

## New species of the genus *Mimogonia* and *Holotrochus* from South America (Coleoptera: Staphylinidae: Osoriinae)

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**Abstract.** Twelve new species of the genera *Mimogonia* Coiffait, 1978 and *Holotrochus* Erichson, 1839 are described from the Neotropical Region: *Mimogonia baloghi* sp. nov. (Paraguay), *M. duckei* sp. nov. (Brazil: Amazonas), *M. marquesi* sp. nov. (Brazil: Mato Grosso), *Holotrochus adisi* sp. nov. (Brazil: Amazonas), *H. agostii* sp. nov. (Brazil: Bahia), *H. hamatus* sp. nov. (Paraguay), *H. lobatus* sp. nov. (Panama), *H. mrazi* sp. nov. (Brazil: Minas Gerais), *H. paraguensis* sp. nov. (Paraguay), *H. pseudoleticiae* sp. nov. (Peru), *P. tortilis* sp. nov. (Bolivia, Suriname) and *H. yasuniensis* sp. nov. (Ecuador). Diagnostic characters of all new species are illustrated and updated identification keys are provided for the Brazilian *Mimogonia* species and the *Holotrochus pubescens* group.

**Key words.** Coleoptera, Staphylinidae, Osoriinae, new species, Bolivia, Brazil, Ecuador, Panama, Paraguay, Suriname, Neotropical Region

### Introduction

In recent years, I studied new materials of Neotropical Osoriinae (Staphylinidae) from the Hungarian Natural History Museum, Budapest, the National Museum Prague, and the British Museum of Natural History, London. Most of the species were collected during several Hungarian Soil-Zoological Expeditions by J. Balogh, L. S. Mahunka, I. Loksa, and A. Zicsi in the years 1965–1966 and later 1979 by J. Balogh. The material identified from the Czech National Museum was collected by S. Mráz in the early 20<sup>th</sup> century from southern Brazil. Other material came from recent samples collected for ecological studies in the Pantanal, Mato Grosso, in the inundation forests near Manaus, Amazonas, Brazil, other material was also used from private collection expeditions. In total, three new species of the genus *Mimogonia* Coiffait, 1978, and seven new species of the genus *Holotrochus* Erichson, 1839 were detected. The new species are described and updated identification keys are provided for the respective species groups.

## Material and methods

For the measurement of total length, the intersegmental space of abdominal segments was considered. The lengths of individual tagmata were determined along the midline, their widths at the widest part of the respective tagma. For the habitus photographs, a Makroskop M 420 (Wild Herbrugg) was used in combination with a digital camera (Leica EC3). CombineZ5 (HADLEY 2006) for optimising the depth of focus.

The species will be deposited in the following collections:

AMNH	American Museum of Natural History, New York, U.S.A.;
BMNH	Natural History Museum, London, United Kingdom;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
INPA	Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil;
KSEM	Natural History Museum, University of Kansas, Lawrence, U.S.A.;
NMPC	National Museum, Prague, Czech Republic;
NHMW	Natural History Museum, Vienna, Austria;
UFMT	Universidade Federal de Mato Grosso, Cuiabá, Brazil;
UIC	Ulrich Irmeler collection, Kiel, Germany;
VAC	Volker Assing collection, Hanover, Germany.

## Taxonomy

### *Mimogonia* Coiffait, 1978

#### *Mimogonia baloghi* sp. nov.

(Figs 2, 16A)

**Type locality.** Paraguay, Puerto Presidente Stroessner.

**Type material.** HOLOTYPE: ♂, 'Paraguay: Puerto Presidente Stroessner, Hungarian Soil-Zool. Exp., 05.01.1966, leg. J. Balogh and L.S. Mahunka' (HNHM). PARATYPES: 4 ♀♀ from the same location (HNHM, UIC); 1 ♀, 'Puerto Presidente Stroessner, Hungarian Soil-Zool.Exp., 30.12.1965, leg. L.S. Mahunka' (HNHM).

**Diagnosis.** According to the head/pronotum width ratio of 0.65, this species resembles the *Mimogonia antennata* group having small eyes, and the species *M. antennata* Irmeler, 1981, *M. subopaca* Irmeler, 1981, *M. brunnea* Irmeler, 1981, *M. similis* Irmeler, 1981, *M. tricolor* Irmeler, 1981, *M. pumilia* Irmeler, 1981, *M. hermani* Irmeler, 2007a and *M. huggerti* Irmeler, 2007a. *Mimogonia baloghi* sp. nov. can be identified only by its unique aedeagus. In particular, the compact coiling of the endophallus are characteristic for this new species.

**Description.** Length: 2.3 mm. Colouration black; anterior half of head, pronotum and elytra light brown to yellow, with posterior margin of elytra darkish; legs and antennae yellow.

Head 0.29 mm long, 0.42 mm wide; eyes only slightly prominent; setiferous punctation deep and coriaceous close to neck; punctation apically sparser with impunctate area on disc; setae yellow; net-like microsculpture weak; surface slightly shiny.

Antennae as long as head and two thirds of pronotum combined; second antennomere oval and as long as conical third antennomere; fourth antennomere small, not wider than third; the following antennomeres increasing in width; tenth antennomere nearly twice as wide as long.

Pronotum 0.38 mm long, 0.64 mm wide; sides in apical two thirds more or less parallel, in posterior third deeply emarginate; setiferous punctation as deep and dense as on head; distance

between punctures as wide as or slightly closer as diameter of punctures; setae yellow, pointing to the centre of posterior edge; net-like microsculpture weak; surface slightly shiny.

Elytra 0.49 mm long, 0.50 mm wide; setiferous punctation as deep and dense as on pronotum; interstices between punctures on average as wide as diameter of punctures; pubescence yellow, pointing to the centre of posterior edge; along suture pointing more or less parallel to suture; net-like microsculpture much deeper than on head and pronotum; thus, surface matte.

Abdomen with deep net-like microsculpture; surface matte; setiferous punctation weaker than on fore-body, but as dense; pubescence yellow, pointing posteriad.

Mesotibia of male without emargination on inner side, but with row of spines at outer apical edge.

Aedeagus with hook-like apex; endophallus with spiral structure at base and more laminar structure at apex.

**Etymology.** This species is named after its collector Janos Balogh.

**Distribution.** Known only from the type locality.

### *Mimogonia marquesi* sp. nov.

(Figs 1, 16B)

**Type locality.** Brazil, Estado Mato Grosso, Pantanal.

**Type material.** HOLOTYPE: ♂, 'Brazil, Est. Mato Grosso, Pantanal, sampled by Mini-Winkler method from soil, 18.12.2000' (UMFT). PARATYPES: 2 ♀♀, 'Brazil, Mato Grosso, Poconé (56°40.215'W, 16°25.029'S), 03.2011, area 3, Proba 3, collected by Mini-Winkler' (UMFT, UIC).

**Diagnosis.** According to the head/pronotum width ratio of 0.94, this species belongs to the *M. unicolor* group including the species *M. adisi* Irmmler, 2007a, *M. paraensis* Irmmler, 2010, *M. unicolor* Irmmler, 1981 and *M. hanagarthi* Irmmler, 2007a. However, the aedeagus resembles that of *M. elytrata* regarding the outthrusted apical branch of the endophallus. The eyes in *M. elytrata* are much larger and more prominent than in *M. marquesi* sp. nov., the colouration is lighter, more light red and not brown as in *M. marquesi* sp. nov.

