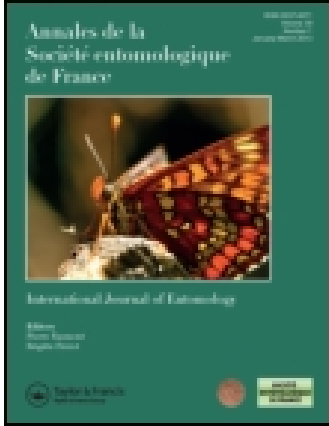


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### Taxonomic review of the subgenus *Hybomidium* Shipp 1897 (Coleoptera: Scarabaeidae: Scarabaeinae: *Deltochilum*)

Arturo González-Alvarado<sup>a</sup> & Fernando Z. Vaz-de-Mello<sup>b</sup>

<sup>a</sup> Colecciones Biológicas, Instituto Alexander von Humboldt. Carrera 8 # 15-08, Villa de Leyva, Colombia

<sup>b</sup> Departamento de Biologia e Zoologia, Instituto de Biociências, Universidade Federal de Mato Grosso, Av. Fernando Corrêa da Costa 2367, Boa Esperança, Cuiabá MT 78060-900, Brazil

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## Taxonomic review of the subgenus *Hybomidium* Shipp 1897 (Coleoptera: Scarabaeidae: Scarabaeinae: *Deltochilum*)

Arturo González-Alvarado<sup>a</sup> & Fernando Z. Vaz-de-Mello<sup>b\*</sup>

<sup>a</sup>Colecciones Biológicas, Instituto Alexander von Humboldt. Carrera 8 # 15-08, Villa de Leyva, Colombia; <sup>b</sup>Departamento de Biología e Zoología, Instituto de Biociências, Universidade Federal de Mato Grosso, Av. Fernando Corrêa da Costa 2367, Boa Esperança, Cuiabá MT 78060-900, Brazil

(Accepté le 10 novembre 2014)

**Summary.** The subgenus *Hybomidium* includes 13 species and one subspecies, of which four are new: *Deltochilum* (*Hybomidium*) *bezdeki* n. sp., *D. (H.) carrilloi* n. sp., *D. (H.) molanoi* n. sp., and *D. (H.) louzadai* n. sp. *D. sublaeve* Bates 1887 **new status** and *D. panamensis* Howden 1966 **n. status** are elevated from subspecies to species. The synonymies between *D. icarus* (Olivier 1789) and *D. guildingii* (Westwood 1835), and between *D. orbignyi* (Blanchard 1846) and *D. chalcea* (Buquet 1844) are invalidated, and the synonymy between *D. guildingii* and *D. chalcea* **new synonymy** is proposed; *D. amazonicum* Bates 1887 is proposed as subspecies of *D. orbignyi* (*D. orbignyi amazonicum* n. status). Lectotypes for *D. amazonicum*, *D. chalcea* and *D. icarus* are designated. Descriptions or (re)descriptions, diagnoses, remarks, figures of external morphology and male genitalia, examined material and distribution maps are presented for all species. A key to the species of the subgenus is presented in two languages (English and Spanish).

**Résumé. Révision taxonomique du sous-genre *Hybomidium* Shipp 1897 (Coleoptera : Scarabaeidae : Scarabaeinae : *Deltochilum*).** Le sous-genre *Hybomidium* Shipp 1897 comprend 13 espèces et une sous-espèce. Quatre sont nouvelles : *Deltochilum* (*Hybomidium*) *bezdeki* n. sp., *D. (H.) carrilloi* n. sp., *D. (H.) molanoi* n. sp., and *D. (H.) louzadai* n. sp. *D. sublaeve* Bates 1887, **n. status**, et *D. panamensis* Howden 1966, **n. status**, sont élevées au rang d'espèce. Les synonymies entre *D. icarus* (Olivier 1789) et *D. guildingii* (Westwood 1835), et entre *D. orbignyi* (Blanchard 1846) et *D. chalcea* (Buquet 1844) sont invalidées, et la synonymie entre *D. guildingii* et *D. chalcea* **n. syn.** est proposée. *D. orbignyi amazonicum* Bates 1887, **n. status**, est proposé. Les lectotypes de *D. amazonicum*, de *D. chalcea* et de *D. icarus* sont désignés. Les descriptions ou redescriptions, diagnoses, remarques, figures de morphologie externe et des génitalia mâles, le matériel examiné et une carte de répartition sont présentés pour toutes les espèces. Une clé des espèces du sous-genre est présentée en anglais et en espagnol.

**Keywords:** dung beetles; Deltochilini; new species; Neotropics

The genus *Deltochilum* Eschscholtz 1822, with about 90 valid species, has the second highest number of species in the tribe Deltochilini in America, after *Canthon* Hoffmannsseg 1817 with 189; the genus is distributed from the southern USA to northern Argentina, and most of the species are found in tropical forests (Vaz-de-Mello 1999). Génier (2012) synonymized the subgenus *Telhyboma* Kolbe 1893 with *Deltochilum* s. str., thus eight subgenera are currently recognized: *Aganhyboma* Kolbe 1893, *Parahyboma* Paulian 1938, *Euhyboma* Kolbe 1893, *Rubrohyboma* Paulian 1938, *Deltohyboma* Lane 1946, *Calhyboma* Kolbe 1893, *Hybomidium* Shipp 1897, and *Deltochilum* s. str.

Eschscholtz (1822) based *Deltochilum* on a single species, *D. dentipes*; Le Peletier and Audinet-Serville (1828) described the genus *Hyboma* for *Scarabaeus gibbosus* Fabricius 1775 and suggested that *Copris icarus* Olivier 1789 should be included in this new genus. Castelnau (1840) included 12 species in *Hyboma* (including the type

species of *Deltochilum*) and established *Deltochilum* as a synonym of *Hyboma*; Burmeister (1848) again used the name *Deltochilum* and proposed three groups (in roman numerals) of species; Kolbe (1893) divided the genus into seven groups, including *Deltochilum* s. str. with *D. gibbosum*, *D. icarus* and *D. amazonicum* Bates 1887 (these species are actually in *Hybomidium*), and species from other subgenera; strangely, he did not include *D. lobipes* described by Bates in the same year that he described *D. amazonicum*; also Kolbe (1893) proposed a new subgenus (*Meghyboma*) which includes the type species of the genus (*D. dentipes*).

Shipp (1897) considered the subgenera of Kolbe (1893) as genera, and said that *D. icarus* cannot be the type species of *Deltochilum*, because *D. icarus* is a type species of *Hyboma* (sensu Shipp), and that *D. dentipes* cannot be the type species of *Meghyboma* because *D. dentipes* is a type species of *Deltochilum*. Shipp (1897)

\*Corresponding author. Email: [fagakorn@gmail.com](mailto:fagakorn@gmail.com)

also proposed a new name (*Hybomidium*) for *Hyboma*, because *Hyboma* had been previously used by Hübner in 1816 (Shipp 1897).

Shipp (1897) designated *C. icarus* Olivier 1789 as type species of *Hybomidium*, but Lane (1946) found that Shipp misinterpreted the information and the real type species of *Hybomidium* would be *S. gibbosus* Fabricius 1775, because this species was originally designated as type species by Le Peletier and Audinet-Serville (1828) when they described the genus *Hyboma*.

Paulian (1938) designated *D. gibbosum* as type species of *Deltophilum* and proposed *Tetraodontides* (with *D. gibbosum* as a type species) as a new subgenus for the species that are now included in *Hybomidium*. Lane (1946) stated that the type species of *Deltophilum* is *D. dentipes*, because the genus was described only using this species (subsequent monotypy ICSN 1999, article 69.3), and proposed that *Tetraodontides* is not valid, because *D. gibbosum* is the type species of *Hybomidium*.

