotrupes maculipennis* Cameron, 1888; by original designation.

Remarks. *Hormoserphus* was established by H. Townes (Townes & Townes 1981) for the North American species *Proctotrupes clypeatus* Ashmead, 1893 (type species, Fig. 1C), as well as for *Hormoserphus segregatus* from Nepal that was described in the same work from a single female mistaken for male. The type species possesses a combination of key features characteristic for members of the genus *Oxyserphus*: a strong margin of the clypeus is bordered by one or more longitudinal keels; the pterostigma has a short r-rs; and the mandibles are bidentate (Fig. 1B). Thus, *Hormoserphus* becomes a junior subjective synonym of *Oxyserphus*, and a new combination *Oxyserphus clypeatus* (Ashmead, 1893), **comb. n.** is established herein.

Henry Townes (Townes & Townes 1981: 114) also mentioned another species—*Hormoserphus transgressus*—in the diagnosis of the genus *Hormoserphus*, stating that “in *H. transgressus* the upper face of tubercle with wrinkling and a marginal carina”. It is unclear what his intention was, since this species was mentioned neither in his key to the species of *Hormoserphus* nor anywhere else in the book. Nevertheless, the name *Hormoserphus transgressus* is technically valid, for its publication meets requirements of the Code (ICZN 1999). However, the mentioned characters—the upper face of the tubercle with wrinkling and a marginal carina—might refer only to *clypeatus* within the Townes’s concept of *Hormoserphus*. Thus, we propose treating *H. transgressus* as a junior synonym of *Oxyserphus clypeatus* (Ashmead, 1893).



FIGURE 1. The head, frontal view (A, B, D), habitus, lateral view (C) and mesonotum, dorsal view (E) of some proctotrupids. A, *Oxyserphus* sp.; B, C, *Oxyserphus clypeatus*; D, E, *Brachyserphus* sp. Scale bars 0.1 mm in all figures except for 1 mm in Fig. 1C. (Photo of *Proctotrupes clypeatus* Ashmead, 1893 holotype USNM 11711 [USNMMENT 01223753] on Fig. 1C courtesy E.J. Talamas)

Genus *Trachyserphus* Kolyada, gen. n.

LSID: urn:lsid:zoobank.org:act:BF15A2E4-9A26-4B0C-AC7C-E2C53E3BB936

Type species. *Hormoserphus segregatus* Townes, 1981.

Etymology. The generic name is formed from Greek *τραχύς* (coarse) and the ending *-serphus* traditionally used in Proctotrupidae.

Diagnosis. Body stout, compact. Apical margin of clypeus simple and not bordered by longitudinal keels. Distance between antennal sockets greater than their diameter. Distance from lower edge of clypeus to centre of tentorial pit 0.8–0.9 of distance to lower edge of antennal socket. Mandible moderately stout, unidentate. Malar sulcus present. Occipital carina present, not reaching oral carina. Notauli moderately developed, curved, traceable to almost mid mesoscutum, approximately as long as or longer than tegula. Pronotal shoulder very well developed, broadly rounded, with neither keels nor wrinkles. Pronotal scrobe with coarse vertical wrinkles. Epomia simple and not extending to pronotal shoulder. Scutellar pit with no inner keels. Horizontal mesopleural groove complete, well developed. Metapleural sulcus present. Longer spur of hind tibia reaching 0.5–0.7 length of hind basitarsus. Stigma deep, r-rs unexpressed, radial vein starting at lower edge of stigma. Costal vein ending at apex of radius. Mediocubital crossvein at base of fore wing expressed as sclerotized vein section or absent. Abdomen stalkless. Syntergite edges overlapping ventrally, meeting over synsternite along its posterior third.