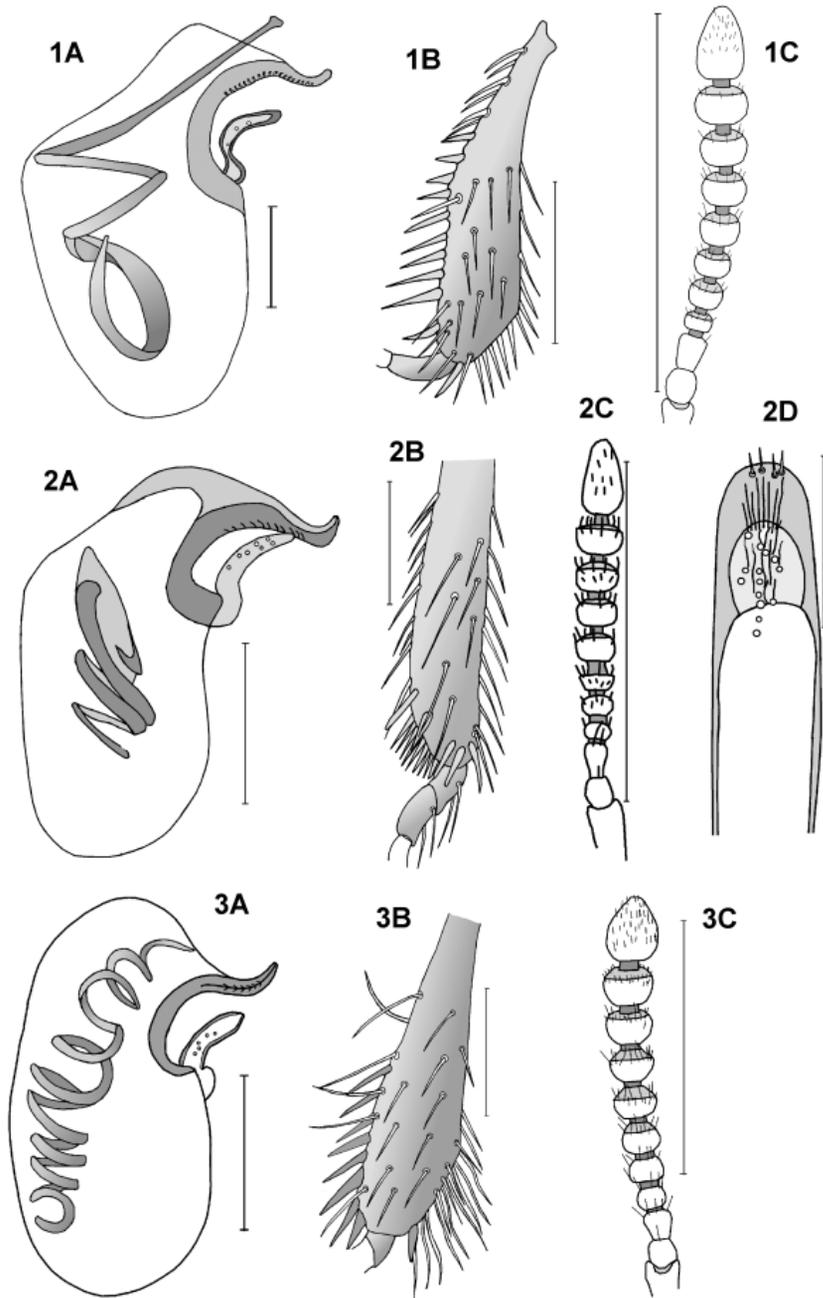
**Description.** Length: 1.9 mm. Colouration reddish brown; posterior margin of elytra black; legs and antennae slightly lighter reddish; clypeus yellow.

Head 0.27 mm long, 0.40 mm wide; eyes large, slightly prominent; temples only one fourth as long as eyes; setiferous punctation moderately dense; on average, interstices between punctures as wide as or slightly shorter than diameter of punctures; on supraocular area, punctation denser than on disc; microsculpture net-like, but only moderately deep; surface slightly shiny.

Antennae with second antennomere globular; third antennomere conical and slightly longer than second; fourth antennomere quadrate and not wider than third; following antennomeres increasing in width; penultimate antennomere nearly twice as wide as long.

Pronotum 0.32 mm long, 0.40 mm wide; in front of posterior emargination nearly parallel; only slightly narrowed to anterior angles; setiferous punctation deep and dense; on average, distance between punctures half as wide as diameter of punctures; net-like microsculpture more distinct and deeper than on head; surface matte.

Elytra 0.45 mm long, 0.46 mm wide; with similar setiferous punctation as on pronotum, but less dense; on average, distance between punctures as wide as diameter of punctures; net-like microsculpture still deeper than on pronotum; surface matte.



Figs 1–3. 1 – *Mimogonia marquezii* sp. nov.; 2 – *M. baloghi* sp. nov.; 3 – *M. duckei* sp. nov. Body parts: A – aedeagus in lateral aspect; B – male mesotibia; C – antenna; D – last sternite. Scale bars: A, B, D – 0.1 mm, C – 0.5 mm.

Mesotibia of male with short comb-like setation on inner apical diagonal edge.

Aedeagus large; with S-shaped apex; inner apical edge with long row of small short grooves; endophallus spiralled, with long apical branch emerging central lobe.

**Etymology.** The specific name refers to the collector of the species, my dear colleague Prof. Marínez Isaak Marquéz who supervised the intensive investigation on the Pantanal soil fauna.

**Distribution.** Known only from the Pantanal region of Mato Grosso, Brazil.

*Mimogonia duckei* sp. nov.

(Figs 3, 16C)

**Type locality.** Brazil, Estado Amazonas, Manaus.

**Type material.** HOLOTYPE: ♂, 'Brazil, Amazonas, Reserva Ducke, 26 km NE of Manaus, flight intercept trap, 1995–1996, #2003-84 (BMNH). PARATYPES: 2♀, with same data as holotype (BMNH).

**Diagnosis.** This species can be identified by the large coarse setiferous punctation of the fore-body and the extremely wide elytra. According to the large prominent eyes, and a head/pronotum width ratio of 0.94, it resembles *M. adisi* Irmler, 2007a and *M. paraensis* Irmler, 2010. However, the elytra of *M. adisi* are longer than wide and in *M. paraensis* they are quadrate, whereas they are distinctly wider than long in *M. duckei* sp. nov.

**Description.** Length: 2.4 mm. Colouration dark brown; legs and antennae light brown.

Head 0.19 mm long, 0.46 mm wide; eyes large and distinctly prominent; temples extremely short; shape of fore-head semi-circular; setiferous punctation coarse and dense; interstices less than half as wide as diameter of punctures; moderately wide midline impunctate; close to neck between setiferous punctation with additional micro-punctation; remains of weak isodiametric microsculpture; surface moderately shiny.

Antennae longer than head and pronotum combined; second antennomere oval; as long as conical third; following antennomeres slightly increasing in width; fourth antennomere quadrate; tenth only slightly wider than long.

Pronotum 0.37 mm long, 0.49 mm wide; widest shortly behind middle; slightly narrowed in smooth curve to anterior obtuse angles; setiferous punctation coarse, partly coriaceous; punctures still larger than on head; on average, interstices between punctures one fourth as wide as diameter of punctures; remains of weak irregular microsculpture; wide midline without punctures and microsculpture except closely behind anterior edge; surface moderately shiny.

Elytra 0.58 mm long, 0.63 mm wide; coriaceous and densely punctate; on average, interstices between setiferous punctures less than half of diameter of punctures; remains of weak irregular microsculpture; surface moderately shiny.

Abdomen densely punctate, but setiferous punctures much finer than on fore-body; isodiametric microsculpture distinct.

Mesotibia of male with row of spines at apical outer edge; in apical third, inner edge transversely narrowed to apex and with several long and undulate setae.

Aedeagus with short hook-like curved apical lobe; apical lobe laterally with striate structure; endophallus thin, but coiled many times.

**Etymology.** This species is named in honour of the famous Brazilian Naturalist Adolpho Ducke, whose name was adopted as the name of the location (i.e. Reserva Ducke) where this new species was collected.

**Distribution.** Known only from the type locality

### Key to the Brazilian *Mimogonia*

In total, ten species of *Mimogonia* are recorded from Brazil. The following key is provided to identify the Brazilian species based only on outer characters. Despite of that, the examination of the aedeagus is needed for a precise identification, because numerous new species may be expected.

1. Very small species, maximally 1.8 mm long. .... 2
  - Larger species, at least 1.9 mm long. .... 3
2. Whole body yellow. .... *M. unicolor* Irmiler, 1981
  - Head, posterior edge of elytra and abdominal segments VII and VIII brown. ....  
..... *M. tricolor* Irmiler, 1981
3. Large species, 2.8 mm long. .... *M. amazonica* Irmiler, 2010
  - Smaller species, 1.9–2.4 mm long. .... 4
4. Eyes very large and distinctly prominent, head/pronotum width ratio 1.18. ....  
..... *M. longipes* Irmiler, 2010
  - Eyes smaller, head/pronotum width ratio smaller than 1.00. .... 5
5. Antennae shorter than head and pronotum combined. .... *M. similis* Irmiler, 1981
  - Antennae at least as long as head and pronotum combined. .... 6
6. Microsculpture of pronotum weak or absent, surface at least moderately shiny. .... 7
  - Microsculpture of pronotum distinct; surface matte. .... 9
7. Elytra longer than wide, microsculpture of elytra distinct. .... *M. adisi* Irmiler, 2007
  - Elytra quadrate or wider than long, microsculpture of elytra weak. .... 8
8. Elytra wider than long, dark brown, elytra much wider than pronotum, pronotum/elytra width ratio 0.77. .... *M. duckei* sp. nov.
  - Elytra quadrate, light reddish brown, elytra only slightly wider than pronotum, pronotum/elytra width ratio 0.86. .... *M. paraensis* Irmiler, 2010
9. Sides of pronotum parallel in anterior half. .... *M. marquesi* sp. nov.
  - Sides of pronotum widest in middle. .... *M. antennata* Irmiler, 1981

### *Holotrochus* Erichson, 1839

#### *Holotrochus adisi* sp. nov.

(Figs 7, 17D)

**Type locality.** Brazil, Prov. Amazonas, Manaus, Ilha do Marchantheria.

**Material.** HOLOTYPE: ♂: 'Brazil, Amazonas, Manaus, Rio Solimões, Ilha do Marchantheria (59°57.710'W, 3°14.715'S), 14.09.1981, leg. J. Adis' (INPA). PARATYPES: 2 ♀♀, data as holotype, but 16.02.1982 (INPA, UIC); 1 ♀, Dec. 1981 (UIC); 2 ♀♀, 18.2.1982 (UIC); 1 ♀, 14.9.1981 collected by emergence traps (UIC); 1 ♀, 02.12.1981, collected by tree emergence trap (UIC); 1 ♀, 02.05.1981, collected by tree emergence trap (UIC).