In the last taxonomic review of the subgenus *Hybomidium* (Paulian 1938), five species and one variety were included: *D. gibbosum* (Fabricius 1775), *D. gibbosum* var *sublaeve* Bates 1887, *D. icarus* (Olivier 1789), *D. orbigny* (Blanchard 1846), *D. amazonicum* Bates 1887 and *D. lobipes* Bates 1887. Paulian (1938) also proposed the synonymy between *D. orbigny* = *D. chalybea* (Buquet 1844). In the next year Balthasar (1939) described *D. pseudoicarus* Balthasar 1939 and *D. densepunctatum* Balthasar 1939.

Howden (1966) designated some lectotypes for species described by Bates (1887), and established the variety described by Bates (1887) as a subspecies of *D. gibbosum* (*D. gibbosum sublaeve*). He also proposed *D. densepunctatum* as a synonym of this subspecies and described one new subspecies, *D. gibbosum panamensis* Howden 1966. Génier (2001) designated the lectotypes for the species described by Balthasar (1939) and decided to keep the synonymy proposed by Howden (1966) between *D. gibbosum sublaeve* and *D. densepunctatum*. Vulcano and Pereira (1964) listed the synonymy between *D. icarus* and *D. guildingii* (Westwood 1835), and González et al. (2009) most recently described a new species (*D. loperae* González and Molano 2009) of the subgenus.

The purpose of this work is to review taxonomically the subgenus *Hybomidium*, of the genus *Deltophilum*; it is based on the examination of more than 900 specimens, including type specimens of 10 names of species, of the 12 previously associated to the subgenus, and the designation of the lectotypes for three species. This work presents a key to species, illustration of the external and internal (aedeagus and sclerites of the internal sac of the aedeagus) morphology, and distribution maps. Also, four new species are described.

## Material and methods

This study is based on the examination of more than 900 specimens from the following collections (institutional curators' names in parenthesis)

**CECC**: Colección Escarabajos Coprófagos de Colombia, Bogotá, Colombia (Alejandro Lopera); **CEMHNLGA**: Colección entomológica del museo de historia natural "Luis Gonzalo Andrade", Universidad Pedagógica y Tecnológica de Colombia, Tunja, Colombia (Fredy Molano); **CEMT**: Seção de Entomologia da Coleção Zoológica, Departamento de Biologia e Zoologia, Instituto de Biociências, Universidade Federal de Mato Grosso. Cuiabá, Brazil (Fernando Vaz-de-Mello); **CEPJJN**: Private collection of Jorge Ari Noriega, Bogotá, Colombia (Jorge Noriega); **CMN**: Canadian Museum of Nature, Ottawa, Canada (François Génier); **IAvH**: Instituto Alexander Von Humboldt, Villa de Leyva, Boyacá, Colombia (Claudia Medina and Arturo González); **ICN**: Colección Zoológica del Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia (Carlos Sarmiento); **MACN**: Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina (Arturo Roig Alsina); **MNHN**: Muséum National d'Histoire Naturelle, Paris, France (Antoine Mantilleri and Olivier Montreuil); **MZUSP**: Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (Carlos Campaner and Sonia Casari); **NHML**: The Natural History Museum, London, UK (Maxwell Barclay and Malcolm Kerley); **NMP**: Národní Muzeum, Prague, Czech Republic (Jiri Hajek); **OUMNH**: Oxford University Museum of Natural History, Oxford, UK (Darren J. Mann); **UNAB**: Colección entomológica Agronomía, Universidad Nacional, Bogotá, Colombia (Francisco Serna Cardona).

Descriptions are based on external morphology and characters from the male genitalia. The male genitalia were dissected including the internal sac. The aedeagus and the internal sac of the aedeagus were macerated in a 10% solution of KOH for several minutes, following the methodology of Medina et al. (2013); the names of the structures of the internal sac are based on Medina et al. (2013).

The names of the external morphology and male genitalia used in the descriptions and re-descriptions are shown in Figures 1 and 2, respectively.

The punctures in all of the body of *Hybomidium* are ocellated, formed by two rings, one ring larger (outer) and the other smaller; the margins of the larger and smaller rings are here termed external margin and internal margin of the puncture, respectively (Figure 1d). In most descriptions, measurements of diameter of the punctures refer to the external margin (larger ring); while in some descriptions the distance between the external and internal margins of the puncture is used; i.e. the distance between the larger (outer) ring and the smaller ring.

External morphology drawings were made using a Pen Tablet (Genius MousePen 8\*6) in the image manipulation program Gimp 2.6 (China).

Labels of the type specimens are cited verbatim; labels are separated by a slash (/), and lines in labels by commas.

## Taxonomy

### Subgenus *Hybomidium*

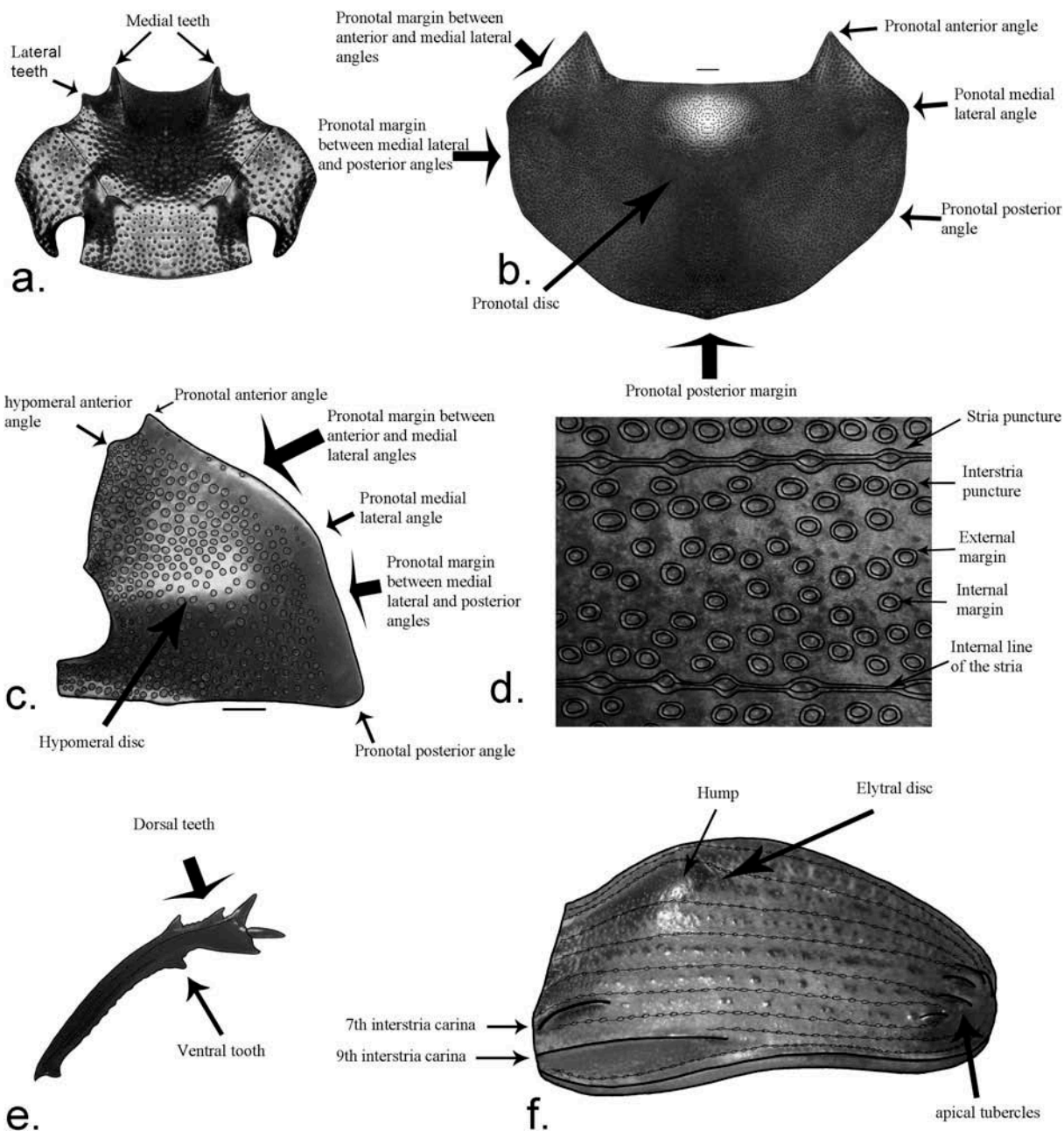
#### *Deltophilum* (*Hybomidium*) Shipp 1897 (Figures 3, 4)