Comparison. The new genus is similar to *Brachyserphus* and *Oxyserphus* and differs from both as following:

- | | | |
|---|---|--------------------------|
| 1 | Distance from lower edge of clypeus to centre of tentorial pit half the distance to lower edge of antennal socket (Fig. 1A); if the former two-thirds of the latter, distance between antennal sockets markedly less than their diameter or mandibles bidentate (Fig. 1B). Apical edge of clypeus strong and bordered by one or several longitudinal keels (Fig. 1B). Stigma with short r-rs (vertical part of radius) | <i>Oxyserphus</i> Masner |
| - | Distance from lower edge of clypeus to centre of tentorial pit 0.7–0.9 of the distance to lower edge of antennal socket (Fig. 1D). Distance between antennal sockets noticeably greater than or rarely equal to their diameter (Fig. 1D). Mandibles simple, unidentate (Fig. 2D). Apical edge of clypeus simple and not bordered by longitudinal keels (Figs 1D, 2D, 3D, 4G). Stigma devoid of r-rs (vertical part of radius) (Figs 2N, 3H, 4H) | 2 |

- 2 Notauli curved and may reach almost mid mesoscutum as traces, about as long as tegula or longer (Figs 2G, 3C, 4D). Malar sulcus present (Figs 2D, 3D, 4G). Epomia simple and not extending to pronotal shoulder (Figs 2A, 3A, 4A). Metapleural sulcus present (Figs 2B, 2C, 3B, 4C). *Trachyserphus* **gen. n.**
- Notauli straight and short, reach about $\frac{1}{4}$ mesoscutum, half as long as tegula (Fig. 1E). Malar sulcus absent (Fig. 1D). Epomia bifurcate dorsally and extending to pronotal shoulder. Metapleural sulcus absent. *Brachyserphus* Hellén

The identification key to genera of the Cryptoserphini (Townes & Townes 1981: 29–32) is outdated and badly needs revision, but lies beyond the scope of the present paper. Nevertheless, *Trachyserphus* gen. n. would run to couplet 12 (*Hormoserphus*) if one takes the second lead of couplet 9 assuming that the notauli are ‘short’ (not reaching the midlength of the mesoscutum vs extending to almost its rear edge).

***Trachyserphus segregatus* (Townes in Townes & Townes, 1981), comb. n.**
(Figs 2A–N)

Hormoserphus segregatus Townes in Townes & Townes, 1981: 115 (female).

Hormoserphus chinensis He & Fan, 1991: 220 (male), **syn. n.**

Hormoserphus striatus He & Xu, 2015: 203 (male), **syn. n.**

Redescription. Female: Fore wing length 3.7 mm. Entire frons densely pilose, entire face finely punctate. Area between antennal sockets strongly convex, weakly pointed. Distance between antennal sockets 2 times greater than their diameter. Occipital carina developed in its upper part as high collar, not reaching oral carina for approx. 0.3 length of its lower part. Clypeus flat, wide and short, its apex broadly truncate. Distance from lower edge of clypeus to centre of tentorial pit 1.3 times less than distance to lower edge of antennal socket. Labrum evenly rounded apically. Mandible moderately stout, unidentate. Gena very short. Antenna long, filiform; 3rd antennomere 4 times as long as wide. Eye bare. Notauli wide and coarse at base, reaching mid mesoscutum as shallow excavations. Mesoscutum posteriorly without noticeable depressions. Humeral tubercle very well developed, broadly rounded, with neither keels nor wrinkles. Pronotal scrobe with coarse vertical wrinkles. Speculum with fan of developed keels in upper anterior part. Horizontal mesopleural groove deep and wide. Mesepimeral sulcus entirely foveate, large, in lower part with group of diverging coarse wrinkles. Metapleuron laterally with shiny bare area occupying about one third of its surface; the area with shallow indistinct groove in its upper part. Longer spur of hind tibia reaching 0.7 basitarsus length. Propodeum with coarse reticulation and dense, long setae, dorsally with two large lateral areas separated by weakly reticulated keel. Stigma deep, trapezoid. Fore wing basally with well expressed sclerotized medio-cubital crossvein. Syntergite base with small longitudinal groove. First pair of tyridia elongate, approximately as long as longitudinal groove at base of syntergite. Ovipositor sheath broad and short, 0.3 times as long as hind tibia; sheath surface neither punctate nor striated and also devoid of setae save for small tuft near apex.

Colour: Entire body black, shining; legs except for coxae and trochanters light to dark brown. Stigma dark brown.

Male: Differs from female in having smaller and apically evenly rounded convexity in lower part of face (Figs 2E, F). Flagellomeres without noticeable tyloids; 3rd antennomere 3 times as long as wide.

