

## A new genus and new species of Neotropical Thoracophorini (Coleoptera: Staphylinidae: Osoriinae)

Ulrich Irmeler

Institut for Ecosystem Research, Dept. Applied Ecology, University of Kiel, Olshausenstrasse 40, D-24098 Kiel, Germany;  
E-mail: uirmler@ecology.uni-kiel.de

**Abstract.** Three new species of the new genus *Geotrochopsis* are described: *G. pubescens*, *G. collaris*, and *G. flaveolus*. The genus is placed in the subtribe Clavilispinina of the tribe Thoracophorini. *G. pubescens* seems to be distributed all over the Neotropical region. Both *G. collaris* and *G. flaveolus* are from Peru and Brazil, respectively. Additionally, one new species is described from the Central Amazon: *Geomitopsis amazonensis*. Furthermore, *Ashnaosorius* MAKHAN, 2008 is recognised as a new synonym of *Geomitopsis*.

**Key words.** New species, Osoriinae, Thoracophorini, Neotropics

### INTRODUCTION

During the studies on the Neotropical Osoriinae few specimens of blind species were found that belong to the tribe Thoracophorini. Hitherto among this subtribe, only the blind genera *Geomitopsis* Scheerpeltz, 1931 and *Ashnaosorius* Makhan, 2008 were known from the Neotropical region. A more detailed study came to the result that some specimens belong to a new genus. The present paper describes this new genus with its new species. Furthermore, *Ashnaosorius* is a new synonym of *Geomitopsis*. According to Herman (2001) the genus *Geomitopsis* is recorded also from the Mediterranean region from Libanon to Canary Islands with nine species and from Africa with six species. Including the new *Geomitopsis* species, a total of six species is also known from the Neotropics. Therefore, a key to the species of the Neotropical region is provided.

### MATERIAL AND METHODS

The material studied in this investigation is presently deposited in the following museums and private collections.

AMNH	American Museum of Natural History, New York
BMNH	British Museum, Natural History, London
INPA	Collections of Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
KNHM	Kansas Natural History Museum, Lawrence
NHMP	National Museum of Natural History, Czech Republic, Prague

ZFMK	Museum Alexander Koenig, Bonn, Germany
JJC	Private collection of Jiří Janák, Prague, Czech Republic
UIC	Private collection of U. Irmeler, Plön, Germany

The photographs were taken using a Makroskop M 420 (Wild, Herbrugg) in combination with a digital camera (LeicaEC3). CombineZ5 (HADLEY 2006) was used to optimise depth of focus. Length was measured in the middle of tagmata: head from clypeus to posterior edge, pronotum from anterior to posterior edge along midline, elytra from anterior edge of shoulders to posterior edge; width at the widest part of tagmata (head width includes eyes). In the measurement of total length, the abdominal inter-segmental space is subtracted. The aedeagus was dissected and drawings were made using a microscope under 250 x magnification.

### DESCRIPTION OF THE NEW SPECIES

#### *Geotrochopsis* n. gen.

**Type species.** *Geotrochopsis pubescens* n.sp. is here designated as the type species

**Diagnosis.** *Geotrochopsis* is similar to the other blind genus in the tribe Thoracophorini, i.e. *Geomitopsis* Scheerpeltz, 1931. In contrast to *Geomitopsis* Scheerpeltz, 1931, *Geotrochopsis* is densely pubescent on the whole body and the antennomere six is not narrower than antennomeres five and seven. Moreover, the tarsi of *Geotrochopsis* are composed of five tarsomeres, whereas they are

composed of four tarsomeres in *Geomitopsis*. Additionally, the aedeagus of *Geotrochopsis* is symmetric and without a ventral prominence such as in *Geomitopsis*.

**Description.** Length and habitus: elongate; blind with reduced elytra; small species of about 1.3–1.6 mm total length.

Head approximately square; clypeus semicircular; labrum divided into two lobes separated by a deep emargination; eyes absent; setiferous punctation; without discrete neck; gular sutures combined.

Antennae not geniculate; width of antennomeres increasing from second antennomere to apex of antenna; penultimate antennomere wider than long.