*Hyboma* Le Peletier de Saint-Fargeau & Audinet-Serville 1828: 352 (nec. Hübner, 1816)

*Deltophilum* Kolbe 1893: 191 (in part)

*Hybomidium* Shipp 1897: 195

*Tetraodontides* Paulian 1938: 259



**Figure 1.** External morphology terminology: **a**, head; **b**, pronotum; **c**, hypomeron; **d**, elytral sculpture; **e**, front tibia; **f**, lateral view of elytron.

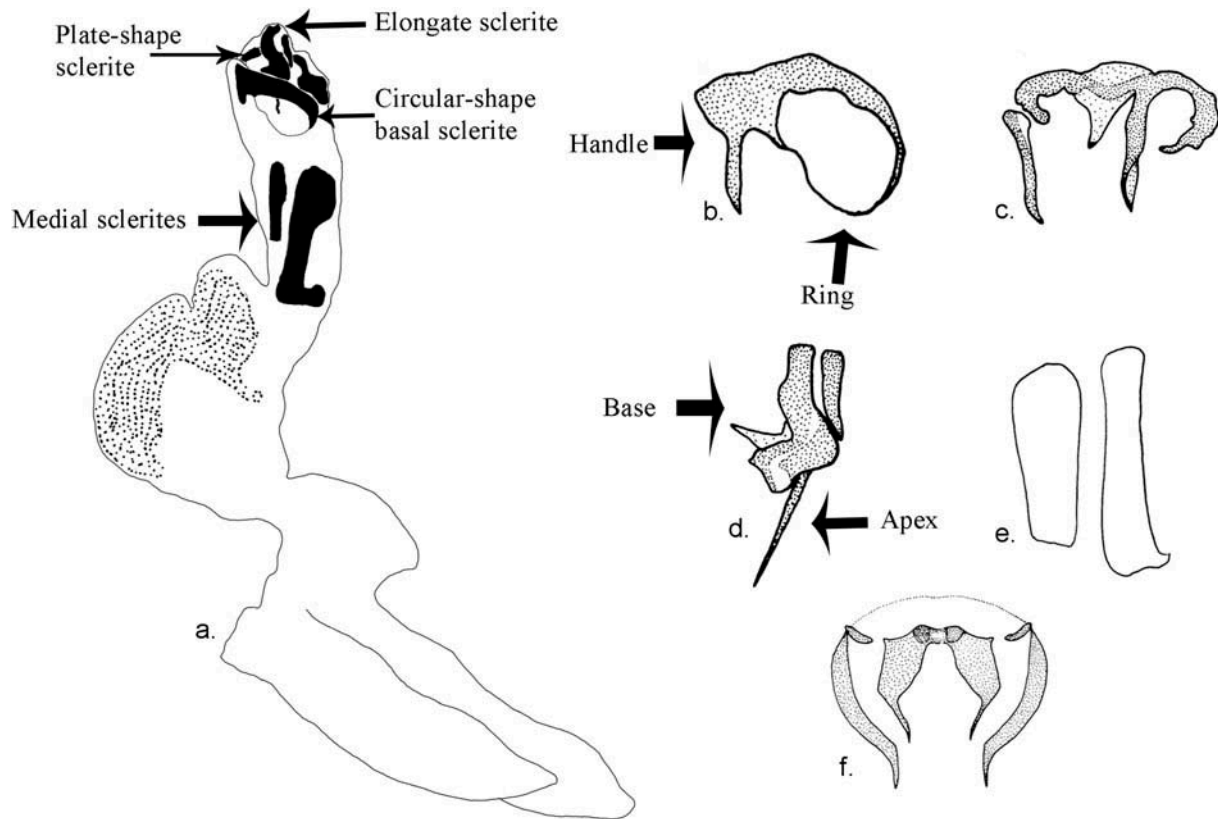
**Type species.** *Deltochilum (Hybomidium) gibbosum* (Fabricius 1775).

**Diagnosis.** Medium to large sized species, clypeus with four teeth, medial teeth stronger and longer than lateral ones (Figure 3a); 7th elytral interstria with short basal carina occupying 1/6 of elytral length, 9th elytral interstria with long basal carina that does not exceed the middle of the elytral length (Figure 3c); pseudoepipleural carina present along all the elytral length with a strong sinuosity near the apical end of the carina of the 9th

interstria. Third to 7th interstriae with apical tubercles (Figure 3c). Metasternum with a posterior tubercle at each side of the longitudinal middle line (Figure 3d). Front tibiae without tarsi (Figure 3e).

**Description.** Color black to cupreous, all punctation ocellated. Clypeus with dorsal carina, separated by feebly concave edge (clypeus not emarginated); medial teeth larger than lateral teeth. Clypeo-genal suture present, clypeal margin between lateral teeth and clypeo-genal suture sinuate; genal





**Figure 2.** Internal sac of aedeagus terminology: **a**, internal sac; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

margin rounded (Figure 3a). Pronotum wider than long, punctuation variable in size, smallest on disc and gradually largest posteriorly and laterally; pronotal anterior angle acute (Figure 3b). Elytra with 11 striae (including the epipleural one); 7th interstria with short basal carina occupying 1/6 of the elytral length; 9th interstria with a long basal carina that does not surpass middle of the elytral length; pseudoepipleural carina extending along all length of elytra; pseudoepipleural carina strongly sinuous, near of the end of the carina of the 9th interstria (Figure 3c). Third to 7th interstriae with apical tubercles. Interstriae with punctation, and bright point, bright calluses, costate or pseudocostate. Mesosternum short; metasternum bearing a posterior tubercle at each side of the longitudinal middle line (Figure 3d). Front tibiae without tarsi, tridentate; tibial margin denticulate between teeth (Figure 3e); ventral face of the protibiae bearing a longitudinal denticulate line.

Parameres symmetrical; apex of the parameres with lateral projection (dorsal view). Internal sac with two asymmetrical medial sclerites (Figure 4a) on the medial area; apical area of the internal sac with three sclerites: the circular basal sclerite, with a fine ring (Figure 4b); opposed to the circular basal sclerite, one sclerite of irregular form, the plate-shape sclerite (Figure 4c); and

between the latter two is found the elongated sclerite, the apex of this sclerite has setiform shape and the base has the irregular form (Figure 4d). All these sclerites vary in the form between each species, however the differences are easy see in the medial sclerites, and the elongated sclerite varies less between species than an other sclerites.

**Secondary sexual characters.** Males with hind tibiae more curved than females; first abdominal ventrite expanded medially (not expanded in females), second to fourth abdominal ventrites visible only laterally (visible medially in females); anterior tibiae with ventral tooth only in males (Figure 3e) or larger than in females.