Type material examined. Holotype ♀ (CNCI No. 17159): **Nepal:** Katmandu, Godavari [27°35'N 85°24'E], 6000 ft, 23–26.vii.1967, Mal[aise]. Tr[ap]., Can[adian]. Exp[edition].

Other material examined. PR China: ♂ Sichuan, 20 km E Maerkang, Qionglai Shan [31°30'N 102°30'E], 2656 m, 3.viii.2002, S.A. Cameron & J.B. Whitfield. **Taiwan:** ♀ Taichung Hsien, Anmashan [24°15'N 120°54'E], 2225 m, 2.v.1990, A. Smetana. **Vietnam:** Tam Dao N.P., Tam Dao env., 21°27'38"N 105°38'28"E, 900–1200 m, 13–26.vi.2011, E. Jendek (CNCI).

Distribution. South and South-East Asia (Nepal, southern China, Taiwan and Vietnam).

Remarks. *Hormoserphus chinensis* He & Fan, 1991 and *Hormoserphus striatus* He & Xu, 2015, were described from the Sichuan and Yunnan provinces in southern China. The authors provided good quality photographs of the holotypes of both species, as well as thorough original descriptions and comparisons. Minor differences indicated by the authors of these species, the shape of the smooth area on the metapleuron and the degree of striation on the mesopleuron, are treated by us as intraspecific variation. This prompted synonymy of *H. chinensis* and *H. striatus* under *T. segregatus*.