Pronotum wider than long; sides smoothly rounded; lateral margin fine; with dense setiferous punctation; in posterior half with longitudinal medial impression.

Elytra much wider than long; not longer than pronotum; shoulders widely rounded; divergent from shoulders to posterior angles; hind wings reduced; sutural striae weak or absent; with setiferous punctation.

Abdomen elongate; conically narrowed posteriad; densely pubescent; with microsculpture.

Protibia slightly wider than meso- and metatibia; procoxae slightly elongate; tarsi composed of five tarsomeres.

Aedeagus with broad and stout central lobe; central lobe nearly straight; not or weakly curved; paramera as long as or longer than central lobe; spermatheca oval with short and straight ductus.

**Etymology.** The specific name is a combination of the Greek words *geo* meaning earth or soil, *trochus* meaning circle, and *opsis* standing for appearance. The name refers to the similarity to the genus *Allotrochus* FÄGEL, 1955, and to the soil dwelling life.

### *Geotrochopsis pubescens* n. sp.

Figs 2A, F, 5A, D

**Type material.** Holotype, male: Peru, Huanuco, Panguana (74°56'W, 9°37'S), rain forest, collected by pitfall trap, April 1984, leg. M. Verhaagh (UIC).

Paratypes: Mexico, 1 female, Veracruz, Córdoba, Paraje Nueve Nacimiento, tropical evergreen forest, collected by Berlese method, 7.8.1969, leg. S. & J. Peck (AMNH); Costa Rica, 1 male, 2 females, Vulcan Arenal, rd. to Arenal Observ. Lodge (84°43.58'W, 10°26.51'N), forest border, litter & dead wood, sifted, 3.12.2012, leg. M. Schülke (UIC, MSC); 3 females, Puntarenas, OSA Peninsula, 5 km W Rincon de OSA (83°31'W, 8°42'N), 50 m elevation, forest floor, collected by Berlese method, 24.–30.3.1973, leg. J. Wagner & J. Kethley (AMNH); 1 male, Osa Penn., Fundación Neotrop., 10 km W. Rincon (83°31.30'W, 8°42.30'N), 20 m elevation, collected from forest litter by

Berlese, 23.6.1997, leg. R. Anderson (KNHM); Peru, 1 female, Rio Tambopata Reserve, 30 km SW Puerto Maldonado (69°16'W, 12°12'S), trop. Moist forest, on fungi *Rigidoporus microporus*, 19.9.–10.10.1984, leg. D.A. Grimaldi (AMNH); Brazil, 1 male, São Paulo, leg. Mráz (NMP).

**Diagnosis.** The species resembles *Geotrochopsis flaveolus* n.sp. (see below) in the structure of the aedeagus and the widely rounded posterior angles of the pronotum. It can be differentiated from *G. flaveolus* by the shorter inner lateral lobes and the longer paramera. The pronotum of *G. flaveolus* is more strongly arched than that of *G. pubescens*, in particular, in the posterior half.

**Description.** Length: 1.4 mm. Colouration: yellow, legs and antennae light yellow.

Head: 0.19 mm long, 0.29 mm wide; without eyes; temples behind base of antennae approximately as long as clypeus; sides of temples parallel; clypeus semicircular; extremely finely punctate; pubescent; weak netlike microsculpture; surface moderately shiny; small area at base of antennae without punctation and microsculpture; surface shiny.