***Deltochilum (Hybomidium) gibbosum (Fabricius 1775)***  
(Figures 5, 6, 31)

*Scarabaeus gibbosus* Fabricius 1775: 28

*Ateuchus gibbosus* Fabricius 1801: 57

*Hyboma gibbosa* Le Peletier de Saint-Fargeau & Audinet-Serville 1828: 353

*Deltochilum gibbosum gibbosum* Howden 1966: 736

**Non-type material examined.** USA: Billy's Id Okefenokee Swamp Ga. VI.1912 [1 ♂ MZUSP]. Alabama: Birmingham, VIII.1991 [2 ♂ 1 ♀ CEMT]. Florida: [1 ♀ MZUSP]; Monroe, Co. N. KeyLargo, S35 1.VIII-16.XI.1985,

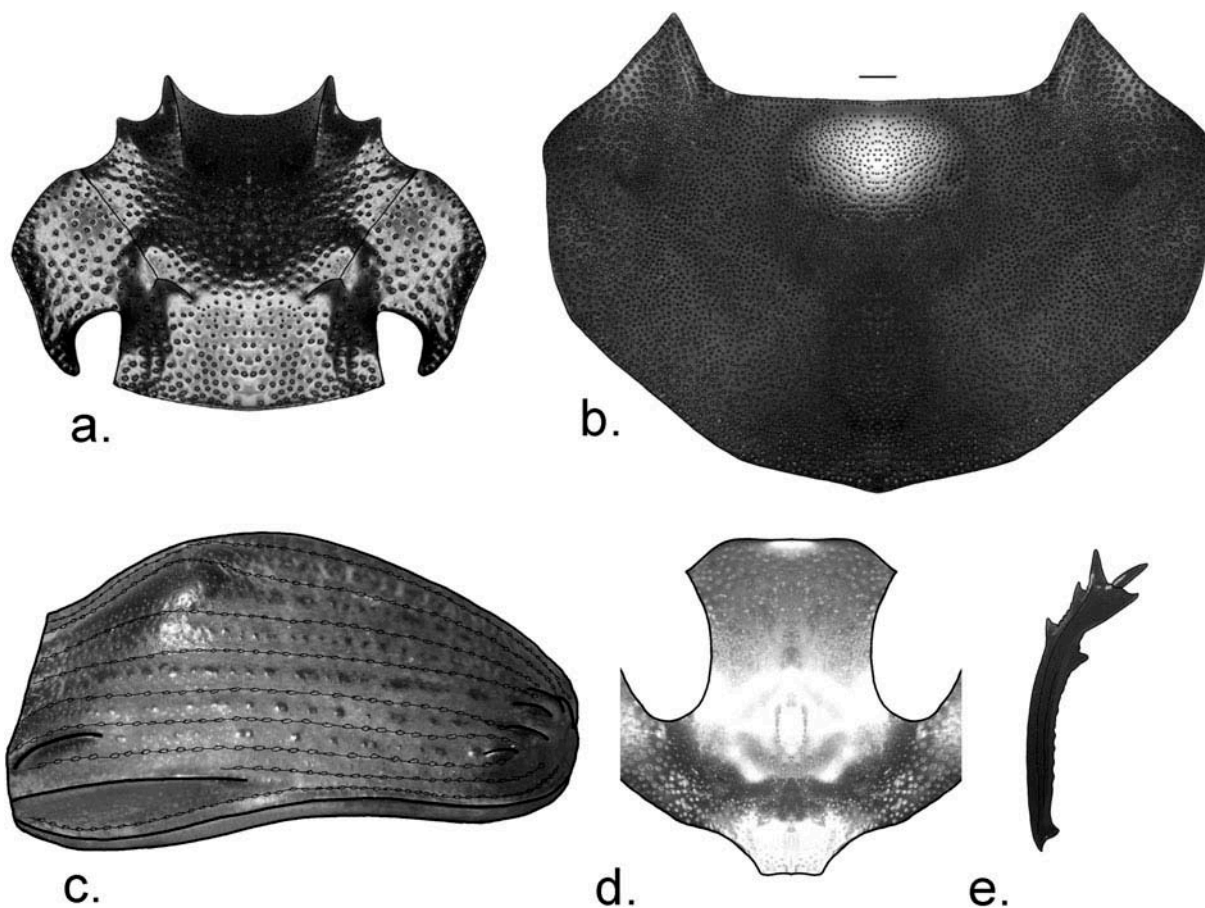


Figure 3. External morphology *Hybomidium*: a, head; b, pronotum, c, lateral view elytra; d, metasternum; e, front tibia.

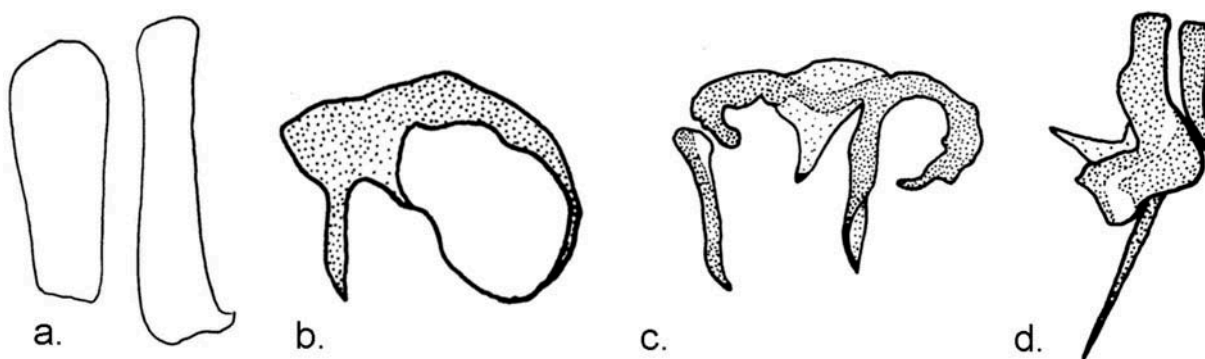
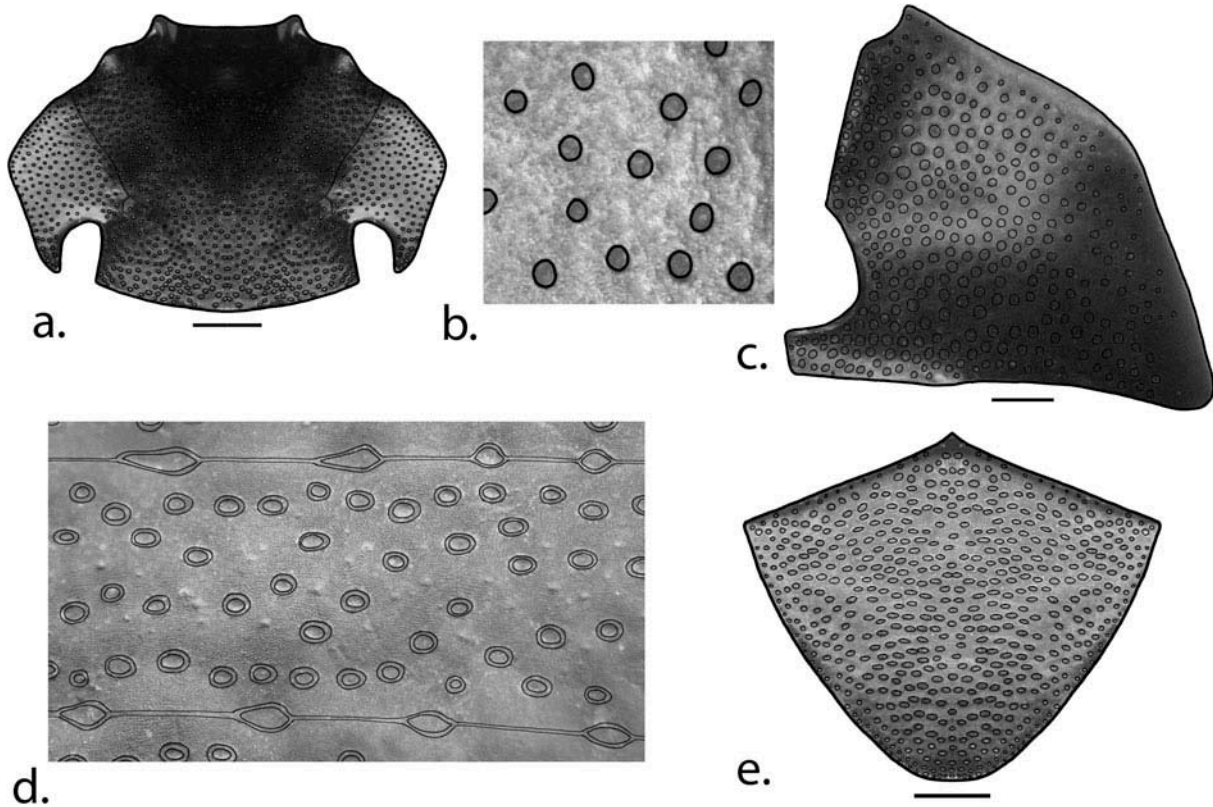


Figure 4. Internal sac of aedeagus *Hybomidium*: a, medial sclerites; b, circular basal sclerite; c, plate-shape sclerite; d, elongate sclerite.