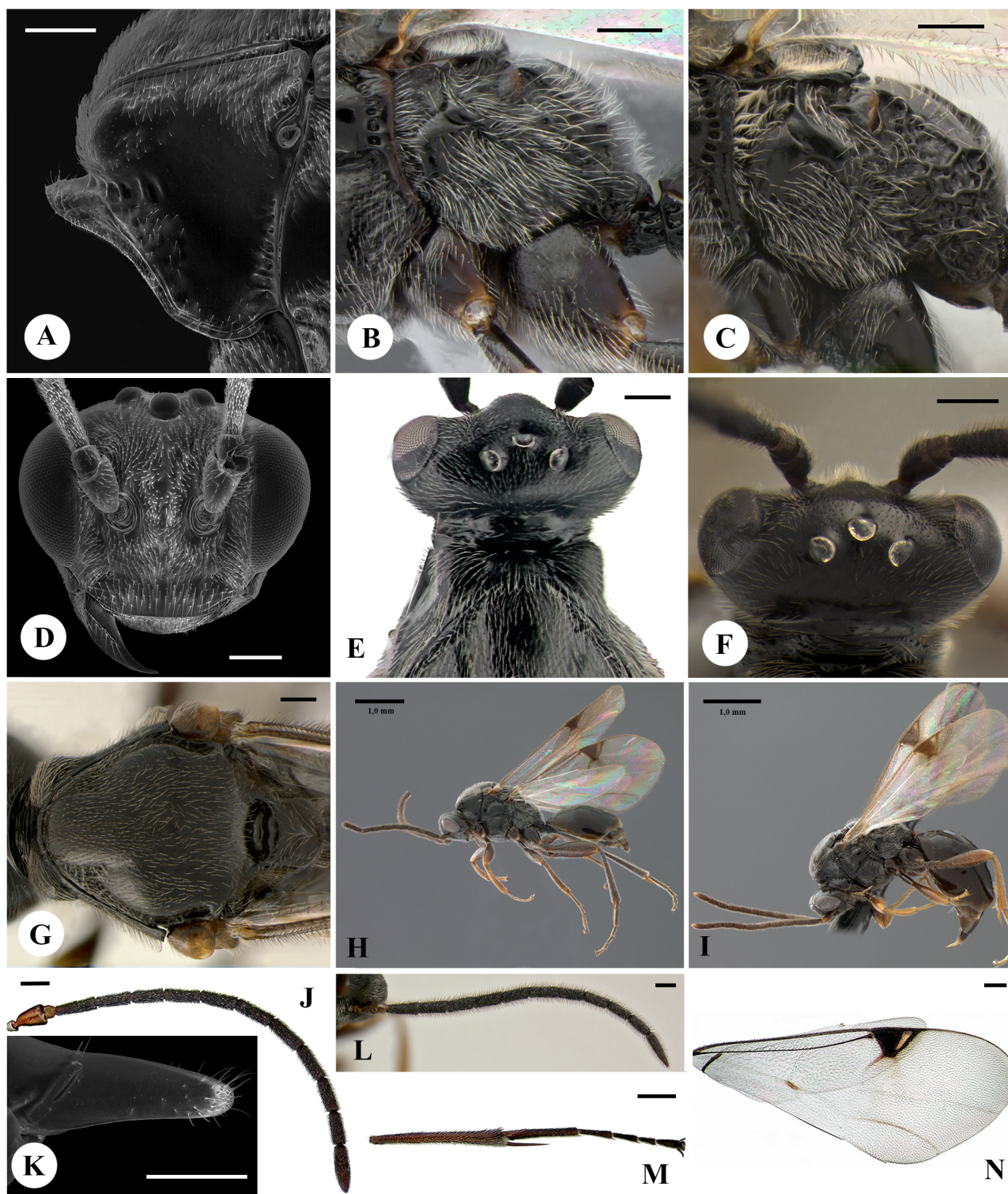


FIGURE 2. *Trachyserphus segregatus*. A, pronotum laterally; B, C, female and male propodeum laterally; D, female head frontal view; E, F, male head dorsally; G, mesonotum dorsally; H, I, general habituses of male and female in lateral view; J, female antenna; K, ovipositor sheath; L, male antenna; M, hind leg; N, wing venation. Scale bars 0.1 mm in all figures except for 1 mm in Figs 2H, 2I.

***Trachyserphus defrictus* (Townes in Townes & Townes, 1981), comb. n.**
(Figs 3A–J)

Sminthoserphus defrictus Townes in Townes & Townes, 1981: 57 (male).