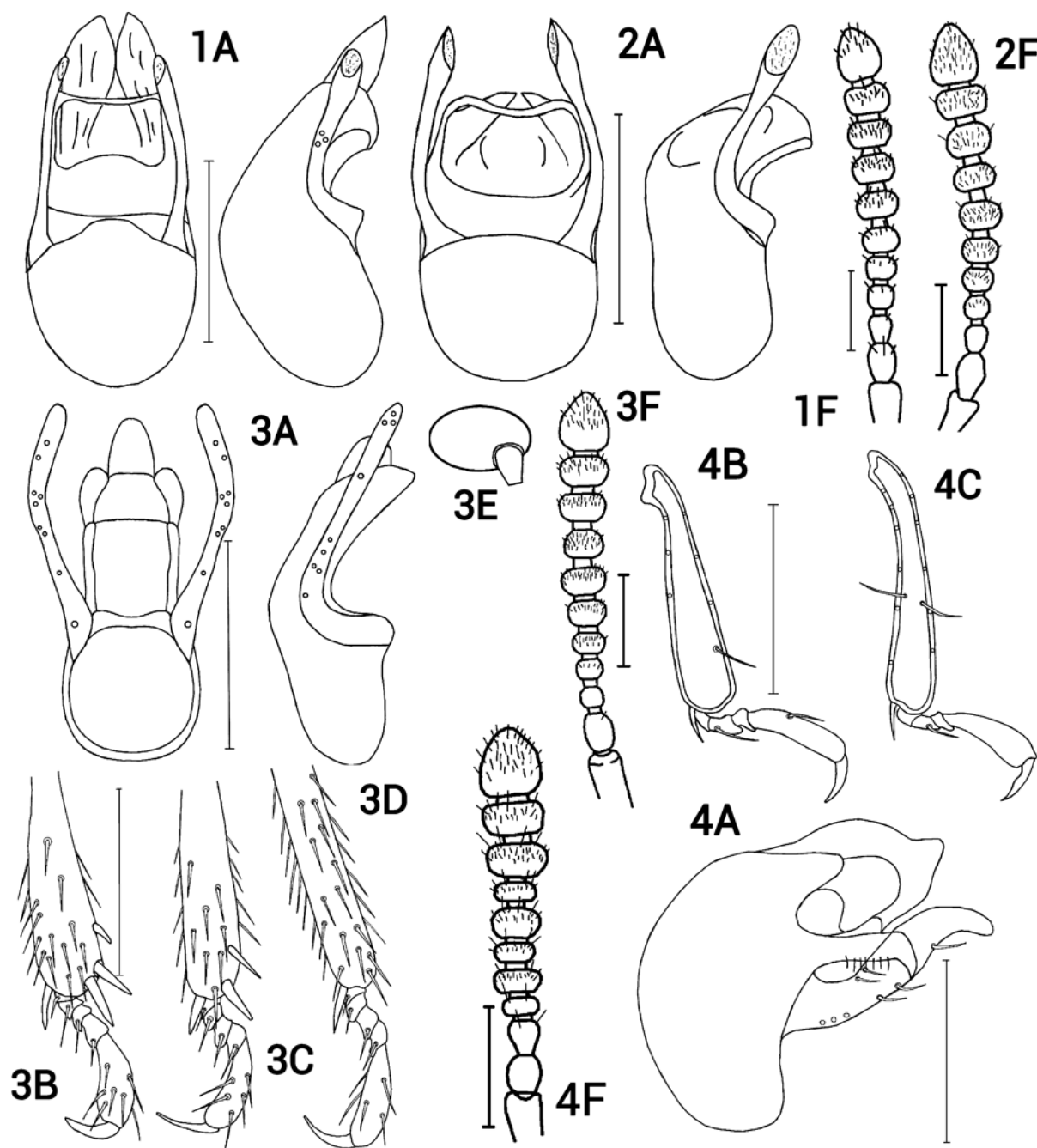
Antennae as long as head and pronotum combined; first antennomere thick and as long as second and third combined; second antennomere nearly as thick as first, but shorter; third antennomere narrower than preceding and following antennomeres; nearly half as long as second antennomere; following antennomeres increasing in width; penultimate antennomere nearly twice as wide as long.

Pronotum: 0.23 mm long, 0.36 mm wide; widest in middle; evenly narrowed in smooth curve to anterior and posterior margin; anterior angles obtuse; anterior edge not margined; posterior angles widely rounded; posterior edge widely emarginate and distinctly margined; in dorsal aspect, lateral margin fine in anterior half, widened in posterior half and continuous in equal width to wide posterior margin; in central posterior half with finely impressed furrow; punctation deeper and coarser than on head; on average, interstices between punctures as wide as diameter of punctures; pubescent; netlike microsculpture deeper than on head; meshes on average wider than diameter of punctures; surface moderately shiny.