**Diagnosis.** This species is extremely similar to *H. pubescens* Sharp, 1876 in size, shape and matte microsculpture. It can be differentiated from *H. pubescens* by the longer antennae, in

particular, the longer antennomeres 3 to 6. Moreover, the short emargination in front of the posterior pronotal angles differs from *H. pubescens* in the more obtuse angles. It differs from *H. siolii* Irmeler, 2000 by the shape of the pronotum. As in *H. pubescens*, the pronotum of *H. adisi* sp. nov. is widest shortly behind the middle, whereas in *H. siolii* it is widest shortly in front of the posterior angles.

**Description.** Length: 3.3 mm. Colouration dark brown; legs and antennae yellow; clypeus reddish.

Head 0.40 mm long; 0.53 mm wide; eyes large, slightly prominent and as long as temples; clypeus trapezoidal; without punctation but pubescent; with long yellow pubescence; isodiametric microsculpture deep; surface matte.

Antennae nearly as long as head and pronotum combined; first antennomere rectangular and thick, second oblong, third conical; third antennomere 1.5 times as long as second and fourth; fifth and sixth antennomeres thicker than preceding antennomeres, but shorter and still longer than wide; following 4 antennomeres more or less globular.

Pronotum 0.54 mm long, 0.67 mm wide; widest behind middle; smoothly narrowed in convex curve to anterior angles; anterior angles not visible in dorsal aspect; in front of posterior angles shortly emarginate; posterior angles nearly rectangular; with oval depression at posterior angles; sides crenate and without margin; disc without punctation, but long yellow pubescence; pubescence on lateral part pointing transversely to central posterior edge; at posterior depressions pointing to posterior angles, and along midline pointing posteriad; isodiametric microsculpture distinct; surface matte.

Elytra 0.87 mm long, 0.90 mm wide; without punctation, but with same yellow pubescence as on head and pronotum; hairs pointing posteriad; isodiametric microsculpture deep; surface matte.

Abdomen with similar pubescence as on fore-body, but microsculpture less distinct; thus, surface less matte; last tergite trapezoidal and with short teeth at outer angles.

Aedeagus with short basal part and longer apical part; apical part smoothly curved to acute apex; parameres S-shaped; endophallus with short straight basal part and irregularly spiralled apical part.

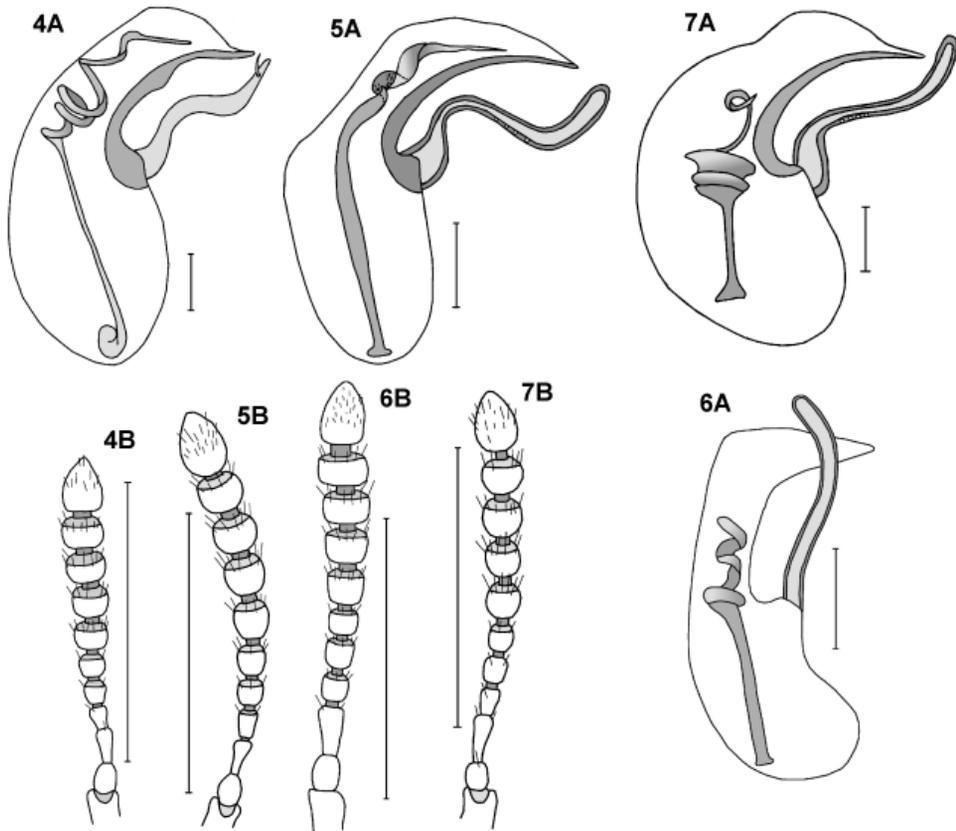
**Etymology.** This species is named in honour of the late Prof. Joachim Adis, a former colleague of mine who collected it during his investigations in the floodplains of the Varzêa of the Rio Solimões.

**Distribution.** Known only from the type locality

### Key to the species of the *Holotrochus pubescens* group

The species of this group are characterised by the pubescent body and the margined anterior edge of the pronotum.

1. Small species, not longer than 2.5 mm. .... 2
- Larger species, at least 3.0 mm. .... 3
2. Punctation of fore-body sparse and fine, interstices between punctures wider than diameter of punctures. .... *H. subtilis* Sharp, 1876
- Punctation of fore-body coarse and dense, interstices between punctures much smaller than diameter of punctures. .... *H. danoffburgi* Irmeler, 2001



Figs 4–7. 4 – *Holotrochus pubescens* Sharp, 1876; 5 – *H. siolii* Irmler, 2001; 6 – *H. amazonicus* Irmler, 1981; 7 – *H. adisi* sp. nov. Body parts: A – aedeagus in lateral aspect; B – antenna. Scale bars: A – 0.1 mm, B – 0.5 mm.

3. Pronotum widest close to posterior angles (Fig. 17E); evenly narrowed to smoothly rounded anterior angles, antennomeres 6 and 7 more or less quadrate (Fig. 5). ..... *H. siolii* Irmler, 2001
- Pronotum widest close to middle; sides evenly narrowed to obtuse or rectangular posterior and obtuse anterior angles, antennomeres 6 and 7 either quadrate or wider than long. .... 4
4. Antennomeres 6 and 7 wider than long (Fig. 4), pronotum evenly narrowed to posterior angles, posterior angles obtuse (Fig. 17A). ..... *H. pubescens* Sharp, 1876
- Antennomeres 6 and 7 quadrate, pronotum with short emargination in front of posterior angles, posterior angles rectangular. .... 5
5. Smaller species, 3.3 mm long (Fig. 17D). ..... *H. adisi* sp. nov.
- Larger species, 3.7 mm long (Fig. 17B). ..... *H. amazonicus* Irmler, 1981

***Holotrochus paraguensis* sp. nov.**

(Figs 10, 18A)

**Type locality.** Paraguay, Puerto Presidente Stroessner.**Type material.** HOLOTYPE: ♂, 'Paraguay, Puerto Presidente Stroessner, Hungarian (54°36' W, 25°31' S) Soil-Zool. Exp., Acaray waterfall, 02.01.1966, leg. I. Loksa' (HNHM). PARATYPES: 1 ♂ 2 ♀♀, with the same data as holotype (HNHM, UIC); 2 ♀♀ from the same location, but not from Acaray waterfall, 26.12.1965, leg. I. Loksa (HNHM); 1 ♀; from the same location, but 30.12.1965, leg. L.S. Mahunka (HNHM); 1 ♀, Brazil, São Paulo, without date, leg. B.J. György (HNHM); 1 ♀, 'Paraná, Iguacú, National Park, 05.01.1966, leg. I. Loksa' (HNHM).**Diagnosis.** This species belongs to the *Holotrochus minor* group due to its small size, the absence of pubescence on the abdomen and the partly margined front edge of the pronotum. Regarding the shape of the pronotum with its more or less parallel sides, it mostly resembles *H. inpai* Irmeler, 1981 and *H. ashei* Irmeler, 2005. However, the species in the *H. minor* group are mainly separated by the structure of the endophallus. Most other species in the group have a straight basal part and a twisted apical part of the endophallus. A throughout twisted endophallus is also developed in *H. schubarti* Irmeler, 1981, but in this species the endophallus developed 5 coils with a distinctly larger apical coil. Thus, the species mostly resembles *H. tortilis* sp. nov. that also has a twisted endophallus, but in *H. tortilis* sp. nov. two wide torsions are developed, while in *H. paraguensis* sp. nov. three short coils are existing. Furthermore, the species can be easily separated by the elytra that have rectangular shoulders in *H. tortilis* sp. nov., but smoothly rounded shoulders in *H. paraguensis*.**Description.** Length: 3.0 mm. Colouration dark brown; posterior margin of pronotum and elytra, and parallel to suture of elytra, lighter reddish; legs red; antennae yellow.

