

New record of the cockroach genus *Pseudophoraspis* (Blaberidae, Epilamprinae) from China with descriptions of three new species

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Academic editor: M. Engel | Received 15 November 2012 | Accepted 4 February 2013 | Published 27 February 2013

[urn:lsid:zoobank.org:pub:226A10DA-952D-488C-9F3D-7B04A00CE534](https://lsid.zoobank.org:443/urn:lsid:zoobank.org:pub:226A10DA-952D-488C-9F3D-7B04A00CE534)

Citation: Wang Z, Wu K, Che Y (2013) New record of the cockroach genus *Pseudophoraspis* (Blaberidae, Epilamprinae) from China with descriptions of three new species. ZooKeys 273: 1–14. doi: 10.3897/zookeys.273.4122

Abstract

The genus *Pseudophoraspis* Kirby, 1903 with three new species, *Pseudophoraspis clavellata* sp. n., *Pseudophoraspis recurvata* sp. n. and *Pseudophoraspis incurvata* sp. n., are reported from China for the first time. This extends the range of this genus northward from Vietnam. Species studied in the present paper are illustrated and described, and a key to these species based on males is provided.

Keywords

Dictyoptera, Blattodea, taxonomy, species group

Introduction

The genus *Pseudophoraspis* was erected by Kirby in 1903. In 1904, he transferred *Epilampra congrua* to *Pseudophoraspis*. Shelford (1910) synonymized *Pseudophoraspis congrua* (Walker, 1868) with *Pseudophoraspis nebulosa* (Burmeister, 1838), and transferred *Epilampra miranda* Shelford, 1906 and *Homalopteryx vasta* (Walker, 1868) to *Pseudophoraspis*. Meanwhile Shelford (1910) also described the species *Pseudophoraspis*

fruhstorferi. Bruner (1915) disagreed with Shelford's views on the taxonomic status of *vasta* and returned it to *Homalopteryx*. Princis (1958) pointed out that the species *vasta* should belong in the genus *Pseudophoraspis*. However, Princis (1967) assigned *vasta* to *Rhabdoblatta*. Bruijning (1948) described *Pseudophoraspis proximata* and transferred *nebulosa* to *Stictomorphna*; later Princis (1967) transferred them to *Rhabdoblatta* and *Stictolampra*, respectively. Hanitsch (1923, 1925, and 1933) described four species assigned to this genus: *Pseudophoraspis emarginata*, *Pseudophoraspis testudinaria*, *Pseudophoraspis lacrimans* and *Pseudophoraspis uniformis*. Of these, one species, *P. emarginata* was transferred to *Stictolampra* by Princis (1967), and he only listed 6 species in this genus in *Orthopterorum Catalogus*. Anisyutkin (1999, 2005) added 9 new species to this genus from Southeast Asia. So far, the genus *Pseudophoraspis* is comprised of 15 species worldwide.

All of the known species were reported from Southeast Asia and South Asia, and the previously known boundary of this genus would be Vietnam. However, we found three new species from China, located in Hainan, Yunnan and Guangxi Provinces respectively. This discovery extends the range of the genus *Pseudophoraspis* northward. We redescribe the three known species, describe and illustrate the three new species, and provide a key for all species from China based on males.

Materials and methods

Terminology used in this paper mainly follows McKittrick (1964) and Anisyutkin (1999). The genital segments of the examined specimens were macerated in 10% NaOH and observed in glycerin jelly using a Motic K400 stereomicroscope. All drawings were made with the aid of a Motic K400 stereomicroscope. All images of specimens were photographed using a Canon 50D plus a Canon EF 100mm f/2.8L IS USM Macro lens combined with Helicon Focus software. All specimens studied are deposited in the Collection of College of Plant Protection, Southwest University (SWU) and the Entomological Museum of Northwest Agriculture and Forestry University (NWAFU), as indicated.

Taxonomy

Genus *Pseudophoraspis* Kirby, 1903, new record to China

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

Pseudophoraspis Kirby, 1903: 275; Kirby 1904: 119; Shelford 1910: 12; Hanitsch 1915: 72; Princis 1958: 65; Princis 1967: 660; Anisyutkin 1999: 444; Anisyutkin 2005: 40.

Type species. *Epilampra nebulosa* Burmeister, 1838

Description. Coloration brownish yellow, glossy and finely granulose (Figs 1–14). Pronotum smooth, broad and rhomboidal, completely covering vertex, anterior margin curved and posterior margin obtusely produced (Figs 1, 3, 5, 7, 9, 11, 13). Tegmina and wings in both sexes fully developed, entirely covering abdomen, apices rounded or posterior margin emarginate in the middle (Figs 1–14). Pulvilli and arolium present; tarsal claws symmetrical and unspecialized. Supra-anal plate and hypandrium nearly symmetrical, posterior margin emarginate near the middle except in *P. fruhstorferi* Shelford (Figs 15, 17, 23, 25, 30, 32, 39, 41, 49, 51, 59, 61). Sclerite *L2d* of male genitalia with well-developed apical outgrowth (Figs 34, 35, 43, 44, 53, 54, 63) except in *Pseudophoraspis fruhstorferi* (Fig. 19) and *Pseudophoraspis trampensis* (Fig. 27).

Females usually shorter and wider than males, more convex, with smaller and widely separated eyes; pronotum larger. Tegmina and wings more or less shorter than in males (Figs 3–4).

According to original descriptions and examined specimens kept in Collection of College of Plant Protection, Southwest University (SWU) and the Entomological Museum of Northwest Agriculture and Forestry University (NWAFU), we subdivide this genus into two species groups: the *fruhstorferi* group and the *gorochovi* group. There are two types of pronotum in this genus: the pronotum of the *fruhstorferi* group is smooth and without any punctures, while in the *gorochovi* group, the pronotum is scattered with punctures and has two crescent depressions on disc.

Remarks. The *gorochovi* group is similar to *Stictolampra* Hanitsch for the scattered punctures of the pronotum, but differs from the latter by the following characters: 1) pronotum rhomboidal, anterior margin curved and completely covering vertex, lateral sides approximately acute and angled, posterior margin obtusely produced and with two crescent depressions on disc; while in *Stictolampra*, pronotum peach-shaped, anterior margin approximately straight and vertex exposed completely, lateral sides more or less rounded, posterior margin strongly produced and without any depressions on disc; 2) sclerite *L2d* with well-developed apical outgrowth, while *Stictolampra* lacks any apical outgrowth.

Distribution. China (Yunnan, Guizhou, Guangxi, Hainan); Indonesia (Sumatra, Java Island, Sulawesi); Malaysia (Malacca State, Borneo Island); Cambodia; Thailand; Vietnam.

Key to the species of *Pseudophoraspis* (males) from China

- | | | |
|---|--|--------------------|
| 1 | Pronotum smooth without any punctures and depressions | 2 |
| – | Pronotum coarse scattered with fine punctures, and with two crescentic depressions on disc | 4 |
| 2 | Face with 1 large and 2 small brown spots. Sclerite <i>L2d</i> without apical outgrowth | 3 |
| – | Face without any spots. Sclerite <i>L2d</i> with apical outgrowth | <i>P. kabakovi</i> |

- 3 Apodema of complex *L1* long with folded terminal, sclerite *L2d* small, basal margin of sclerite *L2vm* transversal *P. fruhstorferi*
 – Apodema of complex *L1* short with transverse terminal, sclerite *L2d* large, basal part of sclerite *L2vm* furcated *P. tramlapensis*
 4 Tegmina variegated with irregular brown spots. Apical outgrowth of sclerite *L2d* nearly straight *P. clavellata* sp. n.
 – Tegmina yellowish brown scattered with regular round brown spots. Apical outgrowth of sclerite *L2d* curved 5
 5 Apical outgrowth of sclerite *L2d* bending outward *P. recurvata* sp. n.
 – Apical outgrowth of sclerite *L2d* bending inward *P. incurvata* sp. n.

Pseudophoraspis fruhstorferi group

Species included here: *P. fruhstorferi* Shelford, 1910, *P. tramlapensis* Anisyutkin, 1999 and *P. kabakovi* Anisyutkin, 1999

Pseudophoraspis fruhstorferi Shelford, 1910, new record to China

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

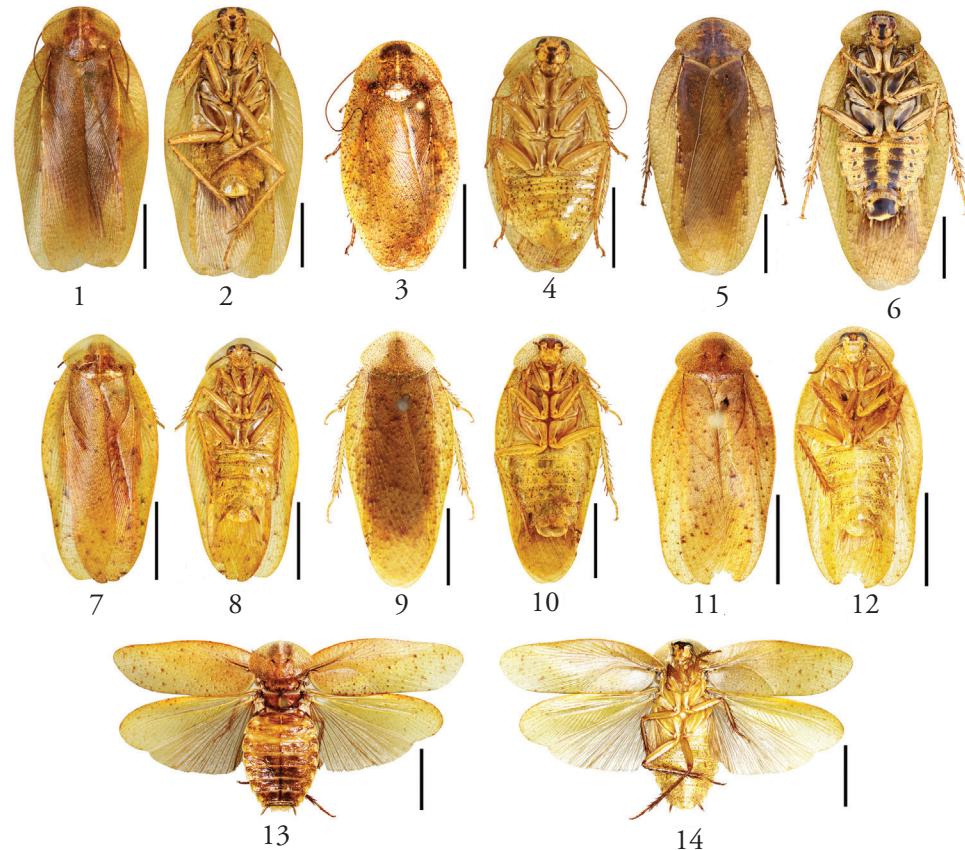
Figs 1–4, 15–22

Pseudophoraspis fruhstorferi Shelford, 1910: 12; Hanitsch 1927: 37; Bruijning 1948: 132; Anisyutkin 1999: 451.

Description. Male. Body yellowish-brown. Head yellowish-brown, facial part of head with large brown spot from ocellus to clypeus, basal margin of ocellus with a round brown spot, eyes dark brown, ocelli yellowish (Figs 2, 4). Pronotum yellowish-brown, covered with scattered brown spots, disc part brown (Figs 1, 3). Tegmen yellow, one third of radius vein from base yellowish white (Figs 1, 3). Dorsal part of abdomen brown; ventral part of abdomen yellow, with dense small brown spots (Figs 2, 4).

Vertex completely covered by pronotum (Figs 1–2). Distance between eyes about 0.36 times of width of head. Ocellus same as scrobe and ocellus width equal to interocular width (Fig. 2). Pronotum rhomboidal, smooth and impunctate, much broader than long, anterior margin curved and posteriorly obtusely produced (Fig. 1). Tegmina and wings exceeding the abdomen and apex rounded (Figs 1–2). Fore femur with 4–7 spines along anterior margin and 2 apical spines. First segment of hind tarsus with spines along most part of its length and plantula occupying the terminal.

Male genitalia. Supra-anal plate symmetrical, trapezoidal, posterior margin with a shallow concavity at middle, lateral sides nearly straight (Fig. 15). Paraprocts asymmetrical, left one broad, simple plate; right one with a stubby finger-like protrusion



Figures 1–14. 1–4 *Pseudophoraspis fruhstorferi* Shelford, male: 1 dorsal view 2 ventral view; female: 3 dorsal view 4 ventral view; 5–6 *Pseudophoraspis trampensis* Anisyutkin, male: 5 dorsal view 6 ventral view; 7–8 *Pseudophoraspis kabakovi* Anisyutkin, male: 7 dorsal view 8 ventral view; 9–10 *Pseudophoraspis clavellata* sp. n., male: 9 holotype, dorsal view 10 holotype, ventral view; 11–12 *Pseudophoraspis recurvata* sp. n., male: 11 holotype, dorsal view 12 holotype, ventral view; 13–14 *Pseudophoraspis incurvata* sp. n., male: 13 holotype, dorsal view 14 holotype, ventral view. Scale bars=1cm.

whose apex bending backwards (Fig. 16). Hypandrium with posterior margin slightly produced, without any concavity (Fig. 17). Complex *L1* with apodema slightly long (Fig. 18). Sclerite *L2d* short, asymmetrical and densely covered with chaeta, without apical outgrowth, *L2vm* distinct and strongly sclerotized (Fig. 19). Sclerite *R2* with terminal rectangular and apex slightly elongate as a tooth (Figs 20–22).

Female. Usually shorter and wider than male (Figs 3–4). Eyes smaller and widely separated, distance between eyes about 0.39 times width of head (Fig. 4). Pronotum, tegmina and abdomen brownish-yellow, covered with scattered brown spots (Fig. 3). Facial part of head with large brown spot same as the male (Fig. 4). Dorsal part of body more convex than in male. Tegmina and wings shorter than the male, with posterior margin slightly emarginate (Figs 3–4).

Male measurements. Body length: 35.5–41.5 mm (including tegmen); Head length × width: 4.5–5.0 mm × 4.0–4.5 mm; Pronotum length × width: 8.0–9.0 mm × 11.5–12.5 mm; Tegmina length × width: 30.5–35.0 mm × 12.0–12.5 mm.

Female measurements. Body length: 29.0–30.0 mm (including tegmen); Head length × width: 5.0–5.5 mm × 4.0–4.5 mm; Pronotum length × width: 8.0–8.5 mm × 11.5–12.0 mm; Tegmina length × width: 25.0–25.5 mm × 10.5–11.0 mm.

Material examined. one male, China: Guangxi Prov., Mt. Daqingshan, 15 May 1963, coll. Yang Jikun (SWU); one male, China: Hainan Prov., Mt. Jianfengling, 29 June 1981, coll. Lin Zai (SWU); two females, China: Hainan Prov., Mt. Wuzhishan (N18.51°, E109.40°) 740 m, 28–30 June 2008, coll. Zhang Weiwei (SWU).

Distribution. China (Guangxi, Hainan); Vietnam.

Remarks. Sclerite $L2d$ of this species and *P. tramlapensis* are strongly sclerotized and without apical outgrowth, but $L2vm$ of the former with basal margin transversal.

Pseudophoraspis tramlapensis Anisyutkin, 1999, new record to China

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

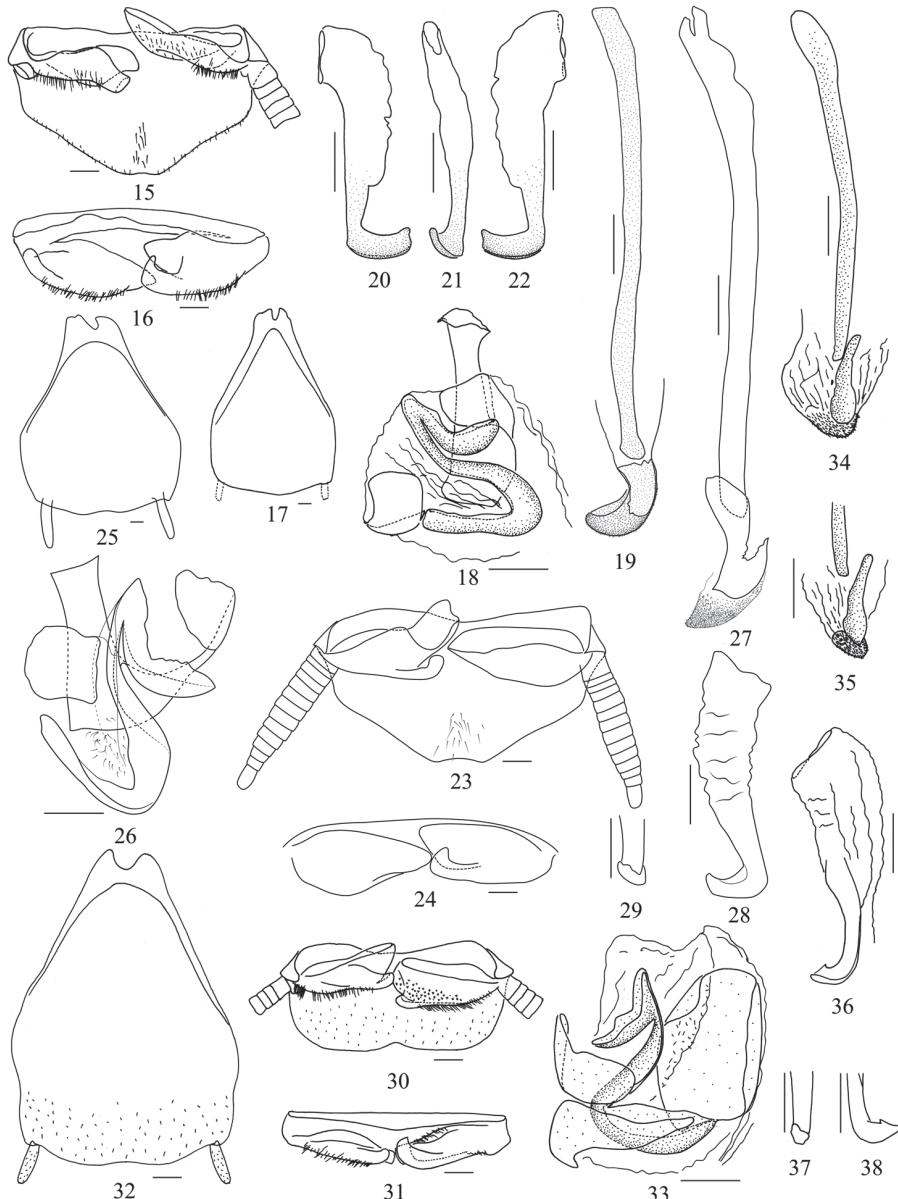
Figs 5–6, 23–29

Pseudophoraspis tramlapensis Anisyutkin, 1999: 453.

Description. Body yellowish-brown. Head yellowish-brown, the dark spots on facial part same as *Pseudophoraspis fruhstorferi* (Figs 5–6). Pronotum and tegmina densely scattered with small brown spots (Fig. 5). Tegmina pale brown with half of radius vein from base yellowish white and scattered with dark brown spots (Fig. 5). Coxae and anterior margin of femora dark brown (Fig. 6). Middle part of abdomen with two brown stripes (Fig. 6). Hypandrium with large brown spots (Fig. 6).

Distance between eyes about 0.4 times width of head. Ocellus slightly smaller than scrobe and ocellus width slightly narrower than interocular width (Fig. 6). Pronotum completely covering vertex, rhomboidal, smooth and impunctate (Fig. 5). Tegmina and wings well-developed, exceeding the abdomen and with posterior margin rounded (Figs 5–6). Fore femur with 7 spines along anterior margin and 2 apical spines. 1st segment of hind tarsus with plantula occupied apically and spines along most of its length.

Male genitalia. Supra-anal plate symmetrical, trapezoidal, posterior margin with a shallow concavity at middle, lateral sides more or less straight (Fig. 23). Paraprocts asymmetrical, left one broad, simple plate; right one with a slender finger-like protrusion whose apex bending backwards (Fig. 24). Hypandrium symmetrical, with posterior margin shallowly emarginated (Fig. 25). Apodema of complex $L1$ with transverse terminal (Fig. 26). Sclerite $L2d$ large and long, with a protrusion at middle (Fig. 27). Basal part of sclerite $L2vm$ furcated (Fig. 27). Sclerite $R2$ with apex slightly pointed (Figs 28–29).



Figures 15–38. 15–22 *Pseudophoraspis fruhstorferi* Shelford 23–29 *Pseudophoraspis tralapensis* Anisyutkin 30–38 *Pseudophoraspis kabakovi* Anisyutkin. 15, 23, 30 supra-anal plate, ventral view 16, 24, 31 paraproct, caudal view 17, 25, 32 hypandrium, dorsal view 18, 26, 33 complex L1 19, 27, 34, 35 complex L2, dorsal view 20–22, 28–29, 36–38 sclerite R2. Scale bars=0.5mm.

Male measurements. Body length 45.0 mm (including tegmen); Head length × width: 5.0 mm × 4.5 mm; Pronotum length × width: 9.0 mm × 12.5 mm; Tegmina length × width: 38.5 mm × 13.0 mm.

Material examined. one male, China: Guizhou Prov., Maolan Nature Preserves, 500–560m, 16–18 June 2006, coll. Yang Zaihua (SWU).

Distribution. China (Guizhou); Vietnam.

Remarks. This species is similar to *P. fruhstorferi*, but can be distinguished by body color and male genitalia.

***Pseudophoraspis kabakovi* Anisyutkin, 1999, new record to China**

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

Figs 7–8, 30–38

Pseudophoraspis kabakovi Anisyutkin, 1999: 450.

Description. Body yellowish-brown. Head yellow. Eyes dark brown, ocelli yellow (Fig. 8). Pronotum yellow with dense and small brown spots, disc brownish-yellow (Fig. 7). Tegmina yellow scattered with brown spots (Fig. 7). Anterior margin of wings with lots of brown spots. Dorsal part of abdomen brown, ventral part of abdomen yellow with dense brown spots (Fig. 8).

Vertex completely covered by pronotum (Figs 7–8). Distance between eyes about 0.15 times width of head. Ocellus same as scrobe and ocellus width equal to interocular width (Fig. 8). Pronotum rhomboidal and smooth, impunctate, with anterior margin curved and posterior margin obtusely angled (Fig. 7). Tegmina covering the abdomen totally, and apex rounded (Figs 7–8). Fore femur with 4 spines along anterior margin and one single apical spine. 1st segment of hind tarsus with spines along 2/3 of its length, plantula covering apical one third.

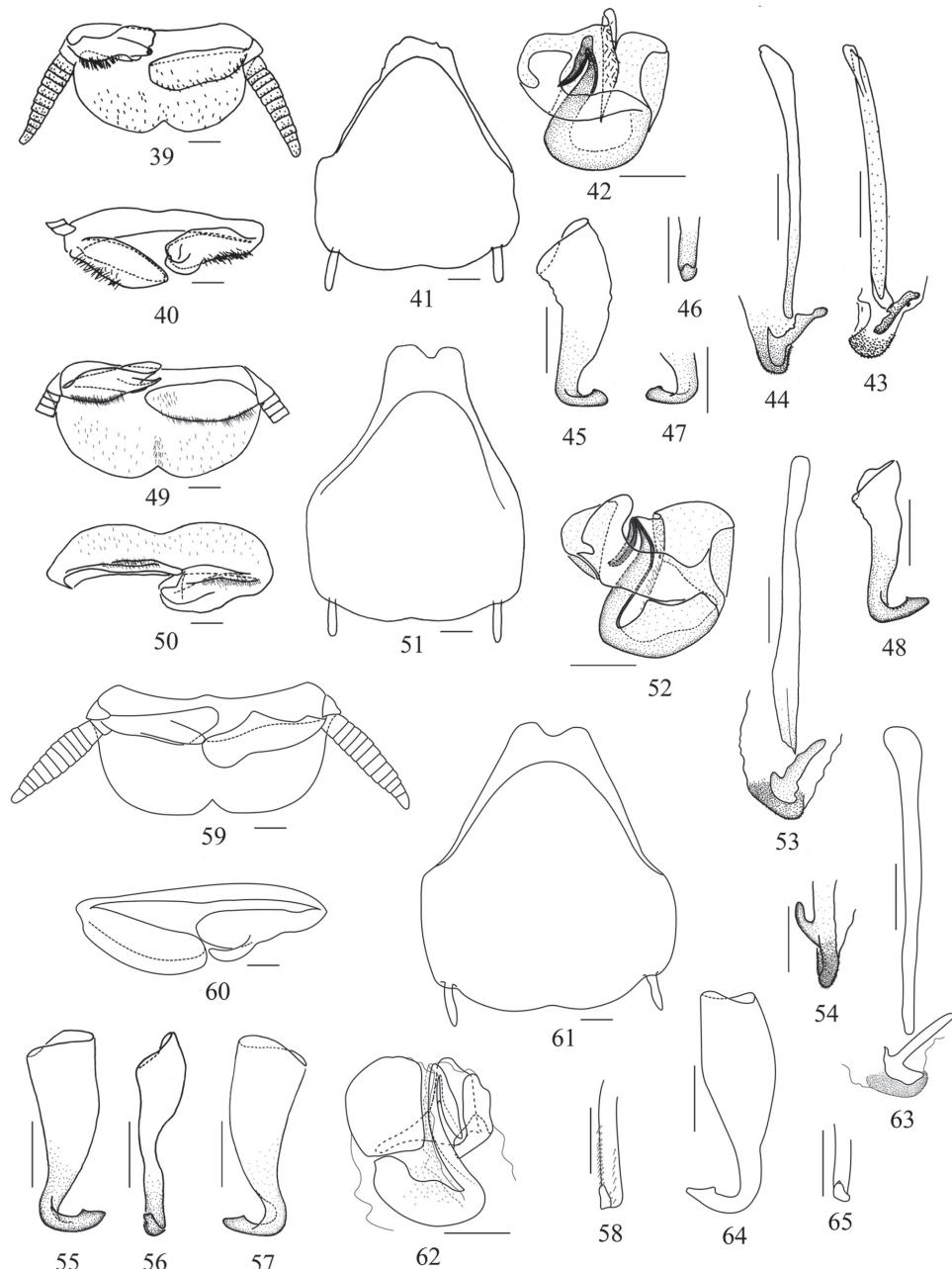
Male genitalia. Supra-anal plate rectangular, symmetrical, with posterior margin emarginated at middle (Fig. 30). Paraprocts asymmetrical, both sides with a finger-like protrusion bending backwards; the right one larger than the left (Fig. 31). Hypandrium symmetrical, with posterior margin shallowly emarginated (Fig. 32). Apodema of complex *L1* moderately sclerotized, triangular (Fig. 33). Apical outgrowth of sclerite *L2d* moderately sclerotized, short and nearly straight, basal part rough and apical part slender (Figs 34–35). Sclerite *R2* with tapering apex (Figs 36–38).

Male measurements. Body length 36.5 mm (including tegmen); Head length × width: 4.0 mm × 3.5 mm; Pronotum length × width: 7.5 mm × 10.5 mm; Tegmina length × width: 31.5 mm × 10.0 mm.

Material examined. one male, China: Yunnan Prov., Xishuangbanna, 27–30 April 1981, coll. Zheng Zhiguang (SWU).

Distribution. China (Yunnan); Vietnam.

Remarks. Apodema of complex *L1* of this species is short and approximately triangular, which is obviously different from others, whose apodemases of complex *L1* are longer and approximately rectangular.



Figures 39–65. 39–48 *Pseudophoraspis recurvata* sp. n. 49–57 *Pseudophoraspis incurvata* sp. n. 58–65 *Pseudophoraspis clavellata* sp. n. 39, 49, 59 supra-anal plate, ventral view 40, 50, 60 paraproct, caudal view 41, 51, 61 hypandrium, dorsal view 42, 52, 62 complex L1 43, 44, 53, 63 complex L2, dorsal view (43 specimen from "Hainan" 44 specimen from "Guangxi") 54 complex L2, lateral view 45–48, 55–57, 64–65 sclerite R2 (45–47 specimen from "Hainan" 48 specimen from "Guangxi") 58 1st segment of hind tarsus. Scale bars=0.5mm.

Pseudophoraspis gorochovi group

Species included here: *Pseudophoraspis recurvata* sp. n., *Pseudophoraspis incurvata* sp. n. and *Pseudophoraspis clavellata* sp. n.

Pseudophoraspis recurvata sp. n.

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

Figs 11–12, 39–48

Description. Body yellowish. Head brownish yellow; vertex and interocular space testaceous; eyes dark brown, ocellus yellowish (Fig. 12). Pronotum yellow covered with dense and small brown spots, and with a few brown stripes at apex (Fig. 11). Tegmina yellowish with more or less small brown spots, and costal vein wholly white (Fig. 11). Coxae and femora ventrally scattered with small brown spots (Fig. 12). Tergite with dense and small brown dots, and a brown stripe in the middle. Sternite with slightly small brown spots (Fig. 12).

Vertex completely concealed by pronotum (Figs 11, 12). Distance between eyes about 0.2 times width of head. Ocellus same as scrope and ocellus width equal to interocular width (Fig. 12). Pronotum broad and rhomboidal, with anterior margin curved and posterior margin obtusely produced; with punctures and two crescentic depressions on disc (Fig. 11). Tegmina and wings fully-developed, exceeding the abdomen and with apex rounded (Figs 11–12). Fore femur with 5 or 6 spines along anterior margin and one single apical spine. First segment of hind tarsus with spines along most part of its length; plantula apically occupying the terminal.

Male genitalia. Supra-anal plate (Fig. 39) and hypandrium (Fig. 41) symmetrical, with posterior margin emarginate; hypandrium slightly longer than supra-anal plate. Paraprocts asymmetrical; left one broad, simple plate, right one with a finger-like protrusion bending backwards (Fig. 40). Apodema of complex *L1* short and weakly sclerotized (Fig. 42). Sclerite *L2d* moderately sclerotized, rough and weakly rugose; its apical outgrowth short, with apex slightly bending outwards (Figs 43–44). Sclerite *R2* short, with a tooth on inner margin of terminal (Figs 46–48).

Male measurements. Body length 26.0–27.5 mm (including tegmen); Head length × width: 3.0–3.5 mm × 2.5–3.0 mm; Pronotum length × width: 5.5–6.0 mm × 8.0–8.5 mm; Tegmina length × width: 22.0–23.0 mm × 7.5–8.0 mm.

Material examined. *Holotype*, male, China: Hainan Prov., Baoting, 10 July 1959, coll. Hu Yichuan. *Paratypes*, one male, China: Hainan Prov., Baoting, 10. July 1959, coll. Hu Yichuan; one male, China: Guangxi Prov., Mt. Daqingshan, September 1958, coll. Xu Yixin.

Distribution. China (Hainan, Guangxi).

Remarks. The species resembles *P. gorochovi*, but can be distinguished by the following characters: 1) tegmina scattered with small brown spots, while the latter, tegmina lack any spots; 2) apical outgrowth of sclerite *L2d* slender, straight and with apex slightly bending outwards, the latter with apical outgrowth of sclerite *L2d* slightly bending outwards, basal part rough and terminal part slender.

Etymology. The specific epithet “*recurvatus*” is derived from Latin, referring to apical outgrowth of sclerite *L2d* bending outwards.

***Pseudophoraspis incurvata* sp. n.**

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

Figs 13–14, 49–57

Description. Body brownish-yellow. Head yellow; occiput, vertex and interocular space brown; eyes dark brown, ocellus yellowish (Fig. 14). Pronotum yellow scattered with small brown spots and some brown stripes near posterior margin (Fig. 13). Tegmina yellow, costal vein wholly yellowish, basal part scattered with small brown spots and the rest with large brown spots (Fig. 13). Anterior margin of wings covered with a few brown spots. Anterior margin of femur brown; coxa and femur scattered with small brown spots (Fig. 14). Abdomen densely scattered with brown spots, of which on tergites are denser than that of on sternites (Fig. 14). Tergites with a brown stripe in the middle (Fig. 13).

Vertex completely concealed by pronotum (Figs 13–14). Distance between eyes about 0.2 times width of head. Ocellus same as scrobe and ocellus width equal to interocular width (Fig. 14). Pronotum punctured and with two crescentic depressions on disc, rhomboidal, broader than long; with anterior margin curved and posterior margin obtusely produced (Fig. 13). Tegmina and wings fully-developed, apex rounded (Figs 13–14). Fore femur with 5 or 6 spines along anterior margin and 2 apical spines. First segment of hind tarsus with spines along most of its length and plantula occupying the terminal. Each tergite with a small ridge in the middle.

Male genitalia. Supra-anal plate symmetrical, semicircular, emarginated along posterior margin (Fig. 49). Paraproct asymmetrical; left one broad, simple plate, right one with a finger-like protrusion bending backwards (Fig. 50). Hypandrium symmetrical, shallowly emarginate in middle of posterior margin (Fig. 51). Hypandrium slightly longer than supra-anal plate. Apodema of complex *L1* short (Fig. 52). Sclerite *L2d* small, moderately sclerotized, apical outgrowth of sclerite *L2d* bending inwards (Figs 53–54). Sclerite *R2* with apex pointed (Figs 55–57).

Male measurements. Body length 29.5 mm (including tegmen); Head length × width: 3.6 mm × 3.0 mm; Pronotum length × width: 6.5 mm × 9.5 mm; Tegmina length × width: 24.5 mm × 8.5 mm.

Material examined. *Holotype*, male, China: Hainan Prov., Mt. Jianfengling, 31 July 1982, coll. Chen Zhiqing (SWU).

Distribution. China (Hainan).

Remarks. The species is similar to *Pseudophoraspis recurvata* sp. n., but can be distinguished by characters as follows: 1) the body larger than that of the latter, 2) apical outgrowth of sclerite *L2d* rough and bending inwards, while the latter straight and with apex slightly bending outwards.

Etymology. The specific name is from the Latin word “*incurvatus*”, referring to apical outgrowth of sclerite *L2d* bending inwards.

***Pseudophoraspis clavellata* sp. n.**

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

Figs 9–10, 58–65

Description. Body brownish-yellow. Head yellow; vertex and interocular space brown; eyes dark brown, ocelli yellowish (Fig. 10). Pronotum yellow scattered with small brown spots and some brown stripes near posterior margin (Fig. 9). Tegmina variegated scattered with brown spots, costal vein almost completely yellowish (Fig. 9). Anterior margin of wings scattered with few brown spots. Anterior margin of femur brown. Coxa, femur, and abdomen scattered with small brown spots (Fig. 10).

Vertex completely covered by pronotum. Distance between eyes at vertex is 0.3 times the width of head. Ocellus oval, much smaller than scrobes and ocellus width equal to interocular width (Fig. 10). Pronotum rhomboidal and with anterior margin curved, posterior margin obtusely produced; with punctures and two crescentic depressions on disc (Fig. 9). Tegmina and wings fully-developed, apex rounded (Figs 9–10). Fore femur with 4 or 6 spines along anterior margin and 1 apical spine. First segment of hind tarsus with 2 rows of spines along most of its length and plantula occupying the terminal (Fig. 58).

Male genitalia. Supra-anal plate (Fig. 59) and hypandrium (Fig. 61) symmetrical, distinctly shorter than hypandrium; both emarginate along posterior margin. Paraprocts asymmetrical; left one broad, simple plate, right one with a finger-like protrusion bending backwards (Fig. 60). The apodema of complex *L1* short, median emargination long (Fig. 62). Apical outgrowth of sclerite *L2d* more or less straight and slender (Fig. 63). Sclerite *R2* with apex pointed and a tooth on inner margin (Figs 64–65).

Male measurements. Body length 31.5 mm (including tegmen); Head length × width: 3.5 mm × 2.6 mm; Pronotum length × width: 7.0 mm × 9.5 mm; Tegmina length × width: 26.5 mm × 8.5 mm.

Material examined. *Holotype*, male, China: Yunnan Prov., Xishuangbanna, 11–13 May 1974, coll. Chou Io & Yuan Feng (NWAFU).

Distribution. China (Yunnan).

Remarks. *Pseudophoraspis clavellata* sp. n. is similar to *Pseudophoraspis incurvata* sp. n., but can be distinguished by the following characters: 1) ocellus small (larger in *Pseudophoraspis incurvata* sp. n.); 2) tegmina variegated with irregular brown spots (tegmina yellowish brown scattered with regular and round brown spots in *Pseudophoraspis incurvata* sp. n.); 3) apical outgrowth of sclerite *L2d* more or less straight and slender (bending inwards and with apex pointed in *Pseudophoraspis incurvata* sp. n.).

Etymology. The specific epithet is derived from the Latin word “*clavellatus*”, referring to apical outgrowth of sclerite *L2d* being nearly straight and slender.

Acknowledgements

We are sincerely grateful to Prof. J. R. Schrock (Department of Biological Sciences, Emporia State University, USA) for revising the manuscript. This study is supported by the National Natural Sciences Foundation of China (30900146, 31093430), and also partly by the Fundamental Research Funds for the Central Universities (XDK2012B025).

Reference

- Anisyutkin LN (1999) Cockroaches of the subfamily Epilamprinae (Dictyoptera, Blaberidae) from the Indochina Peninsula. Entomological Review 79(4): 434–454.
- Anisyutkin LN (2005) Two new species of Epilamprinae from Vietnam and Cambodia (Dictyoptera, Blattina: Blaberidae). Zoosystematica Rossica 14 (1): 37–40.
- Briuijning CFA (1948) Studies on Malayan Blattidae. Zoologische Mededeelingen 29: 1–174.
- Bruner L (1915) Preliminary Catalogue of the Orthopterous Insects of the Philippine Islands. University of Nebraska Studies 15(2): 195–281.
- Burmeister H (1838) Handbuch der Entomologie, Berlin, 505pp.
- Hanitsch R (1915) Malayan Blattidae. Part I. Journal of the Straits Branch of the Royal Asiatic Society 69: 17–178.
- Hanitsch R (1923) Malayan Blattidae. Part II. Journal of the Malayan Branch of the Royal Asiatic Society 1: 393–474.
- Hanitsch R (1925) On a collection of Blattidae from Northern Sarawak, Chiefly Mt. Murud and Mt. Dulit. The Sarawak Museum Journal 8: 75–106.
- Hanitsch R (1927) On a collection of Blattidae from Southern Annam. The Journal of the Siam Society, Natural History Supplement 7: 7–48
- Hanitsch R (1933) XXI. The Blattidae of Mount Kinabalu, British North Borneo. Journal of the Federated Malay States Museums 17: 297–337.
- Kirby WF (1903) Notes on Blattidae, with descriptions of new genera and species in the collection of the British Museum, South Kensington. No. II. The Annals and Magazine of Natural History 12(7): 273–280. doi: 10.1080/00222930308678853
- Kirby WF (1904) A Synonomic Catalogue of Orthoptera. I. British Museum London, 61–209.

- McKittrick FA (1964) Evolutionary Studies of Cockroaches. Cornell University Agricultural Experiment Station. New York State College of Agriculture, Ithaca, New York, 197pp.
- Princis K (1958) Revision der Walkerschen und Kirbyschen Blattarientyen im British Museum of Natural History, London. II. Opuscula Entomologica 23(1–2): 59–75.
- Princis K (1967) Orthopterorum Catalogus, pars 11, Blattariae: Subordo Epilamproidea; Fam. Nyctiboridae, Epilampridae. In Beier, M. (ed.). W. Junk, s'-Gravenhage, 615–710.
- Shelford R (1906) Studies of the Blattidae. The Transactions of the Entomological Society of London 14: 231–281.
- Shelford R (1910) Orthoptera. Fam. Blattidae. Subfam. Epilamprinae. Genera Insectorum. Fascicule 101. On souscrit chez M.P. Wytsman, Zoologiste, 43, rue Saint-Alphonse, à Bruxelles, Prospectus gratis et franco sur demande, 1–21.
- Walker FLS (1868) Catalogue of the Specimens of Blattariae in the Collection of the British Museum. Printed for The Trustees of The British Museum, London, 239pp.