Elytra: 0.22 mm long, 0.38 mm wide; widest at posterior angles; shoulders evenly rounded; with slight obtuse angle, only; sides distinctly margined; posterior edge of elytra straight; punctation slightly finer than on pronotum; irregular microsculpture deeper than on pronotum; pubescent; surface matt; less shiny than on pronotum.

Abdomen as densely and finely punctate as elytra; punctures partly granulate; pubescent; deep netlike microsculpture; surface as matt as surface of elytra.

Aedeagus short and broad; apical lobe shortly curved; paramera distinctly projecting apical lobe; lateral inner lobes transverse and only slightly projecting apical lobe.



**Fig 1–4.** *Geotrochopsis flaveolus* (1), *G. pubescens* (2), *G. collaris* (3), and *Geomitopsis amazonensis* (4); Aedeagus in ventral and lateral aspect (A); protibia and tarsi (B); mesotibia and tarsi (C), metatibia and tarsi (D), spermatheca (E), antenna (F); scale bar: 0.1.

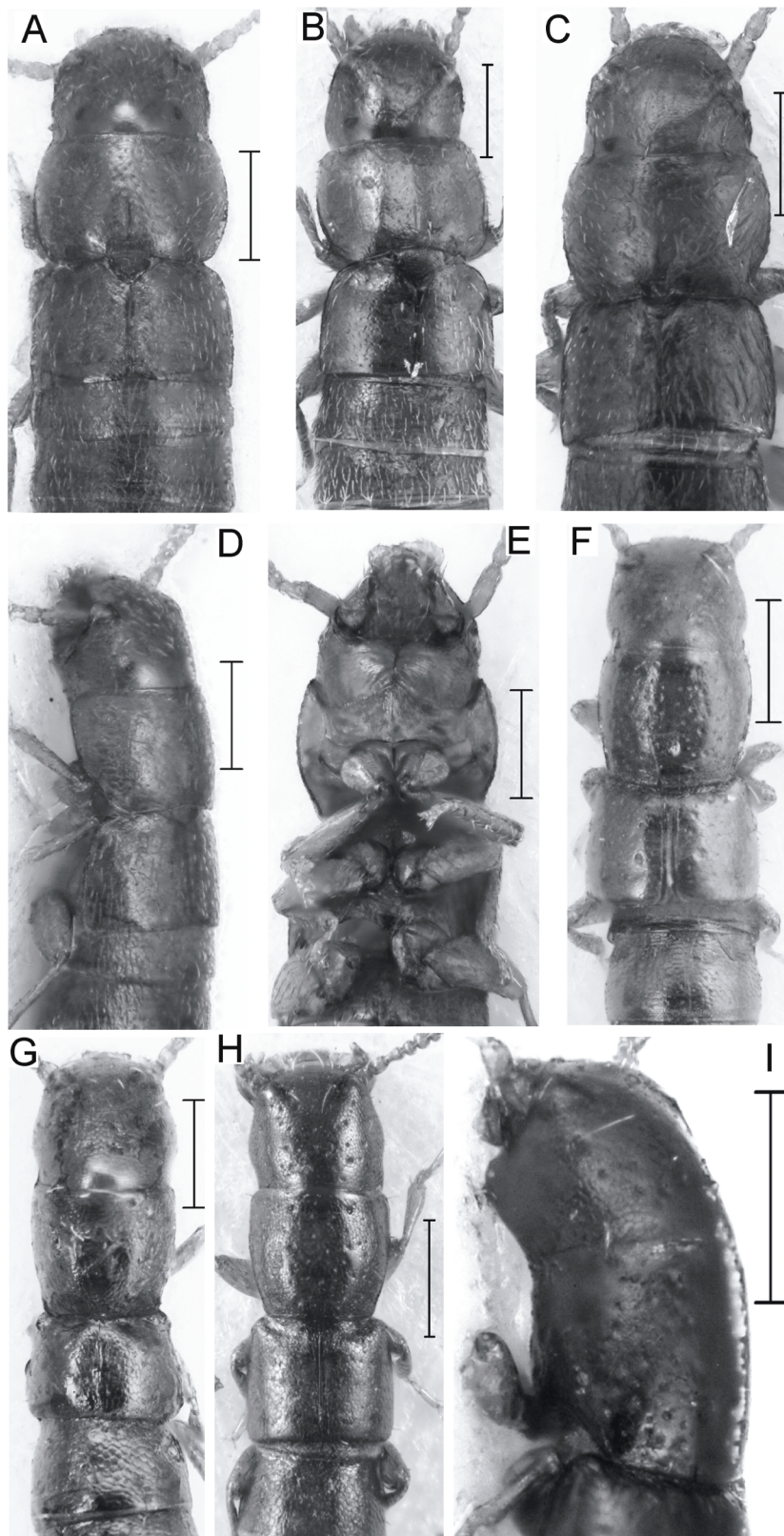
**Etymology.** The specific name *pubescens* derived from the same Latin name and means pubescent. It refers to the finely hairy punctation.