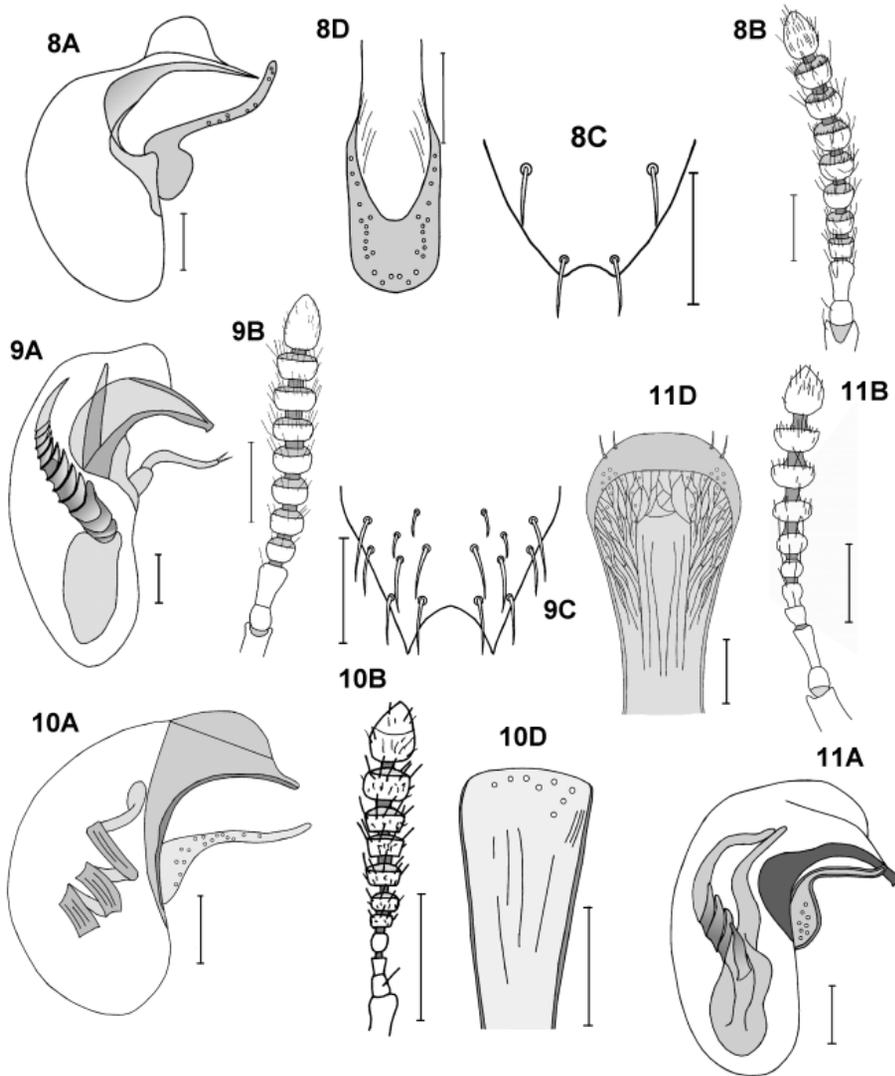
Head 0.34 mm long, 0.50 mm wide; eyes slightly prominent, as long as temples; fore-head smoothly rounded, with supraocular margin continuing to base of antennae; within margin four setiferous punctures; on a line between posterior edges of eyes four setiferous punctures; interstices between inner setiferous punctures nearly four times as wide as interstices between inner puncture and outer puncture; along front edge of clypeus with row of short yellow setae; irregular punctation on vertex moderately dense and deep; on average, interstices between punctures slightly wider than diameter of punctures; sparse micro-punctation on disc; at neck, punctation slightly sparser than on fore-head; surface without microsculpture, polished.

Antennae slightly longer than head; second antennomere oval, distinctly thicker than conical third; fourth antennomere as thick as third, but only half as long as third; following antennomeres increasing in width; fourth antennomere nearly quadrate; tenth antennomere nearly twice as wide as long.

Pronotum 0.54 mm long, 0.67 mm wide; widest in the posterior third; nearly parallel in middle and shortly rounded at posterior and anterior angles; sides with narrow margin from posterior angles to anterior angles and shortly continuing to anterior edge; shortly in front of anterior angles, margin hidden in dorsal aspect, but again distinctly visible at anterior angles; punctation moderately deep and dense; on average, interstices between punctures slightly wider than diameter of punctures; distinct micro-punctation between normal punctation; surface without microsculpture, polished and shiny.

Elytra 0.64 mm long, 0.69 mm wide; shoulders smoothly rounded; with finer punctation than pronotum, but with deep coriaceous ground-sculpture; surface less shiny than head and pronotum.

Abdomen with fine punctation and weak net-like microsculpture; laterally, with few setiferous punctures; surface still less shiny than elytra. Shape of last sternite triangular and with punctures and ridges at apex.



Figs 8–11. 8–*Holotrochus yasuniensis* sp. nov.; 9–*H. mrazi* sp. nov.; 10–*H. paraguensis* sp. nov.; 11–*H. hamatus* sp. nov. Body parts: A – aedeagus; B – antenna, C – tergite XII, D – last sternite. Scale bar: 0.1 mm.

Aedeagus with straight apex and more or less straight parameres; endophallus with three short torsions and additional half apical torsion.

**Etymology.** The specific name is derived from the name of the country where the species was found.

**Distribution.** Known only from Paraguay and southern Brazil (State of São Paulo).

*Holotrochus tortilis* sp. nov.

(Figs 12, 18B)

**Type locality.** Bolivia, Province Beni, Guayaramerin.

**Type material.** HOLOTYPE: ♂, 'Bolivia, Prov. Beni, Guayaramerin (65°22.07' W, 10°49.25' S), banks of the Rio Marmoré, sampled by Berlese method, 26.11.1966, leg. J. Balogh' (HNHM). PARATYPES: 1 ♀, from the same location as the holotype (HNHM); 1 ♂, 'Suriname, Albina (54°03.25' W, 5°30.04' N), 01.06.1981, leg. D. Balázs' (UIC).

**Diagnosis.** This species certainly belongs to the *Holotrochus minor* group due to the same combination of character as mentioned above under *H. paraguensis* sp. nov.. Concerning the structure of the fore-body, the two species *H. tortilis* sp. nov. and *H. paraguensis* sp. nov. are mainly distinguished by the shape of the pronotum and the shape of the shoulders of elytra. Furthermore, the elytra in *H. tortilis* are slightly wider and the punctuation is slightly coarser than in *H. paraguensis* sp. nov.