The subtribes and genera of the tribe Listroderini (Coleoptera, Curculionidae, Cyclominae): Phylogenetic analysis with systematic and biogeographical accounts

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Academic editor: M. Alonso-Zarazaga | Received 12 November 2012 | Accepted 31 January 2013 | Published 28 February 2013

Citation: Morrone JJ (2013) The subtribes and genera of the tribe Listroderini (Coleoptera, Curculionidae, Cyclominae): Phylogenetic analysis with systematic and biogeographical accounts. ZooKeys 273: 15–71. doi: 10.3897/zookeys.273.4116

Abstract

The phylogenetic relationships of the genera of Listroderini LeConte, 1876 are analyzed based on 58 morphological characters. The genera are grouped in four clades, which are given subtribal status: Macrostyphlina new subtribe (*Adioristidius*, *Amathynetoides*, *Andesianellus*, *Macrostyphlus*, *Nacodius* and *Puranius*), Palaechthina Brinck, 1948 (*Anorthorhinus*, *Gunodes*, *Haversiella*, *Inaccodes*, *Listronotus*, *Neopachytychius*, *Palaechthus*, *Palaechtodes*, *Steriphus* and *Tristanodes*), Falklandiina new subtribe (*Falklandiellus*, *Falklandiopsis*, *Falklandius*, *Gromilus*, *Lanteriella*, *Liparogetus*, *Nestrius* and *Telurus*), and Listroderina (*Acroliellus*, *Acrorius*, *Acrostomus*, *Antarctobius*, *Germainiellus*, *Hyperoides*, *Lamiarhinus*, *Listroderes*, *Methypora*, *Philippius*, *Rupanius* and *Trachodema*). The subtribes are characterized and keys to identify them and their genera are provided. Listroderini have four main biogeographical patterns: Andean (Macrostyphlina), Andean-New Zealand (Falklandiina), Andean-Neotropical-Australian (Listroderina) and Andean-Neotropical-Australian-New Zealand-Nearctic-Tristan da Cunha-Gough islands (Palaechthina). Geographical paralogy, particularly evident in the Subantarctic subregion of the Andean region, suggests that Listroderini are an ancient Gondwanic group, in which several extinction events might have obscured relationships among the areas.

Keywords

Cyclominae, weevils, Americas, Australia, New Zealand, Tristan da Cunha-Gough islands

Introduction

Listroderini LeConte, 1876 are one of the largest tribes of Cyclominae (Oberprieler 2010, in press). They are widely distributed in the Southern Hemisphere, with the genus *Listronotus* also occurring in North America (Morrone 2011) and fossils known from Antarctica (Ashworth and Kuschel 2003). The tribe was originally proposed by LeConte (1876) for the New World genera *Listroderes*, *Listronotus* and *Macrops*. In the following decades additional new taxa were described from Chile (Germain 1895–1896; Kuschel 1949, 1950, 1952), Argentina (Enderlein 1907, 1912; Hustache 1926), North and Central America (e.g., Henderson 1940; O'Brien 1977, 1981) and Peru (Voss 1954). Kuschel (1950, 1952, 1955) transferred some listroderine species to genera of Entiminae. Additionally, the circumscription of the tribe was expanded, because several genera that have been originally assigned to other tribes (and even subfamilies) from Australia (Erichson 1842; Pascoe 1865, 1870; Blackburn 1890; Lea 1928), New Zealand (Broun 1893a, b, 1909, 1913, 1915) and the Tristan da Cunha-Gough islands (Brinck 1948) were transferred to Listroderini (Kuschel 1962, 1964, 1971, 1986; May 1994; Zimmerman 1994; Morrone 1997a). Recently, Oberprieler (2010) transferred *Rhigopsidius* from Rhythirrinini to Listroderini and reassigned the listroderine genus *Telurus* to the tribe Cylydrorhinini (Entiminae). According to the last checklist (Morrone 2011), a total of 407 species classified into 36 genera are assigned to Listroderini. Due to all these changes the taxa currently assigned to Listroderini constitute an assemblage that is difficult to characterize, and there is no complete treatment of all the genera.

Listroderini were originally assigned to the subfamily Cylydrorhininae (e.g., Enderlein 1907, 1912; Hustache 1926; Schenckling and Marshall 1931; Voss 1954; Kuschel 1955, 1958; O'Brien and Wibmer 1982). Kuschel (1964) transferred Listroderini to Rhyparosominae, which Kuschel (1971) later treated as a synonym of Rhythirrininae, and was followed by several authors (e.g., Wibmer and O'Brien 1986; Morrone et al. 1992; Morrone 1997a). Later, Rhythirrininae were demoted to a tribe of Cyclominae (Morrone 1997b), and thus Listroderini were considered as a subtribe (Anderson and Morrone 1996; Morrone 1997a, 2002a; Anderson 2002). More recently, Oberprieler (2010), while analysing the circumscription of Cyclominae and their tribes, reassigned tribal status to the listroderines.

Morrone (1997a) undertook a cladistic analysis of the South American genera of the tribe, considering that they represented a paraphyletic group, because the genera from Australia, New Zealand and the Tristan da Cunha-Gough islands are probably closely related to some of the American genera. The phylogenetic placement of these genera is not known, and the inclusion of *Rhigopsidius* and the exclusion of *Telurus* from the tribe, proposed by Oberprieler (2010), need to be tested.

My objective is to analyse the cladistic relationships of the genera of Listroderini, especially to determine the phylogenetic placement of the genera from Australia, New Zealand and the Tristan da Cunha-Gough islands. I intend to provide a phylogenetic framework for future studies and to summarize the systematics and biogeography of the genera to date.

Material and methods

The studied specimens were provided by the following collections:

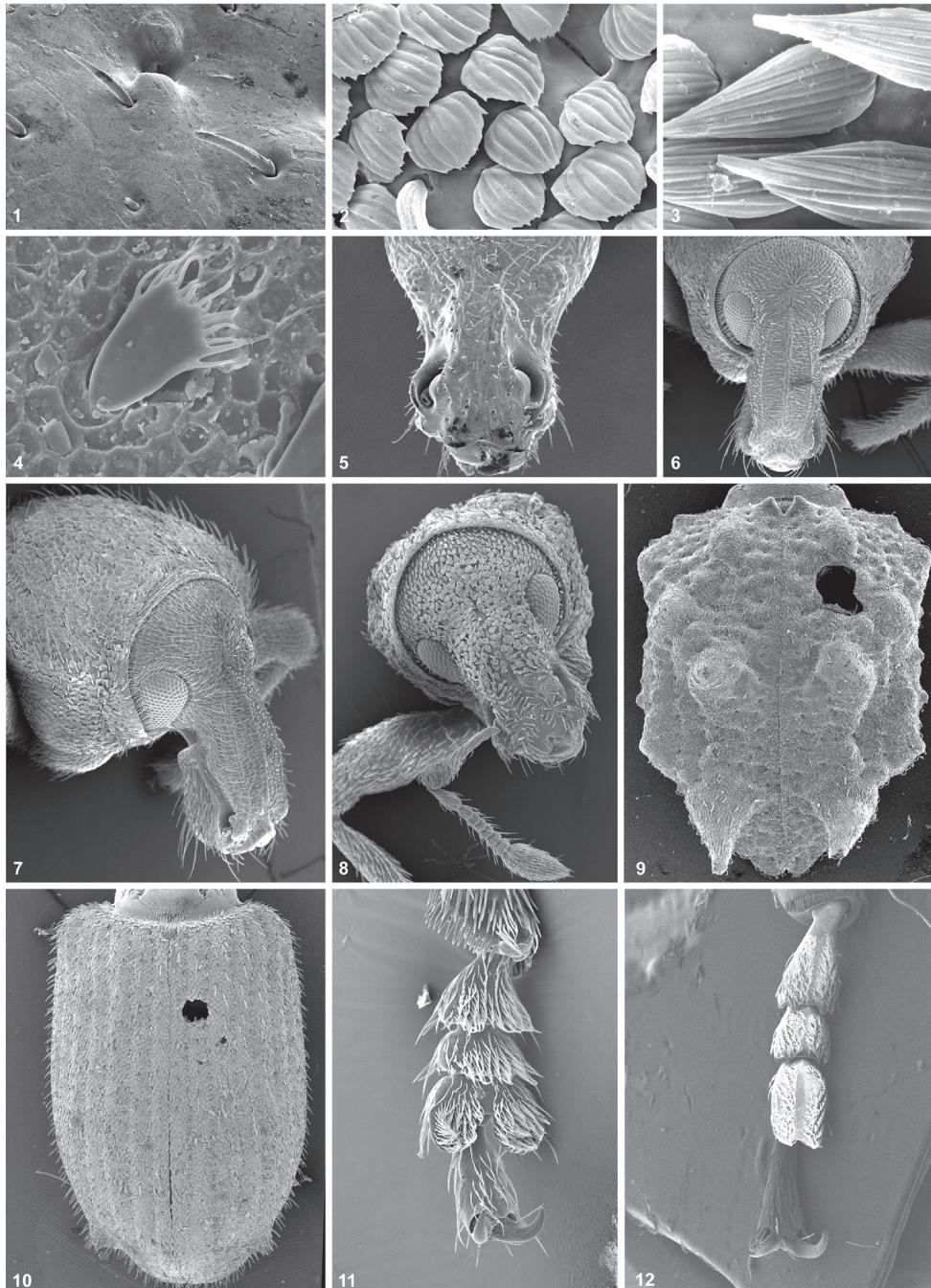
AMNH	American Museum of Natural History, New York, USA.
AMPC	Amyan MacFadyen, private collection, Coleraine, Northern Ireland.
ARPC	Alexander Riedel, private collection, Friedberg, Germany.
BMNH	The Natural History Museum, London, England.
BPBM	Bernice P. Bishop Museum, Honolulu, USA.
CADIC	Centro Austral de Investigaciones Científicas, Ushuaia, Argentina.
CBPC	Carlos Bordón, private collection, Maracay, Venezuela.
CMNC	Canadian Museum of Nature, Ottawa, Canada.
CNCI	Canadian National Collection of Insects, Arachnids and Nematodes, Agriculture and Agri-Food Canada, Ottawa, Canada.
CWOB	Charles W. O'Brien private collection, Arizona, USA.
DEI	Deutsches Entomologisches Institut, Eberswalde-Finow, Germany.
DZUP	Departamento de Zoología, Universidade Federal do Paraná, Curitiba, Brazil.
FIML	Fundación e Instituto Miguel Lillo, San Miguel de Tucumán, Argentina.
FMNH	Field Museum of Natural History, Illinois, USA.
GJWC	Guillermo J. Wibmer, private collection, Tallahassee, USA.
IADIZA	Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina.
ICNB	Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Santafé de Bogotá, Colombia.
IPUM	Instituto de la Patagonia, Universidad de Magallanes, Punta Arenas, Chile.
MACN	Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina.
MCZ	Museum of Comparative Zoology, Harvard University, Massachusetts, USA.
MHNS	Museo Nacional de Historia Natural, Santiago, Chile.
MLP	Museo de La Plata, La Plata, Argentina.
MNHN	Museum National d'Histoire Naturelle, Paris, France.
MZFC	Museo de Zoología "Alfonso L. Herrera", Facultad de Ciencias, UNAM, Mexico City, Mexico.
NZAC	New Zealand Arthropod Collection, Auckland, New Zealand.
SMTD	Staatliches Museum für Tierkunde, Dresden, Germany.
USNM	National Museum of Natural History, Washington D.C., USA.
ZMC	Zoologisk Museum, Copenhagen, Denmark.
ZMHU	Zoologische Museum der Humboldt Universität, Berlin, Germany.

Habitus drawing were made with a camera lucida attached to a stereoscopic microscope. Photographs were taken using a Scanning Electron Microscope at the Facultad de Ciencias, UNAM.

For the present study I examined species of the genera previously recognized for the tribe (Morrone 2011). The outgroup taxa included the genera *Hyomora* (Hipporhinini), *Aphela* (Notiomimetini), *Rhythirrinus* (Rhythirrinini) and *Telurus* (Cylindrornithini). *Epichthonius* (Cyclomini) was used to root the cladograms.

The 58 morphological characters used in the analysis were taken from external structures (53) and male and female genitalia (5). The distribution of character states is shown in the data matrix (Table I). The characters and their corresponding character states are as follows:

- 1 Body: length. (0) large to very large (> 15.0 mm); (1) medium-sized (7.1–14.9 mm); (2) small to very small (< 7.0 mm) [additive].
- 2 Vestiture: scales. (0) present; (1) absent.
- 3 Vestiture: scale shape. (0) seta-like (Fig. 1); (1) subcircular (Fig. 2); (2) lanceolate (Fig. 3); (3) with finger-like processes (Fig. 4) [non-additive].
- 4 Vestiture: setae. (0) present; (1) absent.
- 5 Rostrum: shape. (0) stout, very short (Fig. 5); (1) relatively stout, medium-sized, shorter than pronotum (Fig. 6); (2) slender, as long as or longer than pronotum [additive].
- 6 Rostrum: dorsal carinae. (0) present (Fig. 6); (1) absent (Figs 5, 8).
- 7 Scrobes: shape. (0) long, deep, sharply bordered, reaching eyes; (1) short, ill-defined, broad.
- 8 Epistome. (0) poorly demarcated; (1) raised.
- 9 Scrobes: position. (0) dorsolateral to dorsal; (1) lateral.
- 10 Suprascrobal keels. (0) absent; (1) present.
- 11 Scrobes: ventral tooth. (0) absent; (1) present (Fig. 7).
- 12 Pterygia. (0) simple, not exposed (Fig. 6); (1) auriculate, exposed (Fig. 5).
- 13 Mandibles. (0) with one apical cusp; (1) with two apical cusps.
- 14 Mandible and pharyngeal processes. (0); short and strong; (1) long and narrow.
- 15 Mandibles. (0) plurisetose (more than 4 setae); (1) paucisetose (1–4 setae).
- 16 Maxillary malae: teeth. (0) present; (1) absent.
- 17 Eyes: shape. (0) subcircular (Fig. 5); (1) transverse (Fig. 7).
- 18 Eyes: size. (0) large to medium (more than 30 facets); (1) small (10–25 facets); (2) very small (8 or fewer facets) [additive].
- 19 Eyes: position. (0) lateral (Fig. 6); (1) dorsal (Fig. 5).
- 20 Eyes: convexity. (0) strong; (1) slight; (2) flat [additive].
- 21 Antennal insertions. (0) distal; (1) at the middle of the rostrum.
- 22 Scapes: length. (0) long (surpassing posterior margin of eyes when resting in scrobe); (1) medium-sized (reaching eyes when resting in scrobe); (2) short (not reaching anterior margin of eyes when resting in scrobe) [additive].
- 23 Funicles: segment 1. (0) elongate; (1) globose.
- 24 Funicles: segments 2. (0) elongate; (1) globose.
- 25 Funicles: relative lengths of segments 1 and 2. (0) 1 longer than 2 (Fig. 8); (1) 1 subequal to or shorter than 2.



Figures 1–12. Some of the characters analysed. **1** Seta-like scales **2** subcircular scales **3** lanceolate scales **4** scales with finger-like processes **5, 6, 8** face and rostrum, dorsal view **7** face and rostrum, lateral view **8, 9** elytra, dorsal view **11, 12** tarsomere 3, ventral view. **1, 5** *Falklandius antarcticus*; **2, 8, 11** *Falklandiellus suffodens*; **3** *Hyperoides subcinctus*; **4, 12** *Philippius superbus*; **6, 7, 10** *Listroderes costirostris*; **9** *Lamiarhinus aelficus*.

- 26 Funicles: segments 3–6. (0) elongate; (1) globose (Fig. 8).
- 27 Clubs: shape. (0) fusiform; (1) inflated.
- 28 Pronotum: shape. (0) subcircular; (1) transverse; (2) subtrapezoidal; (3) subquadrate; (4) subcylindrical [non-additive].
- 29 Pronotum: width. (0) larger than that of elytra; (1) smaller than that of elytra.
- 30 Pronotum: disc. (0) rugose; (1) smooth, polished.
- 31 Pronotum: tubercles. (0) absent; (1) present.
- 32 Postocular lobes. (0) present, well-developed; (1) present, slightly developed; (2) absent [additive].
- 33 Prosternum. (0) non-excavate; (1) excavate.
- 34 Metanepisternal sutures. (0) posteriorly fused or obliterated; (1) present, complete.
- 35 Scutellum. (0) not visible; (1) visible.
- 36 Elytra: shape. (0) oblong-oval (Fig. 10); (1) subrectangular (Fig. 9); (2) elongate-oval [non-additive].
- 37 Elytra. (0) not fused; (1) fused along interelytral suture.
- 38 Elytral disc. (0) convex; (1) slightly convex; (2) flat [additive].
- 39 Elytral intervals. (0) convex; (1) flat.
- 40 Elytral basal margin. (0) not raised; (1) raised, subcarinate.
- 41 Elytral humeri. (0) rounded; (1) subquadrate.
- 42 Elytral humeral tubercles. (0) absent; (1) present.
- 43 Several tubercles on elytral disc. (0) present, small, rounded; (1) absent; (2) present, strong (Fig. 9) [non-additive].
- 44 Series of three tubercles restricted to elytral interval 3. (0) absent; (1) present.
- 45 Series of declivital tubercles on elytra. (0) absent; (1) present.
- 46 Carina on elytral apical declivity. (0) absent; (1) present.
- 47 Anteapical elytral tubercle. (0) absent; (1) present.
- 48 Elytral apex, female. (0) not produced; (1) produced.
- 49 Femora: shape. (0) subcylindrical, clavate; (1) dorsoventrally compressed, clavate; (2) subcylindrical, markedly clavate [non-additive].
- 50 Tibiae: shape. (0) subcylindrical, laterally not expanded; (1) apically expanded.
- 51 Tibial spurs. (0) present; (1) absent.
- 52 Tarsomeres 3. (0) bilobed (Fig. 11); (1) subcylindrical (Fig. 12).
- 53 Ventrites 3 and 4, female. (0) combined shorter than 5; (1) combined longer than 5.
- 54 Aedeagus, lateral view. (0) robust; (1) slender.
- 55 Distal gonocoxites. (0) strongly sclerotized; (1) membranous.
- 56 Styli. (0) well-developed, claw-like; (1) well-developed, finger-like; (2) reduced to a few vibrissae [non-additive].
- 57 Apodeme of female sternum 8. (0) short (< 3 times longer than plate); (1) long (> 4 times longer than plate).
- 58 Plate of female sternum 8. (0) developed; (1) reduced.

Table 1. Data matrix analysed. Character states of polymorphic taxa are indicated between square brackets.

<i>Methypora</i>	2010100010001010100102000104000101110200000000110000001100
<i>Nacodius</i>	200010001100101010010000010001020110001000000000011100
<i>Neopachytichius</i>	201020001000111010010200010000010110001000100000000001100
<i>Nestrius</i>	2000101000011001010010200001140002000000000100000000001100
<i>Palaeochthys</i>	1000121001000101010010200111200010112001000100000000001100
<i>Palaeochthodes</i>	100020001000101010010200111400010112001000100000000001100
<i>Philippius</i>	003010101000101011020100010010110101200101010100011001100
<i>Puranus</i>	201010001100101010010100011100010110001000000000000011110
<i>Rhigopsidius</i>	1030000110001010100201000101001011100010201010000000000
<i>Rupanius</i>	2000100010001010100101000101001011100010201010000000000
<i>Steriphus</i>	1010200010001010100100000100000010112000001000100000001100
<i>Trachodema</i>	2030101010001010100100000101001101100100102010100000001100
<i>Tristanodes</i>	200020001000101010010200111400010112001000100000000001100

The cladograms were constructed using software TNT (Goloboff et al. 2008). A first analysis was conducted treating all characters under equal weights. Then, the effect of homoplasy on the results was explored by conducting different implied weights analyses (Goloboff 1993), with constants of concavity (k) set to a different integer value of 1–12, where 1 is weighted most severely against homoplastic characters. Implied weights analyses were conducted using the heuristic “traditional search” algorithm of TNT, with 1000 replications and tree-bisection-reconnection branch-swapping (TBR), holding 1000 trees during each replication.

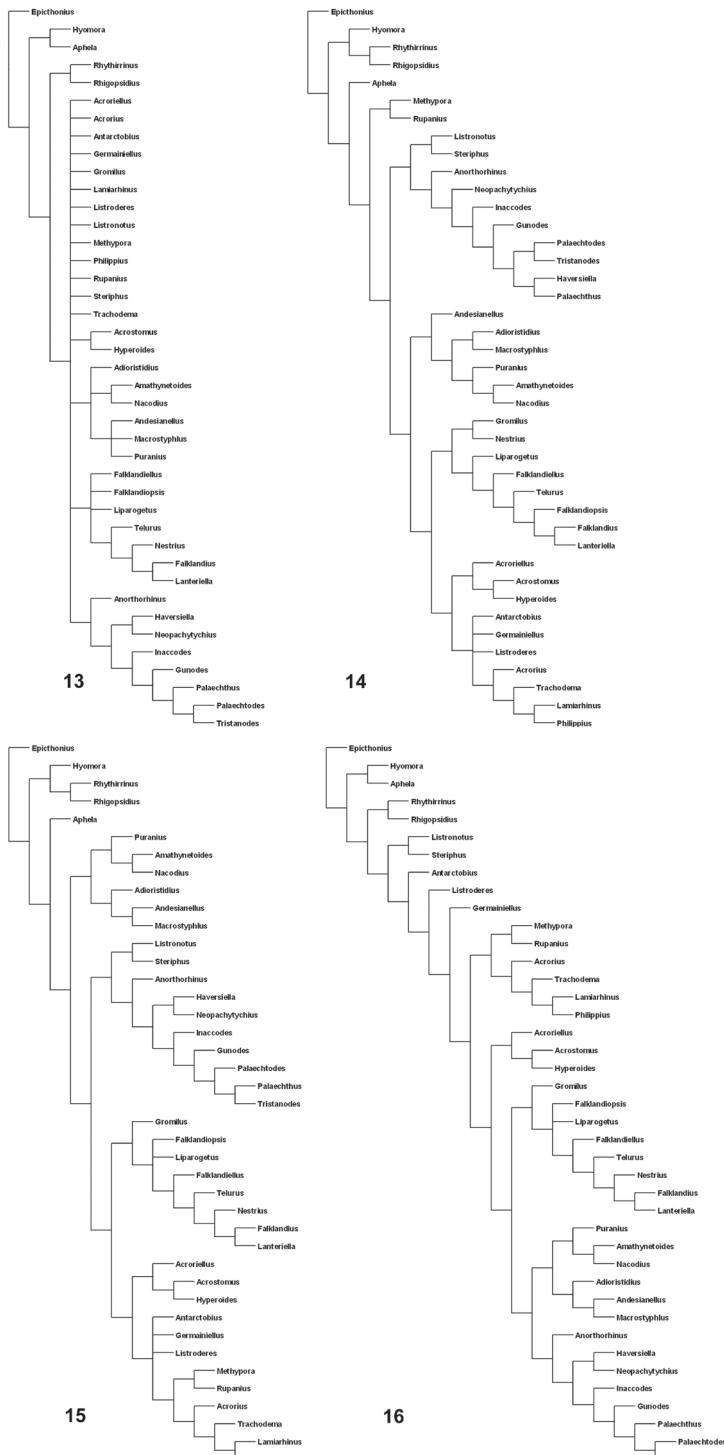
Results

Phylogenetic Analysis

The analysis of the data matrix (Table I) under equal weights and with different concavity constants led to different cladograms: 100 cladograms under equal weights (Fig. 13); three cladograms with $k=3$ (Fig. 14); six cladograms with $k=6$ (Fig. 15); and two cladograms with $k=12$ (Fig. 16). In all the analyses the tribe Listroderini is recovered as a monophyletic taxon. *Rhigopsidius*, previously placed by Oberprieler (2010) in Listroderini, resulted to be the sister taxon to *Rhythirrinus* (Rhythirrinini). *Telurus*, excluded from Listroderini by Oberprieler (2010), was placed within Listroderini. In the analyses with $k=3$ and 6, *Aphela* (Notiomimetini) is the sister taxon to Listroderini. In spite of the different results, there are some larger clades that were fairly constant.

I consider that the results of the analysis with $k=6$ are not as extreme as the others and show more clearly the four main clades, which are treated herein as subtribes (Fig. 17):

- 1 Macrostyphlina new subtribe: genera *Adioristidius*, *Amathynetoides*, *Andesianellus*, *Macrostyphlus*, *Nacodius* and *Puranius*.
- 2 Palaechthina Brinck, 1948: genera *Anorthorhinus*, *Gunodes*, *Haversiella*, *Inaccodes*, *Listronotus*, *Neopachytychius*, *Palaechthus*, *Palaechtodes*, *Steriphus* and *Tristanodes*.
- 3 Falklandiina new subtribe: genera *Falklandiellus*, *Falklandiopsis*, *Falklandius*, *Gromilus*, *Lanteriella*, *Liparogetus*, *Nestrius* and *Telurus*.
- 4 Listroderina LeConte, 1876: genera *Acroriellus*, *Acrorius*, *Acrostomus*, *Antarctobiuss*, *Germainiellus*, *Hyperoides*, *Lamiarhinus*, *Listroderes*, *Methypora*, *Philippius*, *Rupanius* and *Trachodema*.



Figures 13–16. Consensus cladograms of the different analyses. **13** equal weights **14** $k=3$ **15** $k=6$ **16** $k=12$.

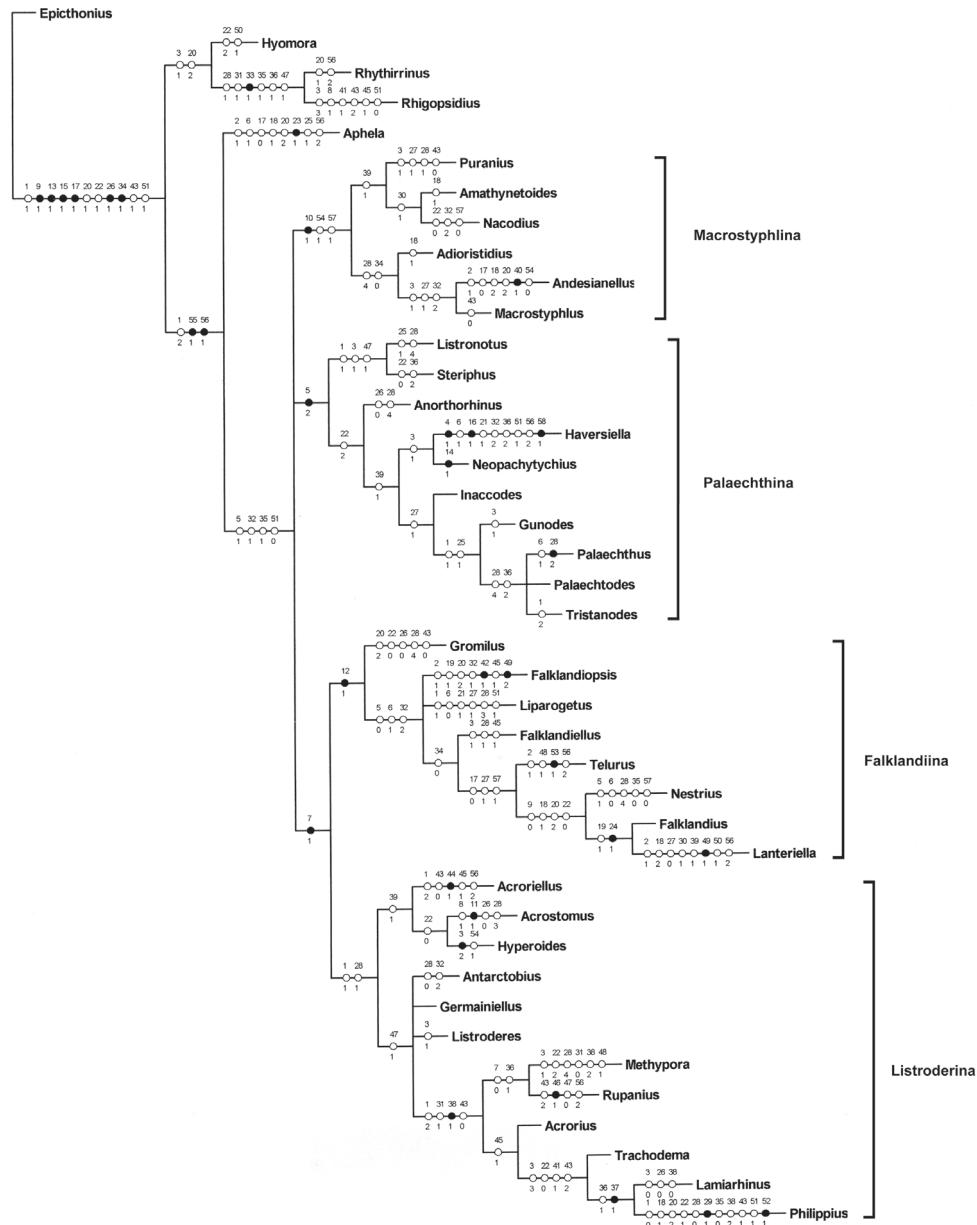


Figure 17. Consensus cladogram of the cladograms obtained with $k=6$ with character state changes indicated.

Systematic Account

Tribe Listroderini LeConte, 1876

Figs 18–35

Listroderi LeConte, 1876: 124.
Listroderitos Germain, 1895: 287.
Listroderina Champion, 1902: 120.
Listroderini Hustache, 1926: 175.
Listroderinae Thompson, 1992: 876.

Type genus. *Listroderes* Schönherr, 1826.

Diagnosis. Very small to very large (1.0–22.8 mm); integument reddish brown (black in *Acrostomus*); vestiture consisting mostly of dense scales and setae (rarely only scales or setae), setae on rostrum and pronotum directed anteriad or mesad, on elytra posteriad; rostrum stout and very short to slender, as long as or longer than pronotum; scrobes usually lateral; epistome poorly demarcated, rarely raised (*Acrostomus*); eyes usually large, flat, transverse or subcircular; mandibles with two apical cusps and paucisetose (1–4 setae); antennae with funicle 7-segmented, segments 1 and usually 2 elongate, clubs fusiform or inflated; prothorax with or without postocular lobes; prosternum long, non-excavate; elytra oblong-oval, elongate-oval or subrectangular; tibiae mucronate, generally with spurs (when present pro- and mesotibiae with 1 spur and metatibiae with 1–2 spurs); claws divaricate, simple or with slight basal swelling; aedeagus with tegmen lacking parameres (reduced in *Methypora*); distal gonocoxites membranous, generally simple, with large, apical or subapical stylus carrying a tuft of setae, but occasionally without stylus and apex of gonocoxite flattened and bent outwards.

Comparative notes. Listroderini were formerly considered as related to Rhytidinini (Kuschel 1971; Anderson and Morrone 1996; Morrone 1997a, b, 2002a; Anderson 2002). Oberprieler (2010, in press) considered Notiomimetini to be close relatives of Listroderini, although he suggested that more detailed studies would be required to decide whether they should be merged into a single tribe or not. Based on the results of this analysis, Listroderini and Notiomimetini (*Aphela*) are hypothesized to be sister tribes.

Biology. Larvae of Listroderini are generally oligophagous ectophytic root-feeders (Oberprieler in press). Adults feed on the leaves of a variety of angiosperms (Morrone 2011).

Key to the subtribes of Listroderini

- 1 Rostrum slender, as long as or longer than pronotum (except shorter than pronotum in some species of *Listronotus*); scrobes long, sharply bordered, reaching eyes; funicular segment 1 usually subequal to or shorter than 2; commonly associated with aquatic or semiaquatic plants **Palaechthrina**

- Rostrum stout or relatively stout, shorter than pronotum; scrobes usually short, ill-defined, broad; funicular segment 1 longer than 2; associated to terrestrial plants 2
- 2 Rostral dorsal carinae usually absent; pterygia auriculate, exposed (Fig. 5) **Falklandiina**
- Rostral dorsal carinae present; pterygia simple, not exposed (Fig. 6) 3
- 3 Scrobes short, ill-defined, broad, lacking suprascrobal keel; elytra with intervals convex, with antepical tubercle (except for *Rupanius*) **Listroderina**
- Scrobes long, deep, sharply bordered, reaching eyes, with suprascrobal keel; elytra with intervals usually flat, lacking antepical tubercle **Macrostyphlina**

Macrostyphlina, subtr. n.

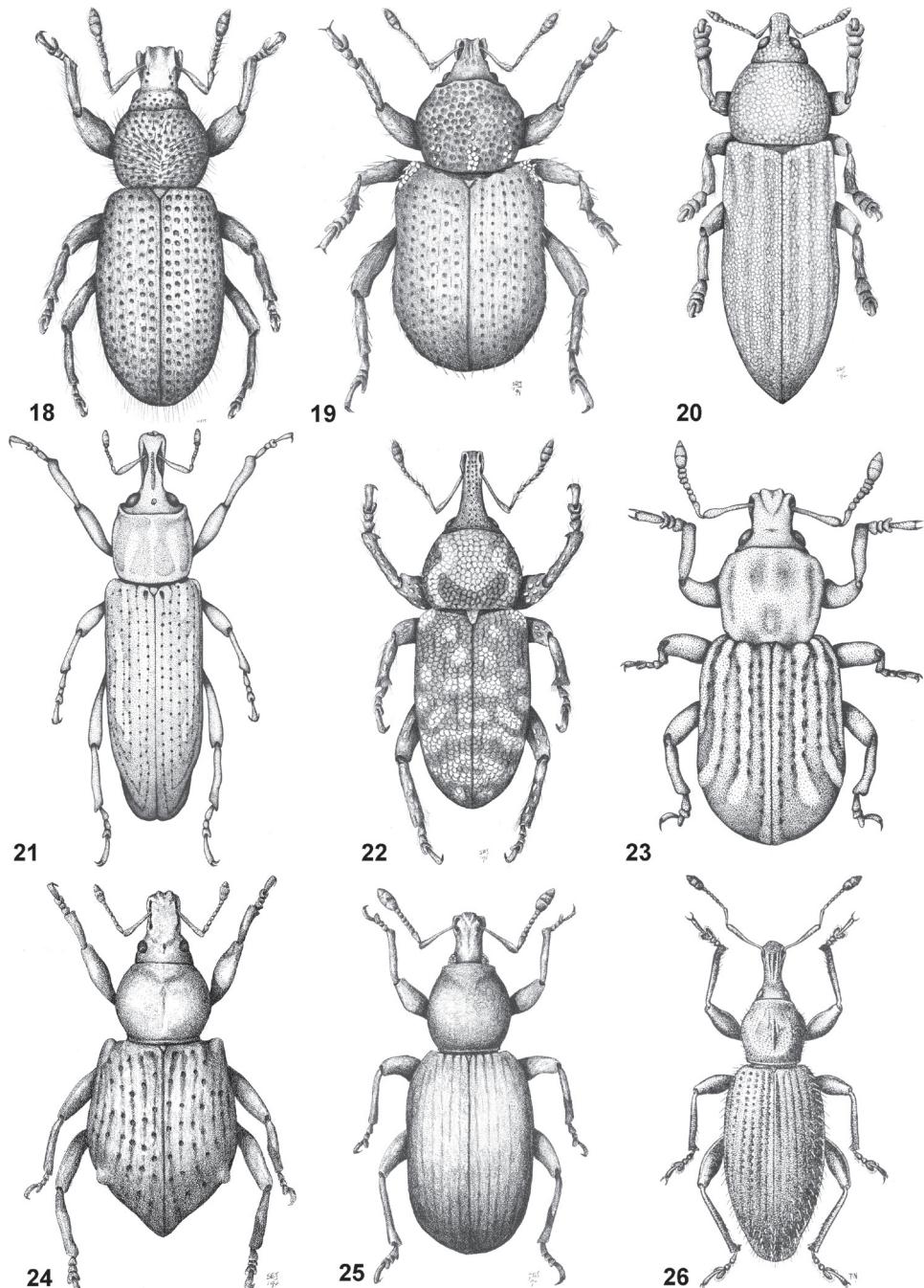
Type genus. *Macrostyphlus* Kirsch, 1889.

Diagnosis. Scrobes long, deep, sharply bordered, reaching eyes, with suprascrobal keel; elytra oblong-oval, with intervals usually flat, lacking antepical tubercle.

Included taxa. This new subtribe, which basically corresponds to the *Macrostyphlus* generic group of Morrone (1994c, 1997a), includes the genera *Adioristidius*, *Amathynetoides*, *Andesianellus*, *Macrostyphlus*, *Nacodius* and *Puranius*. All these genera are distributed in South America, in the Andean region and the South American Transition Zone (*sensu* Morrone 2006).

Key to the genera of Macrostyphlina

- 1 Postocular lobes present 2
- Postocular lobes absent 4
- 2 Pronotum transverse to strongly transverse **Puranius** (Fig. 19)
- Pronotum subcircular or subcylindrical 3
- 3 Pronotum subcircular with subparallel flanks, disc smooth, polished; metanepisternal sutures present, complete; elytra with intervals flat... **Amathynetoides**
- Pronotum subcylindrical, disc rugose; metanepisternal sutures posteriorly fused or obliterated; elytra with intervals convex **Adioristidius** (Fig. 18)
- 4 Vestiture consisting of subcircular scales and setae; elytra with small, rounded tubercles **Macrostyphlus**
- Vestiture consisting of seta-like scales and setae or only setae; elytra lacking tubercles 5
- 5 Vestiture consisting of seta-like scales and setae; eyes large, slightly convex; pronotum disc smooth, polished; basal elytral margin not raised ... **Nacodius**
- Vestiture consisting of setae only; eyes very small, microphthalmic (8 or fewer facets), flat; pronotum disc rugose; basal elytral margin raised, subcarinate ... **Andesianellus**



Figures 18–26. Habitus of representative Listroderini. **18** *Adioristidius hirsutus* **19** *Puranius nigrinus* **20** *Haversiella albolimbata* **21** *Listronotus bosqi* **22** *Neopachytychius squamosus* **23** *Falklandiellus suffodens* **24** *Falklandiopsis magellanica* **25** *Falklandius antarcticus* **26** *Gromilus veneris*.

***Adioristidius* Morrone, 1994**

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

Fig. 18

Adioristidius Voss, 1954: 242 (not available, type species not designated).

Anchadioristus Voss, 1954: 242 (not available, type species not designated).

Adioristidius Edwards & Hopwood, 1966: 5 (lapsus).

Adioristidius Morrone, 1994c: 13.

Type species. *Adioristus similaris* Voss, 1954.

Diagnosis. Small to very small (1.5–4.1 mm); vestiture consisting of seta-like scales and setae; antennal clubs fusiform; pronotum subcylindrical, disc rugose; metanepisternal sutures posteriorly fused or obliterated; elytral intervals convex.

Relationships. *Adioristidius* is the sister genus of *Macrostyphlus-Andesianellus*.

Species included. *Adioristidius anchonoideus* (Hustache, 1938); *A. carinicollis* (Voss, 1954); *A. chilensis* Morrone, 1994; *A. costulatus* (Hustache, 1938); *A. crassirostris* (Hustache, 1938); *A. cuprisquamatus* (Voss, 1954); *A. granulatus* (Hustache, 1938); *A. hirsutus* Morrone, 1994; *A. hydanius* Morrone, 1994; *A. jorgei* Morrone, 1994; *A. lidiae* Morrone, 1994; *A. manu* Morrone, 1994; *A. morio* (Voss, 1954); *A. nivalis* (Kuschel, 1949); *A. pampaensis* (Voss, 1954); *A. peruvianus* (Voss, 1954); *A. puncticollis* (Hustache, 1938); *A. scrobicollis* (Voss, 1954); *A. similaris* (Voss, 1954); *A. subimpresus* (Voss, 1954); *A. subtuberculatus* (Voss, 1954); *A. sulcicollis* (Hustache, 1938); *A. tuberculatus* (Voss, 1954); *A. variegatus* (Voss, 1954).

Host plants. *Adioristidius chilensis*: *Mulinum* spp. (Apiaceae); *A. tuberculatus*: *Solanum tuberosum* L. (Solanaceae) (Morrone 1994c).

Geographical distribution. South American Transition Zone (Puna biogeographical province) and Central Chilean and Subantarctic subregions (Andean region), from Peru to Central Chile (Morrone 1994c).

Material examined. *Adioristidius anchonoideus* (CMNC, DEI, MLP, MZFC), *A. chilensis* (MHNS), *A. costulatus* (DEI), *A. crassirostris* (DEI), *A. granulatus* (DEI), *A. hirsutus* (MHNS, MLP, MZFC), *A. hydanius* (DEI), *A. jorgei* (MHNS, MLP, MZFC), *A. lidiae* (CMNC), *A. manu* (CMNC, FMNH), *A. morio* (CWOB, MLP, MZFC), *A. nivalis* (MHNS, NZAC), *A. puncticollis* (DEI, MZFC), *A. similaris* (DEI), *A. sulcicollis* (DEI), *A. tuberculatus* (CWOB, MZFC, USNM), *A. variegatus* (DEI).

***Amathynetoides* Morrone, 1994**

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

Amathynetes Kuschel, 1949: 43 (non Olliff, 1891; misidentification, in part).

Amathynetoides Morrone, 1994c: 28.

Type species. *Amathynetes appendiculatus* Kuschel, 1949.

Diagnosis. Small to very small (3.0–6.6 mm); vestiture consisting of seta-like scales and setae; pronotum subcircular with subparallel flanks, disc smooth, polished; metanepisternal sutures present, complete; elytral intervals flat.