Malaise-FIT, S&J Peck [1 ♂ CMN]; Venice, 5.VII.1936, A. Nicolay [1 ♀ MZUSP]. **Louisiana:** Calcasieu, Par. Sam Houston Jones St. Pk., 30°18'N, 93°16'W, 2-21.VII.2002, A. Cline & A. Tishechkin [1 ♀ CEMT]; W. Feliciana, Par Feliciana Preserve, 30°47'N, 91°15'W, 2-15.VI.2001, A. Cline & A. Tishechkin [2 ♀ CEMT], [1 ♂ 1 ♀ CECC].

**Mississippi:** Pontotac Country, 32 km SW Tupelo, 17.V-19.VIII.1983, S.J. Peck [1 ♂ 3 ♀ CECC]; **North Carolina:** Stanley Co., VII-1992, P. Bélanger [2 ♂ 1 ♀ CEMT]. **Texas:** Forest burg, VI.1949, [1 ♀ MZUSP], 15.VII.1948, ex coll. v. Wendler-F [1 ♀ MZUSP], 10.VII.1948, ex coll. v. Wendler-F [1 ♀ MZUSP].

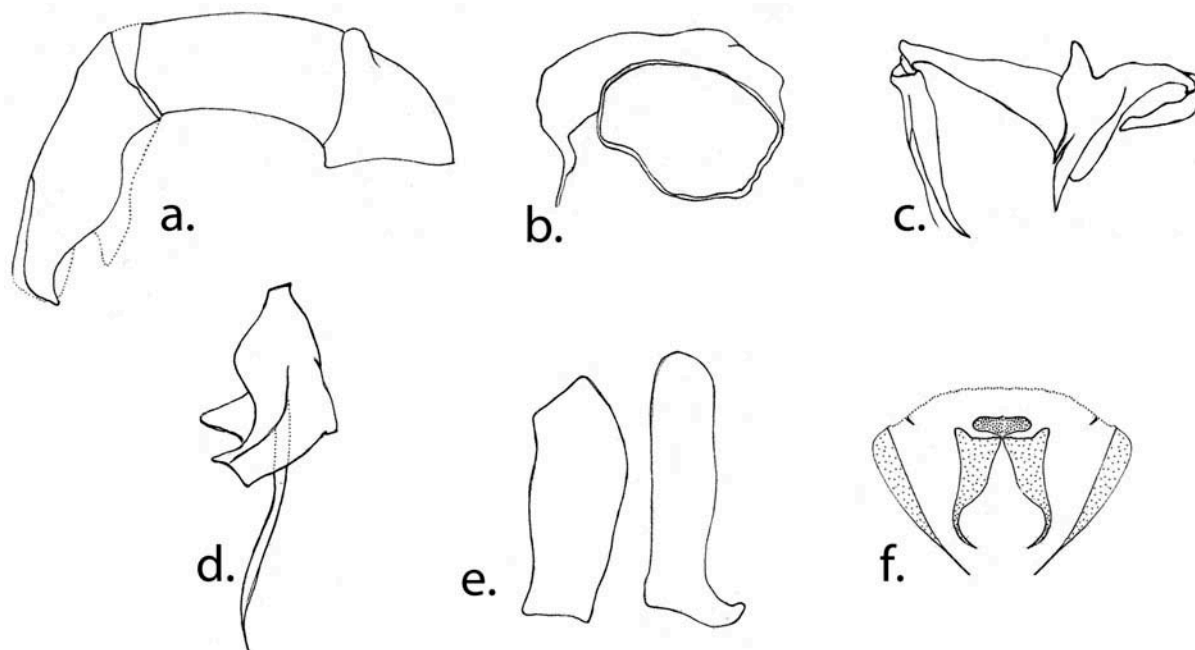


**Figure 5.** External morphology of *D. gibbosum*: **a**, head; **b**, pronotal disc sculpture; **c**, hypomeron; **d**, elytral sculpture; **e**, pygidium.

**Diagnosis.** Closely related to *D. sublaeve* **n. status**, *D. panamensis* **n. status**, and *D. carrilloi* **n. sp.** by surface of the interstriae mixed with bright points and punctures, but distinguishable from all by striae shallower than interstriae punctures (Figure 5d). Also from *D. sublaeve* **n. status** by striae without an internal line, and striae narrower than the distance between internal and external margins of each interstitial puncture (Figure 5d); from *D. sublaeve* **n. status** and *D. carrilloi* **n. sp.** by surface of pronotal disc, between punctures, shagreened (Figure 5b); from *D. panamensis* **n. status** by apical posterior margin (between dorsal and ventral faces) of the posterior femur shallowly excavated, interstitial punctures occupying about 1/10 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria), interstriae punctures separated by more one diameter (diameter measure in the middle of the width of the interstria) (Figure 5d) and by males with elytral humps.

**Description.** Color black. Head punctation strong, punctures separated by one diameter on the center and the genae, and separated by less than one diameter on the margins and between the eyes; punctures smallest between the medial teeth (Figure 5a). Pronotal punctation variable in size, punctures smallest in the disc and gradually largest

posteriorly and laterally; surface of the pronotal disc, between punctures, shagreened and with small points (visible at 30×) (Figure 5b). Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles straight; pronotal medial lateral angle rounded (Figure 5c). Hypomeral punctures variable in size, punctures smallest toward the lateral external margins; hypomeral punctures separated by less than one diameter (Figure 5c). Striae fine, striae narrower than the distance between internal and external margins of each interstitial puncture; striae without internal line; striae shallower than the interstriae punctures; surface of the interstriae with mixed bright points and punctures; interstitial punctures the same size or smaller than striae punctures. Interstitial punctures occupying about 1/10 of the distance between each stria (measured in the middle of the elytral length, in the fifth interstria); interstitial punctures separated by more than one diameter (diameter measured in the middle of the width of the interstria) (Figure 5d). Carina of the 9th interstria extending to the middle of the elytral length. Apical posterior margin (between the dorsal and ventral faces) of the posterior femur shallowly excavated. Pygidial punctures transversely oval; punctures dispersed, separated by more than one diameter (diameter measure in the narrowest part) (Figure 5e).



**Figure 6.** Male genitalia of *D. gibbosum*: a, aedeagus; b, circular-shape basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres; internal sac sclerites and genital segment as in **Figure 6**.

**Sexual dimorphism.** Males with posterior tibiae curved near the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with tubercle on the ventral face of middle femur and with humps in the elytral disc.

**Distribution (Figure 31).** Southern USA (Alabama, Florida, Louisiana, North Carolina, Texas, Illinois, Georgia, Mississippi, South Carolina, Tennessee, Kentucky) (Blackwelder 1944; Howden 1966; Woodruff 1973; Barney 1980; Riley & Wolfe 2003).