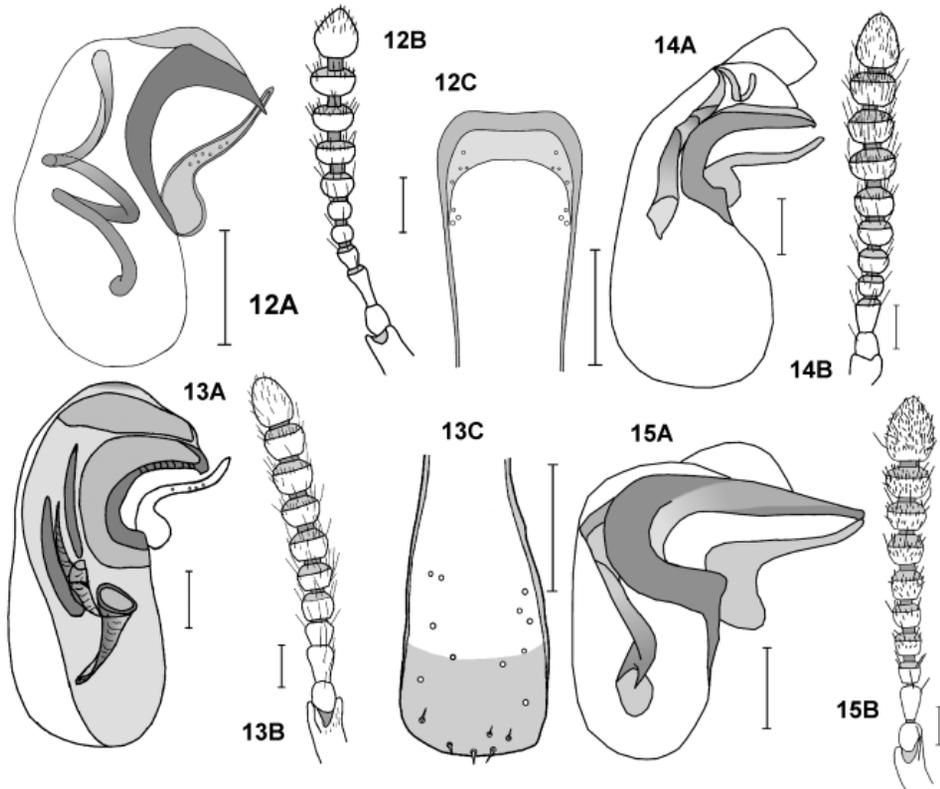
**Description.** Length: 3.2 mm. Colouration dark brown; small posterior margin of pronotum lighter reddish; legs red; antennae yellow.

Head 0.38 mm long, 0.55 mm wide; eyes slightly prominent, as long as temples; with supra-ocular margin continuing to base of antennae; within margin, row of 4 setiferous punctures; on a line between posterior edge of eyes, four setiferous punctures; interstices between inner setiferous punctures nearly twice as wide as distance between inner and outer punctures; punctuation moderately deep and dense; at clypeus denser than on vertex; on average, interstices between punctures as wide as diameter of punctures; with sparse micro-punctuation between normal punctures; surface without microsculpture, polished and shiny.

Antennae slightly longer than head; second antennomere globular; distinctly smaller than first and distinctly wider than conical third antennomere; third antennomere 1.5 times longer than second; antennomere 4 to 6 more or less quadrate only slightly increasing in width; seventh antennomere distinctly wider than sixth; following antennomeres increasing in width; tenth antennomere more than twice as wide as long.

Pronotum 0.55 mm long, 0.71 mm wide; widest in middle; more narrowed to posterior angles than to anterior angles; sides distinctly margined from posterior angles to anterior angles; lateral margin visible throughout its total length and continuing to front edge; punctuation deep and dense; interstices between punctures on most parts as wide as diameter of punctures; near front angles with sparser punctuation; narrow midline in posterior half impunctate; without microsculpture; surface polished and shiny.

Elytra 0.65 mm long, 0.73 mm wide; shoulders more or less rectangular, with short prominent tooth; punctuation deep, dense, and partly coriaceous; with coriaceous ground sculpture; surface less shiny than pronotum.



Figs 12–15. 12 – *Holotrochus tortilis* sp. nov.; 13 – *H. lobatus* sp. nov.; 14 – *H. agostii* sp. nov.; 15 – *H. pseudoleticiae* sp. nov. Body parts: A – aedeagus; B – antenna; C – last sternite. Scale bar: 0.1 mm.

Abdomen finely and densely punctate; with deep and dense net-like microsculpture, in particular on tergite VII; surface matte; last sternite triangular with few lateral punctures.

Aedeagus with acute apex pointing reverse; endophallus with two large torsions; parameres more or less straight; slightly outreaching apex of central lobe.

**Etymology.** The specific name is the Latin adjective *tortilis* meaning “twisted” and refers to the twisted endophallus of the aedeagus.

**Distribution.** Known only from Bolivia and Suriname.

### *Holotrochus hamatus* sp. nov.

(Figs 11, 18C)

**Type locality.** Paraguay, Puerto Presidente Stroessner.

**Type material.** HOLOTYPE: ♂, ‘Paraguay, Puerto Presidente Stroessner (54°36’ W, 25°31’ S), Hungarian Soil-Zool. Exp., 06.01.1966, leg. L.S. Mahunka’ (HNHM).

**Diagnosis.** This species certainly belongs to the *H. simplex* group due to the size, existence of a margined front edge of pronotum, and the absence of abdominal pubescence. *Holotrochus hamatus* is characterised by its short antennae with the fourth antennomere wider than long and the pronotum widest in the middle. Similarly short antennae are found in *H. blackwelderi* Irmeler, 1981, but total size of the body is distinctly smaller. Among the most other similarly sized species of the group, the pronotum is widest in the apical third. In this respect *H. hamatus* resembles *H. vianai* Bernhauer, 1939 within the species found from the same region, but the structure of the endophallus differs significantly. In contrast to *H. hamatus*, the endophallus of *H. vianai*, is simply spiralled with a row of short apical teeth.

**Description.** Length: 4.2 mm. Colouration black, elytra slightly lighter, brown; fine posterior margin of pronotum reddish; legs and antennae red.

Head 0.65 mm long, 0.81 mm wide; eyes not prominent; temples nearly twice as long as eyes; with fine supraocular margin continuing to base of antennae; 4 setiferous punctures within the margin; front edge with several setiferous punctures; on a line between posterior edge of eyes with row of four setiferous punctures; interstices between inner punctures twice as wide as interstices between inner punctures and outer punctures; irregular punctation on vertex distinct; on average, distance between punctures distinctly wider than diameter of punctures; without microsculpture on vertex, but with sparse and fine micro-punctation; surface polished and shiny.

Antennae short, only slightly longer than head; second antennomere globular and only half as long as conical third; fourth antennomere again wider than long; following antennomeres slightly increasing in width; tenth antennomere twice as wide as long.

Pronotum 0.38 mm long, 0.84 mm wide; widest in the middle; in posterior half only slightly narrowed, nearly parallel; in anterior half more distinctly narrowed; sides margined; margin continuing to anterior edge; in dorsal aspect, lateral margin partly hidden in anterior half; punctation similar as on head, but punctures posteriad increasing in size; irregular punctation on anterior half as dense as on head, on posterior half slightly denser; on average, interstices between punctures slightly shorter than diameter of punctures; with impunctate midline in posterior half; with very weak remains of microsculpture, but with sparse micro-punctation; surface shiny.

Elytra 1.07 mm long, 1.14 mm wide; shoulders distinct, nearly rectangular and with very short teeth; punctation coarse and moderately dense; in size and density, punctation similar to punctation of posterior pronotum; ground-sculpture coarse and coriaceous; surface less shiny than on head and pronotum.

Abdomen with very fine punctation; punctures almost half as large as punctures on head or pronotum; surface with distinct net-like microsculpture; surface less shiny than head and pronotum; last sternite widely rounded at apex, with numerous net-like striae and pair of groups of fine punctures.

Aedeagus with shortly curved apical part and obtuse apex; parameres shorter than apical part of central lobe; endophallus bilobed; dorsal lobe with row of four teeth.

**Etymology.** The specific name *hamatus* (Latin, adjective) means “hook-like”.

**Distribution.** Known only from the type locality

***Holotrochus yasuniensis* sp. nov.**

(Figs 8, 18D)

**Type locality.** Ecuador, Province Orellana, Yasuni.

**Type material.** HOLOTYPE: ♂, Ecuador, Orellana (77°08.05'W, 0°41.38'S), E. Científica Yasuni, collected by fogging, 20.04.2011, leg. J. Torres (VAC, to be deposited in NHMW). PARATYPE: ♂, with same data as holotype (UIC).

**Diagnosis.** Concerning the size, punctuation and microsculpture of the fore-body, *H. yasuniensis* sp. nov. resembles *H. decumanus* Irmeler, 2005 from Central America that belongs to the *H. rufopygus* group. *Holotrochus yasuniensis* sp. nov. is characterised by the shape of the pronotum that seems to be unique in the Neotropical *Holotrochus* species. It can be identified easily by the slight lateral emargination in the anterior half.

**Description.** Length: 5.1 mm. Colouration black; legs and antennae light brown.

Head 0.50 mm long, 0.81 mm wide; eyes large and not prominent, slightly longer than temples; sides of clypeus narrowed to anterior edge in smooth convex curve; vertex evenly punctate; punctuation on fore-head denser than posteriorly; supraocular area from base of antennae to posterior edge of eyes impunctate; several setae on supraocular carina and pair of setae on neck; neck setae in equal distance to eyes as interstice between setae; weak net-like microsculpture; surface slightly shiny.

Antennae as long as head and half of pronotum combined; first antennomere rectangular and thick, second oval and slightly smaller than first; conical third two times as long as second; fourth and fifth antennomere quadrate; following antennomeres slightly increasing in width; penultimate antennomere nearly twice as wide as long.