Relationships. *Amathynetoides* is the sister genus of *Nacodius*.

Species included. *Amathynetoides appendiculatus* (Kuschel, 1949); *A. ebeninus* (Hustache, 1938); *A. intemperatus* Morrone, 1994; *A. longulus* (Kuschel, 1949); *A. morbeamus* Morrone, 1994; *A. nitidiventris* (Hustache, 1938); *A. normae* Morrone, 1994; *A. palustris* (Kuschel, 1949); *A. sparsesetosus* (Hustache, 1938); *A. sundrianus* Morrone, 1994.

Host plants. *Amathynetoides nitidiventris*: *Ullucus tuberosus* Caldas (Basellaceae) (López and Hermann 2004).

Geographical distribution. South American Transition Zone (Puna and Coastal Peruvian Desert biogeographical provinces), from Peru to northern Chile (Morrone 1994c).

Material examined. *Amathynetoides appendiculatus* (CWOB, CMNC, MHNS, MZFC, NZAC, USNM), *A. ebeninus* (BPBM, CWOB, DEI, MZFC), *A. intemperatus* (AMNH, CWOB, MLP, MZFC), *A. longulus* (CWOB, MHNS, NZAC, MZFC, USNM), *A. morbeamus* (FIML), *A. nitidiventris* (DEI), *A. normae* (CMNC, MLP, MZFC), *A. palustris* (CWOB, FIML, MHNS, MZFC, NZAC, USNM), *A. sparsesetosus* (CWOB, DEI, CMNC, MZFC), *A. sundrianus* (BMNH, CWOB, FIML, MLP, MZFC).

Andesianellus Anderson & Morrone, 1996

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

Andesianellus Anderson & Morrone, 1996: 260.

Type species. *Andesianellus microphthalmicus* Anderson & Morrone, 1996.

Diagnosis. Very small (1.9–3.3 mm); vestiture consisting of setae only; eyes very small, (8 or fewer facets), flat; postocular lobes absent; basal elytral margin raised, subcarinate.

Relationships. *Andesianellus* is the sister genus of *Macrostyphlus*, as hypothesized in previous analyses (Anderson and Morrone 1996; Morrone 1997a).

Biology. Species of this genus have been reported as leaf-litter inhabitants (Anderson and Morrone 1996).

Species included. *Andesianellus carltoni* Anderson & Morrone, 1996; *A. cotopaxi* Anderson & Morrone, 1996; *A. fulgidus* Anderson & Morrone, 1996; *A. hermani* Anderson & Morrone, 1996; *A. masneri* Anderson & Morrone, 1996; *A. microphthalmicus* Anderson & Morrone, 1996; *A. minutus* Anderson & Morrone, 1996; *A. planirostris* Anderson & Morrone, 1996; *A. tricarinatus* Anderson & Morrone, 1996.

Geographical distribution. South American Transition Zone (North Andean Paramo biogeographical province), in Colombia, Ecuador and Peru (Anderson and Morrone 1996).

Material examined. *Andesianellus carltoni* (CMNC), *A. cotopaxi* (AMNH), *A. fulgidus* (CMNC), *A. hermani* (AMNH), *A. masneri* (CMNC), *A. microphthalamicus* (CMNC, MLP), *A. minutus* (CMNC, FMNH), *A. planirostris* (AMNH, BMNH, CMNC, CWOB, FMNH, MLP, USNM), *A. tricarinatus* (CMNC, FMNH).

***Macrostyphlus* Kirsch, 1889**

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

Macrostyphlus Kirsch, 1889: 25.

Type species. *Macrostyphlus gualcalae* Kirsch, 1889 (by indication, monotypy).

Diagnosis. Very small (1.9–3.5 mm); vestiture consisting of subcircular scales and setae; pronotum subcylindrical; metanepisternal sutures posteriorly fused or obliterated; elytra with intervals convex.

Relationships. *Macrostyphlus* is the sister genus of *Andesianellus*, as hypothesized in a previous analysis (Morrone 1997a).

Species included. *Macrostyphlus bilbo* Morrone, 1994; *M. coelorum* (Olliff, 1891); *M. frodo* Morrone, 1994; *M. gandalf* Morrone, 1994; *M. gualcalae* Kirsch, 1889; *M. howdenorum* Morrone, 1994; *M. peruvianus* Morrone, 1994; *M. sturmi* Morrone, 1994; *M. transatlanticus* (Kirsch, 1889); *M. venezolanus* Morrone, 1994.

Geographical distribution. South American Transition Zone (North Andean Paramo and Puna biogeographical provinces), from eastern Venezuela to southern Peru (Morrone 1994c).

Material examined. *Macrostyphlus bilbo* (CNCI), *M. coelorum* (CWOB), *M. frodo* (ICNB, USNM), *M. gandalf* (CMNC, CNCI, MLP, MZFC), *M. gualcalae* (SMTD), *M. howdenorum* (CMNC), *M. peruvianus* (FMNH), *M. sturmi* (ICNB), *M. transatlanticus* (SMTD), *M. venezolanus* (MZFC).

***Nacodius* Morrone, 1994**

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

Nacodius Morrone, 1994e: 3.

Type species. *Nacodius martitiae* Morrone, 1994.

Diagnosis. Small (4.6–6.9 mm); vestiture of seta-like scales and setae; eyes large, slightly convex; pronotum lacking postocular lobes, with disc smooth, polished; elytra with intervals flat.

Relationships. *Nacodius* is the sister genus to *Amathynetoides*, and both are placed in Macrostyphlini. In a previous analysis (Morrone 1997a) *Nacodius* was placed in the *Antarctobius* generic group (= Listroderina).

Species included. *Nacodius alecrus* Morrone, 1994; *N. brevirostris* (Voss, 1954); *N. martitae* Morrone, 1994; *N. omissus* (Kuschel, 1952).

Geographical distribution. South American Transition Zone (North Andean Paramo and Puna biogeographical provinces), in Ecuador and Peru (Morrone 1994e).

Material examined. *Nacodius alecrus* (CWOB), *N. brevirostris* (SMTD), *N. martitae* (AMNH, CWOB, MLP, MZFC) and *N. omissus* (BMNH).

Puranus Germain, 1895

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

Fig. 19

Puranus Germain, 1895: 313.

Puranus Germain, 1911: 205 (lapsus).

Reichertia Enderlein, 1912: 31 (type species: *Listroderes sculpticollis* Enderlein, 1907, by original designation).

Type species. *Puranus inaequalis* Germain, 1896 (subsequent designation by Morrone, 1994c).

Relationships. *Puranus* is the sister genus to *Amathynetoides-Nacodius*.

Diagnosis. Small to very small (1.9–6.5 mm); vestiture of subcircular scales and setae; pronotum transverse to strongly transverse; metanepisternal suture present, complete; elytra oblong-oval, with small, rounded tubercles.

Species included. *Puranus argentinensis* Morrone, 1994; *P. australis* Germain, 1896; *P. championi* (Kuschel, 1952); *P. dubius* (Germain, 1896); *P. elguetai* Morrone, 1994; *P. exsculpticollis* (Enderlein, 1907); *P. fasciculiger* (Blanchard, 1851); *P. hispidus* (Germain, 1896); *P. inaequalis* Germain, 1896; *P. midas* Morrone, 1994; *P. nigrinus* (Fairmaire, 1884); *P. obrienorum* Morrone, 1994; *P. pusillus* Morrone, 1994; *P. scaber* (Enderlein, 1907); *P. sylvanicus* Morrone, 1994; *P. torosus* Morrone, 1994; *P. tothus* Morrone, 1994; *P. tuberosus* Germain, 1896; *P. verrucosus* (Germain, 1896); *P. vulgaris* Morrone, 1994.

Host plants. *Puranus argentinensis*: *Mulinum* sp. (Apiaceae); *P. championi*: *Poa flabellata* (Lam.) Raspail (Poaceae); *P. fasciculiger*: *Senecio smithii* DC (Asteraceae); *P. nigrinus*: *Taraxacum officinale* Weber ex F. H. Wigg. (Asteraceae) and *Nothofagus* sp. (Nothofagaceae); *P. vulgaris*: *Mulinum* sp. (Apiaceae); *P. scaber*: *Baccharis* sp. (Asteraceae) and *Ephedra* sp. (Ephedraceae) (Morrone, 1994c).

Geographical distribution. Andean region (Subantarctic and Central Chilean subregions) and South American Transition Zone, from southern Argentina, including the Falkland Islands (Islas Malvinas), to Peru (Morrone 1994c; Posadas 2008, 2012).

Material examined. *Puranus argentinensis* (AMNH, BMNH, MLP, MZFC), *P. australis* (AMNH, CWOB, MHNS, NZAC), *P. championi* (BMNH, CWOB, NZAC), *P. dubius* (CWOB, MHNS, NZAC), *P. elguetai* (AMNH, MHNS, MLP, MZFC), *P. exsculpticollis* (BMNH), *P. fasciculiger* (CWOB, MHNS, NZAC, USNM), *P. his-*

pidus (CWOB, MHNS, NZAC), *P. inaequalis* (CMNC, CWOB, MHNS, MZFC, NZAC), *P. midas* (AMNH), *P. nigrinus* (ARPC, BMNH, CADIC, CBPC, CMNC, CNCI, CWOB, DEI, FIML, IPUM, MCZ, MHNS, MZFC, NZAC, USNM), *P. obrienorum* (AMNH, CMNC, CWOB, MLP, MZFC), *P. pusillus* (MHNS, MLP, MZFC), *P. scaber* (AMPC, BMNH, CWOB, NZAC), *P. sylvanius* (AMNH, BMNH, CMNC, MLP, MZFC), *P. torosus* (MHNS, MLP, MZFC), *P. tothus* (MHNS), *P. tuberosus* (CWOB, MHNS, NZAC), *P. verrucosus* (CMNC, CWOB, MHNS, MZFC, NZAC) and *P. vulgaris* (AMNH, BMNH, CMNC, MHNS, MLP, MZFC).

Subtribe Palaechthina Brinck, 1948, stat. n.

Palaechtini Brinck, 1948: 43; Bouchard et al. 2011: 603 (incorrect original stem formation, not in prevailing usage).

Type genus. *Palaechthus* C. O. Waterhouse, 1884 (by original designation, as *Palaechtus*, incorrect subsequent spelling).

Diagnosis. Rostrum slender, as long as or longer than pronotum (except for some species of *Listronotus* where the rostrum is shorter than pronotum); scrobes long, deep, sharply bordered, reaching eyes; scape usually short (not reaching anterior margin of eye when resting in scrobe); pronotum usually subcylindrical or subcircular; elytra oblong-oval to elongate-oval.

Biology. Most of the species of Palaechthina are associated to aquatic or semi-aquatic plants, being found in wet or damp conditions (May 1970; O'Brien 1977, 1981; Marvaldi 1994; Morrone and O'Brien 2000). In contrast with the remaining Listroderini, larvae usually lead a more endophytic way of life inside the stems of several aquatic plants (Oberprieler, in press).

Included taxa. This subtribe includes the genera *Anorthorhinus*, *Gunodes*, *Haversiella*, *Inaccodes*, *Listronotus*, *Neopachytychius*, *Palaechthus*, *Palaechtodes*, *Steriphus* and *Tristanodes*. *Anorthorhinus* and *Steriphus* are Australian; *Gunodes*, *Inaccodes*, *Palaechthus*, *Palaechtodes* and *Tristanodes* are distributed in the Tristan da Cunha-Gough islands; and the remaining three genera are found in the Americas: *Haversiella* and *Neopachytychius* in South America and *Listronotus* has a disjunct distribution in South and North America.

Key to the genera of Palaechthina

1	Funicular segment 1 subequal to or shorter than 2.....	2
-	Funicular segment 1 longer than 2.....	6
2	Elytra with intervals convex; North and South America ...	<i>Listronotus</i> (Fig. 21)
-	Elytra with intervals flat; Tristan da Cunha-Gough islands.....	3
3	Small to very small (3.7–6.5 mm).....	<i>Tristanodes</i>
-	Medium-sized to large (7.0–12.0 mm)	4

- 4 Vestiture of subcircular scales and setae; pronotum subcircular; elytra oblong-oval..... ***Gunodes***
- Vestiture of seta-like scales and setae; pronotum subtrapezoidal or subcylindrical; elytra elongate-oval..... 5
- 5 Large (11.0–12.0 mm); rostral dorsal carinae absent; pronotum subtrapezoidal ***Palaechthus***
- Medium-sized (7.0–7.5 mm); rostral dorsal carinae present; pronotum subcylindrical ***Palaechtodes***
- 6 Scape long (surpassing posterior margin of eye when resting in scrobe); elytra with anteapical tubercle ***Steriphus***
- Scape short (not reaching anterior margin of eye when resting in scrobe); elytra lacking anteapical tubercle..... 7
- 7 Vestiture of seta-like scales and setae; Australia and Tristan da Cunha-Gough islands..... 8
- Vestiture of subcircular scales ans setae; South America 9
- 8 Funicular segments 3-6 elongate; club fusiform; pronotum subcylindrical; elytra with intervals convex; Australia ***Anorthorhinus***
- Funicular segments 3-6 globose; club inflated; pronotum subcircular; elytra with intervals flat; Tristan da Cunha-Gough islands ***Inaccodes***
- 9 Vestiture of subcircular scales and setae; rostral dorsal carinae present; mandibles long and narrow; antennal insertion distal; postocular lobes slightly developed; elytra oblong-oval; tibiae with spurs .. ***Neopachytychius*** (Fig. 22)
- Vestiture of subcircular scales only; rostral dorsal carinae absent; mandibles robust; antennal insertion at the middle of the rostrum; postocular lobes absent; elytra elongate-oval; tibiae lacking spurs ***Haversiella*** (Fig. 20)

***Anorthorhinus* Blackburn, 1890**

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

Anorthorhinus Blackburn, 1890: 327.

Anorthorrhinus Sharp, 1892: 148 (lapsus).

Type species. *Anorthorhinus pictipes* Blackburn, 1890 (by indication, monotypy).

Diagnosis. Small to very small (2.5–6.0 mm); vestiture of seta-like scales and setae; funicular segments 3-6 elongate; club fusiform; pronotum subcylindrical; elytra with intervals convex.

Relationships. *Anorthorhinus* is the sister genus to the clade comprising *Haversiella*, *Neopachytychius* and the five genera from the Tristan da Cunha-Gough islands.

Species included. *Anorthorhinus apicalis* Lea, 1899; *A. brevicornis* Lea, 1899; *A. pictipes* Blackburn, 1890.

Geographical distribution. Australia (Oberprieler 2010).

Material examined. *Anorthorhinus apicalis* (MZFC) and *A. pictipes* (MZFC).

***Gunodes* Brinck, 1948**

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

Gunodes Brinck, 1948: 55.

Type species. *Gunodes major* Brinck, 1948.

Diagnosis. Medium-sized (7.5 mm); vestiture of subcircular scales and setae; pronotum subcircular; elytra oblong-oval.

Relationships. *Gunodes* is the sister genus to *Palaechthus-Paleachthodes-Tristanodes*. Oberprieler (1992) considered that the distinction between *Gunodes* and *Tristanodes* is not without doubt.

Species included. *Gunodes major* Brinck, 1948.

Geographical distribution. Tristan da Cunha-Gough islands (Brinck 1948).

***Haversiella* Schweiger, 1959**

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

Fig. 20

Haversia Champion, 1918a: 185 (*non* Röwer, 1913).

Haversiella Schweiger, 1959: 42 (replacement name for *Haversia*).

Type species. *Haversiella albolimbata* Champion, 1918 (by original designation).

Relationships. *Haversiella* is the sister genus to *Neopachytychius*, and both constitute the sister group to the five genera from the Tristan da Cunha-Gough islands.

Diagnosis. Very small (3.0–3.9 mm); vestiture of subcircular scales only; maxillary mala lacking teeth; antennal insertion at the middle of the rostrum; pronotum subcircular; elytra elongate-oval; tibiae lacking spurs; plate of female sternum 8 reduced.

Species included. *Haversiella albolimbata* (Champion, 1918).

Host plants. Bryophytes (Morrone 1994d).

Geographical distribution. Southern Argentina, including the Falkland Islands (Islas Malvinas), and southern Chile (Morrone 1994d; Posadas 2008, 2012).

Material examined. *Haversiella albolimbata* (BMNH, MHNS, MZFC, USNM).

***Inaccodes* Brinck, 1948**

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

Inaccodes Brinck, 1948: 52.

Type species. *Inaccodes oblongus* Brinck, 1948.

Diagnosis. Small (4.5 mm); vestiture of seta-like scales and setae; funicular segments 3–6 globose; club inflated; pronotum subcircular; elytra with intervals flat.

Relationships. *Inaccodes* is the sister genus to the clade comprising the four remaining genera from the Tristan da Cunha-Gough islands. Oberprieler (1992) considered that the distinction between *Inaccodes* and *Tristanodes* is not without doubt.

Species included. *Inaccodes oblongus* Brinck, 1948.

Geographical distribution. Tristan da Cunha-Gough islands (Brinck 1948).

Listronotus Jekel, 1865

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

Fig. 21

Macrops Kirby, 1837: 199 (*non* Wagler 1830, *nec* Burmeister 1835) (type species: not designated).

Hyperodes Jekel, 1865: 566 (type species: *Listroderes humilis* Gyllenhal, 1834, by original designation).

Listronotus Jekel, 1865: 566.

Anchodemus LeConte, 1876: 181 (type species: *A. hubbardi* LeConte, 1876, subsequent designation by Kuschel 1950: 14).

Lixellus LeConte, 1876: 182 (type species: *L. filiformis* LeConte, 1876, by indication, monotypy).

Mascarauxia Desbrochers des Loges, 1898: 52 (type species: *M. cyrtica* Desbrochers des Loges 1898, by indication, monotypy).

Relistrodes Brèthes, 1910: 209 (type species: *R. breyeri* Brèthes, 1910, by indication, monotypy).

Aulametopiellus Brèthes, 1926: 415 (type species: *A. dauci* Brèthes, 1926, by indication, monotypy).

Mascaranxia Bosq, 1935: 330 (lapsus).

Pseudhyperodes Hustache, 1939a: 49 (type species: *P. elongatus* Hustache, 1939).

Type species. *Rhynchaenus caudatus* Say, 1824 (subsequent designation by Henderson 1940).

Diagnosis. Very small to medium-sized (1.0–14.0 mm); vestiture of subcircular scales and setae; antennal insertion distal; funicular segment 1 subequal to or shorter than 2; postocular lobes present, well-developed; elytra oblong-oval to elongate-oval, with intervals convex.

Relationships. *Listronotus* is the sister genus to *Steriphus* (Australia). In a previous analysis based only on American taxa (Morrone 1997a), *Listronotus* was considered to be the sister genus to *Neopachytychius*.

Species included. *Listronotus alternatus* (Dietz, 1889); *L. americanus* LeConte, 1876; *L. angustatus* (Champion, 1902); *L. annulipes* (Blatchley, 1925); *L. anthracinus* (Dietz, 1889); *L. apicalis* (Hustache, 1926); *L. appendiculatus* (Bohemian, 1842); *L. argentinensis* (Hustache, 1926); *L. arizonicus* O'Brien, 1981; *L. blandus* Henderson, 1940; *L. blatchleyi* Henderson, 1940; *L. bonariensis* (Kuschel, 1955); *L. borrichiae* O'Brien,

1981; *L. bosqi* (Hustache, 1926); *L. breyeri* (Brèthes, 1910); *L. burkei* O'Brien, 1981; *L. californicus* (Dietz, 1889); *L. callosus* LeConte, 1876; *L. carinatus* (Blatchley, 1928); *L. carinicollis* (Hustache, 1926); *L. caudatus* (Say, 1824); *L. cinnamoneus* (Hustache, 1926); *L. conabilis* O'Brien, 1981; *L. crypticus* O'Brien, 1981; *L. cryptops* (Dietz, 1889); *L. cyrticus* (Desbrochers des Loges, 1898); *L. dauci* (Brèthes, 1926); *L. debilis* Blatchley, 1916; *L. deceptus* (Blatchley, 1916); *L. delumbis* (Gyllenhal, 1834); *L. dietrichi* (Stockton, 1963); *L. dietzi* O'Brien, 1979; *L. distinctus* Henderson, 1940; *L. dorsalis* (Dietz, 1889); *L. dorytomoides* (Hustache, 1926); *L. durangoensis* O'Brien, 1977; *L. echinatus* (Dietz, 1889); *L. echinodori* O'Brien, 1977; *L. elegans* Van Dyke, 1929; *L. elegantulus* O'Brien, 1981; *L. elongatus* (Hustache, 1939); *L. fasciatus* O'Brien, 1981; *L. filiformis* (LeConte, 1876); *L. frontalis* LeConte, 1876; *L. geminatus* (Hustache, 1926); *L. griseus* (Hustache, 1926); *L. grypidioides* (Dietz, 1889); *L. haldemani* (Burke, 1963); *L. hirtellus* (Dietz, 1889); *L. hoodi* (Stockton, 1963); *L. hornii* (Dietz, 1889); *L. hubbardi* (LeConte, 1876); *L. humilis* (Gyllenhal, 1834); *L. hyperodes* (Dietz, 1889); *L. incompletus* (Hatch, 1971); *L. ingens* Henderson, 1940; *L. insignis* Henderson, 1940; *L. laevis* (Hustache, 1926); *L. laramiensis* (Angell, 1893); *L. latinasus* (Blatchley, 1922); *L. lineolaticollis* (Blanchard, 1851); *L. lodingi* (Blatchley, 1920); *L. lucens* (Hustache, 1926); *L. lutulentus* (Bohemian, 1843); *L. maculatus* (Hatch, 1971); *L. maculicollis* (Kirby, 1837); *L. manifestus* Henderson, 1940; *L. marginalis* O'Brien, 1977; *L. marginicollis* (Hustache, 1926); *L. marshalli* O'Brien, 1981; *L. meridionalis* O'Brien, 1977; *L. minutus* (Blanchard, 1851); *L. montanus* (Dietz, 1889); *L. nebulosus* LeConte, 1876; *L. neocallosus* O'Brien, 1981; *L. nevadicus* LeConte, 1876; *L. nigropunctatus* (Suffrian, 1871); *L. novellus* (Blatchley, 1916); *L. obscurellus* (Dietz, 1889); *L. obtectus* (Dietz, 1889); *L. oregonensis* (LeConte, 1876); *L. ornatipennis* (Blanchard, 1851); *L. pallidus* O'Brien, 1981; *L. palustris* Blatchley, 1916; *L. pampaensis* (Voss, 1954); *L. peninsularis* (Blatchley, 1916); *L. plumosiventris* O'Brien, 1977; *L. porcellus* (Say, 1831); *L. poseyensis* (Blatchley, 1916); *L. pseudosetosus* O'Brien, 1981; *L. puncticollis* (Hustache, 1926); *L. punctiger* LeConte, 1876; *L. pusillus* (Hustache, 1926); *L. rotundicollis* LeConte, 1876; *L. rubtzoffi* O'Brien, 1981; *L. rufomarginatus* (Hustache, 1939); *L. salicorniae* O'Brien, 1981; *L. scapularis* Casey, 1895; *L. setosipennis* (Hustache, 1926); *L. setosus* LeConte, 1876; *L. similis* Henderson, 1940; *L. sondondoanus* (Voss, 1954); *L. sordidus* (Gyllenhal, 1834); *L. sparsus* (Say, 1831); *L. squamiger* (Say, 1831); *L. sulcipennis* (Bohemian, 1834); *L. suturalis* O'Brien, 1981; *L. teretirostris* (LeConte, 1857); *L. testaceipes* (Champion, 1902); *L. texanus* (Stockton, 1963); *L. truncatus* (Hatch, 1971); *L. tuberosus* LeConte, 1876; *L. turbatus* O'Brien, 1981; *L. vitticollis* (Kirby, 1837); *L. vulgaris* (Hustache, 1926); *L. wallacei* (Stockton, 1963); *L. weiseri* (Hustache, 1926).

Host plants. *Listronotus appendiculatus*: *Sagittaria latifolia* Willdenow (Alismataceae); *L. argentinensis*: *Triticum aestivum* L. (Poaceae); *L. blandus*: *Polygonum hydropiperoides* Michx. (Polygonaceae); *L. bonariensis*: *Dactylis glomerata* L., *Festuca arundinacea* Schreber, *Hordeum vulgare* L., *Lolium multiflorum* L., *L. perenne* L., *Poa annua* L., *Triticum aestivum* L., *Zea mays* L. (Poaceae) and *Trifolium repens* L. (Fabaceae); *L. borrichiae*: *Borrichia frutescens* (L.) DC (Asteraceae) and *Salvinia* sp. (Salviniaceae); *L. caudatus*: *Polygonum bincorne* Raf. (Polygonaceae); *L. cinnamoneus*: *Limnobium stoloniferum* (G.

F. W. Meyer) Griseb. (Hydrocharitaceae); *L. cryptops*: *Sagittaria lancifolia* L. (Alismataceae); *L. dauci*: *Daucus carota* L. (Apiaceae); *L. dietrichii*: *Dahlia* sp. (Asteraceae), *Gossypium* sp. (Malvaceae), *Persus* sp. (Lauraceae), *Phaseolus* sp. (Fabaceae), *Cenchrus* sp., *Chloris* sp., *Cynodon* sp., *Eleusine* sp., *Zea* sp. (Poaceae), *Coffea* sp. (Rubiaceae), *Lycopersicum* sp. (Solanaceae) and *Menta* sp. (Lamiaceae); *L. echinodori*: *Echinodorus cordifolius* (L.) Griseb. and *Sagittaria latifolia* Willdenow (Alismataceae); *L. elongatus*: *Hydrocotyle ranunculoides* L. f. (Apiaceae); *L. haldemani*: *Juncus nodatus* Coville in N. L. Britton and A. Brown (Juncaceae); *L. maculicollis*: *Agrostis palustris* Huds. and *Poa annua* L. (Poaceae); *L. manifestus*: *Sagittaria longiloba* Engelm. ex J. G. Sm. (Alismataceae); *L. marginicollis*: *Myriophyllum aquaticum* (Velloso) Verde (Haloragaceae); *L. montanus*: *Triticum aestivum* L. (Poaceae); *L. neocallosus*: *Sagittaria engelmanniana* J. G. Smith, *S. graminea* Michaux and *S. stagnorum* Small (Alismataceae); *Daucus carota* L. and *Petroselinum crispum* (Miller) A. W. Hill. (Apiaceae) (*L. oregonensis*); *L. plumosiventris*: *Sagittaria latifolia* Willdenow (Alismataceae); *L. rotundicollis*: *Crinum* sp. (Amaryllidaceae); *L. rubtzoffii*: *Sagittaria cuneata* Sheldon (Alismataceae); *L. salicorniae*: *Salicornia virginica* L. (Amaranthaceae); *L. scapularis*: *Sagittaria longiloba* Engelm. ex J. G. Sm. and *Sagittaria* sp. (Alismataceae); *L. setosipennis*: *Parthenium hysterophorus* L. (Asteraceae); *L. similis*: *Paspalum distichum* L. (Poaceae) and *Polygonum bincorne* Raf. (Polygonaceae); *L. teretirostris*: *Eleocharis macrostachya* Britton (Cyperaceae); *L. texanus*: *Daucus carota* L. (Apiaceae); *L. turbatus*: *Sagittaria* sp. (Alismataceae) (Brèthes 1926; Burke 1963; Martel et al. 1976; May 1977; O'Brien 1977, 1981; Cordo and DeLoach 1982; Cordo et al. 1982; Edelson 1985; Barker 1989; Boivin et al. 1990; Kuschel 1990; Maes and O'Brien 1990; Anderson 1992; Wild et al. 1992; May 1993; Cagnolini 1994; Blodgett et al. 1997; Lanteri et al. 2002; Torres and Casey 2002; Rothwell 2003).

Immature stages. *Listronotus bonariensis* (May, 1977, 1993, 1994; Marvaldi, 1998).

Geographical distribution. Widespread in the Americas, from Canada to Argentina and Chile (O'Brien 1977, 1981; O'Brien and Wibmer 1982; Wibmer and O'Brien 1986; Maes and O'Brien 1990; Anderson 1992). This distribution corresponds to the Nearctic, Neotropical and Andean regions, as well as the South American and Mexican Transition Zones.

Material examined. *Listronotus americanus* (BMNH), *L. apicalis* (MLP), *L. appendiculatus* (AMNH, BMNH), *L. argentinensis* (AMNH, MACN, MLP9), *L. blan-*
dus (AMNH, BMNH), *L. bonariensis* (BMNH, MHNS), *L. bosqi* (BMNH, MLP, MZFC), *L. breyeri* (MACN, MZFC), *L. californicus* (AMNH), *L. callosus* (BMNH, AMNH), *L. caudatus* (BMNH, AMNH), *L. cinnamomeus* (MLP), *L. cryptops* (BMNH, AMNH), *L. cyrticus* (AMNH, MACN, MLP), *L. dauci* (MACN), *L. debilis* (AMNH), *L. delumbis* (BMNH, AMNH), *L. dietzi* (AMNH), *L. distinctus* (BMNH), *L. durangoensis* (AMNH, BMNH), *L. echinatus* (AMNH), *L. echinodori* (AMNH, BMNH), *L. elongatus* (MLP, MZFC), *L. filiformis* (BMNH, AMNH), *L. frontalis* (AMNH, BMNH), *L. geminatus* (MACN, MLP), *L. griseus* (AMNH, MACN, MLP), *L. grypido-*
oides (AMNH), *L. haldemani* (BMNH), *L. hornii* (AMNH), *L. hubbardi* (BMNH), *L. humilis* (AMNH), *L. hyperodes* (AMNH), *L. incompletus* (AMNH), *L. ingens* (AMNH), *L. lineolaticollis* (MLP), *L. lutulentus* (BMNH), *L. maculicollis* (AMNH), *L. manifestus*

(AMNH, BMNH), *L. marginalis* (BMNH), *L. marginicollis* (MACN, MLP), *L. meridionalis* (BMNH), *L. minutus* (AMNH), *L. nebulosus* (AMNH), *L. novellus* (AMNH), *L. oregonensis* (AMNH, BMNH, MZFC), *L. ornatipennis* (MHNS), *L. palustris* (AMNH, BMNH), *L. plumosiventris* (BMNH), *L. porcellus* (AMNH), *L. puncticollis* (MLP), *L. punctiger* (AMNH, BMNH), *L. pusillus* (MLP, MZFC), *L. rotundicollis* (AMNH, BMNH), *L. rubtzoffi* (AMNH), *L. rufomarginatus* (MLP), *L. scapularis* (AMNH), *L. setosipennis* (MLP), *L. setosus* (AMNH), *L. similis* (AMNH, BMNH), *L. sordidus* (AMNH, BMNH), *L. sparsus* (AMNH, BMNH), *L. squamiger* (AMNH, BMNH), *L. teretirostris* (AMNH, BMNH), *L. texanus* (AMNH), *L. truncatus* (AMNH), *L. tuberosus* (AMNH, BMNH), *L. vitticollis* (AMNH) and *L. vulgaris* (MLP).

***Neopachytychius* Hustache, 1939**

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

Fig. 22

Neopachytychius Hustache, 1939b: 55.

Pernotaris Voss, 1943: 232 (type species: *P. squamiger* Voss, 1943 [= *Neopachytychius squamosus* Hustache, 1939]).

Type species. *Neopachytychius squamosus* Hustache, 1939.

Diagnosis. Small (3.8–6.5 mm); vestiture of subcircular scales and setae; mandible and pharyngeal process long and narrow; rostral dorsal carinae present; antennal insertion distal; postocular lobes slightly developed; elytra oblong-oval.

Relationships. *Neopachytychius* is the sister genus to *Haversiella*, and both constitute the sister group to the five genera from the Tristan da Cunha-Gough islands. In a previous analysis based only on American genera (Morrone 1997a), *Neopachytychius* was considered to be the sister genus to *Listronotus*.

Species included. *Neopachytychius squamosus* Hustache, 1939.

Geographical distribution. Neotropical region, in Argentina, Bolivia, Chile and Uruguay (Marvaldi 1994).

Material examined. *Neopachytychius squamosus* (FIML, IADIZA, MACN, MHNS, MLP, MZFC).

***Palaechthus* C. O. Waterhouse, 1884**

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

Palaechthus C. O. Waterhouse, 1884: 277.

Palaechthus Brinck, 1948: 47 (lapsus).

Type species. *Palaechthus glabratus* Waterhouse, 1884 (subsequent designation by Brinck 1948).

Diagnosis. Medium-sized (11.0–12.0 mm); vestiture of seta-like scales and setae; rostral dorsal carinae absent; pronotum subtrapezoidal.

Relationships. *Palaechthus* is the sister genus to both *Paleachthodes* and *Tristanodes*. Oberprieler (1992) considered that the distinction between *Palaechthus* and *Palaechthodes* needs to be reevaluated.

Species included. *Palaechthus glabratus* C. O. Waterhouse, 1884.

Geographical distribution. Tristan da Cunha-Gough islands (Brinck 1948).

Material examined. *Palaechthus glabratus* (BMNH).

***Palaechthodes* Brinck, 1948**

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

Palaechthodes Brinck, 1948: 50.

Type species. *Palaechthus cossoides* C. O. Waterhouse, 1884 (by original designation).

Diagnosis. Medium-sized (7.0–7.5 mm); vestiture of seta-like scales and setae; rostral dorsal carinae present; pronotum subcylindrical.

Relationships. *Palaechthodes* is the sister genus to both *Paleachthodes* and *Tristanodes*.

Oberprieler (1992) considered that the distinction between *Palaechthodes* and *Palaechthus* needs to be reevaluated.

Species included. *Palaechthodes cossoides* (C. O. Waterhouse, 1884).

Geographical distribution. Tristan da Cunha-Gough islands (Brinck 1948).

Material examined. *Palaechthodes cossoides* (BMNH).

***Steriphus* Erichson, 1842**

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

Steriphus Erichson, 1842: 190.

Desiantha Pascoe, 1870: 193 (type species: *D. caudata* Pascoe, 1870, subsequent designation by Zimmerman 1994: 697).

Brexius Pascoe, 1870: 201 (type species: *B. murinus* Pascoe, 1870, subsequent designation by Zimmerman 1994: 697).

Dryopais Broun, 1885: 387 (type species: *D. variabilis* Broun, 1885, by indication, monotypy).

Xerostyggnus Broun, 1903: 79 (type species: *X. binodus* Broun, 1903, by indication, monotypy).

Type species. *Steriphus solidus* Erichson, 1842 (by indication, monotypy).

Diagnosis. Small to very small (3.0–6.5 mm); vestiture of subcircular scales and setae; scape long (surpassing posterior margin of eye when resting in scrobe); elytra with anteapical tubercle.

Relationships. *Steriphus* is the sister genus to the American genus *Listronotus*.

Species included. *Steriphus albidoparsus* (Lea, 1928); *S. alpinus* (Lea, 1928); *S. angusticollis* (Pascoe, 1870); *S. ascitus* (Pascoe, 1876); *S. binodulus* Broun, 1903; *S. caudatus* (Pascoe, 1870); *S. curvisetosus* (Lea, 1928); *S. diversipes* (Pascoe, 1870); *S. humeralis* (Lea, 1928); *S. incotaminatus* (Lea, 1899); *S. inermis* (Lea, 1928); *S. irrasus* (Lea, 1899); *S. longus* (Lea, 1928); *S. major* (Blackburn, 1890); *S. mecapispis* (Lea, 1899); *S. metallicus* (Lea, 1928); *S. mucronatus* (Lea, 1928); *S. murinus* (Pascoe, 1870); *S. parvicornis* (Lea, 1928); *S. parvonigrus* (Lea, 1928); *S. parvus* (Blackburn, 1890); *S. pullus* (Broun, 1910); *S. sericeus* (Blackburn, 1890); *S. solidus* Erichson, 1842; *S. stenoderes* (Lea, 1928); *S. variabilis* (Broun, 1885); *S. vittatus* (Blackburn, 1893).

Host plants. *Steriphus ascitus*: *Baumea articulata* (R. Br.) Blake, *B. rubiginosa* (Spreng.) Boeck., *Scirpus fluviatilis* (Torr.) Sojak (Cyperaceae) and *Typha orientalis* C. B. Presl. (Typhaceae); *S. diversipes*: *Medicago sativa* L. (Fabaceae) and *Rumex acetosella* L. (Polygonaceae); *S. variabilis*: *Cotula* spp. (Asteraceae), *Dichondra* sp. (Convolvulaceae) and *Myriophyllum* sp. (Haloragaceae) (May, 1977; Kuschel, 1990).

Immature stages. *Steriphus ascitus*, *S. caudatus*, *S. diversipes* and *S. variabilis* (May, 1970, 1977, 1993, 1994).

Geographical distribution. Australia and New Zealand (Schenkling and Marshall 1931; Kuschel 1972, 1990; May 1977; Zimmerman 1994).

Material examined. *Steriphus ascitus* (MZFC) and *S. variabilis* (MZFC).

***Tristanodes* Brinck, 1948**

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

Tristanodes Brinck, 1948: 58.

Type species. *Tristanodes craterophilus* Brinck, 1948.

Diagnosis. Small to very small (3.7–6.5 mm); vestiture of seta-like scales and setae; pronotum subcylindrical.

Relationships. *Tristanodes* is the sister genus to both *Palaechthus* and *Palaechtodes*. Oberprieler (1992) considered that the distinction between *Tristanodes*, *Gunodes* and *Inaccodes* is not without doubt.

Species included. *Tristanodes attai* Brinck, 1948; *T. conicus* Brinck, 1948; *T. craterophilus* Brinck, 1948; *T. echinatus* Brinck, 1948; *T. insolitus* Brinck, 1948; *T. integer* Brinck, 1948; *T. medioides* Brinck, 1948; *T. minor* Brinck, 1948; *T. reppetonis* Brinck, 1948; *T. scirpophilus* Brinck, 1948; *T. sivertseni* Brinck, 1948.

Immature stages. *Tristanodes scirpophilus* (Kuschel, 1962).

Geographical distribution. Tristan da Cunha-Gough islands (Brinck 1948; Kuschel 1962).

Material examined. *Tristanodes attai* (BMNH) and *Tristanodes* spp. (BMNH).

Falklandiina subtr. n.

Type genus. *Falklandius* Enderlein, 1907.

Diagnosis. Small to very small (except *Liparogetus* and some species of *Gromilus*, which are medium-sized); rostrum stout, shorter than pronotum (except *Gromilus* and *Nestrius*, with relatively stout, medium-sized rostrum); pterygiae auriculate, exposed (Fig. 5); scrobes short, ill-defined, broad; eyes usually flat; postocular lobes usually absent (except *Gromilus* and *Falklandiopsis*); pronotum usually subcircular or subcylindrical; metanepisternal suture usually posteriorly fused or obliterated; elytra oblong-oval.

Included taxa. This new subtribe, which basically corresponds to the *Falklandius* generic group of Morrone (1997a), includes the genera *Falklandiellus*, *Falklandiopsis*, *Falklandius*, *Gromilus*, *Lanteriella*, *Liparogetus*, *Nestrius* and *Telurus*. The genera *Gromilus*, *Liparogetus* and *Nestrius* are distributed in New Zealand, whereas the five remaining genera are South American, distributed in the Subantarctic subregion of the Andean region (*sensu* Morrone, 2006).