**Remarks.** In the males there is some variation in the size of the elytral humps and the tubercle in the ventral face of the middle femur, depending on the development of the individual. Striae could be nearly invisible or fine but always shallower than interstriae punctures.

Howden (1966) recognized *D. gibbosum* var. *sublaeve* described by Bates (1887) as a subspecies of *D. gibbosum*, and in the same paper described another subspecies for *D. gibbosum* (*D. gibbosum panamensis*); however *D. gibbosum* shows differences from the other “subspecies” (pronotal disc texture, striae shape and male genitalia [aedeagus and internal sac sclerites]), and by these differences *D. sublaeve* **n. status** and *D. panamensis* **n. status** are elevated from subspecies to species. Howden and

Ritcher (1952) described some biological aspects and the larva of *D. gibbosum*.

***Deltochilum (Hybomidium) sublaeve* Bates 1887 new status (Figures 7, 8, 32)**

*Deltochilum gibbosum* var. *sublaeve* Bates 1887: 36  
*Deltochilum gibbosum sublaeve* Howden 1966: 736  
*Deltochilum densepunctatum* Balthasar 1939: 17 (syn. by Howden 1966: 736)  
*Deltochilum gibbosum* var. *sublaeve* Bates:

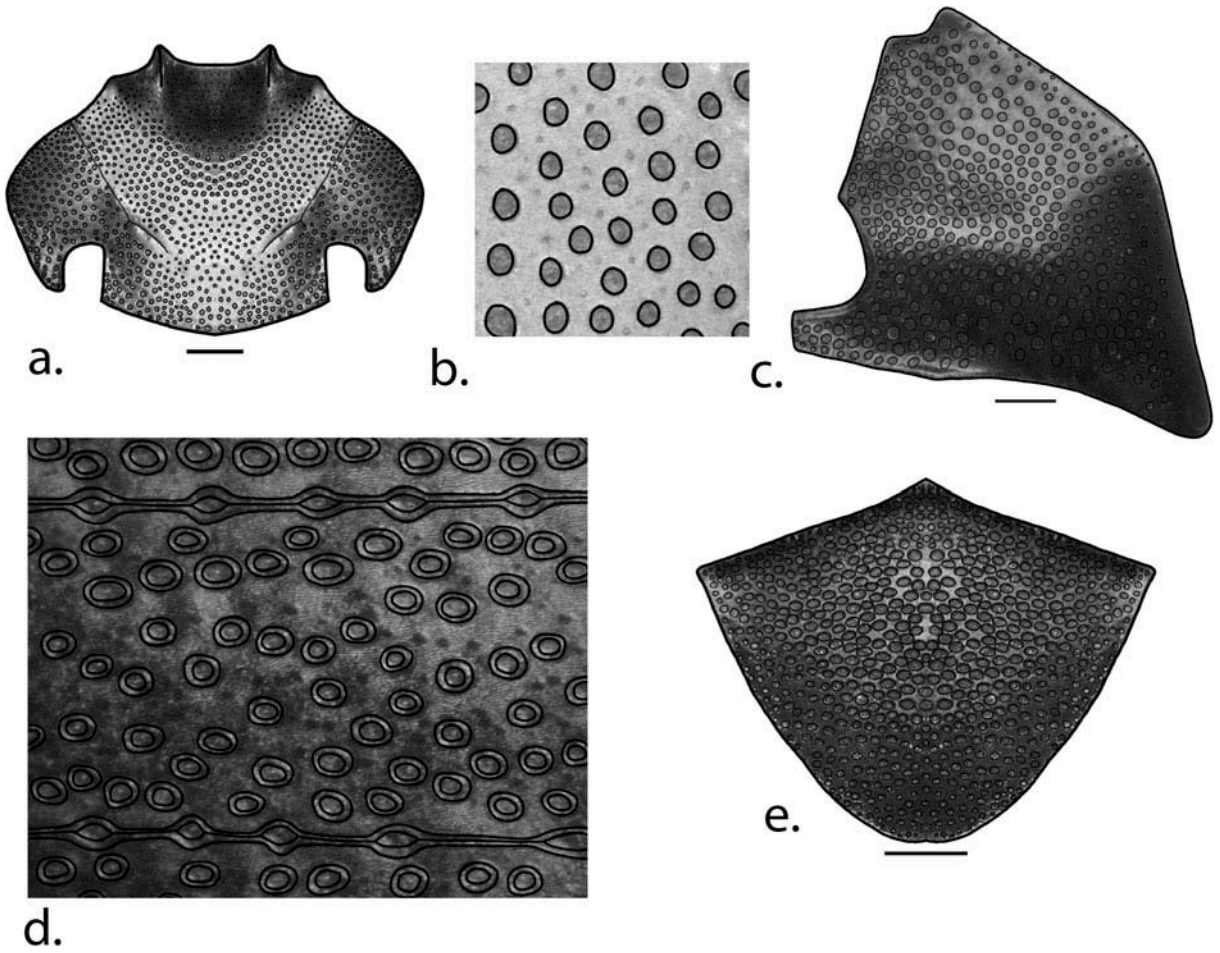
**Type material examined.** Lectotype 1 ♂ (designated by Howden, 1966): Mizantla, Vera Cruz Höge/ [rounded label red margin] Type/ [rounded label purple margin] Lectotype/ B.C.A, 36. 3/ *Deltochilum, gibbosum, var. sublaeve*, male symbol Bates (handwritten)/ *D. gibbosum, sublaeve* Bates (handwritten), DET. at B.M., H.F. HOWDEN ‘62/ Lectotype, *Delto. g. sublaeve*, Bates (handwritten), DET. at B.M., H.F. HOWDEN ‘62 [NHML].

***Deltochilum densepunctatum* Balthasar**

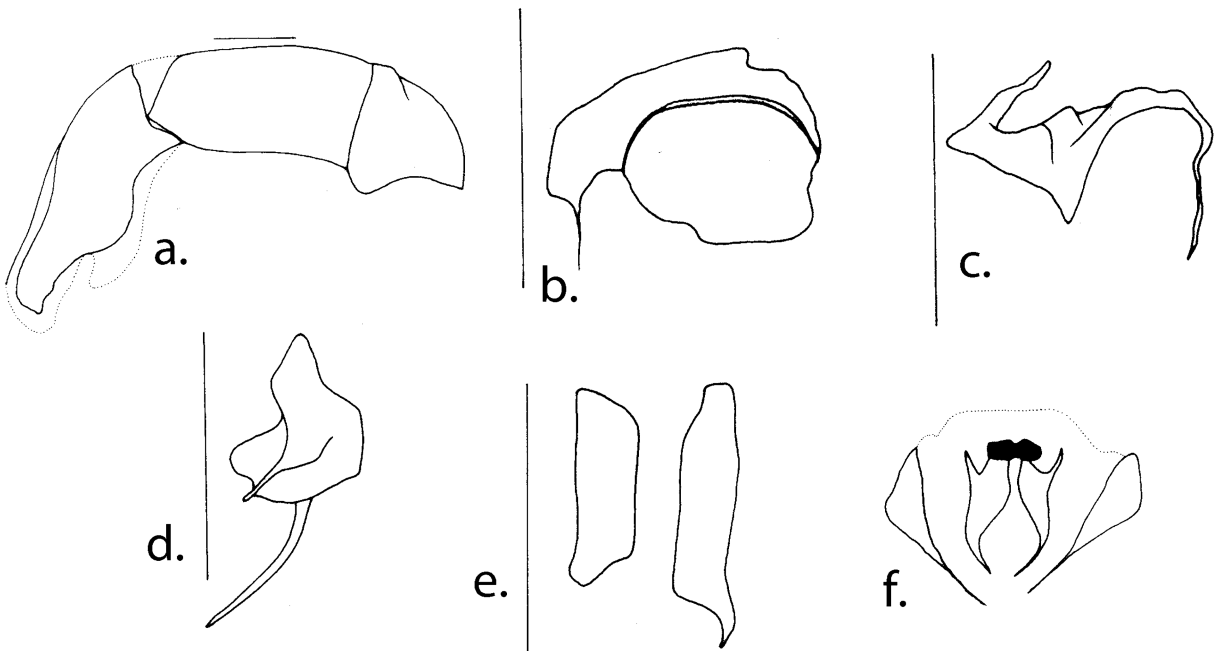
**Type series.** Lectotype 1 ♀ (designated by Génier, 2001): Durango, Mexico/ Typus/ *densepunctatum* m. [NMP].