Pronotum 0.89 mm long, 1.17 mm wide; widest at middle; slightly narrowed to anterior and posterior angles; in anterior half smoothly emarginate; in posterior half slightly concave, but nearly straight; anterior angles distinctly prominent; thus, anterior edge widely emarginate; sides and most parts of anterior edge margined; in dorsal aspect, lateral margin visible throughout its total length; at anterior angles, margin distinctly thicker than laterally and at anterior margin; punctuation moderately dense and deep; slightly deeper than on head; interstices between punctures irregular, but, on average, twice as wide as diameter of punctures; weak net-like microsculpture; surface slightly shiny.

Elytra 1.20 mm long, 1.26 mm wide; with even punctuation; punctures larger and partly denser than on pronotum; on average, distance between punctures as wide as diameter of punctures; net-like microsculpture weak; meshes of microsculpture wider than on pronotum; surface slightly shiny.

Abdomen with sparser and weaker punctuation than on fore-body; laterally and ventrally pubescent; net-like microsculpture denser than on fore-body; thus, surface matte; abdominal tergite VIII with smooth oval depression, depression without distinct border.

Aedeagus with similarly long basal and apical part; apical part in nearly rectangular angle to basal part; apical part carinate from base of parameres to acute apex; parameres sinuate; endophallus indistinct as short tube.

**Etymology.** The specific name is an adjective derived from the region of Yasuni where the species was collected.

**Distribution.** Known only from the type locality

***Holotrochus mrazi* sp. nov.**

(Figs 9, 18E)

**Type locality.** Brazil, Province Minas Gerais, São Paulo.**Type material.** HOLOTYPE: ♂, 'Brazil, Minas Gerais, Sao Pãolo, June 1914, leg. Mraz' (NMPC). PARATYPES: 2 ♀♀, with same data as holotype (NMPC, UIC).**Diagnosis.** The species is closely related to *H. vianai* and *H. hamatus* sp. nov. in shape, punctuation, and absence of microsculpture of fore-body. All three species are characterised by the specific structure of the aedeagus with a minute tooth on the inner side of the apex and the spiralled apical part of the endophallus. *Holotrochus mrazi* sp. nov. is distinctly longer than the two other species that are only 4.2 and 4.5 mm long. Without dissecting the aedeagus, a certain identification is not possible. In contrast to *H. hamatus* sp. nov. and *H. vianai*, the apical spiral part of the endophallus is larger and thicker and has more coils.**Description.** Length: 4.9 mm. Colouration black, elytra dark reddish, legs and antennae light brown.

Head 0.40 mm long, 0.84 mm wide; eyes slightly prominent; 1.5 times as long as temples; shape of fore-head semicircular with slight central emargination; punctuation of vertex dense; on average, interstices between punctures smaller than diameter of punctures; between normal punctures with sparse micro-punctuation; clypeus with remains of transverse microsculpture; vertex without microsculpture; surface polished and shiny.

Antennae short and thick; slightly longer than head; second antennomere globular; third antennomere conical and nearly twice as long as second; following antennomeres wider than long; antennomeres 6 to 11 wider than preceding antennomeres; penultimate antennomere nearly twice as long as wide.

Pronotum 0.90 mm long, 1.18 mm wide; widest in anterior third; anterior angles obtuse and slightly prominent; anterior edge emarginate, but with slight central prominence; sides in posterior half evenly narrowed to posterior angles; posterior angles obtusely rounded; lateral margin continuing to front edge; only central prominence not margined; punctuation even, less dense, but as deep as on head; close to posterior edge denser than in anterior half; interstices between punctures in anterior half 2–3 times as wide as diameter of punctures; with indistinct impunctate midline in posterior half; at posterior angles with indistinct depression.

Elytra 1.05 mm long, 1.16 mm wide; with deep coriaceous ground sculpture; punctures larger than on pronotum, but hardly visible in deep ground sculpture; scutellum semicircular.

Abdomen sparsely punctate and with weak net-like microsculpture.

Aedeagus hook-like at apex; apex strongly sclerotized; shortly obtuse and at inner edge of apex with short minute tooth; endophallus sack-like at base and spiralled at apex.

**Etymology.** The specific name refers to the collector of the species, Jaro Mráz (\*1880–†1927).**Distribution.** Known only from the type locality.***Holotrochus lobatus* sp. nov.**

(Figs 13, 18F)

**Type locality.** Panama, Province Chiriqui, La Fortuna.**Type material.** HOLOTYPE: ♂, 'Panama, prov. Chiriqui, La Fortuna Cont. Divide Trail (8°47.76'N, 82°14.75'W), montane forest, beating, 7.IX.2010, leg. L. Sekerka' (BMNH).

**Diagnosis.** This species can be easily identified by the specific structure of the anterior edge of the head. A similar structure is found also in *H. trilobatus* Irmler, 2010 from Argentina. However, in *H. trilobatus* the trilobate structure is placed behind the clypeus between the base of antennae, whereas in *H. lobatus* sp. nov. it borders the anterior edge of the head. Based on the shape of the lateral margin, the species might be placed in the *H. picescens* group. In this respect it also differs from *H. trilobatus* in a finely margined anterior edge of the pronotum.

**Description.** Length: 4.1 mm. Colouration dark brown; legs and antennae light brown.

Head 0.39 mm long, 0.69 mm wide; shape more or less transversely rectangular; eyes not prominent and as long as temples; anterior edge bisinuate; with central triangular lobe; punctuation fine and sparse; on average, interstices between punctures more than twice as wide as diameter of punctures; isodiametric microsculpture weak, but distinct; surface moderately shiny.

Antennae with thick basal antennomere; second antennomere only half as wide as first and only half as long as conical third antennomere; following antennomeres slightly increasing in width; fourth antennomere quadrate; tenth only slightly wider than long.

Pronotum 0.75 mm long, 0.92; widest closely behind widely rounded anterior angles; evenly and slightly narrowed to more or less rectangular posterior angles; lateral margin fine; slightly thicker at anterior angles; ending in elevated curve at anterior angles; anterior and posterior edge without margin; punctuation fine and sparse; size and density of punctures increasing from anterior to posterior edge; on average, interstices twice as wide as diameter of punctures; isodiametric microsculpture weak; surface moderately shiny.

Elytra 0.93 mm long, 0.99 mm wide; with coriaceous ground sculpture; punctuation still finer and sparser than on head and pronotum: nearly invisible in coarse ground sculpture.

Abdomen with punctuation deeper and denser than on fore-body; net-like microsculpture more distinct than on pronotum and surface less shiny.

Aedeagus with short and slender parameres; parameres as long as short apical lobe; apical lobe at inner edge of apex with short and minute tooth; inner edge with striate structure; endophallus with two long teeth and short wide torsions.

**Etymology.** The specific name is Latin adjective, *lobatus*, meaning lobed and referring to the bisinuate anterior edge of the head with two wide outer lobes and a triangular central lobe.

**Distribution.** Known only from the type locality.

### *Holotrochus agostii* sp. nov.

(Figs 14, 19A)

**Type locality.** Brazil, Bahia, Cerro Grande.

**Type material.** HOLOTYPE: ♂, Brazil, Bahia, Urucuca, Cerro Grande (39°03.43'W, 14°25.17'S), primary Atlantic forest, 120 m elevation, 28.I.1995, leg. D. Agosti (AMNH).

**Diagnosis.** This species certainly belongs to the *H. syntheticus* group concerning its densely pubescent abdomen. It resembles *H. poundi* Blackwelder, 1943 due to the shape and sparse punctuation of the pronotum. However, the posterior half of the pronotum of *H. poundi* is more or less parallel, whereas it is slightly narrowed in *H. agostii* sp. nov. Nevertheless, it can be hardly differentiated from *H. poundi* without dissection of the aedeagus: The apical lobe of the aedeagus in *H. poundi* is more slender and much longer than in *H. agostii* sp. nov. The apical lobe of *H. agostii* sp. nov. is thicker and shorter.