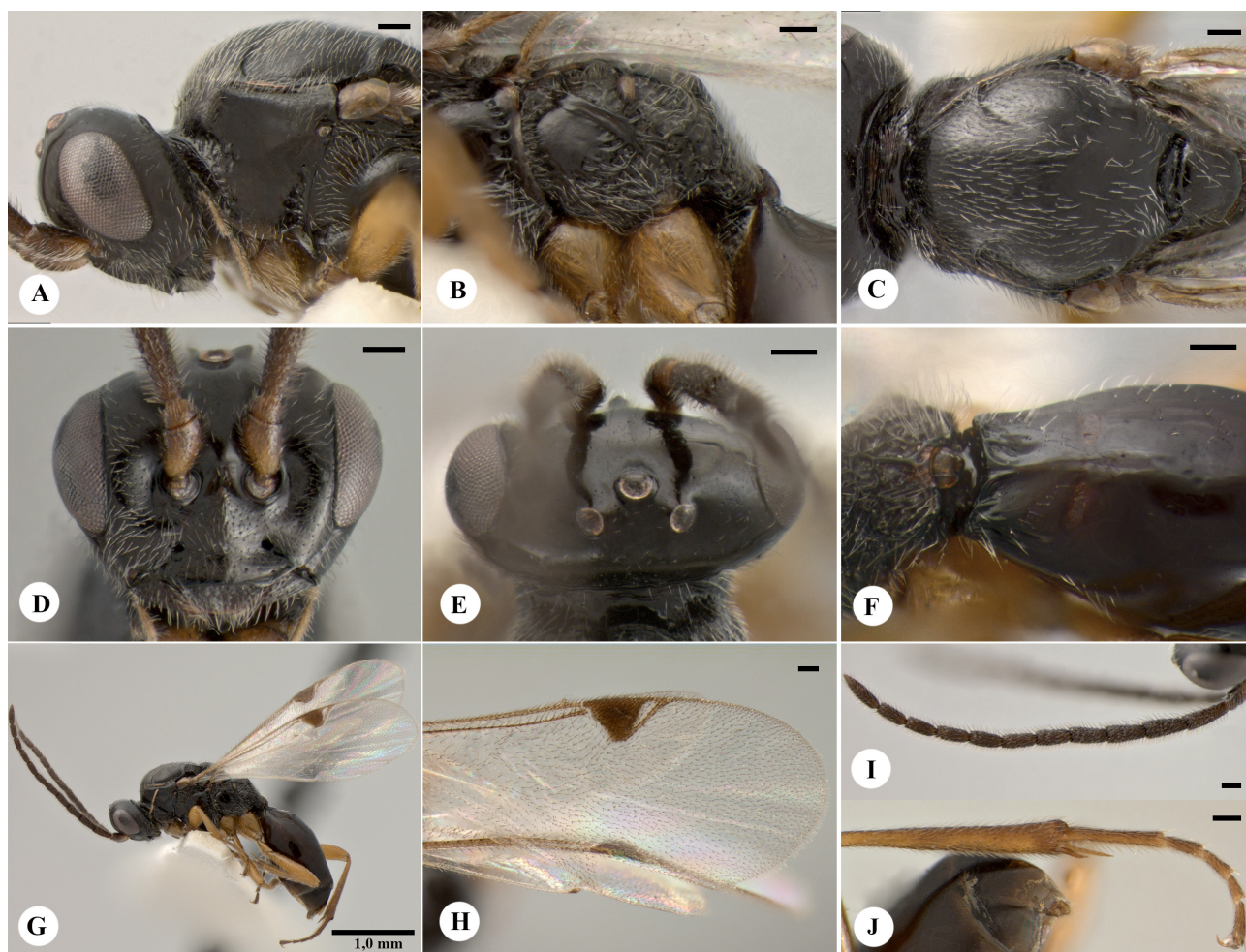


FIGURE 3. *Trachyserphus defrictus*. A, pronotum laterally; B, propodeum laterally; C, mesonotum dorsally; D, female head frontal view; E, head dorsally; F, base of syntergite dorsally; G, general habitus of male in lateral view; H, wing venation; I, male antenna; J, hind leg. Scale bars 0.1 mm in all figures except for 1 mm in Fig. 3G.

Redescription. Male: Fore wing length 3.1 mm. Frons sparsely pilose, entire head except for frons finely punctate. Area between antennal sockets weakly convex, slightly pointed. Distance between antennal sockets 1.2 times as great as their diameter. Occipital carina present, not reaching oral carina for about 0.3 of its lower part. Clypeus flat, wide and short, its apex broadly truncate. Distance from lower edge of clypeus to centre of tentorial pit 0.8 of distance to lower edge of antennal socket. Labrum gently rounded apically. Mandible moderately stout, with a single point. Gena high, 0.38 eye height. Antenna long, filiform; 3rd antennomere 3 times as long as broad; flagellomeres with no noticeable tyloids. Eye bare. Notauli narrow, devoid of coarse sculpture basally, reaching mid mesoscutum as shallow depressions. Mesoscutum posteriorly without noticeable depressions. Humeral tubercle well developed, broadly rounded, with neither keels nor wrinkles. Pronotal scrobe with coarse vertical wrinkles. Speculum without fan of developed keels in upper anterior part. Horizontal mesopleural groove deep and wide. Vertical mesopleural suture entirely foveate, large, below with group of diverging coarse wrinkles. Longer spur of hind tibia reaching 0.5 basitarsus length. Propodeum with coarse reticulation and long rather dense setae, dorsally with two large lateral areas separated by weakly reticulated keel. Metapleuron laterally with shiny bare area occupying about half of its surface; the area with shallow but distinct groove in its upper part. Stigma deep, trapezoid. Fore wing basally with indistinct medio-cubital crossvein. Syntergite base with small longitudinal groove. First pair of tyridia elongate, slightly longer than longitudinal groove at base of syntergite.

Colour: Body black, shining; legs entirely yellow. Stigma light brown.

Female: Unknown.

Type material examined. Holotype ♂: **Mexico:** Durango, El Salto [23°47'N 105°22'W], 9000 ft, 1.vii.1964, W.R.M. Mason (CNCI).

Distribution. Mexico.

Remarks. *Sminthoserphus defrictus* Townes, 1981 was placed in the South American *Sminthoserphus* on the basis of its superficial similarity to other members of the genus. Scrutiny of *S. defrictus* characters has proved that the species does not belong to *Sminthoserphus* and should be included in the new genus *Trachyserphus*. The edges of the syntergite in *S. defrictus* are broadly overlapping ventrally along its posterior third, whereas species of *Sminthoserphus* are characterized by non-overlapping syntergite edges that leave a wide portion of the synsternite visible.