***Geotrochopsis collaris* n. sp.**

Figs 3A–F, 5C, E

**Type material.** Holotype, male: Peru, Madre de Dios, Cuzco Amazonica (69°02.06'W, 12°36.48'S), 300 m elevation, secondary forest W1, F95420, 17.5.1995, leg. D. Agosti (AMNH).





**Fig. 5.** Dorsal aspect of head, pronotum, and elytra of *Geotrochopsis pubescens* (A), *G. flaveolus* (B), *G. collaris* (C), lateral aspect of *G. pubescens* (D), and ventral aspect of *G. collaris* (E); dorsal aspect of head, pronotum, and elytra of *Geomitopsis amazonensis* (F), and *G. campanae* (G), *G. remileti* (H), lateral aspect of *Geomitopsis amazonensis* (I); scale bar: 0.2 mm.

Paratypes: 4 males, 16 females with same data as for holotype; 2 females, same location as holotype, but 17.5.1994 (AMNH, UIC).

**Diagnosis.** The species can be easily differentiated from the other two species by the specific structure of the pronotum. The pronotal sides are slightly emarginate in front of the posterior angles, whereas they are smoothly rounded in the two other species. Furthermore, the posterior edge of the elytra is slightly retreated at suture as triangular emargination and the aedeagus has not the pair of inner lobes as found in *G. pubescens* and *G. flaveolus*.

**Description.** Length: 1.35 mm. Colouration: dark yellow; antennae and legs lighter yellow.

Head: 0.19 mm long, 0.26 mm wide; without eyes; temples as long as semi-circular clypeus; punctation fine; pubescent; on average, interstices between punctures twice as wide as diameter of punctures; netlike microsculpture moderately deep; meshes distinctly wider than diameter of punctures; surface moderately shiny.

Antennae longer than head and pronotum combined; first antennomere thick and nearly as long as second and third antennomere combined; second antennomere slightly narrower than first, but thicker than third antennomere; twice as long as third antennomere; following antennomeres increasing in width; third antennomere approximately square; penultimate antennomere nearly twice as wide as long.

Pronotum: 0.23 mm long, 0.33 mm wide; widest in middle; evenly narrowed to anterior angles in smooth curve; in front of posterior angles with slight emargination; posterior angles obtuse, but nearly rectangular; anterior edge not margined; lateral margin fine and continuous to posterior edge; margined posterior edge slightly emarginate; punctation slightly denser and deeper than on head; pubescent; on average, interstices between punctures slightly wider than diameter of punctures; netlike microsculpture as deep and wide as on head; surface moderately shiny.

Elytra: 0.21 mm long, 0.35 mm wide; widest at posterior angles; narrowed to shoulders in smooth curve; in dorsal aspect, lateral margin visible in its total length; shoulders obtuse without forming angles; posterior edge of elytra retreated to suture as wide triangular emargination; punctation as deep and dense as on pronotum; microsculpture slightly deeper; surface as shiny as on pronotum.