Key to the genera of Falklandiina

- | | | |
|---|---|---------------------------------|
| 1 | Scrobes lateral | 2 |
| - | Scrobes dorsolateral to dorsal (Fig. 5) | 6 |
| 2 | Eyes transverse (Fig. 8); female elytral apex not produced; female ventrites 3 and 4 combined shorter than 5 | 3 |
| - | Eyes subcircular (Fig. 5); female elytral apex produced; female ventrites 3 and 4 combined longer than 5 | <i>Telurus</i> (Fig. 24) |
| 3 | Eyes slightly convex; postocular lobes absent..... | 4 |
| - | Eyes flat; postocular lobes slightly developed..... | 5 |
| 4 | Vestiture of setae only; rostrum very short, stout; rostral dorsal carinae absent; scrobes short, ill-defined; eyes dorsal; scape medium-sized (reaching eye when resting in scrobe); funicular segments 3-6 globose; pronotum subcircular; elytra with humeral tubercles; femora subcylindrical, markedly clavate; southern South America | <i>Falklandiopsis</i> (Fig. 24) |
| - | Vestiture of seta-like scales and setae; rostrum medium-sized, relatively stout; rostral dorsal carinae present; scrobes long, deep, sharply bordered, reaching eyes; eyes lateral; scape long (surpassing posterior margin of eye when resting in scrobe); funicular segments 3-6 elongate; pronotum subcylindrical; elytra lacking humeral tubercles; femora subcylindrical, clavate; New Zealand | <i>Gromilus</i> (Fig. 26) |
| 5 | Very small (2.6–3.5 mm); vestiture of subcircular scales and setae; rostrum lacking dorsal carinae; antennal insertion distal; club fusiform; pronotum transverse; metanepisternal suture posteriorly fused or obliterated; elytra with | |

- series of declivital tubercles; tibiae with spurs; southern South America
..... *Falklandiellus* (Fig. 23)
- Medium-sized (6.0–10.0 mm); vestiture of seta-like scales and setae; rostrum with dorsal carinae; antennal insertion at the middle of the rostrum; club inflated; pronotum subquadrate; metanepisternal suture complete; elytra lacking series of declivital tubercles; tibiae lacking spurs; New Zealand *Liparogetus*
- 6 Rostrum relatively stout, medium-sized, with dorsal carinae; eyes lateral; funicular segment 2 elongate; pronotum subcylindrical; scutellum not visible; New Zealand *Nestrius*
- Rostrum very short, stout, lacking dorsal carinae; eyes dorsal; funicular segment 2 globose; pronotum subcircular; scutellum visible; southern South America 7
- 7 Vestiture of seta-like scales and setae; eyes small; club inflated; pronotum with disc rugose; elytra with intervals convex; femora subcylindrical; tibiae subcylindrical..... *Falklandius* (Fig. 25)
- Vestiture of setae only; eyes very small, microphthalmic; club fusiform; pronotum with disc smooth, polished; elytra with intervals flat; femora dorsoventrally compressed; tibiae apically expanded *Lanteriella* (Fig. 27)

***Falklandiellus* Kuschel, 1950**

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

Fig. 23

Falklandiellus Kuschel, 1950: 14.

Type species. *Falklandius suffodens* Enderlein, 1907 (by original designation).

Diagnosis. Very small (2.6–3.5 mm); vestiture of subcircular scales and setae; rostrum lacking dorsal carinae; antennal insertion distal; club fusiform; pronotum transverse; metanepisternal suture posteriorly fused or obliterated; elytra with series of declivital tubercles; tibiae with spurs.

Relationships. *Falklandiellus* is the sister genus to *Telurus-Nestrius-Falklandius-Lanteriella*.

Species included. *Falklandiellus suffodens* (Enderlein, 1907).

Host plants. Bryophytes (Morrone 1995a).

Geographical distribution. Andean region (Subantarctic subregion), in southern Argentina, including the Falkland Islands (Islas Malvinas), and southern Chile (Morrone 1995a; Posadas 2008, 2012).

Material examined. *Falklandiellus suffodens* (BMNH, CADIC, MACN, MLP, MZFC, USNM, ZMHU).

***Falklandiopsis* Morrone and Anderson, 1995**

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

Fig. 24

Falklandiopsis Morrone and Anderson, 1995: 5.

Type species. *Falklandius magellanicus* Morrone, 1992.

Diagnosis. Very small (3.5–4.0 mm); vestiture of setae only; rostrum very short, stout; rostral dorsal carinae absent; scrobes short, ill-defined; eyes dorsal; scape medium-sized (reaching eye when resting in scrobe); funicular segments 3–6 globose; pronotum subcircular; elytra with humeral tubercles; femora subcylindrical, markedly clavate.

Relationships. *Falklandiopsis* is the sister genus to both *Liparogetus* and the clade *Falklandiellus-Telurus-Nestrius-Falklandius-Lanteriella*.

Species included. *Falklandiopsis magellanica* (Morrone, 1992).

Host plants. *Nothofagus betuloides* (Mirb.) Oerst. (Nothofagaceae) (Morrone 1992b).

Geographical distribution. Andean region (Subantarctic subregion), in southern Chile (Morrone 1992b; Posadas 2012).

Material examined. *Falklandiopsis magellanica* (MLP, MZFC, NZAC, ZMHU).

***Falklandius* Enderlein, 1907**

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

Fig. 25

Falklandius Enderlein, 1907: 65.

Type species. *Falklandius brachyomma* Enderlein, 1907 (= *Otiorhynchus antarcticus* Stierlin, 1903) (by original designation).

Diagnosis. Small to very small (1.9–6.1 mm); vestiture of seta-like scales and setae; eyes small; club inflated; pronotal disc rugose; elytra with intervals convex.

Relationships. *Falklandius* is the sister genus to *Lanteriella*, as found in a previous analysis (Morrone, 1997a).

Species included. *Falklandius antarcticus* (Stierlin, 1903); *F. chilensis* Morrone and Anderson, 1995; *F. goliath* Morrone, 1992; *F. kuscheli* Morrone, 1992; *F. peckorum* Morrone and Anderson, 1995; *F. turbificatus* Enderlein, 1907.

Host plants. *Falklandius antarcticus*: *Callitricha* sp. (Callitrichaceae), *Myrteola nummularia* (Poir.) O. Berg (Myrtaceae), *Nothofagus antarctica* (G. Forster) Oerst. (Nothofagaceae) and *Poa flabellata* (Lam.) Raspail (Poaceae) (Morrone, 1992b); *F. turbificatus*: *Myrteola nummularia* (Poir.) O. Berg (Myrtaceae) (Morrone, 1992b).

Geographical distribution. Andean region (Subantarctic subregion), in southern Argentina, including the Falkland Islands (Islas Malvinas) and southern Chile (Morrone 1992b; Morrone and Anderson 1995; Posadas 2008, 2012).

Material examined. *Falklandius antarcticus* (AMPC, BMNH, CADIC, CMNC, CWOB, MACN, MHNS, MZFC, USNM), *F. chilensis* (AMNH, BMNH, CMNC, CWOB, FMNH, MLP, MZFC, USNM), *F. goliath* (BMNH), *F. kuscheli* (BMNH), *F. peckorum* (AMNH, BMNH, CMNC, CWOB, FMNH, MLP, MZFC, USNM), *F. turbificatus* (BMNH) and *Falklandius* spp. (MZFC).

Gromilus Blanchard, 1853

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

Fig. 26

Gromilus Blanchard, 1853: 208.

Clypeorrhynchus Sharp, 1883: 26 (type species: *C. gracilipes* Sharp, 1883, by indication, monotypy).

Clypeorrhynchus Kirby, 1885: 100 (unjustified emendation).

Dacnophylla Broun, 1893a: 1471 (type species: *D. setosa* Broun, 1893a, by indication, monotypy).

Hycanus Broun, 1905: 545 (type species: *H. cockaynei* Broun, 1905, by indication, monotypy).

Stilbodiscus Broun, 1909: 117 (type species: *S. setarius* Broun, 1909, by indication, monotypy).

Phygothalpus Broun, 1913: 117 (type species: *P. sulcicollis* Broun, 1913, by indication, monotypy).

Heteromias Broun, 1913: 120 (*non* Faust, 1897) (type species: *H. foveirostris* Broun, 1913, by indication, monotypy).

Pseudohycanus Brookes, 1951: 57 (type species: *P. fallai* Brookes, 1951).

Type species. *Gromilus insularis* Blanchard, 1853 (by indication, monotypy).

Diagnosis. Small to medium-sized (3.5–7.5 mm); vestiture of seta-like scales and setae; rostrum medium-sized, relatively stout; rostral dorsal carinae present; scrobes long, deeply bordered, reaching eyes; eyes lateral; scape long (surpassing posterior margin of eye when resting in scrobe); funicular segments 3–6 elongate; pronotum subcylindrical; elytra lacking humeral tubercles.

Relationships. *Gromilus* is the sister genus to the remaining genera of Falklandiina. Kuschel (1964) already noted the close relationship of *Gromilus* with *Nestrius*, *Liparogetus* and *Falklandius*.

Species included. *Gromilus anthracinus* (Broun, 1921); *G. aucklandicus* Kuschel, 1971; *G. bicarinatus* (Broun, 1921); *G. bifoveatus* (Broun, 1923); *G. brevicornis* (Broun, 1893); *G. brounii* Morrone, 2011; *G. calvulus* (Broun, 1913); *G. caudatus* (Broun, 1913); *G. clarulus* (Broun, 1917); *G. cockaynei* (Broun, 1905); *G. cordipennis* (Broun, 1893); *G. cristatus* (Broun, 1893); *G. dorsalis* (Broun, 1921); *G. exiguus* (Brookes, 1951); *G. fallai* (Brookes, 1951); *G. foveirostris* (Broun, 1913); *G. furvus* (Broun, 1921); *G. gracilipes* (Sharp, 1883); *G. granissimus* (Broun, 1917); *G. halli* (Broun, 1917); *G. im-*

pressus (Broun, 1893); *G. inophloeoides* (Broun, 1904); *G. insularis* Blanchard, 1853; *G. kuschelii* Morrone, 2011; *G. laqueorum* Kuschel, 1964; *G. majusculus* (Broun, 1915); *G. merus* (Broun, 1917); *G. narinosus* Kuschel, 1971; *G. nitidellus* (Broun, 1917); *G. nitidulus* (Broun, 1915); *G. nodiceps* (Broun, 1914); *G. philpotti* (Broun, 1917); *G. setosus* (Broun, 1893); *G. sparsus* (Broun, 1921); *G. striatus* (Broun, 1915); *G. sulcicollis* (Broun, 1913); *G. sulcipennis* (Broun, 1917); *G. tenuiculus* (Broun, 1921); *G. thoracicus* (Broun, 1893); *G. variegatus* (Broun, 1893); *G. veneris* (Kirsch, 1877).

Host plants. *Gromilus fallai*: *Blechnum capense* Burm. f. (Blechnaceae); *G. insularis*: *Colobanthus* sp. (Caryophyllaceae), *Pleurophyllum* sp. (Asteraceae), *Poa litorosa* Cheeseman (Poaceae), *Polystichum vestitum* (G. Forst.) C. Presl. (Dryopteridaceae), *Pleurophyllum criniferum* Hook. f. (Asteraceae), *Stilbocarpa polaris* (Homb. and Jacq.) Gray (Araliaceae) and *Tillaea moschata* DC (Crassulaceae); *G. setosus*: *Blechnum* sp. (Blechnaceae) and *Gahnia* sp. (Cyperaceae); *G. veneris*: *Blechnum capense* (L.) Schlecht. (Blechnaceae), *Polystichum* sp. (Dryopteridaceae) and *Pteris* sp. (Pteridaceae); *G. thoracicus*: *Anisotome latifolia* Hook. f. (Apiaceae), *Bulbinella* sp. (Liliaceae), *Cotula pluma* Hook. f. and *Pleurophyllum criniferum* Hook. f. (Asteraceae) and *Poa litorosa* Cheeseman (Poaceae) (May 1977, 1993; Kuschel 1964, 1971, 1990).

Immature stages. *Gromilus exiguis*, *G. insularis*, *G. thoracicus* and *G. veneris* (May, 1971).

Geographical distribution. New Zealand (Schenkling and Marshall 1929; Kuschel 1964, 1971, 1990).

Material examined. *Gromilus gracilipes* (MZFC), *G. insularis* (MZFC), *G. laqueorum* (MZFC), *G. merus* (MZFC), *G. nitidellus* (MZFC) and *G. veneris* (MZFC).

***Lanteriella* Morrone, 1992**

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

Fig. 27

Lanteriella Morrone, 1992b: 167.

Type species. *Lanteriella microptalma* Morrone, 1992.

Diagnosis. Very small (3.4–3.8 mm); vestiture of setae only; eyes very small, microphthalmic; pronotal disc smooth, polished; femora dorsoventrally compressed; tibiae apically expanded.

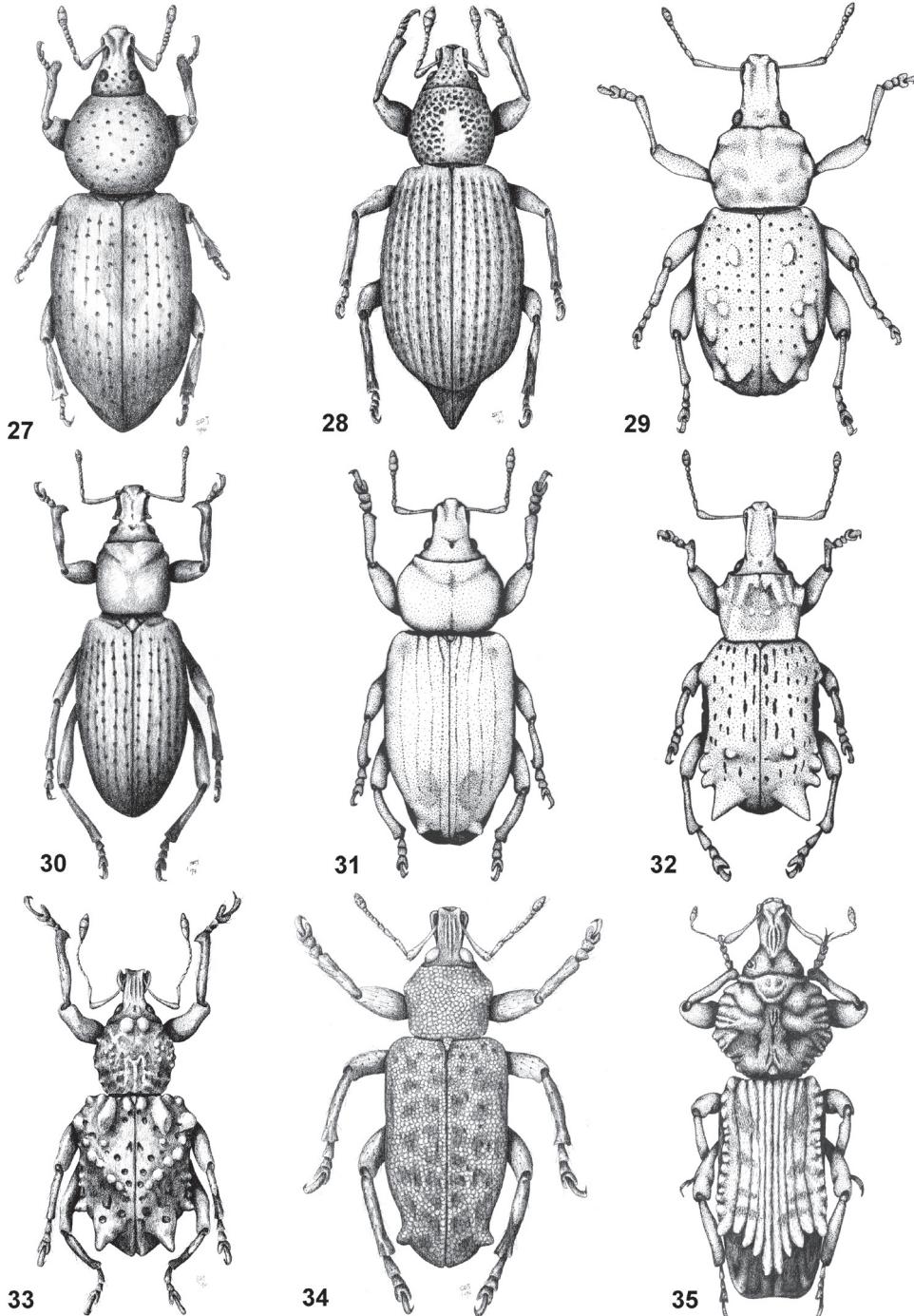
Relationships. *Lanteriella* is the sister genus to *Falklandius*, as found in a previous analysis (Morrone, 1997a).

Biology. The only species of this genus was hypothesized to live in litter or soil (Morrone 1992b).

Species included. *Lanteriella microptalma* Morrone, 1992.

Geographical distribution. Andean region (Subantarctic subregion), in the Falkland Islands (Islas Malvinas) (Morrone 1992b; Posadas 2008).

Material examined. *Lanteriella microptalma* (BMNH).



Figures 27–35. Habitus of representative Listroderini. **27** *Lanteriella microphthalmia* **28** *Telurus caudiculatus* **29** *Acrorius papallacta* **30** *Acrostomus bruchi* **31** *Antarctobius lacunosus* **32** *Germainiellus dentipennis* **33** *Lamiarhinus aelficus* **34** *Listroderes annulipes* **35** *Philippius superbus*.

***Liparogetus* Broun, 1915**

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

Liparogetus Broun, 1915: 331.

Type species. *Liparogetus sulcatissimus* Broun, 1915 (by indication, monotypy).

Diagnosis. Small to medium-sized (6.0–10.0 mm); vestiture of seta-like scales and setae; rostrum with dorsal carinae; antennal insertion at the middle of the rostrum; club inflated; pronotum subquadrate; metanepisternal suture complete; tibiae lacking spurs.

Relationships. *Liparogetus* is the sister genus to both *Falklandiopsis* and the clade *Falklandiellus-Telurus-Nestrius-Falklandius-Lanteriella*.

Species included. *Liparogetus sulcatissimus* Broun, 1915.

Geographical distribution. New Zealand (Alonso-Zarazaga and Lyal 1999).

Material examined. *Liparogetus sulcatissimus* (MZFC).

***Nestrius* Broun, 1893**

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

Nestrius Broun, 1893a: 1480.

Phyllodytes Broun, 1893a: 1479 (non Wagler 1830, nec Gistel 1848, nec Finsch 1873) (type species: *P. foveatus* Broun, 1893a, by indication, monotypy).

Plotnus Broun, 1893a: 1481 (type species: *P. ovithorax* Broun, 1893a, by indication, monotypy).

Proboscoelus Broun, 1909: 55 (type species: *P. sculpturatus* Broun, 1909, by indication, monotypy).

Drymaria Broun, 1909: 56 (type species: *D. cilipes* Broun, 1909, by indication, monotypy).

Phyllodytesius Schenkling & Marshall, 1929: 57 (replacement name for *Phyllodytes* Broun).

Type species. *Nestrius serripes* Broun, 1893a (by indication, monotypy).

Diagnosis. Small to very small (2.8–5.0 mm); vestiture of seta-like scales and setae; rostrum relatively stout, medium-sized, with dorsal carinae; eyes lateral; funicular segment 2 elongate; pronotum subcylindrical; scutellum not visible.

Relationships. *Nestrius* is the sister genus to *Falklandius-Lanteriella*, confirming Kuschel's (1964) suggestion that it was intermediate between *Gromilus* and *Falklandius*.

Species included. *Nestrius bifurcus* Kuschel, 1964; *N. cilipes* Broun, 1909; *N. crassicornis* Broun, 1915; *N. foveatus* (Broun, 1893); *N. hudsoni* Marshall, 1953; *N. irregularis* (Broun, 1910); *N. laqueorum* Kuschel, 1964; *N. ovithorax* (Broun, 1893); *N. prolixus* Broun, 1917; *N. serripes* Broun, 1893; *N. sculpturatus* (Broun, 1909); *N. simmondsi* Broun, 1921; *N. sulcirostris* Broun, 1917; *N. zenoscelis* Broun, 1921.

Geographical distribution. New Zealand (Schenkling and Marshall 1929; Kuschel 1964, 1971).

Material examined. *Nestrius foveatus* (MZFC) and *N. sculpturatus* (MZFC).

***Telurus* Kuschel, 1955, rev. placement**

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

Fig. 28

Telurus Kuschel, 1955: 288.

Type species. *Antarctobius laticauda* Champion, 1918 (= *T. dissimilis* [Fairmaire, 1885]) (by original designation).

Diagnosis. Small (3.9–6.5 mm); vestiture of setae only; eyes subcircular, slightly convex; female elytral apex produced; female ventrites 3 and 4 combined longer than 5.

Relationships. *Telurus* is closely related to *Falklandius-Lanteriella*, as found in a previous analysis (Morrone 1997a), and to *Nestrius*, from New Zealand. Based on the presence of small scars (due to deciduous cusps) on the mandibles of *T. caudiculatus*, Oberprieler (2010) excluded the genus from Listroderini and transferred it to Cylydrorhininae (Entiminae). Future molecular analyses are required to corroborate its precise placement.

Species included. *Telurus caudiculatus* Morrone and Anderson, 1995; *T. dissimilis* (Fairmaire, 1885).

Geographical distribution. Andean region (Subantarctic subregion), in southern Chile (Morrone and Anderson 1995; Posadas 2012).

Material examined. *Telurus caudiculatus* (AMNH, BMNH, CMNC, CNCI, CWOB, MCZ, MHNS, MLP, MZFC, USNM, ZMC) and *T. dissimilis* (BMNH, IPUM, MHNS, MZFC, NZAC).

Subtribe Listroderina LeConte, 1876

Type genus. *Listroderes* Schönherr, 1826.

Diagnosis. Rostrum relatively stout, medium-sized, shorter than pronotum; scrobes short, ill-defined, broad; funicular segment 1 longer than 2; elytra usually oblong-oval (subrectangular in *Lamiarhinus* and *Philippius*), with intervals convex and with antecapital tubercle (except for *Rupanius*).

Included taxa. This subtribe, representing the listroderines in the strictest sense, includes the genera *Acroriellus*, *Acrorius*, *Acrostomus*, *Antarctobius*, *Germainiellus*, *Hyperoides*, *Lamiarhinus*, *Listroderes*, *Methypora*, *Philippius*, *Rupanius* and *Trachodema*. In a previous analysis restricted to American taxa (Morrone 1997a) most of these genera were placed as a grade basal to other listroderines. *Methypora* is distributed in Australia; and the remaining genera are South American: *Listroderes* is widely ranged in the Andean and Neotropical regions, and the other genera are found in the Andean region and the South American Transition Zone (*sensu* Morrone 2006).

Key to the genera of Listroderina

- 1 Elytral disc slightly convex to flat..... **2**
- Elytral disc convex **6**
- 2 Elytra oblong-oval (Fig. 10) **3**
- Elytra subrectangular (Fig. 9) **4**
- 3 Vestiture of seta-like scales and setae; scape medium-sized (reaching eye when resting in scrobe)..... *Acrorius* (Fig. 29)
- Vestiture of scales with finger-like processes and setae; scape long (surpassing posterior margin of eye when resting in scrobe) *Trachodema*
- 4 Pronotum transverse; elytra with carina on apical declivity, disc slightly convex, lacking anteapical tubercle *Rupanius*
- Pronotum subcircular or subcylindrical; elytra lacking carina on apical declivity, disc flat, with anteapical tubercle **5**
- 5 Large (17.5–22.8 mm); mandibles with 3-4 setae; pronotum subcircular, wider than elytra, with tubercles; scutellum not visible; elytra fused along interelytral suture, with series of declivital tubercles; female elytral apex not produced; tibiae lacking spurs; tarsomeres 3 subcylindrical (Fig. 12); southern South America *Philippius* (Fig. 35)
- Small (4.0–7.0 mm); mandibles with 2 setae; pronotum subcylindrical, narrower than elytra, lacking tubercles; scutellum visible; elytra not fused along interelytral suture, lacking series of declivital tubercles; female elytral apex produced; tibiae with spurs; tarsomeres 3 bilobed (Fig. 11); Australia *Methypora*
- 6 Funicular segments 3-6 globose; pronotum lacking tubercles; elytra oblong-oval, not fused along interelytral suture..... **7**
- Funicular segments 3-6 elongate; pronotum with tubercles; elytra subrectangular, fused along interelytral suture *Lamiarbinus* (Fig. 33)
- 7 Pronotum transverse or subquadrate; postocular lobes present **8**
- Pronotum subcircular; postocular lobes absent *Antarctobius* (Fig. 31)
- 8 Integument reddish brown; epistome not raised; pronotum transverse..... **9**
- Integument black; epistome raised; pronotum subquadrate..... *Acrostomus* (Fig. 30)
- 9 Vestiture of seta-like or lanceolate scales and setae; scrobal ventral tooth absent..... **10**
- Vestiture of subcircular scales and setae; scrobal ventral tooth usually present..... *Listroderes* (Fig. 34)
- 10 Vestiture of seta-like scales and setae **11**
- Vestiture of lanceolate scales and setae *Hyperoides*
- 11 Elytral interval 3 lacking series of three declivital tubercles..... *Germaniellus* (Fig. 32)
- Elytral interval 3 with series of three declivital tubercles..... *Acroriellus*

***Acroriellus* Morrone and Ocampo, 1995**

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

Acroriellus Morrone & Ocampo, 1995: 257.

Type species. *Acroriellus viridisquamulosus* Morrone and Ocampo, 1995.

Diagnosis. Very small (2.5–3.8 mm); vestiture of seta-like scales and setae; elytra with small, rounded tubercles and series of three tubercles on interval 3.

Relationships. *Acroriellus* is the sister genus to *Acrostomus-Hyperoides*. Originally, it was suggested that it was close to *Acrorius* (Morrone and Ocampo 1995).

Species included. *Acroriellus bobi* Morrone and Ocampo, 1995; *A. carinatus* Morrone and Ocampo, 1995; *A. similaris* Morrone and Ocampo, 1995; *A. tuberculatus* Morrone and Ocampo, 1995; *A. viridisquamulosus* Morrone and Ocampo, 1995; *A. vittatae* Morrone and Ocampo, 1995.

Geographical distribution. South American Transition Zone (North Andean Paramo and Puna biogeographical provinces), in Colombia, Ecuador and Peru (Morrone and Ocampo 1995).

Material examined. *Acroriellus bobi* (AMNH, CMNC), *A. carinatus* (CMNC), *A. similaris* (CMNC), *A. tuberculatus* (CMNC), *A. viridisquamulosus* (CMNC, FMNH) and *A. vittatae* (AMNH, USNM).

***Acrorius* Kirsch, 1889**

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

Fig. 29

Acrorius Kirsch, 1889: 25.

Ocromis Sharp, 1890: 152 (lapsus).

Type species. *Acrorius puncticollis* Kirsch, 1889 (by indication, monotypy).

Diagnosis. Small (4.0–6.8 mm); vestiture of seta-like scales and setae; scape medium-sized (reaching eye when resting in scrobe); elytra with small, rounded tubercles.

Relationships. *Acrorius* is the sister genus to *Trachodema-Lamiarhinus-Philippius*, taxa that in a previous analysis (Morrone 1997a) constituted a paraphyletic group.

Species included. *Acrorius andersoni* Morrone, 1994; *A. bolivianus* Ocampo and Morrone, 1996; *A. cuprinus* Morrone, 1994; *A. nymphalis* Morrone, 1994; *A. otramas* Ocampo and Morrone, 1996; *A. papallacta* Morrone, 1994; *A. pillahuata* Morrone, 1994; *A. plicatifrons* Morrone, 1994; *A. puncticollis* Kirsch, 1889; *A. sisyphus* Morrone, 1994.

Geographical distribution. Bolivia, Ecuador and Peru (Morrone 1994a; Ocampo and Morrone 1996).

Material examined. *Acrorius andersoni* (CMNC), *A. bolivianus* (CMNC, MZFC), *A. cuprinus* (CMNC), *A. nymphalis* (CMNC), *A. otramas* (CMNC), *A. papallacta* (CMNC, MZFC), *A. pillahuata* (CMNC, FMNH), *A. plicatifrons* (FMNH) and *A. sisyphus* (CNCI, CMNC).

***Acrostomus* Kuschel, 1955**

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

Fig. 30

Acrostomus Kuschel, 1955: 287.

Type species. *Adioristus bruchi* Hustache, 1926 (by original designation).

Diagnosis. Medium-sized (7.3–13.8 mm); integument black; vestiture of seta-like scales and setae; epistome raised; scrobal ventral tooth usually present; pronotum subquadrate.

Relationships. *Acrostomus* is the sister genus to *Hyperoides*.

Species included. *Acrostomus bruchi* (Hustache, 1926); *A. cruralis* Kuschel, 1958; *A. foveicollis* Kuschel, 1958; *A. griseus* (Guérin-Ménéville, 1839); *A. magellanicus* Kuschel, 1958; *A. mordor* Morrone, 1994; *Acrostomus vianai* Kuschel, 1958.

Host plants. *Acrostomus magellanicus* and *A. vianai*: *Azorella trifurcata* (Gaertner) Pers., *Bolax gummifera* (Lam.) Spreng. and *Mulinum spinosum* (Cav.) Pers. (Apiaceae) (Morrone, 1994b).

Geographical distribution. Andean region (Patagonian subregion), in southern Argentina and southern Chile (Morrone 1994b).

Material examined. *Acrostomus bruchi* (CWOB, IPCN, MACN, MLP, MZFC), *A. cruralis* (MACN, USNM), *A. foveicollis* (CBPC, CWOB, MHNS, MZFC), *A. griseus* (CWOB, FIML, IPUM, MHNS, MLP, MZFC), *A. magellanicus* (BMNH, MHNS, USNM), *A. mordor* (AMNH, MACN, MLP, MZFC) and *A. vianai* (BMNH, MHNS).

***Antarctobius* Fairmaire, 1885**

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

Fig. 31

Antarctobius Fairmaire, 1885: 58.

Type species. *Antarctobius lacunosus* Fairmaire, 1885 (subsequent designation by Morrone, 1992a).

Diagnosis. Small to medium-sized (3.7–9.5 mm); vestiture of seta-like or subcircular scales and setae; pronotum subcircular; postocular lobes absent.

Relationships. *Antarctobius* is closely related to *Germainiellus*, *Listroderes* and the clade *Methylpora-Rupanius-Acrorius-Trachodema-Lamiarhinus-Philippius*. The distinction between *Antarctobius*, *Germainiellus* and *Listroderes* is not without doubt (see Morrone and Marvaldi, 1998), and future analyses may determine if they are merged into a single genus.

Species included. *Antarctobius abditus* (Enderlein, 1907); *A. bidentatus* (Champion, 1918); *A. falklandicus* (Enderlein, 1907); *A. germaini* (Kolbe, 1907); *A. hyadesii* Fairmaire, 1885; *A. lacunosus* Fairmaire, 1885; *A. malvinensis* Posadas and Morrone, 2004; *A. rugirostris* Champion, 1918; *A. vulsus* (Enderlein, 1907); *A. yefacel* Morrone, 1992.

Host plants. *Antarctobius abditus*: *Senecio candidans* DC (Asteraceae); *A. hyadesii*: *Senecio alloeophyllus* O. Hoffm. and *S. candidans* DC (Asteraceae) (Morrone, 1992a; Marvaldi, 1998).

Immature stages. *Antarctobius abditus* and *A. falklandicus* (Marvaldi, 1998).

Geographical distribution. Andean region (Subantarctic subregion), in southern Chile and southern Argentina, including the Falkland Islands (Islas Malvinas) (Morrone 1992a; Posadas and Morrone 2004; Posadas 2008, 2012).

Material examined. *Antarctobius abditus* (BMNH), *A. bidentatus* (BMNH), *A. falklandicus* (AMPC, BMNH, MZFC), *A. germaini* (AMNH, BMNH, CADIC, CMNC, CWOB, IPUM, MHNS, MLP, MZFC), *A. hyadesii* (BPBM, CMNC, MHNS, MZFC), *A. lacunosus* (BMNH, MCZ, MHNS), *A. rugirostris* (BMNH), *A. vulsus* (BMNH, USNM) and *A. yefacel* (AMNH).

***Germainiellus* Morrone, 1993**

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

Fig. 32

Germainiellus Morrone, 1993a: 125.

Type species. *Listroderes dentipennis* Germain, 1895 (by original designation).

Diagnosis. Small to medium-sized (6.0-8.4 mm); vestiture of seta-like scales and setae; pronotum transverse; postocular lobes present.

Relationships. *Germainiellus* is closely related to *Antarctobius*, *Listroderes* and the clade *Methypora-Rupanius-Acrorius-Trachodema-Lamiarhinus-Philippius*. It was originally described as intermediate between *Antarctobius* and *Listroderes* (Morrone, 1993a). The distinction between *Antarctobius*, *Germainiellus* and *Listroderes* is not without doubt (see Morrone and Marvaldi, 1998), and future analyses may determine if they are merged into a single genus.

Species included. *Germainiellus angulipennis* (Germain, 1895); *G. attenuatus* (Germain, 1895); *G. dentipennis* (Germain, 1895); *G. fulvicornis* (Germain, 1895); *G. laevirostris* (Germain, 1895); *G. lugens* (Germain, 1895); *G. ovatus* (Boheman, 1842); *G. philippii* (Germain, 1896); *G. planipennis* (Blanchard, 1851); *G. punctiventris* (Germain, 1895); *G. rugipennis* (Blanchard, 1851); *G. salebrosus* (Enderlein, 1907); *Germainiellus* spp. (MZFC).

Host plants. *Germainiellus dentipennis* and *G. fulvicornis*: *Nothofagus* sp. (Nothofagaceae); *G. laevirostris*: *Senecio smithii* DC (Asteraceae); *G. planipennis*: *Nothofagus dombeyi* (Mirb.) Oerst. (Nothofagaceae) and *Peumus boldus* Mol. (Monimiaceae); *G. salebrosus*: *Empetrum rubrum* Vahl ex Willd. (Empetraceae) (Morrone, 1993a).

Geographical distribution. Andean region (Subantarctic subregion), in southern Chile and southern Argentina, including the Falkland Islands (Islas Malvinas) (Morrone 1993a, 1994e; Posadas 2008, 2012).

Material examined. *Germainiellus angulipennis* (MHNS), *G. attenuatus* (ARPC, MHNS), *G. dentipennis* (CBPC, CMNC, CWOB, MHNS, USNM), *G. fulvicornis* (AMNH, BPBM, CBCP, CMNC, CWOB, FIML, MCZ, MHNS, MLP, MZFC, USNM), *G. laevirostris* (BPBM, IPUM, MCZ, MHNS, MLP, USNM), *G. lugens* (CMNC, CWOB, IPUM, MACN, MCZ, MHNS, MZFC), *G. ovatus* (BMNH, MHNS, USNM), *G. philippii* (CMNC, DEI, MHNS, MZFC), *G. planipennis* (BMNH, CWOB, MHNS), *G. punctiventris* (MHNS), *G. rugipennis* (AMNH, BPBM, CADIC, CBCP, CMNC, MHNS, MLP, MZFC, USNM) and *G. salebrosus* (BMNH).

Hyperoides Marshall, 1914

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

Hyperoides Marshall, 1914: 236.

Type species. *Hyperoides fragariae* Marshall, 1914 (by indication, monotypy).

Diagnosis. Small to medium-sized (5.1–7.5 mm); vestiture of lanceolate scales and setae; postocular lobes present; elytra lacking anteapical tubercle.

Relationships. *Hyperoides* is the sister genus to *Acrostomus*, contrasting with its more isolated position in a previous analysis (Morrone, 1997a).

Species included. *Hyperoides balfourbrowniae* (Kuschel, 1952); *H. fragariae* Marshall, 1914; *H. murinus* (Germain, 1896); *H. subcinctus* (Boheman, 1842); *H. victus* (Germain, 1896).

Host plants. *Hyperoides fragariae*: *Fragaria vesca* L. (Rosaceae); *H. subcinctus*: *Senecio* sp. (Asteraceae); *H. murinus*: *Citrulus vulgaris* Schrad. (Cucurbitaceae), *Phaseolus* sp. (Fabaceae) and *Solanum tuberosum* L. (Solanaceae); *H. victus*: *Senecio bahioides* Hook. et Arn. (Asteraceae) (Morrone 1993b; Lanteri et al. 2002).

Geographical distribution. Neotropical region and Andean region (Central Chilean subregion), in Argentina, Chile and Uruguay, and introduced into South Africa (Morrone 1993b).

Material examined. *Hyperoides balfourbrowniae* (MLP, MZFC), *H. fragariae* (BMNH, CBPC, MNHN), *H. murinus* (BMNH, CWOB, MHNS, MZFC), *H. subcinctus* (AMNH, BMNH, CBPC, CMNC, CWOB, IADIZA, MACN, MHNS, MNHN, MZFC) and *H. victus* (BMNH, CMNC, CWOB, MHNS).

Lamiarhinus Morrone, 1992

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

Fig. 33

Lamiarhinus Morrone, 1992c: 419.

Type species. *Lamiarhinus aelficus* Morrone, 1992.

Diagnosis. Small to medium-sized (5.7–6.8 mm); vestiture of seta-like scales and setae; funicular segments 3–6 elongate; pronotum with tubercles; elytra subrectangular, fused along interelytral suture.

Relationships. *Lamiarhinus* is the sister genus to *Philippius*. In a previous analysis (Morrone 1997a), it was considered to be related to *Trachodema*.

Species included. *Lamiarhinus aelficus* Morrone, 1992; *L. horridus* (Germain, 1896).

Host plants. *Lamiarhinus aelficus*: *Podanthus ovatifolius* Lag. (Asteraceae) (Morrone 1992c).

Geographical distribution. Andean region (Central Chilean subregion) (Morrone 1992c).

Material examined. *Lamiarhinus aelficus* (CMNC, CWOB, MLP, MZFC) and *L. horridus* (MHNS).

Listroderes Schönherr, 1826

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

Fig. 34

Listroderes Schönherr, 1823: col. 1142 (*nom. nud.*).

Listroderes Schönherr, 1826: 158.

Listroderus Erichson, 1847: 129 (lapsus).

Listoderes Kuschel, 1990: 71 (lapsus).

Type species. *Listroderes costirostris* Schönherr, 1826 (by original designation, combined description).

Diagnosis. Small to medium-sized (3.9–12.5 mm); vestiture of subcircular scales and setae; scrobal ventral tooth usually present.

Relationships. *Listroderes* is closely related to *Antarctobius*, *Germainiellus* and the clade *Methypora-Rupanius-Acrorius-Trachodema-Lamiarhinus-Philippius*. The distinction between *Antarctobius*, *Germainiellus* and *Listroderes* is not without doubt (see Morrone and Marvaldi 1998), and future analyses may determine if they are merged into a single genus.

Species included. *Listroderes affinis* Hustache, 1926; *L. angusticeps* Blanchard, 1851; *L. annulipes* Blanchard, 1851; *L. apicalis* Waterhouse, 1841; *L. bimaculatus* Boheman, 1842; *L. brevirostris* Germain, 1895; *L. brevisetis* Hustache, 1926; *L. bruchi* Hustache, 1926; *L. charybdis* Morrone, 1993; *L. cinerarius* Blanchard, 1851; *L. confusus* Hustache, 1926; *L. costirostris* Schönherr, 1826; *L. curvipes* Germain, 1895; *L. delaiguei* Germain, 1895; *Listroderes desertorum* Germain, 1895; *L. difficilis* Germain, 1895; *L. elegans* Hustache, 1926; *L. erinaceus* Germain, 1895; *Listroderes fallax* Germain, 1895; *L. foveatus* (Lea, 1928); *L. hoffmanni* Germain, 1895; *L. howdenae* Morrone, 1993; *L. leviculus* Kuschel, 1952; *L. montanus* Germain, 1895; *L. nodifer* Boheman, 1842; *L. obliquus* Klug, 1829; *L. obrieni* Morrone, 1993; *L. paranensis* Hustache, 1926; *L. punicola* Kuschel, 1949; *L. pusillus* Hustache, 1926; *L. robustior* Schenkling and Marshall, 1931; *L. robustus* Waterhouse, 1841;

L. scylla Morrone, 1993; *L. trivialis* Germain, 1895; *L. tuberculifer* Blanchard, 1851; *L. uruguayensis* Kuschel, 1952; *L. wagneri* Hustache, 1926; *Listroderes wittei* Hustache, 1926.

Host plants. *Listroderes apicalis*: *Beta vulgaris* L. (Chenopodiaceae), *Helianthus annus* L. (Asteraceae) and *Triticum aestivum* L. (Poaceae); *L. bimaculatus*: *Baccharis linearis* (Ruiz and Pav.) Pers. (Asteraceae) and *Puya chilensis* Molina (Bromeliaceae); *L. bruchi*: *Baccharis salicifolia* (Ruiz and Pavón) Pers. and *Senecio subulatus* Don Hooker et Arnott (Asteraceae); *L. cinerarius*: *Atriplex* sp. (Chenopodiaceae); *L. costirostris*, *L. difficilis* and *L. obliquus*: *Apium graveolens* L. and *Daucus carota* L. (Apiaceae), *Brassica rapa* L., *B. oleracea* L. and *Coronopus didymus* (L.) Smith (Brassicaceae), *Rumex altissimus* Wood (Polygonaceae), *Nicotiana tabacum* L. and *Solanum tuberosum* L. (Solanaceae) and *Stellaria* spp. (Caryophyllaceae); *L. robustus*: *Atriplex semibaccata* R. Br. (Chenopodiaceae); *L. uruguayensis*: *Hydrocotyle bonariensis* Lam. (Apiaceae) (Morrone 1993d, 1995b; Marvaldi 1998; Lanteri et al. 2002).

Immature stages. *Listroderes bruchi*, *L. delaiguei* and *L. difficilis* (May 1977, 1993, 1994; Marvaldi 1998).