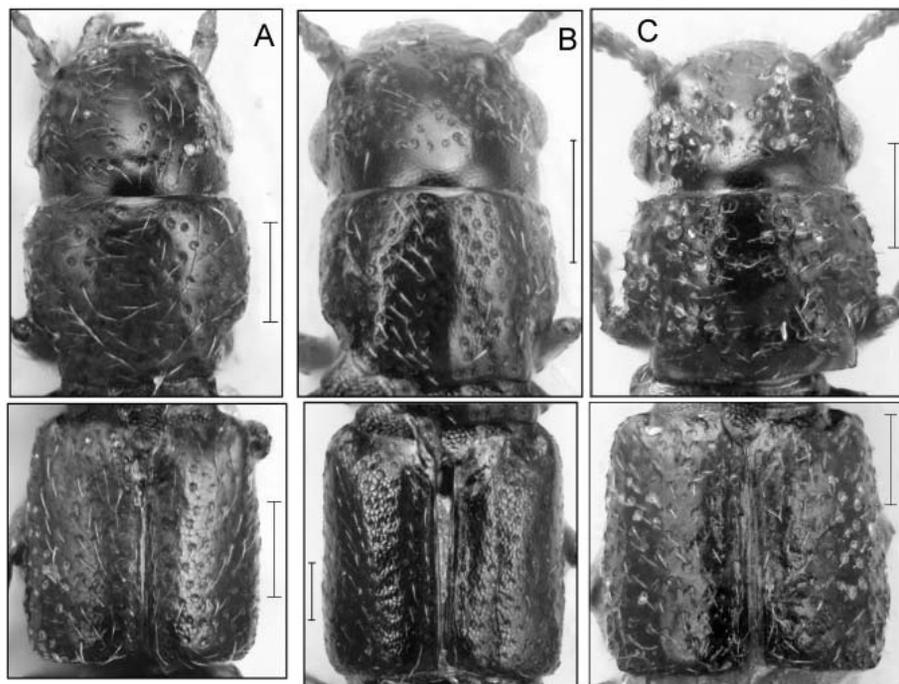


Fig. 16. Head, pronotum, and elytra of *Mimogonia* Coiffait, 1978 showing shape, punctation and microsculpture. A – *M. baloghi* sp. nov.; B – *M. marquesi* sp. nov.; C – *M. duckei* sp. nov. Scale bars: 0.2 mm.

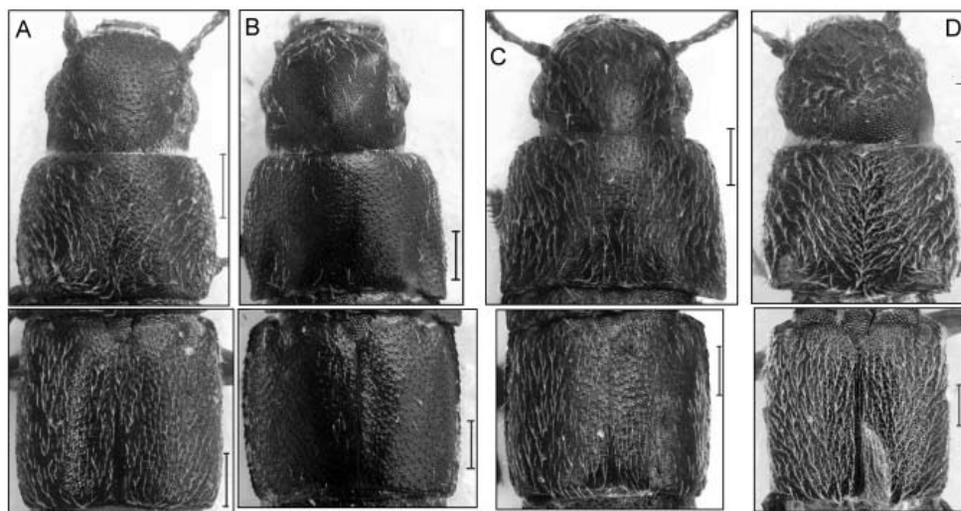


Fig. 17. Head, pronotum, and elytra of *Holotrochus* Erichson, 1839 showing shape, punctation, and microsculpture. A – *H. pubescens* Sharp, 1876; B – *H. amazonicus* Irmeler, 1981; C – *H. siolii* Irmeler, 2001; D – *H. adisi* sp. nov. Scale bars: 0.2 mm.

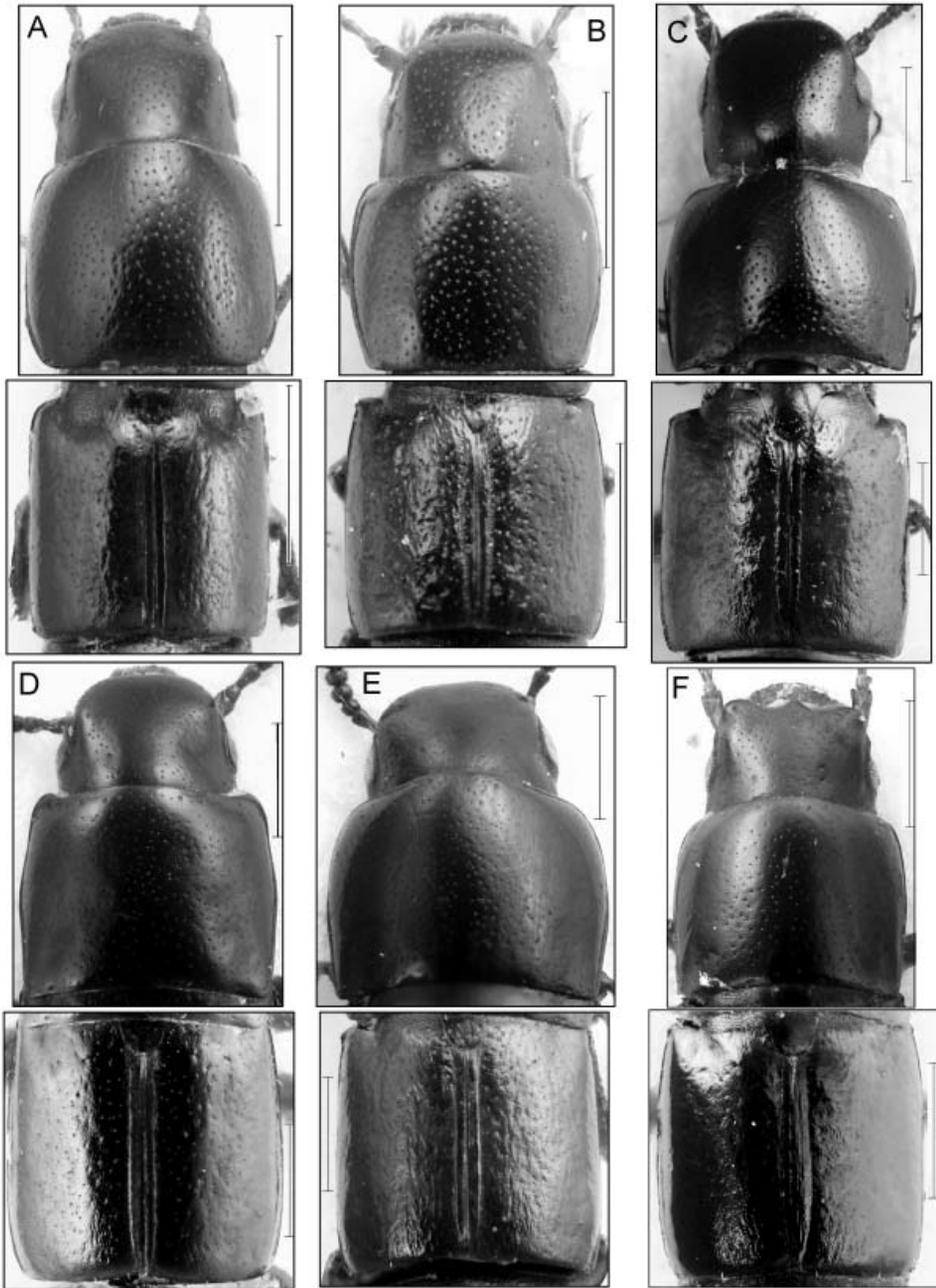


Fig. 18. Head, pronotum, and elytra of *Holotrochus* Erichson, 1839 showing shape, punctuation, and microsculpture. A – *H. paraguensis* sp. nov.; B – *H. tortilis* sp. nov.; C – *H. hamatus* sp. nov.; D – *H. yanuniensis* sp. nov.; E – *H. mrazi* sp. nov.; F – *H. lobatus* sp. nov. Scale bars: 0.5 mm.

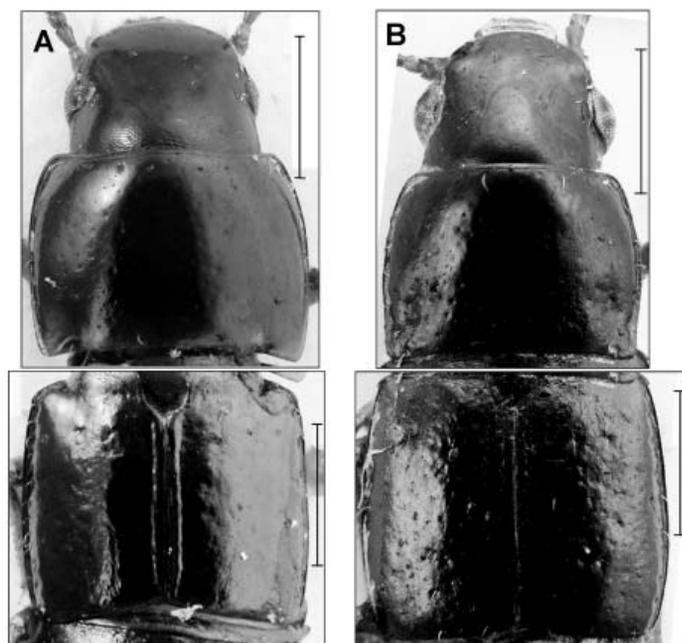


Fig. 19. Head, pronotum, and elytra of *Holotrochus* Erichson, 1839 showing shape, punctuation, and microsculpture. A – *H. agostii* sp. nov.; B – *H. pseudoleticiae* sp. nov. Scale bars: 0.5 mm.