**Non-type material examined.** MEXICO: Chiapas: el aguacero, 16 km W Ocozacautla, 680 m, 5.VI.1990, h&a Howden [1 ♂ CMN]. Sinaloa: Villa Unión, 700 m, VII.1968 Martínez [1 ♂ 1 ♀ CMN]. Tamaulipas: Adolfo





**Figure 7.** External morphology of *D. sublaeve* n. status: a, head; b, pronotal disc sculpture; c, hypomeron; d, elytral sculpture; e, pygidium.



**Figure 8.** Male genitalia *D. sublaeve* n. status: a, aedeagus; b, circular-shape basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

López Mateos, Cerro el Chamalito, 22°54'57"N, 99°9'37"W, 14–17.IX.2003, Parada 2, Selva baja caducifolia, Cervantes & Santiago [1 ♀ CEMT]; Adolfo López Mateos, Cerro el Chamalito, 22°54'57"N, 99°9'37"W, 14–17.IX.2003, Selva baja caducifolia, NTP 80, L. Cervantes & Q. Santiago [2 ♂ 1 ♀ CEMT], NTP 80 Calamar [5 ♂ 4 ♀ CEMT], [1 ♀ CECC]; Adolfo López Mateos, Cerro el Chamalito, IX.2003, L. Cervantes & Q. Santiago [1 ♂ 2 ♀ CEMT], [1 ♂ CECC], 10 km W El Encino, 200 m, 18–20.VII.1979, dung tp lowland rainfor, O. Kukal [1 ♂ CMN]. **Veracruz:** Apazapan, 5 pm a 5 pm, 4–5.X.2006, Trampa copro 2, Zona 1, F. Escobar [3 ♂ 1 ♀ CEMT], Trampa copro 6, Zona 2 [4 ♂ CEMT], Trampa copro 1, Zona 1 [1 ♂ CECC], 5–6.X.2006, Trampa copro 1, Zona 1, [5 ♀ CEMT], Trampa copro 2, Zona 1 [1 ♂ CEMT], Zona 1, Trampa copro 3, Selva baja conservada, 4–5.X.2006 [2 ♀ CEMT], [1 ♀ CECC], Trampa necro 1 [2 ♂ CEMT], Trampa necro 3, Selva baja perturbada con cultivos de caña y mango [1 ♂ CEMT], 5–6.X.2006 Trampa copro 3, Selva baja conservada [2 ♂ 1 ♀ CEMT], Trampa necro 1, Selva baja conservada [2 ♂ CEMT], Trampa necro 3, Selva baja perturbada con cultivos de caña y mango [2 ♀ CEMT]; Ursulo Galván, Chavarrillo, X.2006, F. Vaz-de-Mello, L. Vaz-de-Mello & P. Reyes [1 ♀ CEMT].

**Diagnosis.** Closely related to *D. carrilloi* n. sp., *D. gibbosum* and *D. panamensis* n. status by surface of the interstriae mixed with bright points and punctures (Figure 7d), but distinguishable from all by striae wider than the distance between internal and external margins of each interstitial puncture (almost double) (Figure 7d), striae with internal line, and interstitial punctures occupying about 1/8 of the distance between each stria (Figure 7d); also from *D. gibbosum* by the striae deep, same depth as interstitial punctures (Figure 7d); from *D. panamensis* n. status by interstitial punctures same size as striae punctures and almost the same size the pronotal posterior punctures, and by males with elytral humps.

**Description.** Color black. Head punctation strong, punctures separated by less than one diameter; punctures smallest between medial teeth (Figure 7a). Pronotal punctation variable in size, punctures smallest in disc and gradually largest posteriorly and laterally; surface of the pronotal disc, between punctures, smooth and with small points (at 30×) (Figure 7b). Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles straight; pronotal medial lateral angle rounded (Figure 7c). Hypomerall punctures variable in size; hypomerall punctures in the disc denser than the anterior and lateral margins; hypomerall punctures most dispersed toward the posterior margin and the procoxal margin; hypomerall punctures separated by less than one diameter, anterior punctures with setae (Figure 7c).

Striae deep and wide, same depth as interstitial punctures; striae wider than the distance between internal and external margin of each interstitial puncture (almost double); striae with internal line; interstriae mixed with bright points and punctures (Figure 7d); interstitial punctures same size as striae punctures and almost the same size as the pronotal posterior punctures; interstitial punctures occupying about 1/8 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria) (Figure 7d). Carina of the 9th interstria extending to the middle of the elytral length. Pygidial punctures transversely oval (Figure 7e).

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 8.

**Sexual dimorphism.** Male with posterior tibiae curved near the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with tubercle on the ventral face of middle femur and with humps in the elytral disc.

**Distribution** (Figure 32). Northeast Mexico (Tamaulipas, Veracruz: Apazapan).

**Remarks.** In the males there is some variation in the size of the elytral humps, the tubercle in the ventral face of the middle femur and the ventral tooth in the anterior tibiae, depending on the development of the individual.

Bates (1887) described *D. sublaeve* n. status as variety of *D. gibbosum*, because *D. gibbosum* and the new variety have the same shape of pronotal angles (Bates 1887); Howden (1966) established the variety of Bates as subspecies (*D. gibbosum sublaeve*). However, despite the same shape of the pronotal angles, in *D. gibbosum* and *D. sublaeve* n. status, there are enough morphological differences to establish *D. sublaeve* n. status as a species, principally the pronotal disc texture, striae shape and male genitalia (aedeagus and internal sac sclerites).