***Trachyserphus masneri* Kolyada, sp. n.**

(Figs 4A–O)

LSID: urn:lsid:zoobank.org:act:78102765-7CDE-4C31-AAF2-0B5F8F1D78DE

Etymology. The species is named in honour of a world renowned hymenopterist Lubomir Masner.

Description. Female: Fore wing length 3.8 mm. Frons sparsely pilose, entire face except for frons finely punctate. Area between antennal sockets flat. Distance between antennal sockets equal to their diameter. Occipital carina developed as transverse bolster with faint wrinkles laterally and disappears far from oral carina. Clypeus flat and narrowed, with broadly truncate apex. Distance from lower edge of clypeus to centre of tentorial pit 0.9 of distance to lower edge of antennal socket. Labrum gently rounded apically. Mandible shortened and thickened basally, with a single point. Gena high, 0.5 eye height, with developed malar sulcus. Antenna long, filiform; 3rd antennomere 4 times as long as broad. Eye bare. Notauli narrow, with faint wrinkles basally, reaching mid mesoscutum as shallow depressions. Mesoscutum posteriorly with noticeable depressions. Humeral tubercle well developed, broadly rounded, with neither keels nor wrinkles. Pronotal scrobe with coarse vertical wrinkles. Epomia weak. Speculum anteriorly with fan of developed keels. Horizontal mesopleural groove deep and wide, reticulated inside. Vertical mesopleural suture entirely foveate, large, below with group of diverging coarse wrinkles. Longer spur of hind tibia reaching 0.5 basitarsus length. Propodeum with coarse reticulation and long sparse setae, dorsally with two large lateral areas separated by coarsely reticulated keel. Metapleuron laterally with shiny bare area occupying about two thirds of its surface; the area with deep reticulated suture in its upper part. Stigma shallow, trapezoid. Fore wing basally with indistinct medio-cubital crossvein. Syntergite base with no longitudinal groove. First pair of tyridia elongate, 6 times as long as wide. Ovipositor sheath narrow, with moderately tapered and curved apex, 0.5 times as long as hind tibia; sheath surface punctate with no longitudinal wrinkles.

Colour: Entire body including legs black, shining. Stigma dark brown.

Male: Similar to female, except for having flagellomeres with no noticeable tyloids and 3rd antennomere 3.6 times as long as broad.

Type material. Holotype ♀: **Chile:** Cautin, N.P. Conquillio [38°40'S 71°39'W], 1150 m, 4.ii.1988, yellow pan trap, *Araucaria–Nothofagus* forest, L. Masner (CNCI). Paratypes: 31♀ 4♂ same data as holotype; **Chile:** 2♀ Osorno, N.P. Puyehue [40°38'S 72°00'W], 1250 m, Argent[inian]. border, 13.ii.1988, L. Masner (CNCI).

Distribution. Central Chile.

Key to species of *Trachyserphus*

- | | | |
|---|---|-------------------------------|
| 1 | Area between antennal sockets strongly convex. Occipital carina developed in its upper part as high collar (Figs 2E, 2F). Longer spur of hind tibia reaching 0.7 basitarsus length (Fig. 2M). Fore wing basally with well expressed sclerotized medio-cubital crossvein (Fig. 2N) | <i>T. segregatus</i> (Townes) |
| - | Area between antennal sockets weakly convex or flat (Figs 3E, 4H). Occipital carina less developed (Fig. 4I). Longer spur of hind tibia reaching 0.5 basitarsus length (Figs 3J, 4M). Medio-cubital crossvein at fore wing base unsclerotized (Fig. 3H) . . . 2 | |
| 2 | Distance from lower edge of clypeus to centre of tentorial pit 1.1× less than distance to lower edge of antennal socket (Fig. 4G). Mesoscutum posteriorly with noticeable depressions (Fig. 4D) | <i>T. masneri</i> sp. n. |
| - | Distance from lower edge of clypeus to centre of tentorial pit 1.3× less than distance to lower edge of antennal socket (Fig. 3D). Mesoscutum posteriorly without noticeable depressions (Fig. 3C) | <i>T. defrictus</i> (Townes) |