Abdomen as densely and finely punctate as elytra; punctures partly granulate; pubescent; deep netlike microsculpture; surface as matt as surface of elytra.

Aedeagus slender with long central lobe; apical lobe as long as basal lobe; nearly straight; in slight obtuse angle to basal lobe; slender paramera slightly projecting central lobe; with numerous sensillae; inner lobe projecting.

**Etymology.** The specific name derived from the Latin word *collum* for pronotum and refers to the specific structure of the posterior angles of the pronotum.

*Geotrochopsis flaveolus* n. sp.

Figs 1A, F, 5B

**Type material.** Holotype, male: Brazil, Rio de Janeiro, Moro de Babilônia (43°10'W, 22°57'S), 100–200 m elevation, 25.10.2002, leg. J. Janák (INPA). Paratypes: 172 specimens with same data and from same location as holotype (NHMP, JJC, UIC, ZFMK).

**Diagnosis.** The species is characterised by the arched pronotum, in particular, in the posterior half. In dorsal aspect, the lateral margin is covered at posterior angles. Furthermore, the pair of inner lobe are longer than in *G. pubescens* and the paramera are shorter.

**Description.** Length: 1.6 mm. Colouration: Dark yellow; posterior margin of pronotum darker, light brownish; legs and antennae light yellow.

Head: 0.25 mm long, 0.30 mm wide; without eyes; temples as long as semi-circular clypeus; punctation moderately deep and dense; pubescent; on average, interstices between punctures twice as wide as diameter of punctures; netlike microsculpture moderately deep; meshes distinctly wider than diameter of punctures; surface moderately shiny.

Antennae as long as head and pronotum combined; first antennomere long and thick; slightly shorter than second and third antennomeres combined; second antennomere slightly narrower and shorter than first antennomere; conical third antennomere much narrower and shorter than second antennomere; following antennomeres increasing in width; fourth antennomere approximately square; penultimate antennomere nearly twice as wide as long.

Pronotum: 0.25 mm long, 0.39 mm wide; widest in middle; narrowed in even and smooth curve to anterior and posterior angles; posterior angles obtuse; rounded in wide smooth curve without forming distinct angles; anterior edge without margin; lateral margin fine; continuous to posterior edge; in dorsal aspect, margin covered in anterior half and at posterior angles; punctation as dense and deep as on head; pubescent; netlike microsculpture moderately deep; meshes wider than diameter of punctures; with short impressed furrow in posterior half of midline; netlike microsculpture as deep and wide as on head; surface moderately shiny.

Elytra: 0.24 mm long, 0.40 mm wide; widest at posterior angles; slightly narrowed in posterior half; more strongly narrowed in anterior half; shoulders widely rounded; posterior edge of elytra straight; in dorsal aspect, lateral margin visible throughout its total length; contin-

ued to shoulders and ending shortly in front of scutellum; punctation deeper and denser than on pronotum, pubescent; netlike microsculpture slightly deeper than on pronotum, but meshes as wide as on pronotum and wider than diameter of punctures; surface moderately shiny.

Abdomen conically narrowed posteriad; densely punctate and pubescent; punctation still denser than on elytra; punctures partly granulate; netlike microsculpture dense and deep.

Aedeagus broad; apical lobe placed in wide obtuse angle to basal lobe; inner lateral lobes distinctly projecting central lobe; paramera longer than central lobe, but shorter than central lobe and projecting inner lobes combined; group of three sensillae in middle of paramera.

**Etymology.** The specific name derived from the Latin word '*flaveolus*' meaning yellowish and refers to the overall yellowish colouration of the species.

#### Key to the species of *Geotrochopsis* n. gen.

1. Posterior angles of pronotum obtusely rounded; aedeagus with pair of inner lobes ..... 2
- Posterior angles of pronotum nearly rectangular, pronotal sides in front of posterior angles slightly sinuate (Fig. 5C), aedeagus with one inner lobe (Fig. 3A) ..... *G. collaris* n. sp.
2. Pronotum strongly arched; in dorsal aspect, margin at posterior angles covered (Fig. 5B), pair of inner lobes of aedeagus long, paramera not projecting inner lobes (Fig. 1A) ..... *G. flaveolus* n. sp.
- Pronotum not arched, in dorsal aspect, margin at posterior angles visible (Fig. 5A), pair of inner lobes of aedeagus short and transverse, paramera projecting inner lobes (Fig. 2A) ..... *G. pubescens* n. sp.