Geographical distribution. Andean region (Subantarctic, Central Chilean and Patagonian subregions), South American Transition Zone and Neotropical region, in Argentina, Brazil, Chile, Paraguay, Peru and Uruguay, and introduced into Australia, Easter Island, Israel, Japan, New Zealand, South Africa, Spain and USA (Wibmer and O'Brien 1986; Kuschel 1990; Morrone 1993c-e, 1995b; Morrone 2002b; Friedman 2009; Posadas 2012).

Material examined. *Listroderes affinis* (CBPC, IPCN, IPUM, MACN, MNHN), *L. angusticeps* (MHNS, MNHN, MZFC), *L. annulipes* (CBPC, CWOB, MHNS, MNHN, MZFC), *L. apicalis* (AMNH, BMNH, CMNC, MACN, MHNS, MLP, MZFC), *L. bimaculatus* (AMNH, BMNH, CMNC, CWOB, MACN, MHNS), *L. brevirostris* (MHNS), *L. brevisetis* (CBCP, DZUP, IPCN, MACN, MLP, MNHN), *L. bruchi* (CMNC, DZUP, FIML, IADIZA, MACN, MLP, MZFC), *L. charybdis* (MACN, MLP), *L. cinerarius* (BMNH, CMNC, CWOB, IADIZA, MHNS, MNHN, MZFC), *L. confusus* (DZUP, FIML, MACN, MLP, MNHN), *L. costirostris* complex (AMNH, BMNH, CBPC, CMNC, CWOB, DZUP, FIML, GJWC, MACN, MHNS, MLP, MNHN, MZFC, MZSP, USNM), *L. curvipes* (BMNH, CWOB, MHNS), *L. delaiguei* (BMNH, CADIC, CWOB, IPUM, MHNS, MZFC), *L. desertorum* (BMNH, CMNC, CWOB, MHNS, MZFC), *L. elegans* (GJWC, MACN, MLP, MNHN), *L. erinaceus* (MHNS), *L. fallax* (CWOB, MHNS, MZFC), *L. foveatus* (BMNH, CMNC, DZUP, FIML, GJWC, MACN, MZSP), *L. hoffmanni* (BMNH, CWOB, MHNS, MZFC), *L. howdenae* (CMNC, MLP, MZFC), *L. leviculus* (BMNH), *L. montanus* (MHNS, MZFC), *L. nodifer* (BMNH, CWOB, MACN, MHNS), *L. obrieni* (MHNS, MLP, MZFC), *L. paranensis* (DZUP, MNHN), *L. punicola* (CMNC, MHNS, MZFC), *L. pusillus* (CBPC, MLP, MNHN, MZFC), *L. robustior* (BMNH, CMNC, CWOB, MHNS, MLP, MZFC), *L. robustus* (CMNC, CWOB, MHNS), *L. scylla* (FIML, MLP), *L. trivialis* (MHNS), *L. tuberculifer* (CMNC, MHNS, MZFC), *L. uruguayensis* (BMNH, CMNC), *L. wagneri* (BMNH, MNHN) and *L. wittei* (MACN, MNHN).

***Methypora* Pascoe, 1865**

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

Methypora Pascoe, 1865: 416.

Type species. *Methypora postica* Pascoe, 1865 (by indication, monotypy).

Diagnosis. Small (4.0–7.0 mm); vestiture of subcircular scales and setae; pronotum subcylindrical, lacking tubercles; scutellum visible; elytra not fused along interelytral suture, lacking series of declivital tubercles; female elytral apex produced; tibiae with spurs.

Relationships. *Methypora* is the sister genus to *Rupanius*.

Species included. *Methypora postica* Pascoe, 1865 and *M. tibialis* Lea, 1911.

Geographical distribution. Australia (Oberprieler 2010).

Material examined. *Methypora postica* (BMNH).

***Philippius* Germain, 1895**

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

Fig. 35

Philippius Germain, 1895: 314.

Type species. *Listroderes superbus* Reed, 1872 (subsequent designation by Wibmer and O'Brien 1986).

Diagnosis. Large to very large (17.5–22.8 mm); vestiture of scales with finger-like processes and setae; mandible with 3-4 setae; pronotum wider than elytra; scutellum not visible; elytra subrectangular, fused along interelytral suture; tibiae lacking spurs; tarsomeres 3 subcylindrical.

Relationships. *Philippius* is the sister genus to *Lamiarhinus*.

Species included. *Philippius superbus* (Reed, 1872).

Geographical distribution. Andean region (Subantarctic subregion), in southern Argentina and southern Chile (Kuschel 1987; Morrone 1990).

Material examined. *Philippius superbus* (IADIZA, MACN, MHNS, MLP, USNM).

***Rupanius* Morrone, 1995**

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

Rupanius Morrone, 1995c: 604.

Type species. *Rupanius carinatus* Morrone, 1995c.

Diagnosis. Small (5.3–6.6 mm); vestiture of seta-like scales and setae; pronotum transverse; elytra subrectangular, with carina on apical declivity, disc slightly convex, lacking anteapical tubercle.

Relationships. *Rupanius* is the sister genus to *Methypora* (Australia), and both are placed in Listroderina. In a previous analysis (Morrone 1997a) *Rupanius* was placed in the *Macrostyphlus* generic group (= *Macrostyphlina*).

Species included. *Rupanius carinatus* Morrone, 1995.

Geographical distribution. South American Transition Zone (North Andean Paramo biogeographical province), in Colombia (Morrone 1995c).

Material examined. *Rupanius carinatus* (CMNC).

***Trachodema* Blanchard, 1849**

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

Trachodema Blanchard, 1849: pl. 24.

Type species. *Trachodema tuberculosa* Blanchard, 1849 (by indication, monotypy).

Diagnosis. Small to very small (2.5–5.3 mm); vestiture of scales with finger-like processes and setae; scape long (surpassing posterior margin of eye when resting in scrobe); pronotum transverse.

Relationships. *Trachodema* is the sister genus to *Lamiarhinus-Philippius*.

Species included. *Trachodema paolae* Alonso-Zarazaga, 2012 and *T. tuberculosa* Blanchard, 1849.

Host plants. *Trachodema tuberculosa*: *Atriplex semibaccata* R. Br. (Chenopodiaceae) (Morrone 1992c).

Geographical distribution. Andean region (Central Chilean subregion) (Morrone 1992c).

Material examined. *Trachodema paolae* (MHNS) and *T. tuberculosa* (CMNC, CWOB, DZUP, FIML, MHNS, MZFC, USNM).

Species inquirendae

***Listroderes bicallosus* (Boheman, 1859)**

Cryptorhynchus bicallosus Boheman, 1859: 139.

Listroderes bicallosus; Wibmer and O'Brien, 1986: 113.

Distribution. Ecuador and Peru (Wibmer and O'Brien 1986).

***Listroderes mus* Germain, 1895**

Listroderes mus Germain, 1895: 102.

Distribution. Chile (Wibmer and O'Brien 1986).

Biogeographical Account

The geographical distribution of the genera analysed indicates that Listroderini are basically a Gondwanan taxon, with *Listronotus* being the only genus distributed in North America. All the subtribes have Andean representatives (especially in the Subantarctic subregion), each showing a different pattern:

- 1 Macrostyphlina: exclusively Andean, in both the Andean region (Subantarctic and Central Chilean subregions) and the South American Transition Zone.
- 2 Falklandiina: distributed in the Andean region (Subantarctic subregion) and New Zealand.
- 3 Listroderina: distributed in the Andean region (Subantarctic, Patagonian and Central Chilean subregions), the South American and Mexican Transition Zones and the Neotropical and Australian Temperate regions.
- 4 Palaechthina: distributed in the Andean (Subantarctic and Central Chilean subregions), Neotropical and Nearctic regions, the South American Transition Zone, the Tristan da Cunha-Gough islands, New Zealand and the Australian Temperate region.

By replacing the genera for the areas where they are distributed, a taxon-area cladogram was obtained (Fig. 36). The paralogy-free subtrees that can be obtained from this taxon-area cladogram are mostly uninformative, and the informative ones cannot be combined into a general area cladogram. Geographical paralogy is particularly evident in the Subantarctic subregion, where representatives of the four subtribes are represented, suggesting that Listroderini are an ancient Gondwanan group. Several extinction events might have obscured the relationships among the areas.

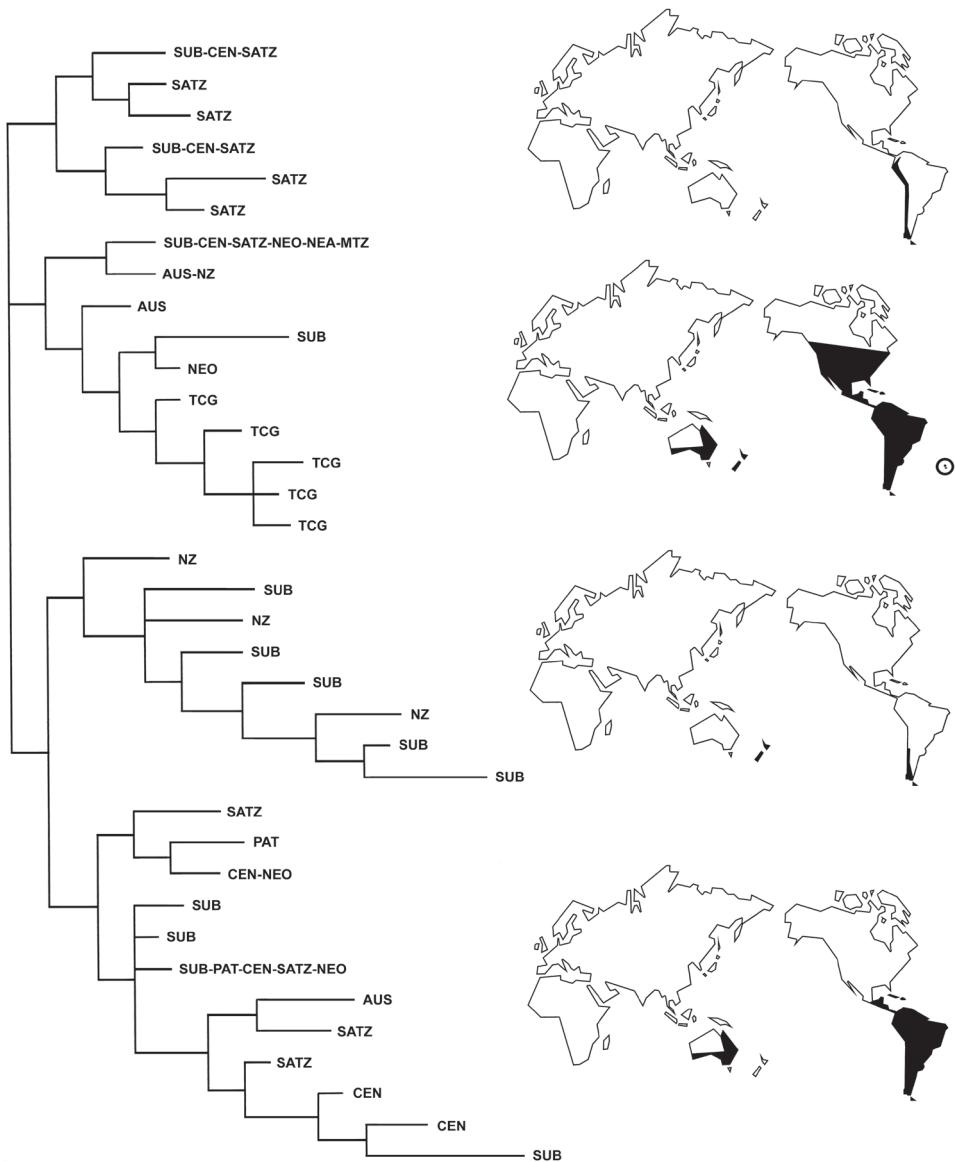


Figure 36. Taxon-area cladogram of the tribe Listroderini, with the geographical distribution of the subtribes represented on maps. AUS, Australia; CEN, Central Chilean subregion; MTZ, Mexican Transition Zone; NEA, Nearctic region; NEO, Neotropical region; NZ, New Zealand; PAT, Patagonian subregion; SATZ, South American Transition Zone; SUB, Subantarctic subregion; TCF, Tristan da Cunha-Gough islands.

Acknowledgements

I thank Rolf Oberprieler for stimulating discussions on weevil systematics over the years and for donating specimens of *Anorthorhinus*, Samuel Brown for communicating some omissions and corrections to my 2011 checklist, Silvia Espinosa Matías for preparing

the Scanning Electron Microscope images at the Facultad de Ciencias, UNAM, and Sergio Roig-Juñent for the habitus illustrations. Rolf Oberprieler and one anonymous reviewer provided very useful comments that helped improve the manuscript. The image of *Gromilus veneris* is used with permission of the Bishop Museum, Honolulu.

References

- Alonso-Zarazaga MA (2012) *Trachodema paolae* nom. nov. (Coleoptera, Curculionidae, Cyclo-minae) and a correction to Morrone's list of Listroderini. *Graellsia* 68: 219. doi: 10.3989/graelessia.2012.v68.065
- Alonso-Zarazaga MA, Lyal CHC (1999) A world catalogue of families and genera of Curculo-noidae (Insecta: Coleoptera) (excluding Scolytidae and Platypodidae). Entomopraxis, Barcelona.
- Anderson RS (1992) Curculionoidea of southern Florida: An annotated checklist (Coleoptera: Curculionoidea [excluding Curculionidae; Scolytinae, Platypodinae]). *Insecta Mundi* 6: 193–248.
- Anderson RS (2002) Chapter 131. Curculionidae. In: Arnett RH Jr, Thomas MC, Skelley PE, Frank JH (Eds) American Beetles, Volume II: Polyphaga: Scarabaeoidea through Curculionoidea, CRC Press, Boca Raton, 722–815.
- Anderson RS, Morrone JJ (1996) A new genus of microptalmic Rhytidrhinini from Andean leaf litter (Coleoptera: Curculionidae). *Entomologica Scandinavica* 27: 259–278. doi: 10.1163/187631296X00098
- Angell CWJ (1893) Notes on *Macrops* and *Anthonomus*. *Journal of the New York Entomological Society* 1: 12–15.
- Ashworth AC, Kuschel G (2003) Fossil weevils (Coleoptera: Curculionidae) from latitude 85°S Antarctica. *Palaeogeography, Palaeoclimatology, Palaeoecology* 191: 191–202. doi: 10.1016/S0031-0182(02)00712-5
- Blackburn T (1890) Notes on Australian Coleoptera, with description of new species. Part VII. *Proceedings of the Linnean Society of New South Wales* 5: 303–366.
- Blackburn T (1893) Further notes on Australian Coleoptera, with descriptions of new genera and species. XIV. *Transactions of the Royal Society of New South Wales* 17: 294–315.
- Blanchard E (1849) Láminas. In: Gay C (Ed) Historia física y política de Chile, vol. 5, Zoología, author, Paris, and Museo Nacional de Historia Natural de Santiago, Santiago, 32 pl.
- Blanchard E (1851) Fauna chilena. Insectos. Coleópteros. In: Gay C (Ed) Historia física y política de Chile, vol. 5, Zoología, author, Paris, and Museo Nacional de Historia Natural de Santiago, Santiago, 285–563.
- Blanchard E (1853) Insectes. Voyage au Pole Sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée; exécutée par ordre du Roi pendant les années 1837–1838–1839–1840 sous le commandement de M. J. Dumont-d'Urville, Capitaine de vaisseau. *Zoologie*, vol. 4, pt. 1. Baudry, Paris, 422 pp.
- Blatchley WS (1916) In: Blatchley WS, Leng CW, Rhynchophora or weevils of North Eastern America, The Nature Publishing Co., Indianapolis. doi: 10.5962/bhl.title.1557

- Blatchley WS (1920) Some new Rhynchophora from eastern North America with additions to and corrections of the “Rhynchophora of Northeastern North America”. *Journal of the New York Entomological Society* 28: 161–178.
- Blatchley WS (1922) Notes on the Rhynchophora of eastern North America, with characterizations of new genera and descriptions of new species. *Journal of the New York Entomological Society* 30: 95–106.
- Blatchley WS (1925) Notes on the Rhynchophora of eastern North America with descriptions of new species, III. *Journal of the New York Entomological Society* 33: 87–113.
- Blatchley WS (1928) Notes on the Rhynchophora of eastern North America with descriptions of new species, IV. *Journal of the New York Entomological Society* 36: 235–262.
- Blodgett SL, Denke PM, Ivie MA, O'Brien CW, Lenssen AW (1997) *Listronotus montanus* Dietz (Coleoptera: Curculionidae) damaging spring wheat in Montana. *Canadian Entomologist* 129: 377–378. doi: 10.4039/Ent129377-2
- Bohemian CH (1834) In: Schoenherr CJ, Genera et species curculionidum, cum synonymia hujus familiae, Vol. 2, pt. 1, Roret, Paris, 1–326.
- Bohemian CH (1842) In: Schönherr CJ, Genera et species curculionidum cum synonymia hujus familiae, Vol. 6, pt. 2, Roret, Paris and Fleischer, Leipzig, 1–495.
- Bohemian CH (1843) In: Schoenherr CJ, Genera et species curculionidum cum synonymia hujus familiae, Vol. 7, pt. 1, Roret, Paris and Fleischer, Leipzig, 1–479.
- Bohemian CH (1859) Coleoptera. Species novas descripsit. In: Kongliga Svenska Fregatten Eugenies resa omkring Jorden under befäl af C. A. Virgin aren 1851–1853. Vetenskapliga iakttagelser Pa H. Maj: t Konung Oscar den Förstes befallning utgifna af K. Svenska Vetenskaps-Akademien. Zoologi. III. Insekter. Norstedt & Söner, Stockholm, 113–217.
- Boivin GS, Cote M, Anciso JR (1990) Egg parasitoid of a carrot weevil, *Listronotus texanus* (Stockton), in the lower Rio Grande Valley, Texas. *Journal of the Rio Grande Valley Horticultural Society* 43: 91–92.
- Bosq JM (1935) Primera lista de los coleópteros de la República Argentina dañinos a la agricultura. *Boletín del Ministerio de Agricultura de la Nación* 36: 313–346.
- Bouchard P, Bousquet Y, Davies AE, Alonso-Zarazaga MA, Lawrence JF, Lyal CHC, Newton AF, Reid CAM, Schmitt M, Ślipiński SA, Smith ABT (2011) Family-group names in Coleoptera (Insecta). *Zookeys* 88: 1–972. doi: 10.3897/zookeys.88.807
- Brèthes J (1910) Coleópteros argentinos y bolivianos. *Anales de la Sociedad Científica Argentina* 69: 205–227.
- Brèthes J (1926) Descripción de un gorgojo que ataca la zanahoria: “*Aulametopiellus dauci*”, n. gen., n. sp. *Physis* 8: 414–416.
- Brinck P (1948) Coleoptera of Tristan da Cunha. *Results of the Norwegian Scientific Expedition to Tristan da Cunha, 1937–1938* 17: 1–121.
- Brookes AE (1951) The Coleoptera of the Auckland and Campbell Islands. *Cape Expedition Series, Bulletin* 5: 1–68.
- Broun T (1885) Abstract of paper on New Zealand Scydmaenidae. *New Zealand Journal of Science*, Dunedin 2: 384–387.
- Broun T (1893a) Manual of the New Zealand Coleoptera. Parts V, VI, VII, vol. 5. Wellington.

- Broun T (1893b) Descriptions of new Coleoptera from New Zealand. *The Annals and Magazine of Natural History* 6: 288–302. doi: 10.1080/00222939308677625
- Broun T (1903) Descriptions of new genera and species of New Zealand Coleoptera. *The Annals and Magazine of Natural History* 12: 69–86. doi: 10.1080/00222930308678830
- Broun T (1904) Descriptions of new genera and species of New Zealand Coleoptera. *The Annals and Magazine of Natural History* 14: 105–127. doi: 10.1080/03745480409442977
- Broun T (1905) Descriptions of a new genus and four species of New Zealand Coleoptera. *The Annals and Magazine of Natural History* 15: 543–547. doi: 10.1080/03745480509442849
- Broun T (1909) Descriptions of new genera and species of New Zealand Coleoptera. *The Annals and Magazine of Natural History* 4: 51–71. doi: 10.1080/00222930908692639
- Broun T (1910) Descriptions of new genera and species of Coleoptera. *New Zealand Institute Bulletin* 1: 1–78.
- Broun T (1913) Descriptions of new genera and species of New Zealand Coleoptera. *Transactions and Proceedings of the New Zealand Institute* 45: 97–164.
- Broun T (1914) Descriptions of new genera and species of Coleoptera (Part II). *New Zealand Institute Bulletin* 1: 79–142.
- Broun T (1915) Descriptions of new genera and species of Coleoptera (Part IV). *New Zealand Institute Bulletin* 1: 267–346.
- Broun T (1917) Descriptions of new genera and species of Coleoptera (Part V). *New Zealand Institute Bulletin* 1: 347–474.
- Broun T (1921) Descriptions of new genera and species of Coleoptera (Part VI). *New Zealand Institute Bulletin* 1: 475–590.
- Broun T (1923) Descriptions of new genera and species of Coleoptera. *New Zealand Institute Bulletin* 1: 1–708.
- Burke HR (1963) New species of Texas weevils, with notes on others (Coleoptera: Curculionidae). *The Southwestern Naturalist* 8: 162–172. doi: 10.2307/3669209
- Casey TL (1895) Coleopterological notices. VI. *Annals of the New York Academy of Sciences* 8: 438–838.
- Champion GC (1902) *Biologia Centrali-Americanana. Insecta. Coleoptera. Rhynchophora. Curculionidae. Curculioninae (part)*, vol. 4, pt. 4, 1–144.
- Champion GC (1918a) The Coleoptera of the Falkland Islands. *The Annals and Magazine of Natural History*, series 9, 1: 167–186.
- Champion GC (1918b) Notes on various South American Coleoptera collected by Charles Darwin during the voyage of the “Beagle”, with descriptions of new genera and species. *Entomological Monthly Magazine* 54: 43–55.
- Cockerell TDA (1906) Preoccupied generic names of Coleoptera. *Entomological News* 17: 240–244.
- Cordo HA, DeLoach CJ (1982) Weevils *Listronotus marginicollis* and *L. cinnamoneus* that feed on *Limnobium* and *Myriophyllum* in Argentina. *The Coleopterists Bulletin* 36: 302–308.
- Cordo HA, DeLoach CJ, Ferrer R (1982) The weevils *Lixellus*, *Tanysphiroideus*, and *Cyrtobagous* that feed on *Hydrocotyle* and *Salvinia* in Argentina. *The Coleopterists Bulletin* 36: 279–286.

- Cragnolini CI (1994) Observaciones sobre el ciclo biológico y comportamiento de *Listronotus dauci* (Brethes) (Coleoptera-Curculionidae) en cultivos de zanahoria en Córdoba (Argentina). *Agriscentia* 11: 83–86.
- Desbrochers des Loges J (1898) Description d'un Curculionide nouveau de France constituant une coupe generique nouvelle de la tribu des Erirhinides. *Le Frelon* 7: 52–54.
- Dietz WG (1889) On the species of *Macrops* Kirby, inhabiting North America. *Transactions of the American Entomological Society* 16: 28–54.
- Edelson JV (1985) Biology of a carrot weevil, *Listronotus texanus* (Coleoptera: Curculionidae): Range and seasonality of infestations. *Journal of Economic Entomology* 78: 895–897.
- Edwards MA, Hopwood AT (Eds) (1966) *Nomenclator Zoologicus*. The Zoological Society of London, London.
- Enderlein G (1907) Die Rüsselkäfer der Falklands-Inseln. 13. Beitrag zur Kenntnis der antarktischen Fauna. *Stettiner Entomologische Zeitung* 68: 36–69.
- Enderlein G (1912) Die Insekten des Antarkto-Archiplato-Gebietes (Feuerland, Falklands-Inseln, Süd-Georgien). 20. Beitrag zur Kenntnis der antarktischen Fauna. *Kungliga Svenska Vetenskapsakademiens Handlingar* 48: 1–170.
- Erichson WF (1842) Beitrag zur Insecten-Fauna von Vandiemensland, mit besonderer Berücksichtigung der geographischen Verbreitung der Insecten. *Archiv für Naturgeschichte* 8: 83–287.
- Erichson WF (1847) Conspectus Insectorum Coleopterorum, quae in Republica Peruana observata sunt. *Archiv für Naturgeschichte* 13: 67–185.
- Fairmaire L (1884) Note sur quelques Coléoptères de Magellan et de Santa-Cruz. *Annales de la Société Entomologique de France* 1883 (1884), ser. 6: 483–506.
- Fairmaire L (1885) Liste de coléoptères recueillis à la Terre de Feu par la mission de la Romanche et description des espèces nouvelles. *Annales de la Société Entomologique de France* 6: 33–62.
- Friedman ALL (2009) The vegetable weevil, *Listroderes costirostris* Schoenherr (Curculionidae: Cyclominae): A new invasive pest in Israel. *Phytoparasitica* 37: 331–332. doi: 10.1007/s12600-009-0039-2
- Germain P (1895–1896) Apuntes sobre los insectos de Chile. Estudio i descripción de los Listroderitos de Chile i tierras magallánicas de la colección del Museo Nacional i de la de Don Fernando Paulsen. *Anales de la Universidad de Chile* 90: 287–324, 467–505, 567–602, 91: 53–104 (1895); 93: 791–838, 94: 721–752 (1896).
- Germain P (1911) Informes de los jefes de Sección i otros empleados del Museo. 1-Informe del jefe de la Sección de Entomología. *Boletín del Museo Nacional de Chile* 3: 197–221.
- Goloboff P (1993) Estimating character weights during tree search. *Cladistics* 9: 83–91. doi: 10.1111/j.1096-0031.1993.tb00209.x
- Goloboff PA, Farris JS, Nixon KC (2008) TNT, a free program for phylogenetic analysis. *Cladistics* 24: 774–786. doi: 10.1111/j.1096-0031.2008.00217.x
- Guérin-Ménéville FE (1839) Description de quelques Coléoptères des côtes du Détroit de Magellan. *Revue de Zoologie* 2: 295–305.
- Gyllenhal L (1834) In: Schoenherr CJ, Genera et species curculionidum, cum synonymia hujus familiae, Vol. 2, pt. 1, Roret, Paris, 1–326.

- Hatch MH (1971) The beetles of the Pacific Northwest. University of Washington Publications in Biology 16: 1–662.
- Henderson LS (1940) A revision of the genus *Listronotus*. University of Kansas Science Bulletin 26: 215–337.
- Hustache A (1921) Deux Curculionides américains introduits en France. Bulletin de la Société Entomologique de France, 1921: 134.
- Hustache A (1926) Contribution à l'étude des Curculionides de la République Argentine (première note). Anales del Museo Nacional de Historia Natural "Bernardino Rivadavia" 34: 155–261.
- Hustache A (1938a) Curculionides nouveaux de l'Amérique méridionale, qui se trouvent dans le Deutsches Entomologisches Institut. (1ère note). Arbeiten über morphologische und taxonomische Entomologie aus Berlin-Dahlem 5: 174–184.
- Hustache A (1938b) Curculionides nouveaux de l'Amérique méridionale, qui se trouvent dans le Deutsches Entomologisches Institut. 2ième note. Arbeiten über morphologische und taxonomische Entomologie aus Berlin-Dahlem 5: 265–288.
- Hustache A (1939a) Curculionides nouveaux de l'Argentine et autres régions Sud-Américaines. Anales de la Sociedad Científica Argentina 128: 38–64, 99–124.
- Hustache A (1939b) Curculionides nouveaux de l'Amérique méridionale, qui se trouvent dans le Deutsches Entomologisches Institut. Suite de la 3ième note. Arbeiten über morphologische und taxonomische Entomologie aus Berlin-Dahlem 6: 50–68.
- Jekel H (1865) Recherches sur la classification naturelle des Curculionides. Annales de la Société Entomologique de France, 1864 [1865], ser. 4: 537–566.
- Kirby W (1837) Part the fourth and last. The insects. In: Richardson J, Fauna Boreali-Americanica; or the zoology of the northern parts of British America: containing descriptions of the objects of natural history collected on the late Northern Land Expeditions, under command of Captain Sir John Franklin, R.N., Fletcher, Norwich, 1–325.
- Kirby W (1885) Coleoptera. In: Rye EC (Ed) The Zoological Record for 1882; being the volume twentieth of the record of zoological literature, 16–123.
- Kirsch T (1877) In: Kiesenwetter H von, Kirsch T, Die Käferfauna der Auckland-Inseln, nach Herm. Krone's Sammlungen beschrieben. Deutsche Entomologische Zeitschrift 21: 153–174.
- Kirsch T (1889) Coleopteren gesammelt in den Jahren 1868–1877 auf einer Reise durch Süd Amerika von Alphons Stübel. Abhandlungen und Berichte des königlichen zoologischen und anthropologisch-ethnographischen Museum zu Dresden, 1888/89 (1889), 4: 1–58.
- [Klug F] (1829) Preis-Verzeichniss vorrätiger Insectendoubletten des Königl. Zoologischen Museums der Universität, Berlin.
- Kolbe HJ (1907) Coleopteren. Ergebnisse der Hamburger Magalhaensische Sammelreise 8: 1–125.
- Kuschel G (1949) Los "Curculionidae" del extremo norte de Chile (Coleoptera, Curcul. ap. 6). Acta Zoológica Lilloana 8: 5–54.
- Kuschel G (1950) Nuevas sinonimias, revalidaciones y combinaciones (9º aporte a Col. Curculionidae). Agricultura Técnica de Chile 10: 10–21.

- Kuschel G (1952) Cylydrorhininae aus dem Britischen Museum. (Col. Curculionidae, 8. Beitr.). The Annals and Magazine of Natural History, ser. 12, 5: 121–137. doi: 10.1080/00222935208654274
- Kuschel G (1955) Nuevas sinonimias y anotaciones sobre Curculionoidea (1) (Coleoptera). Revista Chilena de Entomología 4: 261–312.
- Kuschel G (1958) Nuevos Cylydrorhininae de la Patagonia (Col. Curculionoidea, Aporte 18). Investigaciones Zoológicas Chilenas 4: 231–252.
- Kuschel G (1962) The Curculionidae of Gough Island and the relationships of the weevil fauna of the Tristan da Cunha Group. Proceedings of the Linnean Society of London, 1960-61 (1962), 173: 69–78.
- Kuschel G (1964) Insects of Campbell Island. Coleoptera: Curculionidae of the Subantarctic islands of New Zealand. Pacific Insects Monographs 7: 416–493.
- Kuschel G (1971) Entomology of the Aucklands and other islands south of New Zealand: Coleoptera: Curculionidae. Pacific Insects Monographs 27: 225–259.
- Kuschel G (1972) The foreign Curculionoidea established in New Zealand (Insecta: Coleoptera). New Zealand Journal of Science 15: 273–289.
- Kuschel G (1986) In: Wibmer GJ, O'Brien CW, Annotated checklist of the weevils (Curculionidae sensu lato) of South America (Coleoptera: Curculionoidea), Memoirs of the American Entomological Institute 39: 1–563.
- Kuschel G (1987) The subfamily Molytinae (Coleoptera: Curculionidae): General notes and descriptions of new taxa from New Zealand and Chile. New Zealand Entomologist 9: 11–29. doi: 10.1080/00779962.1987.9722488
- Kuschel G (1990) Beetles in a suburban environment: A New Zealand case study. New Zealand Department of Scientific and Industrial Research, Auckland.
- Lanteri AA, Marvaldi AE, Suárez S (2002) Gorgojos de la Argentina y sus plantas huéspedes: Tomo I: Apionidae y Curculionidae. Publicación Especial de la Sociedad Entomológica Argentina, nro. 1, San Miguel de Tucumán.
- Lea AM (1899) Descriptions of Australian Curculionidae, with notes on previously described species. Transactions and Proceedings of the Royal Society of South Australia [23]: 137–197.
- Lea AM (1911) Notes on Australian Curculionidae in the Berlin Museum with descriptions of new species. Mitteilungen aus dem Zoologischen Museum in Berlin 5: 177–201.
- Lea AM (1928) New species of Australian Erirhinides (Curculionidae). Proceedings of the Linnean Society of New South Wales 53: 375–396.
- LeConte JL (1857) Report upon insects collected on the survey. In: Reports of explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean, Vol. 9, no. 1, 1–72.
- LeConte JL (1876) In: LeConte JL, Horn GH, The Rhynchophora of America, north of Mexico. Proceedings of the American Philosophical Society 15: 1–455.
- López G, Hermann M (Eds) (2004) El cultivo del ulluco en la sierra central del Perú. Centro Internacional de la Papa, Lima.
- Maes JM, O'Brien CW (1990) Lista anotada de los Curculionoidea (Coleoptera) de Nicaragua. Revista Nicaragüense de Entomología 12: 1–78.

- Marshall GAK (1914) Four new injurious weevils from Africa. *Bulletin of Entomological Research* 5: 235–239.
- Marshall GAK (1926) On new Neotropical Curculionidae (Col.). *The Annals and Magazine of Natural History* 18: 530–543. doi: 10.1080/00222932608633549
- Marshall GAK (1930) New Curculionidae, with notes on synonymy. *The Annals and Magazine of Natural History* 9: 551–577. doi: 10.1080/00222933008673252
- Marshall GAK (1935) New Curculionidae (Col.) from tropical Africa, with notes on synonymy etc. *The Annals and Magazine of Natural History*, series 10: 497–518.
- Marshall GAK (1937) New Curculionidae (Col.) from New Zealand. *Transactions of the Royal Society of New Zealand* 67: 316–340.
- Marshall GAK (1943) New Indian Curculionidae (Col.). *The Annals and Magazine of Natural History* 11: 105–119. doi: 10.1080/03745481.1943.9727999
- Marshall GAK (1953) Four new Curculionidae (Col.) from New Zealand. *Transactions of the Royal Society of New Zealand* 81: 67–70.
- Martel P, Svec HJ, Harris CR (1976) The life history of the carrot weevil, *Listronotus oregonensis* (Coleoptera: Curculionidae) under controlled conditions. *Canadian Entomologist* 108: 931–934. doi: 10.4039/Ent108931-9
- Marvaldi AE (1994) Estudio taxonómico del género *Neopachytychius* Hustache (Coleoptera: Curculionidae). *Revista de la Sociedad Entomológica Argentina* 53: 57–63.
- Marvaldi AE (1998) Larvae of South American Rhytirrhininae (Coleoptera: Curculionidae). *Coleopterists Bulletin* 52: 71–89.
- May BM (1970) Aquatic adaptation in the larva of *Desiantha ascita* (Coleoptera: Curculionidae). *New Zealand Entomologist* 4: 7–11. doi: 10.1080/00779962.1970.9723066
- May BM (1971) Entomology of the Aucklands and other islands south of New Zealand: Immature stages of Curculionoidea. *Pacific Insects Monographs* 27: 271–316.
- May BM (1977) Immature stages of Curculionidae: Larvae of the soil-dwelling weevils of New Zealand. *Journal of the Royal Society of New Zealand* 7: 189–228. doi: 10.1080/03036758.1977.10427160
- May BM (1993) Larvae of Curculionoidea (Insecta: Coleoptera): A systematic overview. *Fauna of New Zealand* 28: 1–221.
- May BM (1994) An introduction to the immature stages of Australian Curculionoidea. In: Zimmerman, E. C. *Australian weevils. Volume II. Brentidae, Eurhynchidae, Apionidae and a chapter on immature stages by Brenda May*. CSIRO, Melbourne.
- Morrone JJ (1990) *Philippius* Germain, a remarkable Listroderini from southern South America (Coleoptera: Curculionidae). *The Coleopterists Bulletin* 44: 429–436.
- Morrone JJ (1992a) Revisión sistemática y análisis cladístico del género *Antarctobius* Fairmaire (Coleoptera: Curculionidae). *Neotropica* 38: 3–20.
- Morrone JJ (1992b) Revisión sistemática, análisis cladístico y biogeografía histórica de los géneros *Falklandius* Enderlein y *Lanteriella* gen. nov. (Coleoptera: Curculionidae). *Acta Entomológica Chilena* 17: 157–174.
- Morrone JJ (1992c) Revision of *Trachodema* Blanchard with the description of an allied genus from central Chile (Insecta, Coleoptera, Curculionidae). *Zoologica Scripta* 21: 417–422. doi: 10.1111/j.1463-6409.1992.tb00341.x

- Morrone JJ (1993a) Revisión sistemática de un nuevo género de Rhytirrhinini (Coleoptera: Curculionidae), con un análisis biogeográfico del dominio Subantártico. Boletín de la Sociedad de Biología de Concepción 64: 121–145.
- Morrone JJ (1993b) Revisión sistemática del género *Hyperoides* Marshall (Coleoptera: Curculionidae). Neotropica 39: 17–26.
- Morrone JJ (1993c) Revisión de las especies de *Listroderes* Schoenherr del grupo *curvipes* (Coleoptera: Curculionidae). Revista Chilena de Entomología 20: 15–21.
- Morrone JJ (1993d) Systematic revision of the *costirostris* species group of the weevil genus *Listroderes* Schoenherr (Coleoptera: Curculionidae). Transactions of the American Entomological Society 119: 271–315.
- Morrone JJ (1993e) Revisión de las especies de *Listroderes* Schoenherr del grupo *nodifer* (Coleoptera: Curculionidae). Boletín del Museo Nacional de Historia Natural, Chile, 1992 [1993], 43: 117–130.
- Morrone JJ (1993f) Cladistic and biogeographic analyses of the weevil genus *Listroderes* Schoenherr (Coleoptera: Curculionidae). Cladistics 9: 397–411. doi: 10.1111/j.1096-0031.1993.tb00233.x
- Morrone JJ (1994a) Systematics of the Andean genus *Acrorius* Kirsch (Coleoptera: Curculionidae). The Coleopterists Bulletin 48: 101–114.
- Morrone JJ (1994b) Systematics of the Patagonian genus *Acrostomus* Kuschel (Coleoptera: Curculionidae). Annals of the Entomological Society of America 87: 403–411.
- Morrone JJ (1994c) Systematics, cladistics, and biogeography of the Andean weevil genera *Macrostyphlus*, *Adioristidius*, *Puranius*, and *Amathynetoides*, new genus (Coleoptera: Curculionidae). American Museum Novitates 3104: 1–63.
- Morrone JJ (1994d) Cladistic placement of the Subantarctic genus *Haversiella* (Coleoptera: Curculionidae). Journal of the New York Entomological Society 102: 299–302.
- Morrone JJ (1994e) Clarification of the taxonomic status of species formerly placed in *Listroderes* Schoenherr (Coleoptera: Curculionidae), with the description of a new genus. American Museum Novitates 3093: 1–11.
- Morrone JJ (1995a) Estudio taxonómico y biogeográfico del género subantártico *Falklandielus* Kuschel (Coleoptera: Curculionidae). Physis (Buenos Aires), Sección C, 1992 (1995), 50: 105–110.
- Morrone JJ (1995b) Revisión de las especies de *Listroderes* Schoenherr del grupo *robustus* (Coleoptera: Curculionidae). Physis (Buenos Aires), Sección C, 1992 (1995), 50: 73–80.
- Morrone JJ (1995c) A new genus of Rhytirrhinini from Colombia (Coleoptera: Curculionidae). Caldasia 17: 603–606.
- Morrone JJ (1997a) Cladistics of the New World genera of Listroderina (Coleoptera: Curculionidae: Rhytirrhinini). Cladistics 13: 247–266. doi: 10.1111/j.1096-0031.1997.tb00318.x
- Morrone JJ (1997b) Nomenclatural notes on the subfamily Cyclominae (Coleoptera: Curculionidae). Acta Entomológica Chilena 21: 101–102.
- Morrone JJ (2002a) Checklist of the species of Cyclominae (Coleoptera: Curculionidae) occurring in America south of the United States. Revista de la Sociedad Entomológica Argentina 61: 1–8.