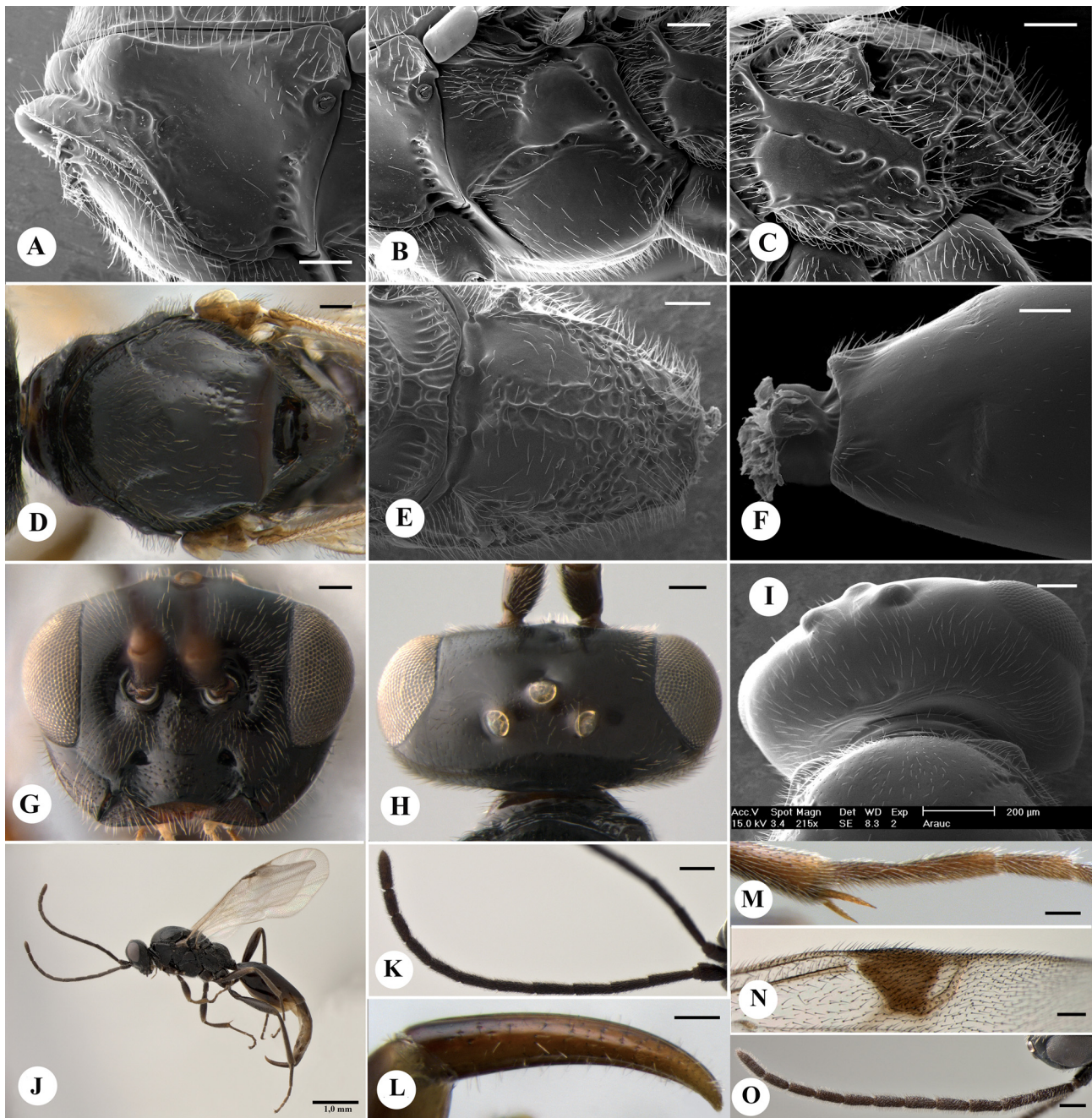


FIGURE 4. *Trachyserphus masneri* sp. n. A, pronotum laterally; B, mesopleuron laterally; C, propodeum laterally; D, mesonotum dorsally; E, propodeum dorsally; F, base of syntergite dorsally; G–I, female head frontal, dorsal and occipital views; J, general habitus of female in lateral view; K, female antenna; L, ovipositor sheath; M, hind leg; N, wing venation; O, male antenna. Scale bars 0.1 mm in all figures except for 1 mm in Fig. 4J.

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