#### *Geomitopsis* Scheerpeltz, 1931

*Ashnaosorius* Makhan, 2008: 1, new synonymy.

*Libanotyphlus* Coiffait, 1954: 155.

**Remarks.** MAKHAN (2008) described the new genus *Ashnaosorius* on the basis of two new species from Suriname that were formerly described under the genus *Cubanotyphlus* Coiffait & Decou (1972). He characterised the genus by tarsi being composed of three tarsomeres and differences in the aedeagal structure to *Geomitopsis* Scheerpeltz, 1931. However, he compared his species only with *G. remelleti* Orousset, 1985 that was placed in the subgenus *Pseudogeomitopsis* Orousset, 1983. Fortunately, he published photos of the legs. It can be derived from the photos that the tarsi are not composed of three tarsomeres, as mentioned in the description, but composed of four tarsomeres as in the genus *Geomitopsis*. The first tarsomere

is very short and can be easily overlooked. Furthermore, all other characters of *Geomitopsis*, i.e. sixth antennomere narrower than fifth and seventh antennomeres, absence of eyes, the specific structure of the aedeagus, and the overall habitus as derived from the photos of the original publication are equal in *Ashnaosorius* and *Geomitopsis*. Thus, no generic difference between *Ashnaosorius* and *Geomitopsis* is found. Therefore, *Ashnaosorius* is regarded as synonym to *Geomitopsis*.

Unfortunately, the type specimens of the species of *Ashnaosorius* could not be studied. Requests to loan specimens were not answered.

#### *Geomitopsis amazonensis* n. sp.

Figs 4A–F, 5F

**Type material.** Holotype, male: Brazil, Amazonas, Reserva Ducke, 26 km NE Manaus, Plot A, leaf litter, Jan. 1996, leg. M.G.V. Barbosa (BMNH)

Paratypes: Brazil, 2 females from the same location as holotype, but collected on April and Aug. 1995, leg. M.G.V. Barbosa (BMNH); Peru, 1 female, Huanuco, Yuypichis, Panguana (74°56.8'W, 9°37'S), manioc field, 22.9.1975, leg. W. Hanagarth (UIC).

**Diagnosis.** *G. amazonensis* is characterised by the deep punctation of the pronotum and the elytra. *G. remelleti* Orousset, 1985 has only free larger punctures in a longitudinal row close to the midline. The Chilean species can be distinguished from the Amazonian species by the prominent shoulders.

**Description.** Length: 1.35 mm. Colouration: light brown, legs and antennae yellow.

Head: 0.17 mm long, 0.22 mm wide; widest shortly in front of posterior margin; clypeus slightly cheek-like extended; without distinctly narrower neck; without eyes; base of antennae to anterior edge; in dorsal aspect; anterior edge even; pair of setiferous punctures between base of antennae and laterally on posterior vertex; punctation weak; only few punctures larger; netlike microsculpture weak; surface shiny.

Antennae slightly longer than head and half of pronotum combined; first antennomere thick; second oval and slightly narrower than first antennomere; third antennomere conical and slightly shorter than second; following antennomeres increasing in width except narrower sixth and eighth antennomeres; antennomere four to ten much wider than long; fourth antennomere twice as wide as long; tenth antennomere slightly wider than twice as wide as long.

Pronotum: 0.23 mm long, 0.25 mm wide; widest near middle; sides evenly narrowed to anterior and posterior angles, but posteriad more strongly narrowed than ante-



riad; posterior angles obtuse; lateral margin continued to posterior edge; anterior edge not margined; punctation much deeper and coarser than on head; narrow midline impunctate; on average, interstices between punctures half as wide as diameter of punctures; in posterior half of midline with oval impression; netlike microsculpture weak, but deeper than on head; surface moderately shiny.