- Morrone JJ (2002b) On the species of the *Listroderes costirostris* complex (Coleoptera: Curculionidae). *Neotropica* 48: 70–72.
- Morrone JJ (2006) Biogeographic areas and transition zones of Latin America and the Caribbean Islands based on panbiogeographic and cladistic analyses of the entomofauna. *Annual Review of Entomology* 51: 467–494. doi: 10.1146/annurev.ento.50.071803.130447
- Morrone JJ (2011) Annotated checklist of the tribe Listroderini (Coleoptera: Curculionidae: Cyclominae). *Zootaxa* 3119: 1–68.
- Morrone JJ, Anderson RS (1995) The *Falklandius* generic group: Cladistic analysis with description of new taxa (Coleoptera: Curculionidae: Rhytirrhinini). *American Museum Novitates* 3121: 1–14.
- Morrone JJ, Díaz NB, Loiácono MS (1992) Comparative morphology of mouthparts in the tribe Listroderini (Coleoptera: Curculionidae). *Elytron* 6: 47–59.
- Morrone JJ, Marvaldi AE (1998) *Listroderes abditus* or *Antarctobius abditus*? A simultaneous analysis of larval and adult characters (Coleoptera: Curculionidae). *European Journal of Entomology* 95: 229–236.
- Morrone JJ, Marvaldi AE, O'Brien CW (1995) *Lixellus* LeConte, a new synonym of *Listronotus* Jekel (Coleoptera: Curculionidae). *Entomological News* 106: 108–112.
- Morrone JJ, O'Brien CW (2000) The aquatic and semiaquatic weevils (Coleoptera: Curculionoidea: Curculionidae, Dryophthoridae and Eriphiniidae) of Argentina, with indication of their host plants. *Physis* (Buenos Aires) secc. C, 57: 25–37.
- Morrone JJ, Ocampo F (1995) *Acroriellus*, a new weevil genus of northern Andean Listroderina (Coleoptera: Curculionidae). *Zoologica Scripta* 24: 257–262. doi: 10.1111/j.1463-6409.1995.tb00403.x
- Oberprieler RG (1992) Preliminary report on the weevils (Curculionidae) collected on Inaccesible and Nightingale islands during September 1989 by the expedition of the Fitzpatrick Institute for African Ornithology, University of Cape Town, submitted by Mr. A. J. Gardiner, Zimbabwe. Manuscript distributed by the author, 1–2.
- Oberprieler RG (2010) A reclassification of the weevil subfamily Cyclominae (Coleoptera: Curculionidae). *Zootaxa* 2515: 1–35.
- Oberprieler RG (In press) Cyclominae Schoenherr, 1826. In: Beutel RG, Leschen RAB (Eds) *Handbook of Coleoptera*, Vol. 3, deGruyter Press, Berlin.
- O'Brien CW (1977) The semiaquatic weevil genus *Listronotus* in Mexico and Central America (Coleoptera: Curculionidae: Cylindrorhininae). *Transactions of the Entomological Society of America* 70: 804–814.
- O'Brien CW (1981) The larger (4.5+ mm) *Listronotus* of America, north of Mexico (Cylindrorhininae, Curculionidae, Coleoptera). *Transactions of the American Entomological Society* 107: 69–123.
- O'Brien CW, Wibmer GJ (1982) Annotated checklist of the weevils (Curculionidae sensu lato) of North America, Central America, and the West Indies (Coleoptera: Curculionoidea). *Memoirs of the American Entomological Institute* 34: 1–382.
- Ocampo F, Morrone JJ (1996) Two new species and cladistic analysis of *Acrorius* Kirsch (Coleoptera: Curculionidae: Rhytirrhinini). *Neotropica* 42: 23–28.

- Olliff AS (1891) Coleoptera (continued). In: Whymper, E., Supplementary appendix to travels amongst the Great Andes of the Equator. Murray, London, 58–81.
- Pascoe FP (1865) On some new genera of Curculionidae. Part I. Journal of Entomology, London 2: 413–432.
- Pascoe FP (1870) Descriptions of some genera and species of Australian Curculionidae. Transactions of the Entomological Society of London 2: 181–209.
- Pascoe FP (1873) Additions to the Australian Curculionidae. The Annals and Magazine of Natural History 11: 178–199. doi: 10.1080/00222937308696794
- Pascoe FP (1876) Descriptions of new genera and species of New Zealand Coleoptera. The Annals and Magazine of Natural History 18: 57–67. doi: 10.1080/00222937608682007
- Posadas P (2008) A preliminar overview of species composition and geographical distribution of Malvinian weevils (Insecta: Coleoptera: Curculionidae). Zootaxa 1704: 1–26.
- Posadas P (2012) Species composition and geographic distribution of Fuegian Curculionidae (Coleoptera: Curculionoidea). Zootaxa 3303: 1–36.
- Posadas P, Morrone JJ (2004) A new species of *Antarctobius* Fairmaire from Islas Malvinas (Coleoptera: Curculionidae: Cycloaminae). Insect Systematics and Evolution 35: 353–359. doi: 10.1163/187631204788920194
- Reed EC (1872) (Apéndice) Parte zoológica. In: Vidal Gormaz F (Ed.) Exploración de la costa de Llanquihue, practicada por órden del Supremo Gobierno por el capitán de corbeta don Francisco Vidal Gormaz. Anales de la Universidad de Chile 41: 354–355.
- Rothwell NL (2003) Investigation into *Listronotus maculicollis* (Coleoptera: Curculionidae), a pest of highly maintained turfgrass. Electronic Doctoral Dissertations for UMass Amherst. Paper AAI3096313. <http://scholarworks.umass.edu/dissertations/AAI3096313>
- Say T (1824) Descriptions of Coleopterous insects collected in the late expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under the command of Mayor Long. Journal of the Academy of Natural Sciences of Philadelphia, 1823 (1824), 3: 298–331.
- Say T (1831) Descriptions of new species of Curculionites of North America, with observations on some of the species already known. New Harmony, 1–30.
- Schenkling S, Marshall GAK (1929) Coleopterorum Catalogus. Pars 106: Curculionidae: Byrsopinae, Rhytirrhininae, Thecesterninae, Hipporhininae, Rhyparosominae. Junk, s'Gravenhage.
- Schenkling S, Marshall GAK (1931) Coleopterorum Catalogus. Pars 114, Curculionidae: Cy-lindrorrhininae, pp. 1–23. Junk, Berlin.
- Schönherr CJ (1823) Curculionides. Isis Oken, heft X, columns 1132–1146; heft V, columns 581–588.
- Schönherr CJ (1826) Curculionidum dispositio methodica cum generum characteribus, descriptionibus atque observationibus variis, seu prodromus ad synonymiae insectorum. Partem 4. Fleischer, Leipzig. doi: 10.5962/bhl.title.9327
- Schweiger H (1959) Über einige von der Skottsbergexpedition im Antarkto-Archiplata-Gebiet aufgesammelte Koleopteren. Arkiv för Zoologi 12: 1–43.
- Sharp D (1883) Some new species and genera of Coleoptera from New Zealand. Entomologist's Monthly Magazine 20: 66–68.

- Sharp D (1890) Insecta. In: *Zoological Record for 1889*, Vol. 26, London, 1–320.
- Sharp D (1892) Insecta. In: *Zoological Record for 1891*, Vol. 28, London, 1–311.
- Stierlin [G] (1903) Beschreibung einiger neuen europäischen Rüsselkäfer. *Mittheilungen der Schweizerischen Entomologischen Gesellschaft Schaffhausen* 11: 56–57.
- Stockton WD (1963) New species of *Hyperodes* Jekel and a key to the Nearctic species of the genus (Coleoptera: Curculionidae). *Bulletin of the California Academy of Sciences* 62: 140–149.
- Suffrian E (1871) Verzeichniss der von Dr. Gundlach auf der Insel Cuba gesammelten Rüsselkäfer (Fortsetzung, Siehe Jahreg. XXXVI. S. 150). *Archiv für Naturgeschichte* 37: 122–184.
- Torres AN, Casey H (2002) Sample scheme for carrot weevil (Coleoptera: Curculionidae) in parsley. *Environmental Entomology* 31: 1251–1258. doi: 10.1603/0046-225X-31.6.1251
- Thompson RT (1992) Observations on the morphology and classification of weevils (Coleoptera, Curculionoidea) with a key to major groups. *Journal of Natural History* 26: 835–891. doi: 10.1080/00222939200770511
- Van Dyke EC (1929) Two n. sp. *Listronotus*. *Pan-Pacific Entomologist* 5: 106–108.
- Voss E (1943) Einige neue Rüsselarten aus Argentinien und Paraguay (Coleoptera: Curculionidae.) (106. Beitrag zur Kenntnis der Curculioniden.). *Arbeiten über morphologische und taxonomische Entomologie aus Berlin-Dahlem* 10: 225–236.
- Voss E (1954) Curculionidae (Col.). *Beiträge zur Fauna Perus* 4: 193–376.
- Waterhouse CO (1884) Coleoptera collected during the Expedition of H.M.S. ‘Challenger’. *The Annals and Magazine of Natural History* 13: 276–283. doi: 10.1080/00222938409459235
- Waterhouse GR (1841) (Descriptions of numerous species of coleopterous insects from the southern parts of South America). *Proceedings of the Zoological Society of London* 9: 105–128.
- Wibmer GJ, O’Brien CW (1986) Annotated checklist of the weevils (Curculionidae *sensu lato*) of South America (Coleoptera: Curculionoidea). *Memoirs of the American Entomological Institute* 39: 1–563.
- Wild CH, McFadyen RE, Tomley AJ, Wilson BW (1992) The biology and host specificity of the stem-boring weevil *Listronotus setosipennis* [Col.: Curculionidae]: A potential bio-control agent for *Parthenium hysterophorus* [Asteraceae]. *Entomophaga* 37: 591–598. doi: 10.1007/BF02372329
- Zimmerman EC (1994) Australian weevils. Volume I. Anthribidae to Attelabidae. Centre of Scientific and Industrial Research, Melbourne.

A review of the genus *Berosus* Leach of Cuba (Coleoptera, Hydrophilidae)

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Academic editor: C. Majka | Received 28 December 2012 | Accepted 3 February 2013 | Published 28 February 2013

Citation: Deler-Hernández A, Fikáček M, Cala-Riquelme F (2013) A review of the genus *Berosus* Leach of Cuba (Coleoptera, Hydrophilidae). *ZooKeys* 273: 73–106. doi: 10.3897/zookeys.273.4591

Abstract

The Cuban fauna of the genus *Berosus* Leach, 1817 is reviewed based on newly collected material as well as historical and type specimens. Nine species are recognized, including three recorded from Cuba for the first time: *B. infuscatus* LeConte, 1855, *B. interstitialis* Knisch, 1924 (= *B. stribulus* Orchymont, 1946 **syn. n.**) and *B. metalliceps* Sharp, 1882. Only one of the nine Cuban species, *B. chevrolati*, remains endemic to Cuba, as two other species previously considered as endemic to Cuba are recorded from elsewhere: *B. quadridens* from Mexico and Central America and *B. trilobus* from the Dominican Republic. Notes on biology and Cuban distribution are provided for all nine species. *Berosus quadridens* Chevrolat, 1863, **stat. restit.** is removed from synonymy with *B. truncatipennis* and considered a valid species.

Resumen

La fauna cubana de *Berosus* Leach, 1817 es revisada a partir de nuevo material colectado así, como de material tipo e histórico. Se reconocen un total de nueve especies, incluyendo tres nuevos registros: *B. infuscatus* LeConte, 1855, *B. interstitialis* Knisch, 1924 (= *B. stribulus* Orchymont, 1946, **syn. n.**) y *B. metalliceps* Sharp, 1882. Solo una de las nueve especies cubanas, *B. chevrolati*, permanece como endémica, las otras dos especies originalmente consideradas como endémicas han sido registradas fuera de Cuba: *B. quadridens* presente en México y América Central y *B. trilobus* en República Dominicana. Se ofrecen datos sobre la biología y la distribución de todas las especies cubanas. *Berosus quadridens* Chevrolat, 1863, **stat. restit.** es destituida como sinónimo de *B. truncatipennis* y considerada como una especie válida.

Keywords

Hydrophilinae, Berosini, taxonomy, new synonymy, new records, Caribbean, Neotropical region, identification key

Palabras clave

Hydrophilinae, Berosini, taxonomía, nuevo sinónimo, nuevo registro, Caribe, región Neotropica, clave de identificación

Introduction

The hydrophilid genus *Berosus* Leach, 1817 is the largest genus in family Hydrophilidae, containing more than 270 species distributed worldwide (Hansen 1999, Short and Fikáček 2011) and inhabiting various types of standing and slowly running waters (Oliva and Short 2012). The genus has been little studied in the Caribbean and in Cuba specifically, and the current knowledge is based primarily on occasional collecting events and historical records. Chevrolat (1863) described three species which are until now considered Cuban endemics: *Berosus trilobus* Chevrolat, 1863, *B. quadridens* Chevrolat, 1863 and *B. aculeatus* Chevrolat, 1863 (the name of the latter was later changed to *B. chevrolati* Zaitzev, 1908 due to the homonymy). Gundlach (1891) provided short redescriptions of these species and few additional records. Another supposedly endemic species, *B. stribulus* Orchymont, 1946, was described later by Orchymont (1946). Spangler (1973, 1981) recorded *B. undatus* (Fabricius, 1792) for the first time from Cuba and provided additional records on the five Cuban species. Hansen (1999) only listed four species of *Berosus* from Cuba. Finally, Peck (2005) published the most complete checklist of Cuban Coleoptera with data on their distribution; in this work he listed seven species of *Berosus*. Except of the published works, an unpublished thesis by Van Tassell (1966) contains additional data on Cuban *Berosus*, which we also adopt here.

In this paper we provide a review of the Cuban fauna of *Berosus* containing redescriptions of the three of four species described as Cuban endemics (*B. chevrolati*, *B. quadridens* and *B. trilobus*), we synonymize the fourth supposedly endemic species *B. stribulus* with a widely distributed Caribbean *B. interstitialis*, provide identification key and illustrations of all Cuban species and notes on their distribution and bionomics based on newly collected material. Three species are newly recorded for the Cuban fauna.

Materials and methods

This study is mainly based on the material collected during the field survey of Cuban aquatic beetles conducted between 2008 to 2012 by A. Deler-Hernández, Y. S. Megna and F. Cala-Riquelme. The survey was mainly focused on eastern Cuba, but several areas of western Cuba were also sampled. In total, the samples from 170 localities have

been collected, of which only 40 sites yielded *Berosus*. Specimens were collected with aquatic nets and preserved in 70%–95% ethanol. Except of this material, we also used the following sources of information: *i*) recently collected specimens provided to us by some Cuban colleagues; *ii*) material deposited in the zoological collection of the Instituto de Ecología y Sistemática in La Habana, Museo de Historia Natural “Charles T. Ramsden”, Universidad de Oriente in Santiago de Cuba, National Museum in Prague and the Division of Entomology of the University of Kansas in Lawrence; and *iii*) literature records (Chevrolat 1863; Gundlach 1891; Van Tassell 1966; Spangler 1973, 1981; Hansen 1999; Peck 2005). In the systematic section we provide detailed descriptions and differential diagnoses for three species originally described as Cuban endemics (*B. chevrolati*, *B. quadridens* and *B. trilobus*), for remaining species we only include a short diagnosis summarizing the most important diagnostic characters.

Habitus photographs were taken using Canon D-550 digital camera with attached Canon MP-E65mm f/2.8 1–5× macro lens, and subsequently adapted in Adobe Photoshop CS2. Photographs of genitalia were taken using Nikon Coolpix P6000 digital camera attached to Olympus BX41 compound microscope and subsequently combined with Helicon Focus software. Line drawings were traced from the photographs taken using a Canon PowerShot A620 camera attached to a Zeiss Stemi 2000-C stereomicroscope or with the same equipment as for taking the habitus photographs. Dissections of male genitalia and mounting techniques follow those used by Oliva and Short (2012). Complete label data are provided for type specimens, data of additional material are listed in an adapted form; our notes to the label data are in square brackets []; and it is added the catalogue number for each vial of the Cuban material deposited in BSC-E. General morphological terminology follows Hansen (1991) and Komarek (2004), special terminology concerning *Berosus* follows Oliva (1989) and Oliva and Short (2012).

Examined material is deposited in the following collections:

- BSC-E** Departamento de Zoología, Centro Oriental de Ecosistemas y Biodiversidad, Santiago de Cuba, Cuba (A. Deler-Hernández);
CZACC Colección Zoológica, Instituto de Ecología y Sistemática, La Habana, Cuba (I. Fernández);
CZCTR Museo de Historia Natural “Charles Ramsden”, Facultad de Ciencias Naturales, Universidad de Oriente, Santiago de Cuba, Cuba (C. T. Ramsden historical collection) (M. Soto);
IRSNB Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (P. Limbourg);
KSEM Division of Entomology, University of Kansas Natural History Museum, Lawrence, USA (A. Short);
NMPC National Museum, Prague, Czech Republic (M. Fikáček);
MNHN Museum National d’Histoire Naturelle, Paris, France (Bedel collection) (A. Mantilleri).

Checklist of the Cuban species of *Berosus*

(asterisk indicates the species newly recorded for Cuba)

- Berosus chevrolati* Zaitzev, 1908
Berosus exiguus (Say, 1825)
**Berosus infuscatus* LeConte, 1855
**Berosus interstitialis* Knisch, 1924
=*Berosus stribulus* Orchymont, 1946, **syn. n.**
**Berosus metalliceps* Sharp, 1882
Berosus peregrinus (Herbst, 1797)
Berosus quadridens Chevrolat, 1863 **stat. restit.**
Berosus trilobus Chevrolat, 1863
Berosus undatus (Fabricius, 1792)

Systematics

Genus *Berosus* Leach, 1817

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

Diagnosis. Adults are mostly medium-sized, elongate, and strongly convex. Coloration of the body is brown to yellowish-brown, with or without dark spots on the pronotum and elytra. The head is strongly flexed down, eyes are protuberant, and antennae have 7 antennomeres. The elytral apex is entire or produced into one or two spines. The mesoventral process is usually laminar. The male protarsi are widened and have four tarsomeres; those of females have five tarsomeres. The middle and hind tibiae and tarsi bear a fringe of long natatory setae. Abdominal ventrite 5 has a rectangular (or less frequently semicircular) emargination posteriorly.

Among Cuban hydrophilid genera, *Berosus* may be easily identified by large globular eyes, scutellum longer than wide and middle and hind tibiae and tarsi with well developed fringe of long natatory setae.

Species treatments

Berosus chevrolati Zaitzev, 1908

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

Figures 1a–g, 11, 12a

Berosus aculeatus Chevrolat, 1863: 207 (primary homonym of *Berosus aculeatus* LeConte, 1855). – Gundlach 1891: 48 (diagnosis and distribution).

Berosus (s.str.) *chevrolati* Zaitzev, 1908: 358 (replacement name for *B. aculeatus* Chevrolat, 1863). – Van Tassell 1966: 169 (unpublished PhD thesis: redescription, identification key). – Spangler 1981: 155 (diagnosis and distribution). – Hansen 1999: 84 (catalogue). – Peck 2005: 48 (checklist). – Epler 2010: 12.24 (notes on distribution).

Type locality. Cuba.

Type material examined. Holotype: female (MNHN): “aculeatus / Ch. Cuba // this must be / Chevr. unique type of aculeatus / PJS [= P. J. Spangler] 1966”.

Additional material examined. CUBA: Santiago de Cuba: 3 exs. (dry-mounted) (NMPC): Dos Caminos, stream, 20°11'2.50"N, 75°46'17.7"W, 150 m a.s.l., 01.viii.2008, leg. A. Deler-Hernández., 1 ex. (dry-mounted) (BSC-E): El Vivero, 1.6 km E of Dos Caminos, 20°11'2.50"N, 75°46'17.7"W, 150 m a.s.l. Guaninicú river, 20–21.vi.2012, leg. Deler-Hernández & Fikáček; 1 ex. (in alcohol) (BSC-E): La Maya, Cuatro Caminos, remanso [backwater] 20°07'58"N, 75°34'01"W, 150 m a.s.l., 24.i.2008, leg. Y. S. Megna, 00019.

Published Cuban records: Pinar del Río: Quemado de Pineda (Spangler 1981).

Matanzas: Este de Matanzas [Eastern Matanzas], Río Caimar (Gundlach, 1891).

Camagüey: Río El Manantiales (Spangler 1981). **Sancti Spíritus:** Río Caburny (Spangler 1973); Arroyo Vega Grande (Spangler, 1973). **Santiago de Cuba:** Contramaestre, Pozo Caliente, Río Contramaestre (Spangler 1981); II Frente, Arroyo Jaraíuela (Spangler 1981); II Frente, Sabanilla, Río Mayarí (Spangler 1981); Río Ceiba (Spangler 1981); III Frente, Matías, Río Mogote (Spangler 1981). **Guantánamo:** La Tinta, Río Baracoa (Spangler 1981); Baracoa, Río Miel (Spangler 1973); Niceto Pérez, Arroyo de los Berros (Spangler 1981).

Diagnosis. Small, widely elongate species, body length 3.6–4.6 mm. Head dark, metallic; pronotum pale, with median unpaired narrow black longitudinal spot mesally, pronotal punctuation not darkened; elytra pale with irregular small dark spots in posterior half of elytral intervals. Elytral apices each without subapical tooth. Mesoventral process highly laminar, square-shaped, with large anterior and posterior teeth. Abdominal ventrite 1 with median keel throughout its length. Emargination of abdominal ventrite 5 rectangular with a median tooth. Median lobe of the aedeagus with short basal projection and rounded apex in lateral view.

Differential diagnosis. *Berosus chevrolati* resembles *B. trilobus* (with which it may even co-occur) by the small strongly punctate body, metallic head, presence of an unpaired dark spot on the pronotum, mesoventrite with hooded anterior tooth, median keel developed throughout abdominal ventrite 1, emargination of abdominal ventrite 5 rectangular with single median tooth and the median lobe of the aedeagus with long basal lobe projecting far posteriad and enlarged apical portion in lateral view. It differs from *B. trilobus* by the narrow central dark spot on the pronotum (dark spot is large and trilobate in *B. trilobus*), elytra more evenly convex (subapical area of each elytra forms a bump in *B. trilobus*), short basal projection of the median lobe (long in *B. trilobus*) and, rounded apex of the median lobe in lateral view (apex is beak-shaped in lateral view in *B. trilobus*).

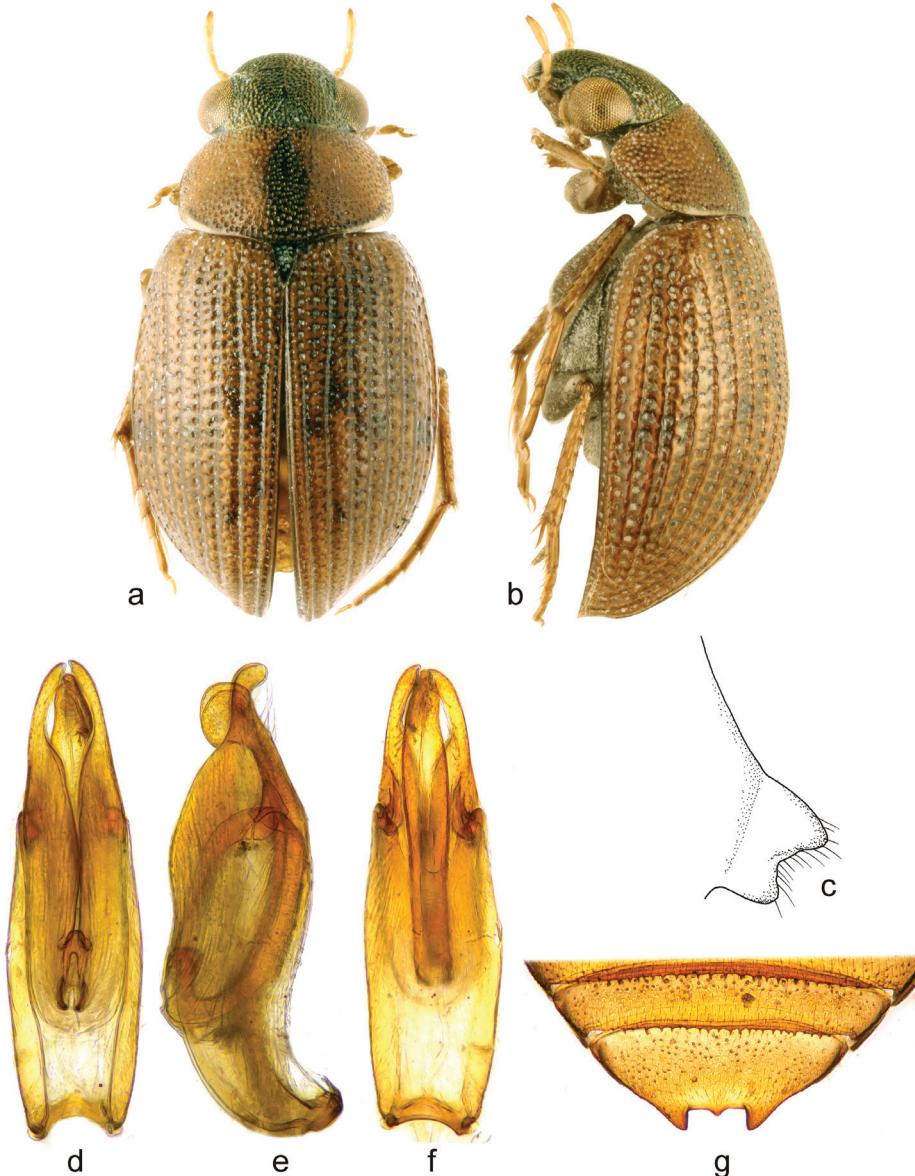


Figure 1. *Berosus chevrolati* Zaitzev, 1908. **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d-f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

Redescription. Habitus as in Figs 1a, b. Body length 3.4–4.6 mm. Body short and wide, moderately convex. Head black with metallic sheen, labrum black. Antennae testaceous. Maxillary palpi testaceous with palpomere 4 brown at apex. Pronotum testaceous with a central elongate metallic spot. Scutellum black with metallic sheen. Elytra testaceous with small brown spots without discrete borders. Pro-, meso- and metafemora testaceous, basal portion of metafemora sometimes slightly darker.

Head with moderately large and rounded punctures. Pronotum with punctures of the same size as on head. Scutellum with a few deeply impressed punctures slightly smaller than those on the pronotum. Elytral striae well-impressed. Interstriae with small and shallow punctures, irregular long setae on posterior half of elytra; spine-like setae absent. Elytral apices entire and rounded, of same shape in males and females. Mesoventral process highly raised, square-shaped, with hood-like anterior tooth, posterior tooth moderately large (Fig. 1c). Metaventral process wide, slightly raised, square-shaped, with large, deep glabrous rhomboid median depression; posterolateral angles raised and rounded, posteromesal projection carinate. Abdominal ventrite 1 with median carina throughout its length. Abdominal ventrite 5 with deep rectangular emargination, bearing a broad median tooth (Fig. 1g). Basal pubescence on basal 0.7 of meso- and of metafemora, the margin between pubescent and bare portions sinuate. Protarsus of male with adhesive soles on the first basal tarsomeres, first and second tarsomere distinctly thickened, third tarsomere very slightly thickened, fourth tarsomere elongate, almost as long as tarsomeres 1-3 combined. Claws moderately long, slender, arcuate.

Male genitalia (Figs 1d-f): Phallobase ca. 0.6× total length of aedeagus. Parameres in lateral view wide basally, apically projecting into rounded apex slightly bent ventrad, bearing a row of subapical setae ventrally. Median lobe C-shaped in lateral view; basal projection short, directing apicad; apex wide and rounded in lateral view.

Distribution. Currently only known from Cuba. Spangler (1981) recorded this species from several localities across the island, but all new material is from two sites in Santiago de Cuba province.

Habitat. We collected *B. chevrolati* along the margins of lowland streams and in isolated pools along these streams, in both cases having clear to turbid water and abundant organic matter (Fig. 11a). This species is found at low altitudes (ranging from sea level to ca. 160 m a.s.l.) situated in the Central Valley (Valle Central). *Berosus chevrolati* is frequently associated with *B. trilobus* in those habitats. Spangler (1981) also collected the species in standing waters.

Berosus exiguus (Say, 1825)

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

Figures 2a-g, 11

Hydrophilus exiguus Say, 1825: 189.

Berosus exiguus (Say). – Van Tassell 1966: 145 (unpublished PhD thesis: redescription, identification key, recorded from Cuba). – Testa and Lago 1994: 26 (diagnosis, bionomic and distribution notes, identification key). – Hansen 1999: 86 (catalogue). – Peck 2005: 48 (checklist). – Epler 2010: 12.19 (identification key, taxonomic notes). – Fernández et al. 2010: 28 (checklist).

For complete references and synonymy see Hansen (1999).

Type locality. USA: Virginia, Chincoteague Island.

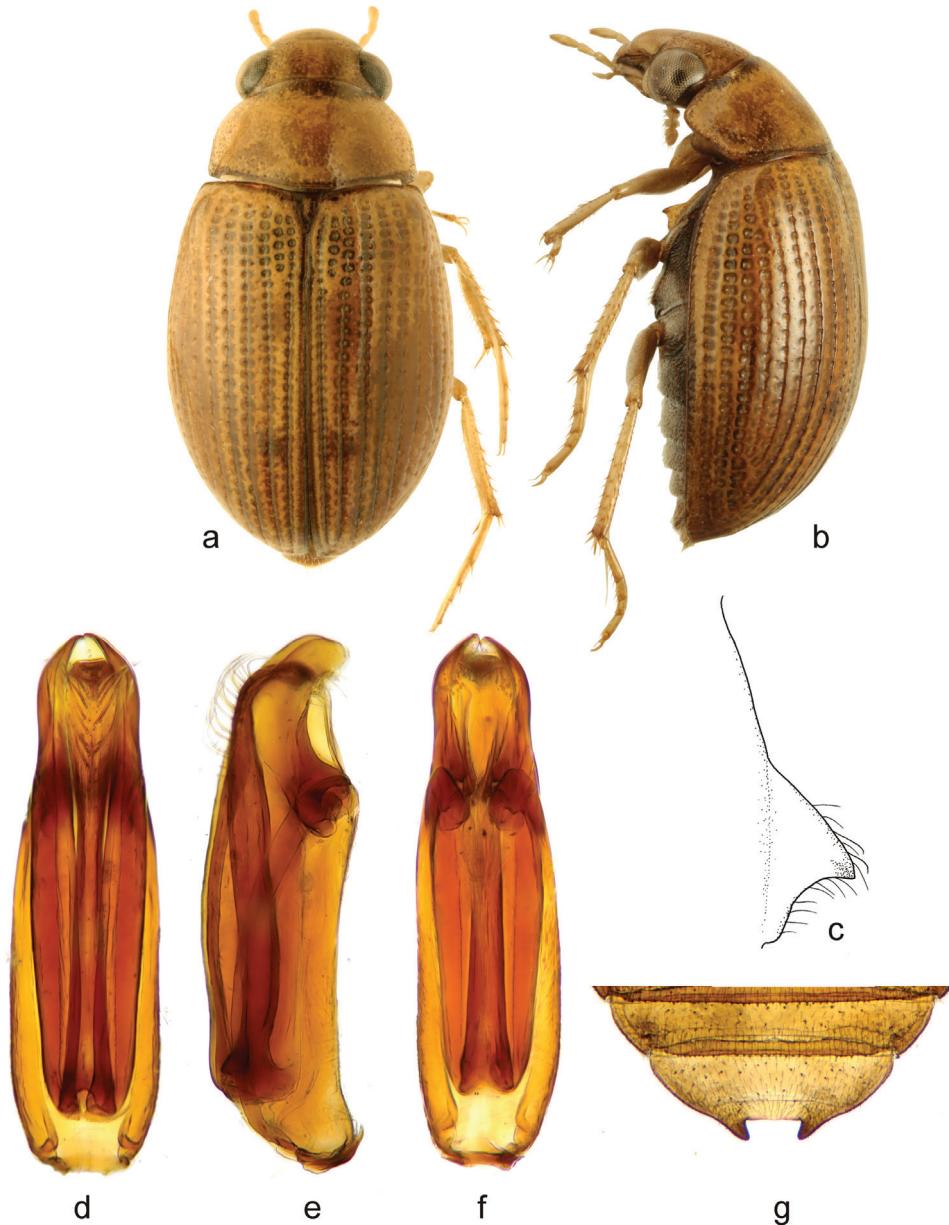


Figure 2. *Berosus exiguus* (Say, 1825). **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d–f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

Material examined. CUBA: Isla de la Juventud: 1 ex. (in alcohol) (BSC-E): Punta del Este, Laguna Cayamás, 21°33'43"N, 82°33'18"W, 3 m a.s.l., 23.v.2006, leg. Y. S. Megna, 00165. Camagüey: 2 exs. (in alcohol) (BSC-E): Nuevitas, Cayo Sabinal, Laguna permanente [permanent pool], 21°38'6.1"N, 77°10'8.2"W, 5 m a.s.l., 06.v.2010,

leg. O. Bello, 00153; 2 exs. (dry-mounted) (NMPC): Cayo Sabinal, permanent lagoon, 21°38'6.1"N, 77°10'8.2"W, 5 m a.s.l., 06.v.2010, leg. Y. Torres. **Santiago de Cuba:** 1 ex. (in alcohol) (BSC-E): San Miguel de Parada, Laguna temporal [temporal pool], 20°11'2.50"N, 75°46'17.7"W, 1 m a.s.l., 29.v.2009, leg. A. Deler-Hernández, 00136; 4 exs. (in alcohol) (BSC-E): San Miguel de Parada, Laguna temporal [temporal pool], 20°11'2.50"N, 75°46'17.7"W, 1 m a.s.l., 05.ix.2009, leg. A. Deler-Hernández, 00151; 2 exs. (dry-mounted) (NMPC): San Miguel de Parada, temporal lagoon, 20°11'2.50"N, 75°46'17.7"W, 1 m a.s.l., 05.ix.2009, leg. A. Deler-Hernández.

Published Cuban records: **Pinar del Rio:** unspecified locality (Van Tassell 1966: 149, Map 21).

Diagnosis. Habitus as in Figs 2a, b. Body length 3.0–3.7 mm. Head testaceous, pronotum testaceous without median darker spots, punctuation not darkened, elytra testaceous with irregularly arranged ill-defined slightly darker spots. Elytral apices entire and rounded in both sexes. Mesoventral process highly laminar, triangular in shape, anterior tooth large projecting posteriad (Fig. 2c). Abdominal ventrite 1 with median keel developed on basal half only. Emargination of abdominal ventrite 5 rectangular, without teeth (Fig. 2g) (in non-Cuban specimens, a very small medial tooth is present: Testa and Lago 1994). Aedeagus (Figs 2d–f) with median lobe only slightly shorter than parameres, with apex curved ventrad, bearing two series of long setae on dorsal surface.

Distribution. Eastern USA (from New York to Florida, westwards reaching to Illinois, Indiana, Mississippi and Oklahoma), Bahamas (Young 1953; Hansen 1999; Peck 2005) and Cuba. In Cuba, it is known from the central and eastern region.

Habitat. *Berosus exiguus* is mainly restricted to brackish waters in coastal regions. Cuban specimens have been collected in temporary brackish pools with clear water, abundant organic detritus on the bottom and associated aquatic riparian vegetation.

Berosus infuscatus LeConte, 1855

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

Figures 3a–g, 11

Berosus infuscatus LeConte, 1855: 365: – Van Tassell 1966: 248 (unpublished PhD thesis: redescription, identification key). – Testa and Lago 1994: 26 (diagnosis, bionomic and distribution notes, identification key). – Epler 2010: 12.21 (identification key, taxonomic notes).

For complete synonymy and references see Hansen (1999).

Type locality. USA: “middle and southern States, e.g. New Orleans”.

Material examined. CUBA: Isla de la Juventud: 1 ex. (in alcohol) (BSC-E): Punta del Este, Laguna temporal [temporal pool], 21°33'43"N, 82°33'18"W, 1 m a.s.l., 21.v.2006, leg. Y. S. Megna, 00160. **Pinar del Río:** 1 ex. (in alcohol) (BSC-E): Guanahacabibes, 21°54'26"N, 84°39'14"W, 3 m a.s.l., 20.iii.2003, leg. Y. S. Megna and

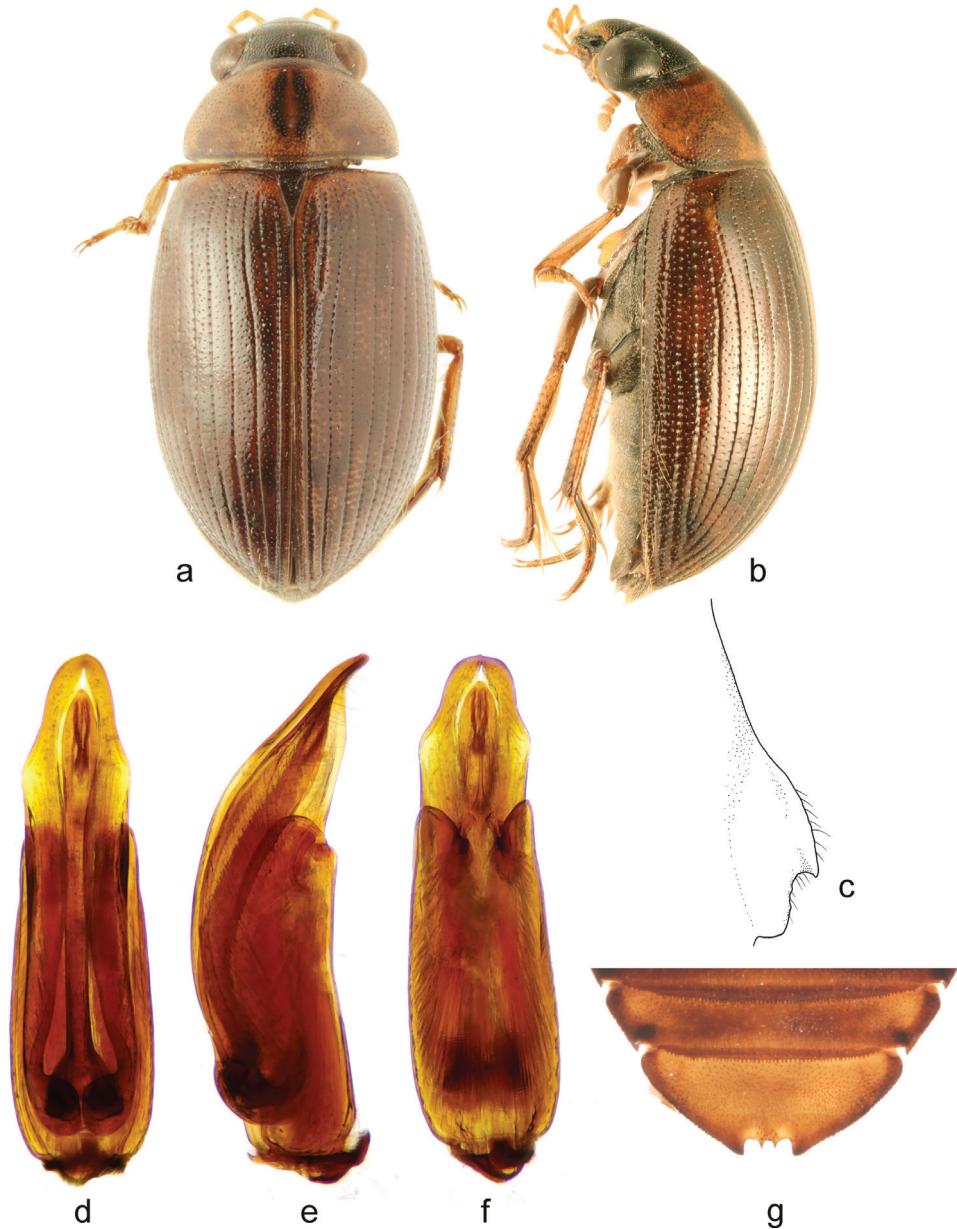


Figure 3. *Berosus infuscatus* LeConte, 1855. **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d–f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

O. Bello, 00176. **Camagüey:** 2 exs. (dry-mounted) (NMPC): Cayo Sabinal, lagoon, 21°38'6.1"N, 77°10'8.2"W, 5 m a.s.l., 06.v.2010, leg. Y. T. Cambas. **Las Tunas:** 1 ex. (in alcohol) (BSC-E): Palancón, 21°00'N, 76°54'W, 100 m a.s.l., 04.viii.2004, leg. Y. S. Megna, 00017. **Granma:** 1 ex. (in alcohol) (BSC-E): Cauto Cristo, Laguna

permanente-I [permanent pool-I], 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 04.i.2005, leg. L. Chávez, 00175. **Guantánamo:** 1 ex. (dry-mounted) (CZACC): [no locality and date] leg. C. T. Ramsdem.

Diagnosis. Habitus as in Figs 3a, b. Body length 5.5–6.0 mm. Head metallic black with paler anterior margin of clypeus; pronotum pale, with a pair of closely associated dark narrow longitudinal spots mesally, elytra brownish with indistinct irregularly arranged slightly darker spots. Head and pronotum with very distinct mesh-like microsculpture on interstices. Elytral apices entire and rounded in both sexes. Mesoventral process laminar, anterior tooth large, projecting posteriad (Fig. 3c). Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of abdominal ventrite 5 rectangular, with two sharp medial teeth (Fig. 3g). Aedeagus (Figs 3d–f) with median lobe slightly shorter than parameres, arched in lateral view. Parameres sinuate on lateral margin subapically.