**Description.** Length: 3.8 mm. Colouration dark brown; posterior margin of abdominal segments lighter brown; posterior margin and posterior angles of pronotum reddish; legs and antennae light red.

Head 0.45 mm long, 0.69 mm wide; eyes large; distinctly longer than temples; fore-head semicircular; punctuation fine and sparse; interstices nearly three times as wide as diameter of punctures; two setiferous punctures on clypeus; four setiferous punctures on vertex placed in quadrate and two supraocular setiferous punctures; without microsculpture; surface polished.

Antennae slightly longer than head and half of pronotum combined; second antennomere nearly globular; conical third antennomere 1.5 times longer than second; following antennomeres distinctly increasing in width; tenth antennomere twice as wide as fourth; fourth antennomere quadrate; tenth antennomere 1.5 times as wide as long; antennomeres six to eleven with dense setation.

Pronotum 0.69 mm long, 0.97 mm wide; widest in middle; narrowed in smooth curve to anterior and posterior angles; lateral margin thick; combined with anterior margin; posterior edge not margined; margin thickest at anterior angles; punctuation sparse and fine; interstices between punctures between three to four times as wide as diameter of punctures; row of setiferous punctures at anterior margin and few setiferous punctures in lateral margin; two setiferous punctures on each side at posterior edge; without microsculpture, but partly with very weak coriaceous ground sculpture; between normal punctuation with sparse micro-punctuation; surface shiny.

Elytra 0.83 mm long, 0.99 mm wide; with very weak punctation; nearly invisible in coarse coriaceous ground sculpture; lateral margin wide; numerous setiferous punctures in lateral margin; on anterior disc, two setiferous punctures on each side placed in longitudinal row.

Aedeagus with short apical lobe; apical lobe thick and ending in hook-like apex; endophallus slightly curved in basal part; apical part with two torsions; paramere weakly sinuate and as long as apical lobe.

**Etymology.** The specific name is derived from its collector D. Agosti.

**Distribution.** Known only from the type locality.

***Holotrochus pseudoleticiae* sp. nov.**

(Figs 15, 19B)

**Type locality.** Peru, Departamento Loreto, San Jacinto.

**Type material.** HOLOTYPE: ♂, Peru, Dept. Loreto, Campamento San Jacinto (75°51.77'W, 2°18.75'S), 175–215 m, flower fall berlese, 2. July 1993, leg. R. Leschen (KSEM). PARATYPE: ♂, Peru, Dept. Loreto, Campamento San Jacinto (75°51.77'W, 2°18.75'S), 175–215 m, rainforest berlese, 6. July 1993, leg. R. Leschen (UIC).

**Diagnosis.** This species belongs to the *H. syntheticus* group due to the pubescent abdomen. It resembles *H. leticiae* Irmler, 1987 by the large prominent eyes and the clavate antennae. *H. pseudoleticiae* sp. nov. is distinctly larger than *H. leticiae*. The parameres of *H. leticiae* are straight; whereas they are sinuate in *H. pseudoleticiae* sp. nov. The endophallus of both species is tube-like and nearly without coils.

**Description.** Length: 3.8 mm. Colouration black; very narrow posterior margin of pronotum lighter brown; legs and antennae yellow.

Head 0.51 mm long, 0.85 mm wide; eyes very large and prominent; at least two times longer than temples; fore-head semicircular; punctation fine and sparse; on average, interstices between punctures at least two times as wide as diameter of punctures; few setiferous punctures on clypeus; four setiferous punctures on vertex placed in quadrate; few setiferous punctures on supraocular area; remains of isodiametric microsculpture; surface polished and shiny.

Antennae as long as head and half of pronotum combined; second antennomere oblong and slightly shorter than conical third; following antennomeres extremely increasing in width and covered by numerous short and long setae; apical antennomere 2.5 times wider than fourth; fourth antennomere quadrate; nearly two times as wide as long.

Pronotum 0.55 mm long, 0.91 mm wide; widest in middle; slightly and evenly narrowed to posterior angles; more strongly narrowed in smooth curve to anterior angles; posterior angles nearly rectangular; lateral margin distinct; in dorsal aspect, visible throughout its total length; combined with anterior margin; punctation moderately sparse and deep; punctures of different size; on average, interstices between punctures at least two times as wide as diameter of punctures; along anterior margin with row of setiferous punctures; another longitudinal row of setiferous punctures in lateral margin; close to posterior angles a further setiferous puncture; distance between posterior angle and setiferous puncture at least two times of diameter of puncture; between normal punctures with sparse micro-punctation; without microsculpture; surface polished and shiny.

Elytra 0.91 mm long, 1.00 mm wide; with distinct rectangular shoulders, marked by short prominent teeth; widest shortly behind middle; punctation deeper, but not denser than on

pronotum; few setiferous punctures on disc and longitudinal row of setiferous punctures in lateral margin; weak coriaceous ground sculpture.

Aedeagus with long apical lobe; placed in rectangular angle to basal lobe; apex with short tooth; tube like endophallus with indistinct torsions; sinuate parameres as long as apical lobe.

**Etymology.** The specific name is derived from the close resemblance to *H. leticiae* and means similar as *H. leticiae*.

**Distribution.** Known only from the type locality.

## Discussion

The genus *Mimogonia* is currently represented in South America by 20 species including the three most recent additions (IRMLER 1981, 2005, 2007, 2010, present study). The genus is highly speciose in Brazil and Peru, containing 10 and 8 species, respectively. The new species *Mimogonia baloghi* sp. nov. is the first record of the genus from Paraguay. One species is recorded each from Bolivia and French Guyana. Most species of *Mimogonia* are known only from one country and one location; and this likely indicates the insufficient knowledge about the distribution of the species. In nearly all collections containing *Mimogonia* studied in the previous decades, new species were found. Thus, the presently known number of species certainly shows only a fraction of the actually occurring number of species. As none of the collections studied had representatives of the genus from Central America or the Caribbean, it seems that *Mimogonia* is restricted to the tropical region of South America.

In contrast to *Mimogonia*, the genus *Holotrochus* is distributed in all tropical countries of the world (HERMAN 2001). It is, therefore, also represented in all countries of the Neotropical Region from southern Mexico to Chile. Brazil and Panama have the larger number of species (32 and 23, respectively). High numbers were also found in Peru (19) and Ecuador (18), while only one species is found in Chile out of the currently known 102 species in the Neotropics. The southernmost species, *Holotrochus chilensis* Irmmler, 2005, from the Isla de Chiloe seems to be isolated from the remaining distribution of the genus, which has its southern border in southern Bolivia and northern Argentina. The *H. pubescens* group with *H. adisi* sp. nov. seems to be restricted to the Amazon lowland rainforest and adjacent low montane forests. The *Holotrochus simplex* group is distributed from the southern Mexico to central Argentina and excludes the Amazon Basin. Thus, a Circum-Amazonian distribution including Central America is supposed for this species group. The localities of *H. mrazi* sp. nov. and *H. hamatus* sp. nov. fit into this hypotheses. They occur in the area between the south-eastern species of the eastern Brazilian coast, the southernmost species, *H. vianai* Bernhauer, 1939 from Paraguay and Argentina and the western Andean species in Peru. The *H. minor* group has a wide distribution. Its species are represented in nearly all Neotropical countries, even on the Caribbean islands, e.g. Trinidad and Jamaica. Some species like *H. schubarti* are distributed from southern Brazil to Belize (IRMLER 1987). Beside *H. paraguensis* sp. nov., a second species (i.e. *H. ingae* Irmmler, 1981) is previously known from Paraguay, southern Brazil and northern Argentina. *Holotrochus tortilis* sp. nov. is the third species of the species group recorded from Bolivia. The *H. syntheticus* group was recently reviewed by IRMLER (2007b)

and contains fifteen species including the two most recent additions. The species of the group are distributed from southern Mexico to south-eastern Brazil. Similar to the *H. simplex* group, no species are known from the Amazon Basin. The locations of the two new species fit into the overall distribution of the *H. syntheticus* group, because they occur at the margin of the Amazon Basin. *Holotrochus agostii* sp. nov. from the Atlantic forest in the Brazilian State of Bahia is now the easternmost species of the group. *Holotrochus pseudoleticiae* occurs in the western margin of the Amazon basin on the eastern slopes of the Andean range.

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