Elytra: 0.21 mm long, 0.28 mm wide; widest near posterior edge; narrowed to shortly rounded shoulders; punctation weaker and sparser than on pronotum; on average, interstices at least as wide as diameter of punctures; two pairs of large circular impressions close to suture; posterior impression larger than anterior impression; three to four setiferous punctures in lateral margin; netlike microsculpture as deep as and as wide as on pronotum; surface moderately shiny.

Abdomen as deeply, but more densely punctate than elytra; netlike microsculpture deeper than on pronotum and elytra; meshes distinctly wider than diameter of punctures; surface less shiny than on pronotum.

Aedeagus with thick central lobe; central lobe with long slender and straight digit ending in acute curved apex; digit at ventral side with row of setae; paramera thick and sinuate; several sensillae on ventral and dorsal side.

**Etymology.** The specific name derived from the Brazilian state Amazonas, where the species was collected.

#### Key to the species of *Geomitopsis* in the Neotropical region

1. Pronotum distinctly and densely punctate, elytra with round impressions close to suture (Fig. 5F) ..... *G. amazonensis* n. sp.
- Pronotum weakly and sparsely punctate, elytra without impressions ..... 2
2. Shoulders of elytra not carinate, elytra posteriad not dilated (Fig. 5H) ..... 4
- Shoulders of elytra carinate, elytra posteriad dilated (Fig. 5G) ..... 3
3. Pronotum with large impressions on the disc ..... *G. campanae* Saiz, 1973
- Pronotum with fine elongate impression in the posterior half of the midline ..... *G. chilensis* Coiffait & Saiz, 1963
4. Aedeagus at ventral edge of central lobe with triangular prominence ..... *G. amrishi* (Makhan, 2007)
- Aedeagus at ventral edge of central lobe straight, without prominence ..... 5
5. Central lobe of aedeagus at ventral edge straight, with short hook-like apex ..... *G. rishwani* (Makhan, 2007)
- Central lobe of aedeagus at ventral edge evenly curved to acute apex ..... *G. remilleti* Orousset, 1985

## DISCUSSION

The new genus *Geotrochopsis* must be certainly placed to the tribe Thoracophorini, as the protibia has no inner emargination with comb such as in the tribe Osoriini. Regarding the united gular sutures, it seems most closely related to the genus *Clavilispinus* Bernhauer, 1926. In contrast to the other blind genus, i.e. *Geomitopsis*, of the same tribe that has four tarsomeres, *Geotrochopsis* has five tarsomeres. Furthermore, *Geomitopsis* was placed to the subtribe Glyptomina by Herman (2001), because gular sutures are separated. Irmmler (2010) found that gular sutures can be separated or united even in one genus, which makes their constitution unsuitable for a generic differentiation. Nevertheless, the generic characters, e.g. tarsi composed of five tarsomeres and united gular sutures let suppose that *Geotrochopsis* is closely related to *Clavilispinus*, although the overall habitus is very different. *Clavilispinus* has well developed eyes, a dorsoventrally depressed body, and no pubescence, whereas *Geotrochopsis* is blind with cylindrical body and dense pubescence. It might be also related to *Allotrochus* Fagel, 1955 regarding the overall habitus and the slightly elongate procoxae. But, *Allotrochus* has well developed eyes, no shortened elytra, and no pubescence.

According to Herman (2001) the genus *Geomitopsis* is recorded from Europe, Africa, and South America. Nine species are known from the Mediterranean Europe including northern Africa and Near East, six from tropical Africa, and, together with the newly described species, six species from the Neotropical region. Whereas at present several blind genera are known in the tribe Osoriini, only this genus with blind species was so far known from the tribe Thoracophorini. The genus is characterised by the absence of eyes, tarsi composed of four tarsomeres, shortened elytra, a narrow sixth antennomere, and a characteristic structure of the aedeagus. A similar combination of characters is found in the genus *Arborilispinus* Irmmler, 2010. However, *Arborilispinus* has eyes while eyes are absent in *Geomitopsis*.

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