Distribution. USA (Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Louisiana, Mississippi, Missouri, North Carolina, Texas, Wisconsin), Mexico (Young 1953; Hansen 1999) and Cuba. The above specimens represent the first record of *B. infuscatus* from Cuba and the West Indies.

Habitat. Cuban specimens of *B. infuscatus* have been collected among submerged aquatic vegetation in sun-exposed brackish permanent and temporary lagoons in coastal zones with turbid water and muddy/stony bottoms.

Berosus interstitialis Knisch, 1924

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

Figures 4a–g, 11

Berosus tessellatus Fletiaux and Sallé 1889: 337 (secondary homonym of *Enoplurus tessellatus* Motschulsky, 1859).

Berosus (s.str.) *interstitialis* Knisch, 1924: 270. – Van Tassell 1966: 191 (unpublished PhD thesis: redescription, identification key). – Epler 2010: 12.24 (taxonomic notes).

Berosus stribalus Orchymont, 1946: 13. **Syn. n.** – Spangler 1981: 156 (taxonomic and distribution notes). – Fernández et al. 2010: 28 (checklist).

Type locality. Guadeloupe, Grande Terre and Trois-Rivières.

Type material examined. *Berosus tessellatus*: Not examined. Type specimens were not found on our request for loan in MNHN. Instead, we examined the specimens identified as *B. tessellatus* and *B. interstitialis* deposited in coll. d'Orchymont and coll. Knisch in IRSNB (see below).

Berosus stribalus: Holotype: male (IRSNB): “[male sign] / Cuba 10. K / S. of Pinar Rio / Sep. 12-23 '13 // A. d'Orchymont det. / *Berosus* (s.str.) / *stribalus* m. // Type”. Paratype: 1 spec. (IRSNB): “St. / Domin- / go // *Berosus* / *striatus* / Say // coll. Orch. // A. d'Orchymont det. / *Berosus* (s.str.) / *stribalus* m. // Para- / type”.

Additional material examined. CUBA: Isla de la Juventud: 4 exs. (dry-mounted) (CZACC): vii.1960 [no locality and collector indicated]; 8 exs. (in alcohol) (BSC-E):

Punta del Este, laguna temporal [temporal pool], 21°33'43"N 82°33'18"W, 1 m a.s.l., 21.v.2006, leg. Y. S. Megna, 00180; 8 exs. (in alcohol) (BSC-E): Laguna Cayamás, 21°33'43"N, 82°33'18"W, 3 m a.s.l., 23.v.2006, leg. Y. S. Megna, 00178. **Pinar del Río:** 57 exs. (dry-mounted) (CZACC): Lomas de Soroa, v/vi.1963, [no collector indicated]; 1 ex. (in alcohol) (BSC-E): Viñales, arroyo [stream], 22°33'36.35"N, 83°49'59"W, 170 m a.s.l., 18.iv.2012, leg. A. Deler-Hernández, 00146. **Artemisa:** 8 exs. (dry-mounted) (CZACC): Laguna Ariguanabo, vi.1963, [no collector indicated]. **Mayabeque:** 1 ex. (dry-mounted) (CZACC): Jibacoa, littoral on north coast, v.1962, [no collector indicated]. **Matanzas:** 1 ex. (dry-mounted) (CZACC): Playa Larga, iv.1965, [no collector indicated]; 1 ex. (dry-mounted) (CZACC): Bacunayagua, vi.1940 [no collector indicated]. **Camagüey:** 1 ex. (in alcohol) (BSC-E): Sierra de Cubitas, Río El Roble, 21°32'53.23"N, 77°46'42.31"W, 55 m a.s.l., 14.iv.2012, leg. A. Deler-Hernández, 00148. **Las Tunas:** 1 ex. (in alcohol) (BSC-E): Amancio, Comunales, laguna permanente [permanent pool], 20°49'59"N, 77°32'32"W, 34 m a.s.l., 04.x.2008, leg. Y. S. Megna, 00179; 1 ex. (in alcohol) (BSC-E): La Fé, laguna temporal [temporal pool], 20°49'17.7"N, 77°34'40.8"W, 50 m a.s.l., 18.xii.2008, leg. Y. S. Megna, 00147. **Granma:** 2 exs. (in alcohol) (BSC-E): Cauto Cristo, laguna permanente [permanent pool], 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 04.i.2005, leg. L. Chávez, 00150; 1 ex. (dry-mounted) (NMPC): Cauto Cristo, permanent lagoon 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 04.i.2005, leg. L. Chávez. **Santiago de Cuba:** 1 ex. (in alcohol) (BSC-E): Guamá, La Mula, laguna permanente [permanent pool], 19°58'33.6"N, 76°46'4.8"W, 4 m a.s.l., 20.vi.2008, leg. A. Deler-Hernández, 00018. **Guantánamo:** 1 ex. (dry-mounted) (CZCTR): Guantánamo, San Carlos [at light], 20°26'22"N, 74°42'31"W, 160 m a.s.l., 18.vii.1915, leg. C. T. Ramsden; 1 ex. (dry-mounted) (CZCTR): San Carlos [at light], 20°26'22"N, 74°42'31"W, 160 m a.s.l., 24.viii.1917, leg. C. T. Ramsden; 1 ex. (in alcohol) (BSC-E): San Antonio del Sur, Macambo, Río Macambo, 20°03'26.9"N, 74°44'15"W, 4 m a.s.l., 24.x.2008, leg. A. Deler-Hernández; 1 ex. (in alcohol) (BSC-E): Baracoa, Nibujón, laguna temporal [temporal pool], 20°30'8.6"N, 74°38'88"W, 8 m a.s.l., 03.ii.2010, leg. A. Deler-Hernández, 00149. 1 ex. (dry-mounted) (IRSNB): [without precise locality]: "Cuba / Gundlach // 1541 / 977 // Kniž det. / interstitialis". **GUADELOUPE:** 1 ex. (dry-mounted) (IRSNB): "Guadeloupe / coll. A. d'Orchymont // Berosus s.str. / tessellatus / Fleut. & Salle // A. d'Orchymont det." [based on attached note, d'Orchymont compared this specimen with one of the types of *B. tessellatus* from the collection of Fleutiaux which is currently lost and not available for reexamination; the specimen is a male, but has the abdomen destroyed by a dermestid larva]; 1 ex. (dry-mounted) (IRSNB): Trois Rivières, leg. Dufau. **PUERTO RICO:** 1 ex. (dry-mounted) (IRSNB): [without detailed locality data], leg. Moritz. **VIRGIN ISLANDS:** 2 exs. (dry-mounted) (IRSNB): Saint Thomas, leg. C. Felsche.

Published Cuban records: **Pinar del Río:** Entronque de Manuel Sanguili (Spangler 1981). **Isla de la Juventud:** Laguna Base Julio Antonio Mella (Spangler 1981). **Holguín:** Gibara, Arroyo Landivar at Finca Pozón (Spangler 1981). **Santiago de Cuba:** Matías (Spangler 1981).

Diagnosis. Habitus as in Figs 4a, b. Body length 5.0–5.3 mm. Head uniformly dark, metallic green; pronotum pale with a pair of closely aggregated longitudinal nar-

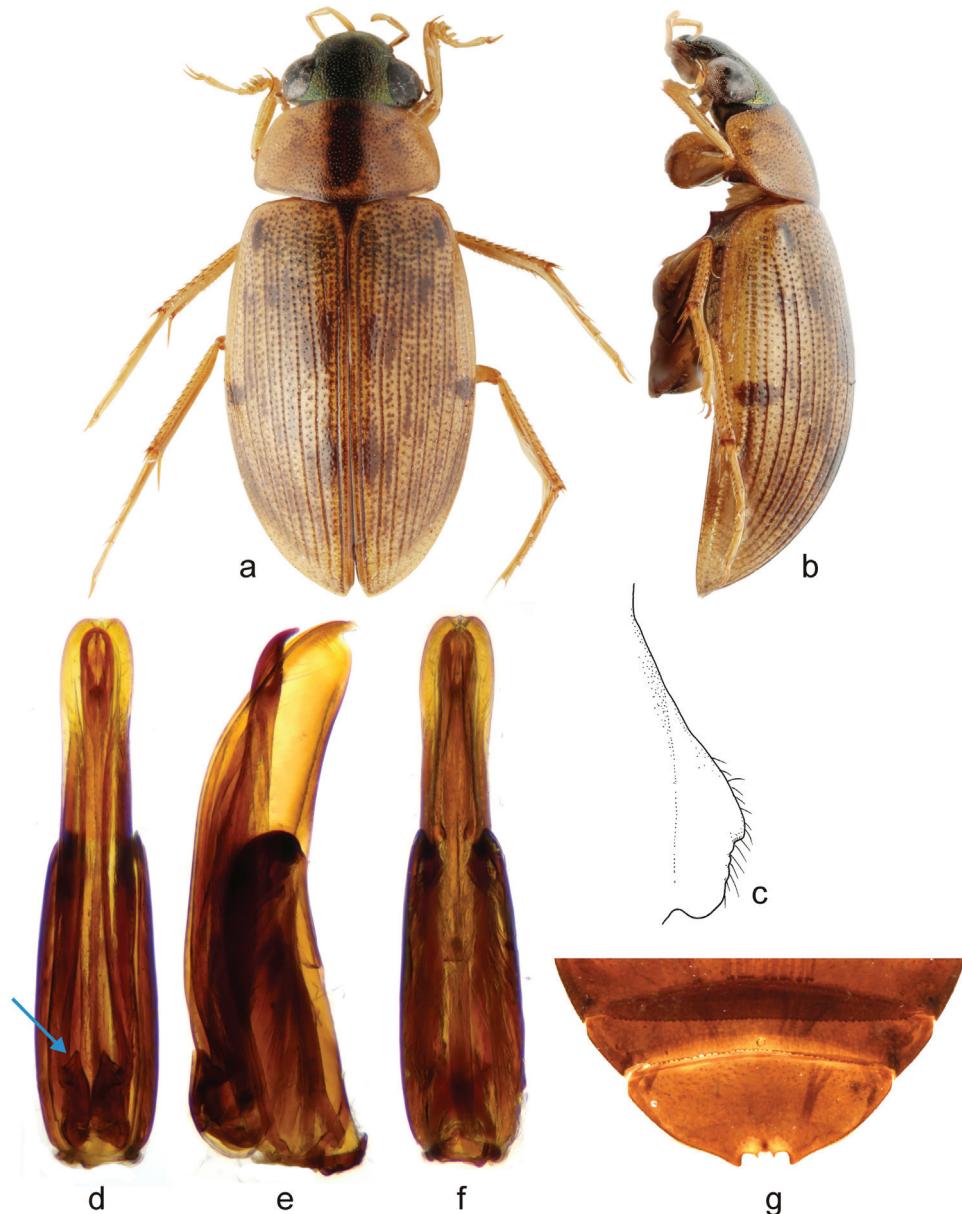


Figure 4. *Berosus interstitialis* Knisch, 1924. **a-b** habitus of the holotype of *B. stribalus* Orchymont, 1946 (**a** dorsal view **b** lateral view) **c** mesoventral process in lateral view **d-f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

row dark spots mesally; elytra pale with darkened punctuation and with dark spots in anterior and posterior third of intervals 1 and 2, in humeral area and at midlength of intervals 7-9, plus with variable number of spots on remaining intervals. Elytral apices entire in both sexes. Mesoventral process laminar, with small anterior tooth projecting

ventrad, nearly straight middle portion and rounded posterior part (Fig. 4c). Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of ventrite 5 deep, subrectangular, with two slender medial teeth (Fig. 4g), not showing sexual dimorphism. Aedeagus (Figs 4d–f) strongly compressed from sides; parameres ca. 2× as long as phallobase, wide throughout in lateral view except for tooth-like apex; bases of the parameres in dorsal view with characteristic basal teeth.

Taxonomic note. The synonymy of *Berosus stribalus* with *B. interstitialis* was first proposed in an unpublished thesis by Van Tassell (1966: 302). The reasons for the synonymy were not explained, and Cuba (i.e. type locality of *B. stribalus*) was not even mentioned in the distribution of *B. interstitialis* in the taxonomic part of the thesis. We were not able to examine the types of *B. tessellatus* from the collection of Fleutiaux in MNHN as the specimens were not found. We therefore examined the specimens identified as *B. tessellatus* and *B. interstitialis* deposited in IRSNB, including one male from Guadeloupe (type locality of *B. tessellatus*) bearing the note that it was compared with the types of *B. stribalus* by A. d'Orchymont. Comparison of these specimens with the types of *B. stribalus* and with newly collected Cuban specimens revealed that they all specimens agree in the diagnostic characters mentioned above, including the characteristic shape of the aedeagus and a characteristic tooth on the base of each paramere. We may therefore confirm the unpublished synonymy proposed by Van Tassell (1966) and consider *B. stribalus* as a junior subjective synonym of *B. interstitialis*.

Habitat. Cuban specimens were collected mainly in standing waters as well as in isolated pools along streams and rivers in the lowlands. The localities are usually exposed to sun and have turbid water, muddy bottom, submerged vegetation and are rich in organic matter.

Distribution. Widely distributed Caribbean species, so far recorded from the Bahamas, Haiti Guadeloupe, Virgin Islands Puerto Rico and Cuba (Van Tassell 1966, Orchymont 1946, Epler 2010, this paper). The species is here recorded for the first time from Cuba, due to the synonymy of *B. stribalus* with *B. interstitialis*.

Berosus metalliceps Sharp, 1882

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

Figures 5a–g, 11

Berosus metalliceps Sharp, 1882: 83. – Van Tassell 1966: 150 (unpublished PhD thesis: redescription, identification key). – Epler 2010: 12.24 (taxonomic and distribution notes).

For complete synonymy and references see Hansen (1999).

Type locality. México: Tres Marías Island.

Material examined. CUBA: Camagüey: 1 ex. (dry-mounted) (NMPC): Cayo Sabinal, permanent lagoon, 21°38'6.1"N, 77°10'8.2"W, 5 m a.s.l., 06.v.2010, leg. Y. Torres.



Figure 5. *Berosus metalliceps* Sharp, 1882. **a–b** habitus of the only known Cuban specimen (**a** dorsal view **b** lateral view) **c** mesoventral process in lateral view **d–f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

Diagnosis. Habitus as in Figs 5a, b. Body length 4.5 mm. Head metallic black, pronotum pale without dark spots, elytra pale with dark stripes on elytral series and slightly darker spot in posterior third of interval 1. Elytral apices entire and rounded.

Mesoventral process laminar, triangular in shape, anterior tooth projecting posteriad (Fig. 5c). Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of abdominal ventrite 5 rectangular, without tooth median (Fig. 5g). Aedeagus (Figs 5d–f) with median lobe much longer than parameres, with enlarged spatula-shaped apex in ventral view, sinuate on dorsal face in lateral view. Parameres simple, rounded apically, phallobase ca. 0.3× total length of aedeagus.

Distribution. USA (California), Mexico, Bahamas (Young 1953; Hansen 1999) and Cuba. The above specimen represents the first record of *B. metalliceps* from Cuba.

Habitat. The Cuban specimen was collected in the highly exposed brackish permanent lagoon with muddy bottom.

Berosus peregrinus (Herbst, 1797)

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

Figures 6a–g

Hydrophilus peregrinus Herbst, 1797: 314.

Berosus peregrinus (Herbst); LeConte (1855: 364, transferred to *Berosus*). – Van Tassell 1966: 163 (unpublished PhD thesis: redescription, identification key). – Smetana 1988: 50 (diagnosis, recorded from Cuba). – Hansen 1999: 91 (catalogue). – Peck 2005: 48 (checklist). – Epler 2010: 12.20 (identification key).

Type locality. “North America”.

Material examined. CUBA: no material examined. USA: Texas: 1 ex. (dry-mounted) (NMPC); 1 ex. (in alcohol) (BSC-E): Maverick Co., Rt. 277 at Tequesquite Creek, large creek [AS-03-011], 31.viii.2003, leg. A. E. Z. Short.

Published Cuban records: Cuba: without specified locality (Smetana 1988). Pinar del Río: without specified locality (Peck 2005).

Diagnosis. Habitus as in Figs 6a, b. Body length 4.1–5.2 mm. Head metallic black, pronotum pale with two small submedian dark spots anteriorly, elytra pale with rather sharply defined dark spots on intervals 1–2 and in humeral area. Elytral apices entire and rounded. Mesoventral process laminar, triangular in shape, anterior tooth large, projecting posteriad (Fig. 6c). Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of abdominal ventrite 5 rectangular with a single median broad and short tooth (Fig. 6g). Aedeagus (Figs 6d–f) with median lobe slender, pointed at apex, parameres shorter than median lobe, very wide in lateral view, narrowing into sharply pointed apex bearing tuft of setae apically. Phallobase long, ca. 0.6× total length of aedeagus.

Distribution. Canada (Nova Scotia, Ontario, Quebec), USA (from New York and Pennsylvania to Florida, Louisiana, Mississippi and Texas, westward at least to Arizona, Illinois, Indiana and Wisconsin) (Hansen 1999), and Cuba. In Cuba, *B. peregrinus* has been recorded only from Pinar del Río (without exact locality) by Peck (2005). We did not collect this species in our survey.

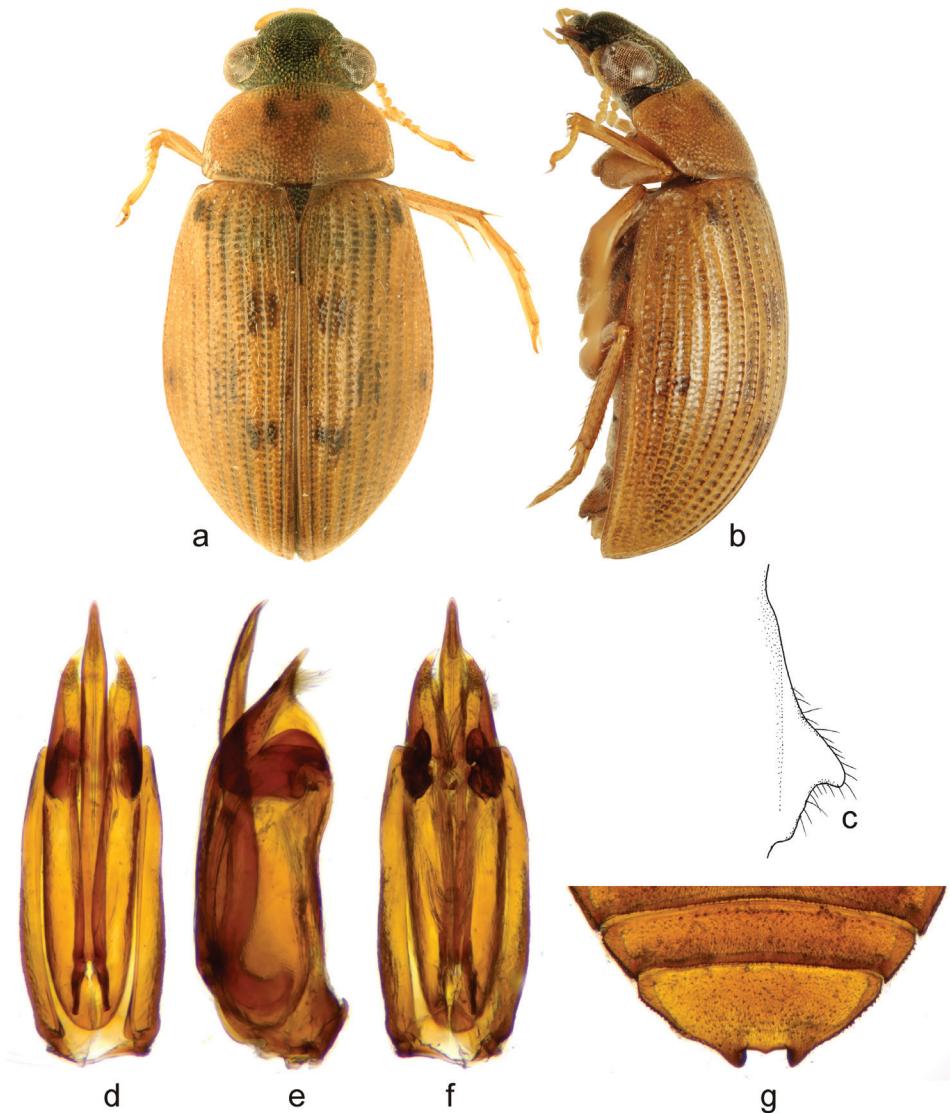


Figure 6. *Berosus peregrinus* (Herbst, 1797), specimen from USA, Texas. **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d-f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

***Berosus quadridens* Chevrolat, 1863, stat. restit.**

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

Figures 7a-g, 8e-h, 11

Berosus (Anchialus) quadridens Chevrolat, 1863: 206.

Berosus quadridens: – Gundlach 1891: 47 (diagnosis and distribution). – Zaitzev 1908: 357. – Mouchamps 1963: 121 (synonymized with *B. truncatipennis* Castelnau

1840). – Van Tassell 1966: 56 (unpublished PhD thesis: redescription, identification key). – Spangler 1981: 156 (diagnosis and distribution). – Hansen 1999: 82 (as synonym of *B. truncatipennis*). – Peck 2005: 48 (checklist). – Deler-Hernández and Cala-Riquelme 2010: 73 (diagnosis, distribution, identification key).

Type locality. Cuba.

Type material. Not examined.

Additional material examined CUBA: **Pinar del Río:** 1 ex. (dry-mounted) (IRSNB): S of Pinar del Rio, 12/23.ix.1913. **Isla de la Juventud:** 7 exs. (in alcohol) (BSC-E): Punta del Este, Laguna temporal [temporal pool], 21°33'43"N, 82°33'18"W, 1 m a.s.l., 21.v.2006, leg. Y. S. Megna, 00142. **Granma:** 3 exs. (in alcohol) (BSC-E): Cauto Cristo, Laguna permanente-I [permanent pool-I], 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 04.i.2005, leg. L. Chávez, 00087; 1 ex. (in alcohol) (BSC-E): Cauto Cristo, Laguna permanente-I [permanent pool-I], 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 13.vi.2004, leg. L. Chávez, 00174. **Santiago de Cuba:** 1 ex. (in alcohol) (BSC-E): Palma Soriano, Monte Barranca, 20°20'13.5"N, 76°1'11.6"W, 203 m a.s.l., 05.xii.2007, leg. A. Deler-Hernández and B. Téllez, 00052. **MEXICO:** **Sinaloa:** 1 ex. (dry-mounted) (IRSNB): Los Mochis Station, x.1921 leg. R. V. van Zwaluwenburg. **Veracruz:** 2 exs. (dry-mounted) (IRSNB): without more detailed locality, leg. Höge. **GUATEMALA:** 4 exs. (dry-mounted) (IRSNB): Paso Antonio, 400 ft., leg. Champion. **NICARAGUA:** **Chinandega:** 1 ex. (dry-mounted) (IRSNB): Posoltega, 06.v.1984, UV light, leg. Algodon. **COSTA RICA:** **Guanacaste:** 10 exs. (dry-mounted) (KSEM, NMPC): 11.5 km W of Cañas, 15 m a.s.l., HG light by ditch/field [AS-04-026], leg. A. E. Z. Short & D. J. Lebbin; 1 ex. (dry-mounted) (NMPC): Highway 1, 13.1 km SW of Liberia, roadside ditch/pools, 16.vi.2003, leg. A. E. Z. Short.

Published Cuban records: **Cuba:** **Isla de la Juventud:** Laguna Base Julio Antonio Mella (Spangler 1981). **Matanzas:** Cárdenas (Gundlach 1891). **Holguín:** Gibara, Arroyo Landivar at Finca Pozón (Spangler 1981).

Diagnosis. Large elongate species, body length 6.2–6.7 mm. Head testaceous with darker central part of clypeus and frons; pronotum pale, with a pair of vaguely defined narrow black longitudinal spots mesally, pronotal punctation darkened; elytra pale with dark elytral striae, interval punctation and variable number of larger dark spots on elytral intervals. Elytral apices each with a large subapical tooth, sutural angle sexually dimorphic, rounded in males, sharply pointed in females. Mesoventral process highly laminar, subtriangular in shape, anterior tooth weakly developed. Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of abdominal ventrite 5 deeply and narrowly excised in males, shallowly semicircular in females. Aedeagus large, with joint parameres pointed apically, with subbasal tuft of setae on dorsal surface, ventral membranous lobes minute, median lobe slender and long.

Differential diagnosis. *Berosus quadridens* is easily distinguishable from *B. truncatipennis* by the relatively larger and more sclerotized aedeagus having stouter and relatively longer phallobase, by ventral face of parameres bearing subbasal tuft of setae

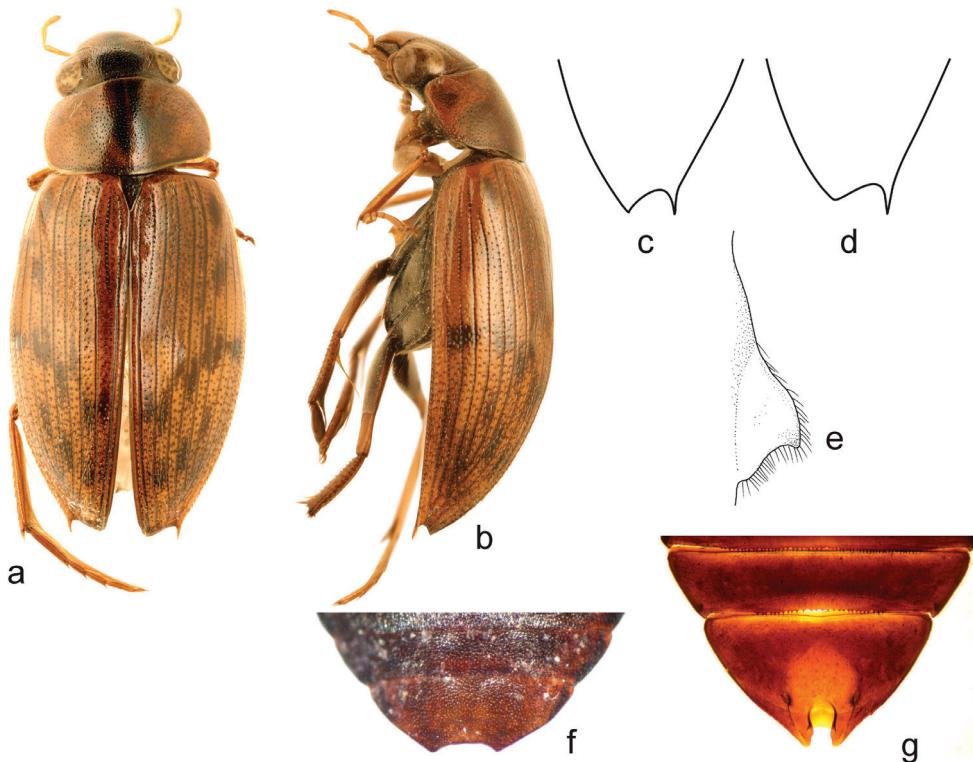


Figure 7. *Berosus quadridens* Chevrolat, 1863. **a** habitus in dorsal view **b** habitus in lateral view **c** apex of female elytron **d** apex of male elytron **e** mesoventral process in lateral view **f-g** abdominal ventrite 5 (**f** female **g** male).

(Fig. 8g) (whereas bearing a series of setae (Fig. 8c) in *B. truncatipennis*), by relatively longer and narrower median lobe and minute membranous dorsal projections of the parameres (Figs 8e, f, h) (in contrast to moderately large ones present (Figs 8a, b, d) in *B. truncatipennis*). The aedeagus of *B. quadridens* may resemble that of *B. megaphallus* by its large size and presence of subbasal tuft of setae on ventral face of the paramere, but both species distinctly differ by the size and proportions of the phallobase (ca. half as long as the whole aedeagus and very robust in *B. megaphallus*; ca. third as long as the whole aedeagus and less robust in *B. quadridens*) and by the proportions of the ventral membranous lobe of the paramere (minute in *B. quadridens*, nearly as long as paramere in *B. megaphallus*). In general, the aedeagus of *B. quadridens* looks like an enlarged aedeagus of *B. truncatipennis* on the first view, whereas that of *B. megaphallus* clearly differs from both *B. truncatipennis* and *B. quadridens* by the general proportions of its parts. We failed to find any reliable external differences between *B. truncatipennis* and *B. quadridens*; Van Tassell (1966) indicates the differences in the shape of the apical portion of elytra – these were found rather constant in shape in examined specimens of *B. quadridens*, but seem to be very variable in examined specimens of *B. truncatipennis*.

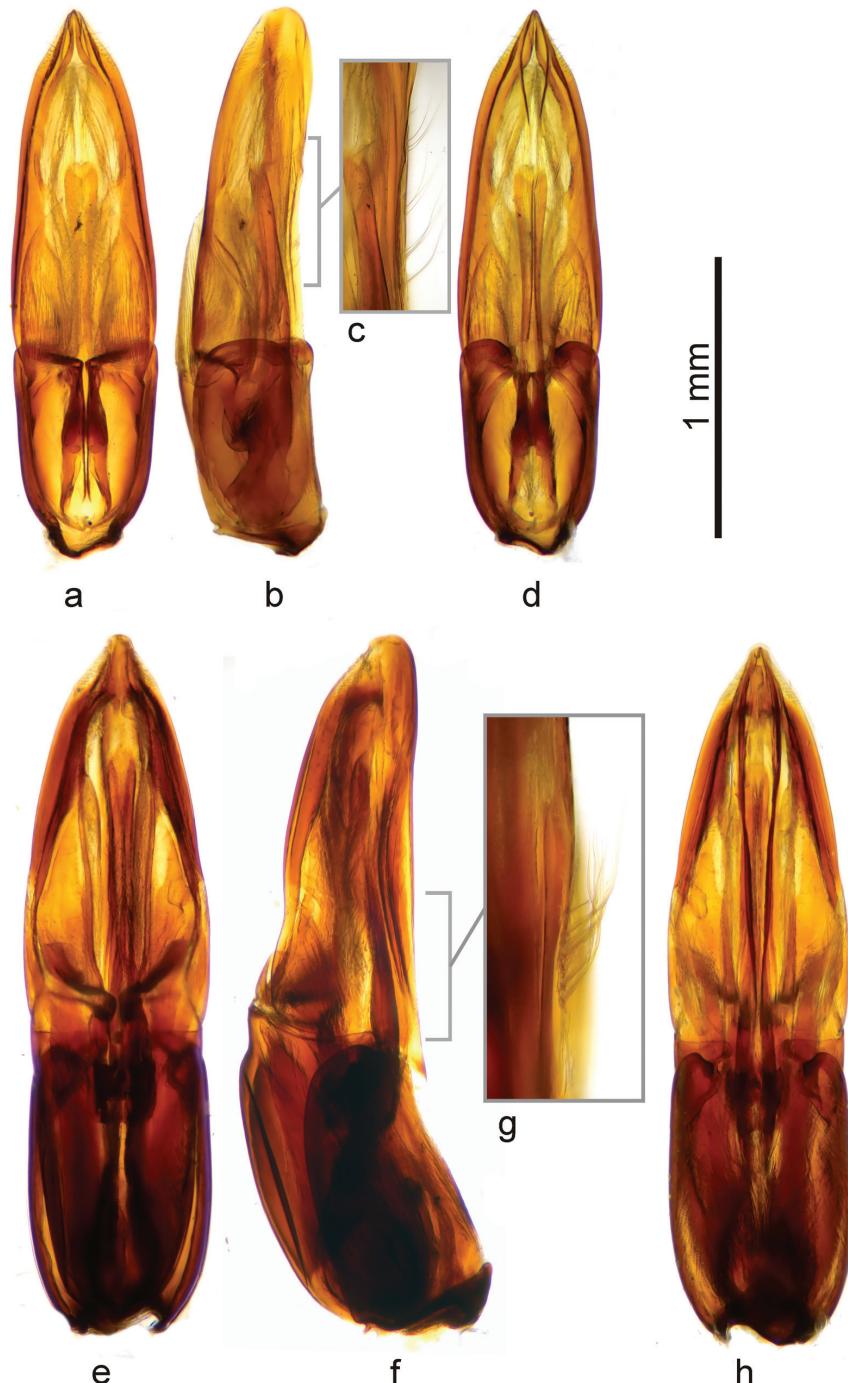


Figure 8. Comparison of the aedeagus of *Berosus truncatipennis* Castelnau, 1840 (a–d) and *B. quadridens* Chevrolat, 1863 (e–h). **a, e** dorsal view **b, f** lateral view **c, g** detail of setae of parameres **d, h** ventral view. Both aedeagi shown to scale.

and the character seems to be therefore unreliable for distinguishing both species at the moment. Based on the differences mentioned above, we confirm that *B. quadridens* is a valid species, distinct from *B. truncatipennis*.

Redescription. Habitus as in Figs 7a, b. Body length 6.2–6.7 mm. Head, labrum and antennae testaceous. Maxillary palpi testaceous with palpomere 4 dark at apex. Pronotum testaceous with two metallic black central spots developed throughout pronotum. Scutellum testaceous. Elytra testaceous with oblique series of dark brown spots in posterior half and laterally, interval punctuation and elytra striae darkened. Pro- and mesofemora testaceous; metafemora with pubescent portion brown, glabrous portion testaceous.

Head and pronotum with punctures moderately fine and rounded. Elytral striae narrow well impressed. Interstriae fine and flat, bearing spine-like setae on posterior half of elytra. Scutellum with few impressed punctures. Elytral apices bidentate, each bearing a projection on sutural angle and subapically; shape sexually dimorphic, with sutural angle rounded in males (Fig. 7d), sharply pointed in females (Figs 7c). Mesoventral process highly laminar, triangular in shape, anterior tooth barely visible, followed by a convex and smooth ridge (Fig. 7e). Metaventral process raised, triangular in shape, with elongate and deep glabrous median depression; posterolateral angles produced into triangular laminae, posterior projection pointed. Abdominal ventrite 1 with median carina only between metacoxae and with large, deep, rounded lateral depressions. Abdominal ventrite 5 with a deep rounded emargination without tooth in males (Fig. 7g), in females with semicircular apical notch (Fig. 7f). Basal pubescence of meso- and metafemora covering basal two thirds of femoral length, borderline between pubescent and glabrous portion sinuate on mesofemur, straight on metafemur. Protarsus of male with adhesive soles on the two basal tarsomeres, protarsomeres 1–2 thickened, tarsomere 1 longer than tarsomere 2, tarsomere 3 elongate; tarsomere 4 elongate, as long as tarsomeres 1–3 combined. Claws long, slender and curved.

Male genitalia (Figs 8e–h): Phallobase robust, ca. 0.4× as long as whole aedeagus, slightly widening basad in lateral view. Parameres joint mesally, together forming a dish-like structure surrounding median lobe; apical portion rounded in lateral view, pointed in ventral view; ventral portion of each paramere with minute membranous lobe; dorsal face of each paramere with a tuft of setae situated subbasally. Median lobe stick-shaped, reaching to apical 0.75 of parameres.

Taxonomic comments. Described from Cuba, *Berosus quadridens* was considered endemic to the island, whereas the continental form was supposed to represent the widely distributed South American species *B. truncatipennis* (e.g., Zaitzev 1908, Knisch 1924). Based on two females from Cuba (one of which we reexamined in this study), Mouchamps (1963) synonymized *B. quadridens* with *B. truncatipennis*. This was questioned by Van Tassell (1966) who followed the unpublished opinion of J. Balfour-Browne and considered *B. quadridens* as a species separate from *B. truncatipennis* occurring not only in Cuba, but also in Central America. The thesis by Van Tassell (1966), and therefore the revalidation of *B. quadridens*, remained unpublished.

and was only adopted without any explanatory comments in the catalogue of Cuban beetles by Peck (2005). Hansen (1999) considered *B. quadridens* as a dubious synonym of *B. truncatipennis* pending revision (Hansen 1999). Oliva (1989) considered the size and proportions of the genitalia of *B. truncatipennis* as geographically variable, being larger and wider in subtropical areas. Recently, Oliva & Short (2012) described the specimens with the large aedeagus from Venezuela and Guyana as a separate species *B. megaphallus* Oliva & Short, 2012, but the identity of the Central American and Caribbean specimens remained unsolved.

We were not able to examine the unique type of *B. quadridens* from “Cuba”, as it was not found in MNHN after our loan request in 2012. A single species of Cuban *Berosus* matching the original description by Chevrolat (1863) was found in Cuba in our survey; no closely related or similar species was recorded from Cuba. We therefore do not have doubts that the Cuban specimens examined correspond to Chevrolat’s (1863) understanding of *B. quadridens*. Moreover, Van Tassell (1966) mentioned that J. Balfour-Browne has examined the type of *B. quadridens* and found it to be conspecific with Central American specimens identified previously as *B. truncatipennis*. This corresponds with our findings, as we found that all examined Central American specimens of “*B. truncatipennis*” are conspecific with the Cuban ones, and clearly differ from the South American species (see Diagnosis above for diagnostic characters).

By confirming the separate species status of *B. quadridens*, the originally widely understood *B. truncatipennis* is shown to consist of three species: the widely distributed South American *B. truncatipennis*, *B. quadridens* confined to the Caribbean and Central America, and *B. megaphallus* known so far from Venezuela and Guyana. In the material from IRSNB we examined for this study, we have found few specimens from Bolivia (Río Beni) and southern Peru (Ica) which male genitalia are extremely similar to those of *B. quadridens* by their large size, strong sclerotization and relatively longer phallobase; however, they seem to differ from *B. quadridens* by the presence of the series of setae on the paramere (as in *B. truncatipennis*) and the dorsal membranous lobe of the paramere being ca. as long as in *B. megaphallus* (examined only in the Bolivian specimen, indistinct in dissected Peruan ones). We suppose that these specimens may represent yet another undescribed species of the formerly broadly understood *B. truncatipennis*.

Habitat. The Cuban specimens examined in the present work were collected in highly exposed freshwater pools with turbid water, muddy bottom and without cover vegetation. Gundlach (1891) also reports this species from permanent ponds in the Matanzas Province.

Distribution. Based on the specimens examined for this study, we may confirm the occurrence of *B. quadridens* for Mexico, Guatemala, Nicaragua, Costa Rica and Cuba. Van Tassell (1966) also maps one record from Panama, but does not cite label data. In Cuba, the species is known from the western (including Isla de la Juventud special municipality) and eastern regions.

***Berosus trilobus* Chevrolat, 1863**

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

Figures 9a–g, 11, 12a–b

Berosus trilobus Chevrolat, 1863: 207. – Gundlach 1891: 47 (diagnosis and distribution). – Spangler 1973: 354 (distribution). – Spangler 1981: 155 (diagnosis and distribution). – Hansen 1999: 95 (catalogue). – Peck 2005: 48 (checklist). – Epler 2010: 12.24 (notes on distribution).

Type locality. Cuba.

Type material examined. Holotype: female (MNHN): “*Berosus / trifidus / Chv. Cuba / ... [illegible] // von / G. Hemiosus / Sharp [= of the genus Hemiosus Sharp] // this must be / Chev. unique / type of trilobus / 1966 / PJS [= P. J. Spangler]”.*

Additional material examined. CUBA: **Sancti Spíritus:** 50 exs. (in alcohol) (BSC-E): Topes de Collantes, El Nueve, Río Caburny, 21°55'50"N, 80°00'59"W, 539 m a.s.l., 29.vi.2010, leg. A. Deler-Hernández. **Camagüey:** 19 exs. (in alcohol) (BSC-E): Sierra de Cubitas, Río El Roble, 21°32'53.23"N, 77°46'42.31"W, 55 m a.s.l., 14.iv.2012, leg. A. Deler-Hernández, 00144. **Holguín:** 6 exs. (in alcohol) (BSC-E): Jardín Botánico, Arroyo [stream], 20°51'46.8"N, 76°13'22,8"W, 84 m a.s.l., 07.xii.2008, leg. A. Deler-Hernández, 00074. **Granma:** 7 exs. (in alcohol) (BSC-E): Parque Nacional Turquino, La Platica, 20°00'33.80"N, 76°53'38.47"W, 800 m a.s.l., 29.iii.2012, leg. A. Deler-Hernández, 00143; 12 exs. (dry-mounted) (NMPC): Turquino NP, around La Platica, 20°0.7'N, 76°53.4'W, 880 m a.s.l. [MF24], 25–26. vi.2012 leg. A. Deler-Hernández and M. Fikáček. **Santiago de Cuba:** 6 exs. (in alcohol) (BSC-E): Campo Rico-II, Río Indio, 19°59'54.5"N, 75°32'4.6"W, 150 m a.s.l., 15.ix.2003, leg. A. Deler-Hernández and F. Cala-Riquelme, 00046; 4 exs. (in alcohol) (BSC-E): Gran Piedra, El Olimpo, Arroyo [stream], 20°00'33"N, 75°40'13"W, 820 m a.s.l., 04.viii.2005, leg. A. Deler-Hernández, 00016; 1 ex. (in alcohol) (BSC-E): II Palmas, La Cubana, Laguna temporal-II [temporal pool-II], 20°3'15.48"N, 76°8'3.12"W, 320 m a.s.l., 02.xii.2005, leg. Y. S. Megna, 00086; 30 exs. (in alcohol) (BSC-E): Palma Soriano, Arroyo [stream], 20°06'05"N, 75°58'44"W, 130 m a.s.l., 16.ii.2005, leg. K. Blanco, 00047; 5 exs. (in alcohol) (BSC-E): Guamá, La Mula, Río Turquino, 19°56'57"N, 76°45'36"W, 8 m a.s.l., 21.vi.2005, leg. Y. S. Megna, 00085; 6 exs. (in alcohol) (BSC-E): Guamá, Los Morones, Río Turquino, 19°58'33.6"N, 76°46'4.8"W, 200 m a.s.l., 18.vi.2008, leg. A. Deler-Hernández, 00006; 2 exs. (in alcohol) (BSC-E): San Luis, Dos Caminos, El Vivero, Laguna permanente [permanent pool], 20°11'2.50"N, 75°46'17.7"W, 150 m a.s.l., 01.viii.2008, leg. A. Deler-Hernández, 00028; 3 exs. (in alcohol) (BSC-E): San Luis, Dos Caminos, El Vivero, Río Guaninicú, 20°11'2.50"N, 75°46'17.7"W, 150 m a.s.l., 01.viii.2008, leg. A. Deler-Hernández, 00029; 31 exs. (dry-mounted) (NMPC): El Vivero, 1.6 km E of Dos Caminos, 20°10.8'N, 75°46.4'W, ca. 150 m a.s.l. [MF18], 20–21.vi.2012, leg. A. Deler-Hernández and M. Fikáček; 5 exs. (in alcohol) (BSC-E): Loma del Gato,

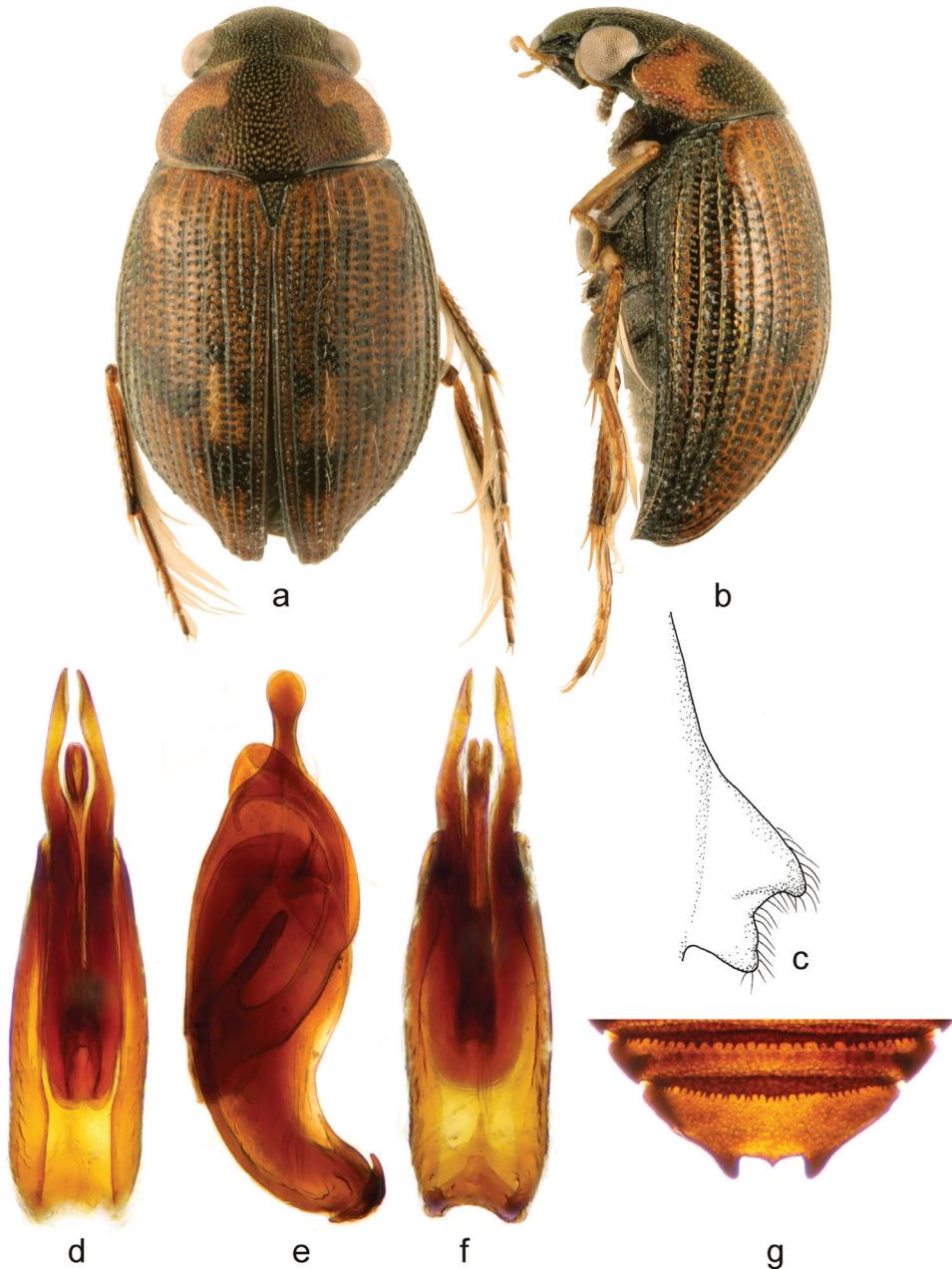


Figure 9. *Berosus trilobus* Chevrolat, 1863. **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d-f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** abdominal ventrite 5.

Chan-Chan, Arroyo [stream], 19°58'27.4"N, 75°53'22.2"W, 353 m a.s.l., 27.vi.2009, leg. A. Deler-Hernández, 00118; 3 exs. (in alcohol) (BSC-E): La Redonda, Río Sevilla, 20°00'54.3"N, 75°45'45.6"W, 15 m a.s.l., 17.v.2009, leg. A. Deler-Hernández,

00154. **Guantánamo:** 36 exs. (in alcohol) (BSC-E) Imías, Yacabo Abajo, Río Yacabo Abajo, 20°06'05"N, 74°69'00"W, 5 m a.s.l., 24.x.2008, leg. A. Deler-Hernández and S. Muñiz, 00091; 20 exs. (in alcohol) (BSC-E): San Antonio del Sur, Macambo, Río Macambo, 20°03'26.9"N, 74°44'15.82"W, 4 m a.s.l., 25.x.2008, leg. A. Deler-Hernández and S. Muñiz, 00055; 16 exs. (in alcohol) (BSC-E): Baracoa-Maisí, Río Yumurí, 20°17'47.76"N, 74°17'39.5"W, 5 m a.s.l., 27.i.2010, leg. A. Deler-Hernández and R. Correa, 00152; 96 exs. (in alcohol) (BSC-E): Baracoa, Yunque, Río Duaba, 20°19'54.40"N, 74°34'9.08"W, 70 m a.s.l., 31.i.2010, leg. A. Deler-Hernández, 00171; 27 exs. (dry-mounted) (NMPC): El Yunque, 2.5-3.3 km SW of campismo popular, 20°19.4'N, 74°34.2'W, ca. 80-100 m a.s.l., 10.vi.2012 [MF02], leg. A. Deler-Hernández and M. Fikáček; 61 exs. (dry-mounted) (NMPC, KSEM): El Yunque, "La Cascada", ca. 2.1 km SW of campismo, 20°19.9'N, 74°34'W, ca. 60 m a.s.l. [MF07], 12-13.vi.2012, leg. F. Cala-Riquelme, A. Deler-Hernández and M. Fikáček; 2 exs. (dry-mounted) (NMPC): El Yunque, 3.2 km SW of campismo, right tributary of Duaba river, 20°19'N, 74°34'W, ca. 150 m a.s.l. [MF09], 13.vi.2012; leg. A. Deler-Hernández and M. Fikáček; 14 exs. (dry-mounted) (NMPC): El Yunque, in/around campismo popular, 20°20.4'N, 74°32.9'W, ca. 40 m a.s.l. [MF05], 10-13.vi.2012, leg. M. Fikáček; 20 exs. (dry-mounted) (NMPC): PN Alejandro de Humboldt, ca. 1.7 km NW of Santa María, 20°32'N, 74°43'W, ca. 50 m a.s.l. [MF13], 16.vi.2012, leg. A. Deler-Hernández and M. Fikáček; 18 exs. (in alcohol) (BSC-E): Baracoa, Jamal, 20°17'13.9"N, 74°25'33.6"W, 40 m a.s.l., 09.ii.2010, leg. R. Correa, 00169; 1 ex. (in alcohol) (BSC-E): Baracoa, Cabacú, Laguna permanente [permanent pool], 20°19'14"N, 74°28'58"W, 10 m a.s.l., 04.iii.2010, leg. R. Correa, 00170; 6 exs. (in alcohol) (BSC-E) 6 exs. (dry-mounted) (NMPC): Baracoa, Cabacú, Laguna permanente [permanent pool], 20°19'14"N, 74°28'58"W, 10 m a.s.l., 16.iii.2010, leg. R. Correa, 00164; 1 ex. (in alcohol) (BSC-E): La Marsella, Río Guaso, 20°26'22"N, 74°42'31"W, 60 m a.s.l., 26.i.2004, leg. Y. S. Megna, 00173; 3 exs. (in alcohol) (BSC-E): Baracoa, Loma de los Guineos, Arroyo [stream], 20°19'38.38"N, 74°35'35.37"W, 530 m a.s.l., 07.iv.2012; leg. A. Deler-Hernández, 00177. **Without precise locality:** 2 exs. (dry-mounted) (NMPC): "O. Koechin / Cuba // Collectio / Dr. Jureček / H. Jurečková"; 1 ex. (dry-mounted) (MNHN): "1542 / 1798". **DOMINICAN REPUBLIC:** 25 exs. (dry-mounted) (KSEM, NMPC): near Hato Mayor, creek off Ruta 103, 02.xi.2000, leg. A. E. Z. Short.

Published Cuban records: Cuba: without specified locality (Gundlach, 1891).

Pinar del Río: Quemado de Pineda (Spangler 1981). **Sancti Spíritus:** Río Caburny near Topes de Collantes (Spangler 1973); Arroyo Vegas Grande near Topes de Collantes (Spangler 1973). **Camagüey:** Río El Manantiales (Spangler 1981). **Holguín:** Arroyo Jarahueca (Spangler 1981). **Santiago de Cuba:** II Frente, Sabanilla, Arroyo La Poa (Spangler 1981); II Frente, Arroyo Jarahueca (Spangler 1981); Contramaestre, Pozo Caliente, Río Contramaestre (Spangler 1981); II Frente, Sabanilla, Río Mayarí (Spangler 1981); II Frente, Río Ceiba affl. Río Mayarí (Spangler 1981); III Frente, Río Brazo Seco (Spangler 1981); III Frente, Matías, Río Mogote (Spangler 1981). **Guantánamo:** Maisí, La Tinta, Río Baracoa (Spangler 1973, 1981); Niceto Pérez, Sierra de

Canasta, Arroyo de los Berros (Spangler 1981); Río Miel at Baracoa (Spangler 1973); Baracoa, Yumurí, Río Yumurí (Spangler 1981).

Diagnosis. Small widely elongate species, body length 3.2–3.7 mm. Head dark, metallic; pronotum pale laterally, with large trilobite central dark spot, pronotal punctation not darkened laterally; elytra pale with dark intervals 8–10 and large transverse dark spots on posterior half of elytral intervals 1–7. Elytral apices without subapical tooth, bumpy along suture subapically. Mesoventral process highly laminar, rectangular with large anterior and posterior teeth. Abdominal ventrite 1 with median keel throughout its length. Emargination of abdominal ventrite 5 rectangular with a median tooth. Median lobe of the aedeagus with long basal projection and beak-like apex in lateral view.

Differential diagnosis. For diagnostic characters and difference from *B. chevrolati*, see the latter species.

Redescription. Habitus as in Figs 9a, b. Body length 3.2–3.7 mm. Body short and wide, moderately convex in lateral view. Labrum black, dorsum of head melanic with strong metallic luster. Antennae testaceous. Maxillary palpi testaceous with palpomere 4 dark at apex. Pronotum testaceous with unpaired metallic black spot, the spot expanding laterad posteriorly, and hence trilobite in general shape. Elytra testaceous with small ill-defined dark brown spots on disc and, a broad metallic dark area throughout lateral portion. Pro-, meso- and metafemora with pubescent portion dark brown, glabrous portion testaceous.

Head with moderately large and rounded punctures. Pronotum with punctures slightly larger than on head. Scutellum with few impressed punctures. Elytral striae distinctly impressed; intervals flat and wide, irregular long setae on elytra; spine-like setae absent. Elytral apices entire and rounded in both sexes; highly bumpy along suture, depressed laterally on sides. Mesoventral process raised, rectangular in shape, with hood-like anterior tooth, posterior tooth large (Fig. 9c). Metaventral process widely rectangular, with large and deep elongate glabrous median depression; posterolateral portions bulge-like, posterior projection pointed. Abdominal ventrite 1 with median carina throughout the length. Abdominal ventrite 5 with rectangular emargination bearing broad and sharp median tooth (Fig. 9g). Meso- and metafemora with pubescence covering basal 0.7 of total length, borderline between pubescent and glabrous portion sinuate. Protarsus of male with adhesive soles on tarsomeres 1–2, tarsomeres 1–2 distinctly thickened, tarsomere 3 elongate; tarsomere 4 2× as long as tarsomere 3. Claws long, slender, slightly arched.

Male genitalia (Figs 9d–f). Phallobase ca. 0.7× total length of aedeagus. Parameres in lateral view wide basally, narrowing subapically and apically projecting into rounded apex, lacking setae. Median lobe G-shaped in lateral view, with long basal projection directing apicad; apex wide, beak-shaped in lateral view.

Distribution. Dominican Republic and Cuba. The species was until now considered as Cuban endemic (e.g., Hansen 1999, Peck 2005), although Van Tassell (1966) mentioned specimens from the Dominican Republic. We are here confirming the occurrence of the species in the Dominican Republic based on recently collected specimens deposited in KSEM.

Habitat. In our survey, the specimens of *B. trilobus* were collected usually in streams and rivers with stony or sandy bottom, clear water and with or without aquatic vegetation (Figs 11a, b), although once it has also been collected in a temporary pool with stony-muddy bottom, abundant organic matter, turbid water and rich submerged vegetation. *Berosus trilobus* is found in elevations ranging from sea level to ca. 850 m a.s.l.

***Berosus undatus* (Fabricius, 1792)**

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

Figures 10a–i, 11

Hydrophilus undatus Fabricius, 1792: 185.

Berosus undatus (Fabricius, 1792). Synonymy: Gemminger and Harold 1868: 485. – Van Tassell 1966: 74 (unpublished PhD thesis: redescription, identification key). – Spangler 1981: 156 (diagnosis and distribution). – Hansen 1999: 82 (catalogue). – Peck 2005: 48 (checklist). – Epler 2010: 12.24 (notes on distribution). – Deler-Hernández and Cala-Riquelme 2010: 73 (diagnosis, distribution, identification key).

For complete synonymy and references see Hansen (1999).

Type locality. “America meridionalis”.

Material examined. CUBA: Las Tunas: 1 ex. (in alcohol) (BSC-E): Las Cuarenta, 20°00'9.72"N 76°57'48.6"W, 100 m a.s.l., 27.xi.2004, leg. Y. S. Megna, 00045.

Granma: 2 exs. (in alcohol) (BSC-E): Cauto Cristo, Laguna permanente-II [permanent pool-II], 20°33'33.1"N, 76°28'44"W, 44 m a.s.l., 06.iii.2004, leg. L. Chávez, 00053. **Santiago de Cuba:** 4 exs. (in alcohol) (BSC-E): Laguna Juraguá, 19°56'30.8"N, 75°40'21.3"W, 22 m a.s.l., 17.ix.2003, leg. Y. S. Megna, 00044; 1 ex. (in alcohol) (BSC-E); 3 exs. (dry-mounted) (NMPC): Palma Soriano, Monte Barranca, 20°20'13.5"N, 76°1'11.6"W, 203 m a.s.l., 05.xii.2007, leg. A. Deler-Hernández, 00054; 1 ex. (dry-mounted) (NMPC): Palma Soriano 20°06'05"N, 75°58'44"W, 130 m a.s.l. 01.v.2005, leg. K. Blanco; 2 exs. (in alcohol) (BSC-E): La Maya, Los Reinaldos, Laguna temporal [temporal pool], 20°11'12"N, 75°31'43"W, 100 m a.s.l., 17.iii.2006, leg. Y. S. Megna, 00088. **Guantánamo:** 1 ex. (in alcohol) (BSC-E): Imías, Yacabo Abajo, Laguna temporal [temporal pool], 20°03'33.1"N, 74°42'29.9"W, 6 m a.s.l., 24.x.2008, leg. A. Deler-Hernández and S. Muñiz, 00060; 3 exs. (in alcohol) (BSC-E): San Antonio del Sur, Macambo, río Macambo, remanso [backwater], 20°03'26.9"N, 74°44'15.82"W, 4 m a.s.l., 25.x.2008, leg. A. Deler-Hernández and S. Muñiz, 00059.

Published Cuban records: Santiago de Cuba: Laguna Juraguá (Spangler 1981); Siboney (Spangler 1981). **Holguín:** Gibara, La Aguada (Spangler 1981).

Diagnosis. Habitus as in Figs 10a, b. Body length 6.3–7.2 mm. Head metallic black; pronotum pale with a pair of closely arranged elongate longitudinal black spots mesally, pronotal punctuation darkened; elytra pale with darkened striae and interval punctuation, plus with larger elongate dark spots on posterior half of intervals 1–4 and at midlength of intervals 8–10. Elytral apices with subapical spine in male (Fig. 10g),

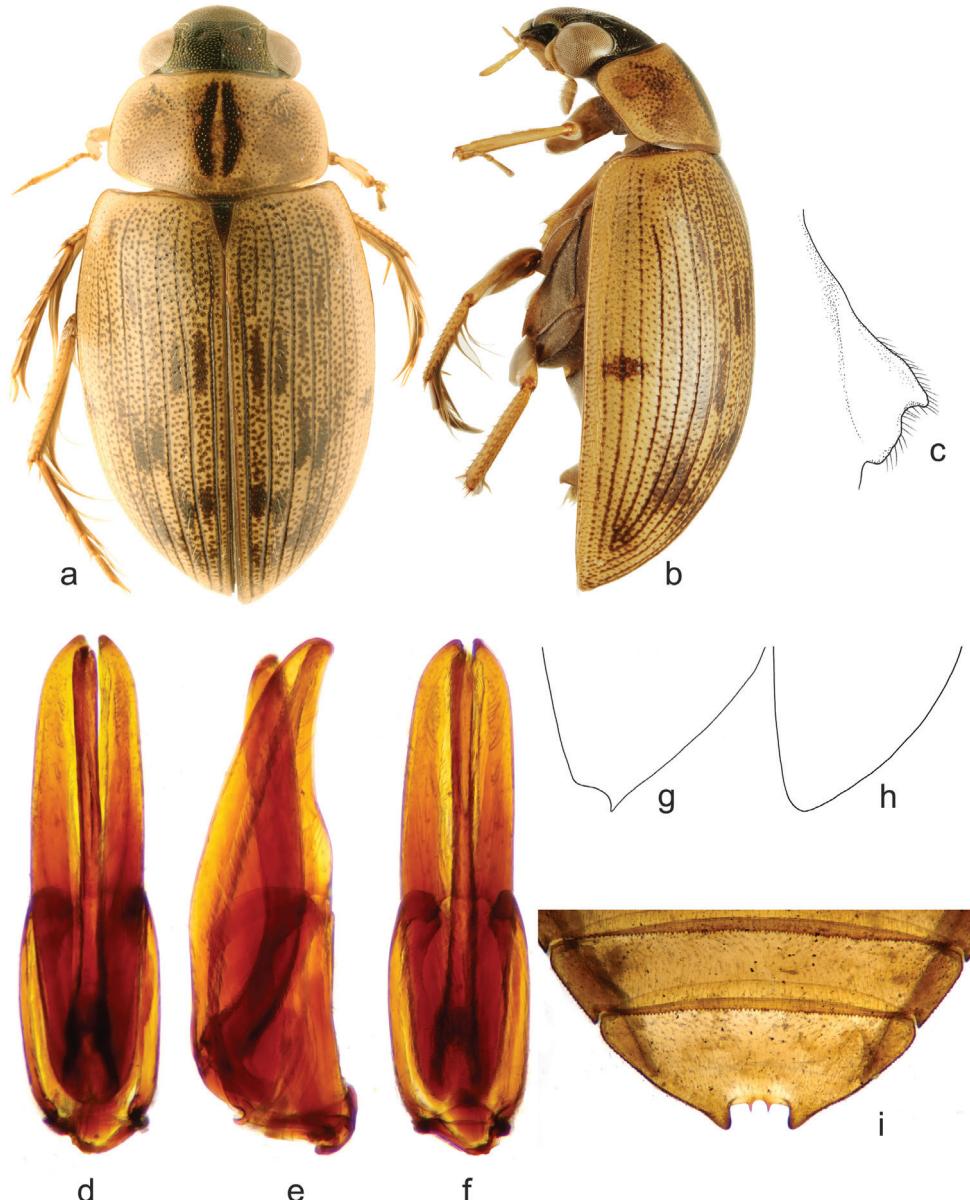


Figure 10. *Berosus undatus* (Fabricius, 1792). **a** habitus in dorsal view **b** habitus in lateral view **c** mesoventral process in lateral view **d–f** aedeagus (**d** dorsal view **e** lateral view **f** ventral view) **g** apex of male elytron **h** apex of female elytron **i** abdominal ventrite 5.

entire and rounded in female (Fig. 10h). Mesoventral process lowly laminar with large tooth directed posteriad (Fig. 10c). Abdominal ventrite 1 with median keel developed only between metacoxae. Emargination of abdominal ventrite 5 rectangular, with two broad and short medial teeth (Fig. 10i). Aedeagus (Figs 10d–f) with median lobe ca.

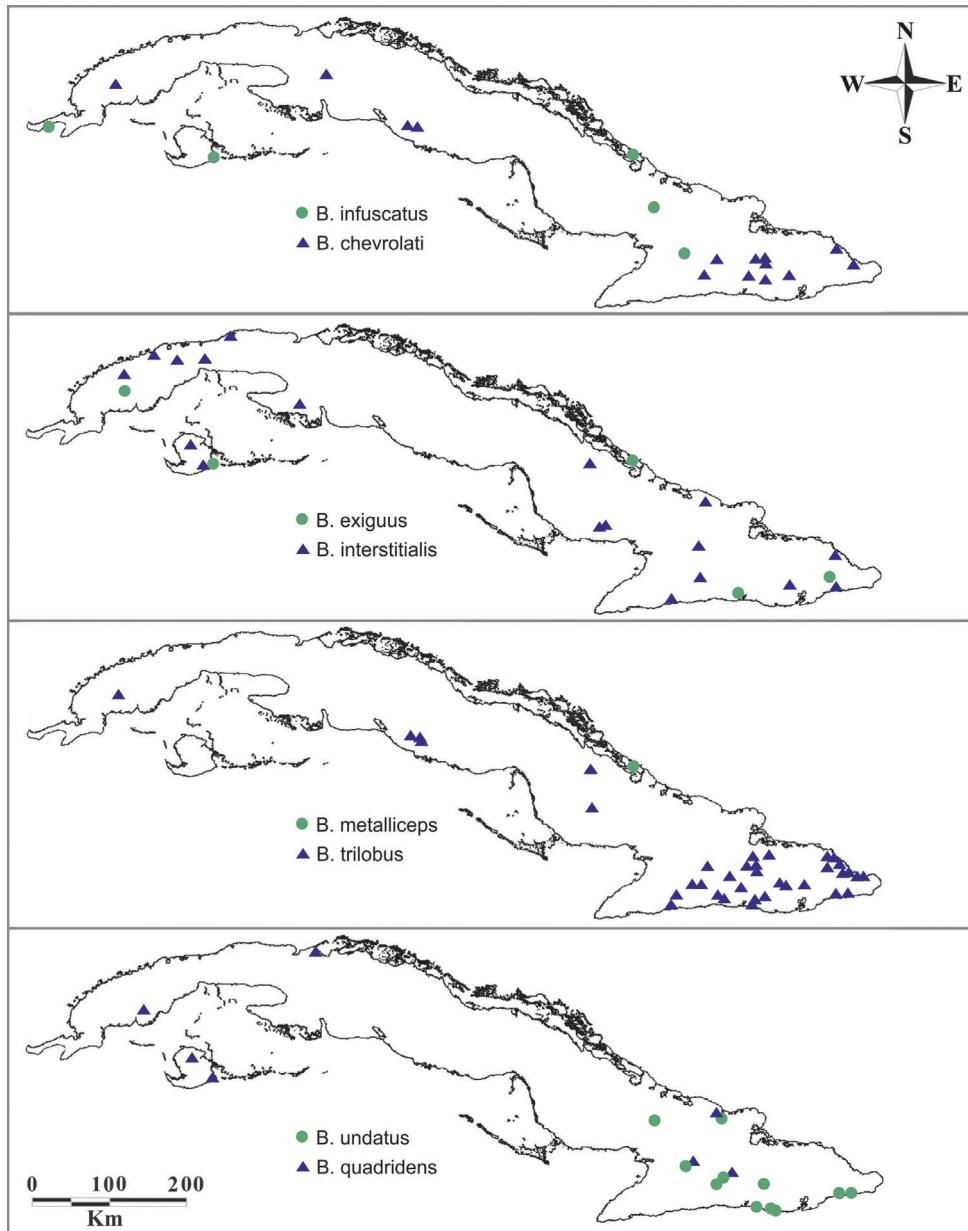


Figure 11. Known distribution of *Berosus* species in Cuba (includes our as well as historical records).

as long as parameres, lateral margins of parameres subparallel except apically; median lobe narrow in dorsal view, slightly wider in lateral view.

Distribution. USA (Texas), Mexico, Lesser Antilles (Hansen, 1999) and Cuba.

Habitat. Cuban specimens were collected in permanent and temporary pools as well as from running waters with clear or turbid water, having or lacking aquatic vegetation.



Figure 12. Localities of Cuban *Berosus* **a** Deler-Hernández collecting *B. chevrolati* and *B. trilobus* in a deep pool on side of a lowland river in Dos Caminos (June 2012) **b** locality of *B. trilobus* near Topes de Collantes (June 2010).

Key to identification of Cuban *Berosus*

- 1 First abdominal ventrite carinate along its entire length or large part of it. Small to medium sized species (3.0-4.6 mm). Pronotum testaceous, with unpaired median black spot (Figs 1a, 9a) or without any dark spots (Fig. 2a)... 2
- First abdominal ventrite carinate only basally. Medium sized to large species (4.1-7.2 mm). Pronotum pale or testaceous with a pair of median black spots (Figs 3a, 4a, 6a, 7a, 10a), or pale without dark spots (Fig. 5a) 4
- 2 Head black. Pronotum and elytra with dark spots. Dorsal surface coarsely punctate. Mesoventral process subquadrate. First abdominal ventrite with median carina throughout the length. Median lobe of the aedeagus without subapical dorsal series of setae 3
- Head testaceous; pronotum and elytra without dark spots (Fig. 2a). Mesoventral process triangular (Figs 2b-c). First abdominal ventrite with median carina reaching the midlength. Aedeagus with median lobe bearing two series of long setae setae subapically on dorsal surface (Fig. 2e) *B. exiguum* (Say)
- 3 Dark pronotal spot large and trilobate, narrow anteriorly and very wide posteriorly (Fig. 9a). Subapical area of each elytron forming a bump (Figs 9a-b). Apex of the median lobe beak-shaped in lateral view, basal projection of the median lobe long (Fig. 9e) *B. trilobus* Chevrolat
- Dark pronotal spot narrow, situated mesally, not widened posteriad (Fig. 1a). Subapical area of each elytron without a distinct bump (Figs 1a-b). Apex of the median lobe rounded in lateral view, basal projection of the median lobe short (Fig. 1e). *B. chevrolati* Zaitzev
- 4 Head metallic black to black. First abdominal ventrite without lateral depressions, emargination of abdominal ventrite 5 rectangular, without distinct sexual dimorphism. Parameres separated from each other. Elytral apex with or without subapical spine 5
- Head testaceous (except mesally in some cases, Figs 7a-b). First abdominal ventrite with lateral depressions; emargination of abdominal ventrite 5 deeply or shallowly circular, sexually dimorphic (Figs 7f-g). Parameres joined mesally into a common dish-like structure (Figs 8e-h). Elytral apex with subapical spine in both sexes (Figs 7c-d)..... *B. quadridentatus* Chevrolat
- 5 Pronotal disc without spots (Fig. 5a) or with small submesal anterior spots (Fig. 6a), never with a pair of mesal elongate large dark spots throughout the pronotal length. Apical emargination of abdominal ventrite 5 without tooth (Fig. 5g) or with a single medial tooth (Fig. 6g). Median lobe longer than parameres 6
- Pronotal disc with a pair of narrow elongate metallic central black spots. Apical emargination of abdominal ventrite 5 with two medial teeth. Median lobe shorter than parameres 7
- 6 Elytral striae distinctly darkened, elytral disc without numerous darker spots (Figs 5a-b). Apical emargination of abdominal ventrite 5 without median

- tooth (Fig. 5g). Median lobe of the aedeagus very long, spatulate apically in dorsal view, sinuate in lateral view (Figs 5d–f)..... ***B. metalliceps* Sharp**
- Elytral series not darkened, each elytron with several darker spots on the disc (Figs 6a-b). Apical emargination of abdominal ventrite 5 with a broad and short median tooth (Fig. 6g). Median lobe of the aedeagus slender and apex, pointed in dorsal view, slightly arcuate in lateral view (Figs 6d–f)
- ***B. peregrinus* (Herbst)**
- 7 Body size less than 6.0 mm. Elytral apices entire (without subapical spines) in both sexes. Phallobase longer than a half of total length of the aedeagus **8**
- Body size more than 6.3 mm. Elytral apices sexually dimorphic, with subapical spine in males (Fig. 10g) and rounded in females (Fig. 10h). Phallobase shorter than a half of the total length of the aedeagus (Figs 10d–f).....
- ***B. undatus* (Fabricius)**
- 8 Pronotum without mesh-like microsculpture on interstices. Mesoventral process with very small tooth (Fig. 4c). Posterolateral angles of metaventral process triangular. Aedeagus narrow, lateral margins of parameres subparallel, base of each paramere with a conspicuous tooth (Figs 4d–f) .***B. interstitialis***
- Pronotum with strong mesh-like microsculpture on interstices. Mesoventral process with larger tooth (Fig. 3c). Posterolateral angles of metaventral process with rounded laminae. Parameres sinuate along lateral margins, base of parameres without conspicuous teeth (Figs 3d–f)..... ***B. infuscatus***

Acknowledgements

We thank Yoandri S. Megna (Universidad de Oriente, Santiago de Cuba) for his help during the field collecting and sharing of some specimens for this study, Andrew Short (Kansas University, Lawrence, U.S.A.) for his help with identification of the specimens, providing the literature, valuable discussions and numerous corrections of this manuscript, and Bruno Clarkson Mattos (Universidade do Brasil, Rio de Janeiro, Brasil) for numerous corrections of the text and comments on the morphology of male genitalia. We are deeply grateful to the authorities and personnel of the Cuban Ministry of Science, Technology and Environment (CITMA) and the Empresa Nacional para la Protección de la Flora y la Fauna (ENPFF) for providing access to protected areas under their control. The work of M. Fikáček was partly supported by the Ministry of Culture of the Czech Republic (DKRVO 2012 and DKRVO 2013/12, National Museum, 00023272), the visit of the first author to Prague was supported by the institutional resources of the Ministry of Education, Youth and Sport of the Czech Republic. Open access to this paper was supported by the Encyclopedia of Life (EOL) Open Access Support Project (EOASP).

References

- Castelnau FL, Laporte de (1840) Historie naturelle des Animaux articulés. Historie naturelle des Insectes Coleopteres, Vol. 2 (Necrophages-Trimeres). P. Dumenil, Paris, 565 pp.
- Chevrolat LAA (1863) Coléoptère de l'Île de Cuba. Notes, synonymies et descriptions d'espèces nouvelles. Familles des cicindélées, carabiques, dytiscides, gyrinides et palpicornes. Annales de la Société Entomologique de France 3 (4): 183–210.
- Deler-Hernández A, Cala-Riquelme F (2010) Escarabajos acuáticos de la reserva florística manejada “Monte Barranca”, Santiago de Cuba, Cuba (Coleoptera: Adephaga, Polyphaga). Novitates Caribaea 3: 69–76.
- Epler JH (2010) The water beetles of Florida -an identification manual for the families Chrysomelidae, Curculionidae, Dryopidae, Elmidae, Gyrinidae, Haliplidae, Helophoridae, Hydraenidae, Hydrochidae, Hydrophilidae, Noteridae, Psephenidae, Ptilodactylidae and Scirtidae. Florida Department of Environmental Protection, Tallahassee, FL. 399 pp.
- Fabricius JC (1792) Entomologia Systematica. Vol. 1, pars 1. 20 + 330 pp. - C.G. Proft, Hafniae.
- Fernández IG, Deler-Hernández A, Megna YS (2010) Coleópteros de las superfamilias Hydrophiloidea e Histeroidea (Coleoptera: Staphyliniformia) depositados en el Instituto de Ecología y Sistemática, La Habana, Cuba. Poeyana 498: 27–30.
- Fleutiaux E, Sallé A (1889) Liste des Coléoptères de la Guadeloupe et descriptions d'espèces nouvelles. Annales de la Société entomologique de France (6) 9: 351–484.
- Gemminger M, Harold B de (1868) Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus. Vol. 2, pp. 425–752 + 6 unn. (index). E. H. Gummi, Monachii.
- Gundlach JC (1891) Coleoptera. Contribución a la entomología Cubana. Habana. Anales de la Academia de Ciencias Médicas Físicas y Naturales (3): 33–42.
- Hansen M (1991) The hydrophiloid beetles. Phylogeny, classification and a revision of the genera (Coleoptera, Hydrophiloidea). Biologiske Skrifter 40: 1–367.
- Hansen M (1999) World Catalogue of Insects. Volume 2. Hydrophiloidea (s. str.) Coleoptera. Apollo Books, Stenstrup, 416 pp.
- Herbst JFW (1797) Natursystem aller bekannten in- und ausländischen Insekten. Der Käfer, 7. 346 + xi pp., 26 pl. - Pauli, Berlin.
- Knisch A (1924) Hydrophilidae. In Junk, W & Schenkling S (Eds) Coleopterorum Catalogus. Vol. 14, part 79, 306 pp. W. Junk, Berlin.
- Komarek A (2004) Taxonomic revision of Anacaena Thomson, 1859. I. Afrotropical species (Coleoptera: Hydrophilidae). Koleopterologische Rundschau 74: 303–349.
- LeConte JL (1855) Synopsis of the Hydrophilidae of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia 7: 356–375.
- Mouchamps R (1963) Beiträge zur Kenntnis der Insektenfauna Boliviens XVIII. Coleoptera XIV. Sur quelques Berosini (Coleoptères-Hydrophilidae) de l'Amérique du Sud. Mitteilungen der Münchener Entomologischen Gesellschaft 53:118–149.
- Oliva A (1989) El genero *Berosus* (Coleoptera: Hydrophilidae) en America del Sur. Revista del Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” e Instituto Nacional de Investigacion de las Ciencias Naturales 6: 57–254.

- Oliva A, Short AEZ (2012) Review of the *Berosus* Leach of Venezuela (Coleoptera, Hydrophilidae, Berosini) with description of fourteen new species. *Zookeys* 206: 1–69. doi: 10.3897/zookeys.206.2587
- Orchymont Ad' (1946) Notes on some American *Berosus* (s. str.) (Coleoptera-Palpicornia-Hydrophilidae). *Bulletin du Musée Royal d'Histoire Naturelle de Belgique* 22: 1–20.
- Peck SB (2005) A checklist of the beetles of Cuba with data on distribution and bionomics (Insecta: Coleoptera). *Arthropods of Florida and Neighboring Land Areas* 18: 1–241.
- Say T (1825) Descriptions of new species of Coleopterous Insects inhabiting the United States. *Journal of the Academy of Natural Sciences of Philadelphia* 5 (1): 160–204.
- Sharp D (1882) Dytiscidae. 3–5. In: Godman FC, O. Salvin RH (Eds) *Biologia Centrali-Americana, Insecta, Coleoptera* (Families Haliplidae, Dytiscidae, Gyrinidae, Hydrophilidae, Heteroceridae, Parnidae, Georissidae, Cyathoceridae), volume 1, part. 2: 1–144.
- Short AEZ, Fikáček M (2011) World catalogue of the Hydrophiloidea (Coleoptera): additions and corrections II (2006–2010). *Acta Entomologica Musei Nationalis Pragae* 51: 83–122.
- Smetana A (1988) Review of the family Hydrophilidae of Canada and Alaska (Coleoptera). *Memoirs of the Entomological Society of Canada* 142: 1–316. doi: 10.4039/entm120142fv
- Spangler PJ (1973) Aquatic Coleoptera, collected by the Biospeleological Expeditions to Cuba by the Academies of Science of Cuba and Romania (Gyrinidae: Dytiscidae: Hydrophilidae: Hydraenidae: Elmintidae: Psephenidae). *Résultats des Expéditions Biospéologiques Cubano-Roumaines à Cuba* 1: 353–358.
- Spangler PJ (1981) Supplement to the aquatic and semiaquatic Coleoptera of Cuba collected by the Biospeleological Expeditions to Cuba by the Academies of Science of Cuba and Romania. *Résultats des Expéditions Biospéologiques Cubano-Roumaine à Cuba* 3: 145–171.
- Testa S, Lago, PK (1994) The aquatic Hydrophilidae (Coleoptera) of Mississippi. *Mississippi Agricultural and Forestry Experimental Station Technical Bulletin* 193: 1–71.
- Van Tassell ER (1966) Taxonomy and biology of the subfamily Berosinae of North and Central America and the West Indies (Coleoptera: Hydrophilidae). Unpublished Ph.D. dissertation, The Catholic University of America, Washington D. C., 329 pp.
- Young FN (1953) The water beetles of the Bahama Islands, British West Indies (Coleoptera: Dytiscidae, Gyrinidae, Hydrochidae, Hydrophilidae). *American Museum Novitates* 1616: 1–20.
- Zaitzev P (1908) Catalogue des Coléoptères aquatiques des familles des Dryopidae, Georyssidae, Cyathoceridae, Heteroceridae et Hydrophilidae. *Horae Societatis Entomologicae Rossicae* 38: 283–420.

Corrigenda: Taylor CK (2013) Further notes on New Zealand Enantiobuninae (Opiliones, Neopilionidae), with the description of a new genus and two new species. ZooKeys 263: 59–73

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Received 12 February 2012 | Accepted 18 February 2013 | Published 28 February 2013

Citation: Taylor CK (2013) Corrigenda: Taylor CK (2013) Further notes on New Zealand Enantiobuninae (Opiliones, Neopilionidae), with the description of a new genus and two new species. ZooKeys 263: 59–73. ZooKeys 273: 107–107. doi: 10.3897/zookeys.273.4857

The International Code of Zoological Nomenclature (ICZN 1999) requires that, for all newly published species, the type depository be clearly indicated. This was not done for *Mangatangi parvum* Taylor 2013 and *Forsteropsalis pureora* Taylor 2013. The holotypes of both species (specimen details given in the original publication) are from Te Papa Tongarewa, Wellington, New Zealand (MONZ).

The latter species was inadvertently spelt '*Forsteropsalis pureroa*' at two places in the original publication. The correct spelling is *Forsteropsalis pureora*, as used elsewhere and in accordance with the cited type locality of Pureora.

I would like to thank Stephen Thorpe (Auckland University, New Zealand) for bringing these errors to my attention.

Reference

ICZN (1999) International Code of Zoological Nomenclature, 4th ed. International Trust for Zoological Nomenclature, London. <http://iczn.org/code>