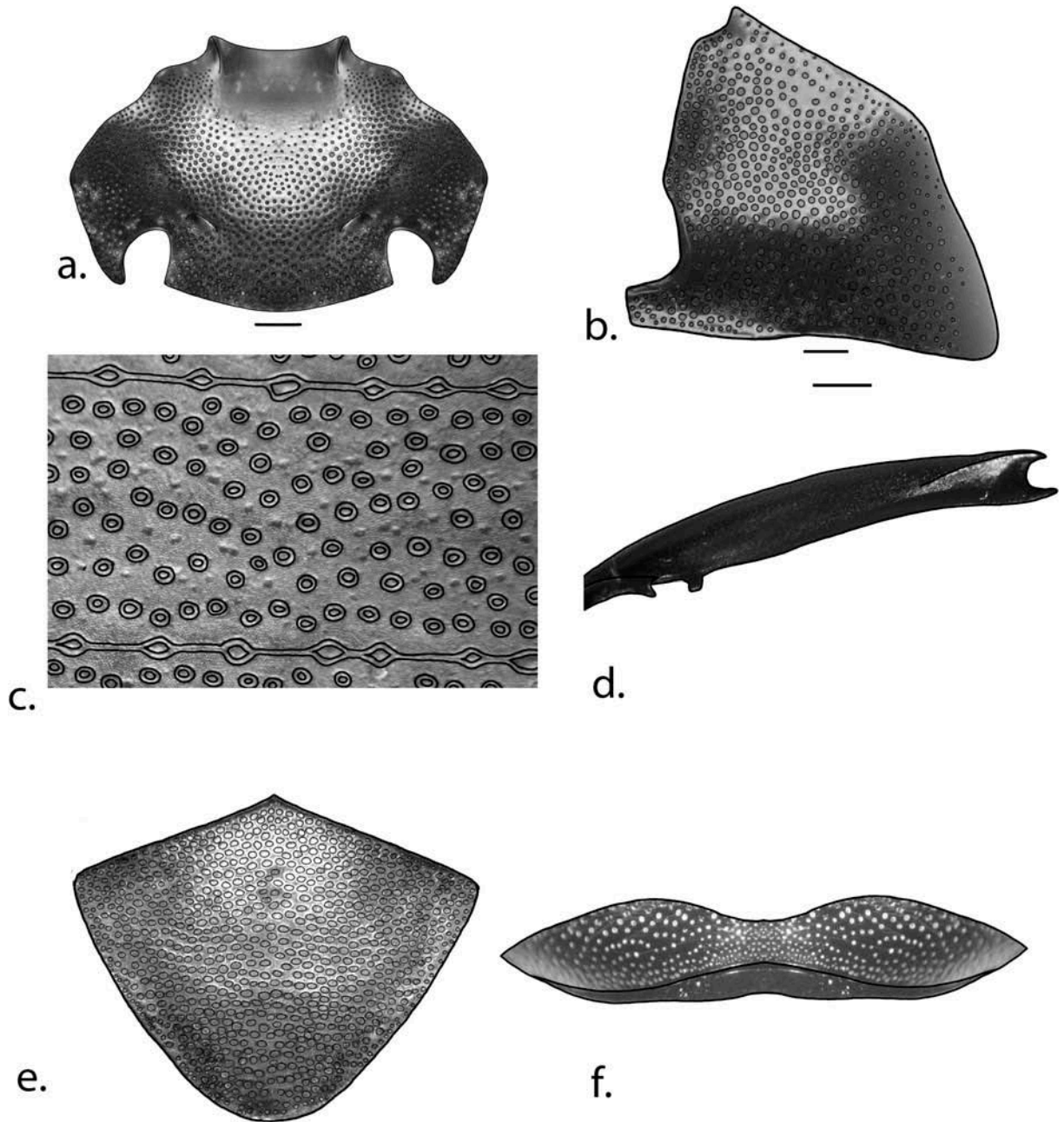
### *Deltochilum (Hybomidium) panamensis*

Howden 1966 n. status

(Figures 9, 10, 33)

*Deltochilum gibbosum panamensis* Howden 1966: 736

**Non-type material examined.** **COLOMBIA:** Antioquia: Embalse Porce, Bosque San Ignacio, Pit-fall pescado, XII.1997, M. Delgado [1 ♂ IAvH]. **Chocó:** Acandí, Capurganá, 8°37'N, 77°21'W, 20 m, Excremento humano, Ene-08, Arias, J. et al. [1 ♂ 1 ♀ CEMHNLGA]; P.N.N. Ensenada de Utria, 18.VII.1997, Pitfall Exc. Humano, Selva, Noche, Llanos-Jurado [1 ♂ CEMT]. **Nariño:** La Espriella, Bp- T, 50 m, Excremento Humano, IV.1995, F. Escobar. [1 ♂ 2 ♀ IAvH]. **ECUADOR:** Esmeraldas: Pajonal, 1.V.2001, Ex. Pitfall carroña, I. Yépez [1 ♀ CEMT]; Playa de Oro, Estero Pote, 0°51'88"N, 78°43'74"

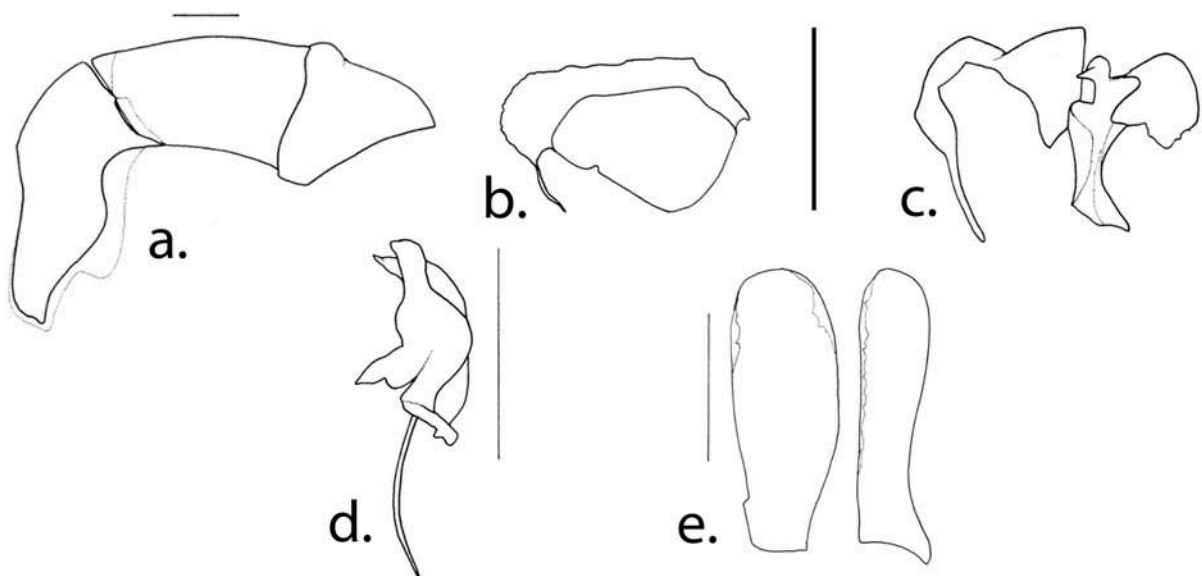


**Figure 9.** External morphology of *D. panamensis* n. status: **a**, head; **b**, hypomeron; **c**, elytral sculpture; **d**, lateral view posterior femur; **e**, pygidium; **f**, ventral view of the last abdominal ventrite and pygidium.

W, 12.II.1999, Ex. Pitfall Carroña, J. Celi & A. Dávalos [6 ♂ 4 ♀ CEMT], [3 ♂ 1 ♀ CECC]; Playa de Oro, Pote, 200 m, 11.XII.1998, Ex. Pitfall carroña, J. Celi [4 ♂ 2 ♀ CEMT]; Playa de Oro, III-2001, Ex. Pitfall heces humanas, M. Kellogg [1 ♀ CEMT]; 5 m 11 km SE S. Lorenzo, LaChiquita, For. Stat., 6–11.VI.1975, S. Peck, for. carrion traps [1 ♂ CMN]; **Pichincha**: 113 km N Puerto Quito, 2420–2680', 18–19.VIII.1976, J. Cohen dung trp 8 [1 ♂ CMN]. **PANAMA: Darién**: Cerro Campana, 800 m, 12.IX.

SEPT1970, H.P Stockwell [1 ♂ CMN]; Estación Ambiental Cana, 07°45.32'N, 77°41.07'W, 600–750 m, 5–7.VI.1996, R.S. Anderson, 96–110 human dung traps [1 ♂ CMN].

**Diagnosis.** Closely related to *D. sublaeve* n. status, *D. gibbosum*, and *D. carrilloi* n. sp. by surface of the interstriae mixed with bright points and punctures (Figure 9c), but distinguishable from all by apical



**Figure 10.** Male genitalia of *D. panamensis* n. status: **a**, aedeagus; **b**, circular-shape basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites.

posterior margin (between the dorsal and ventral faces) of the posterior femur excavated (Figure 9d), and the males without elytral humps. Also from *D. gibbosum* by the striae with the same depth as interstitial punctures (Figure 9c); from *D. sublaeve* n. status by striae fine, striae almost the same width as the distance between internal and external margins of each interstitial puncture, by interstitial punctures occupying about 1/11 of the distance between each stria (measured in the middle of the elytral length, in the fifth interstria), interstitial punctures smaller than striae punctures and punctures of the pronotal posterior margin (Figure 9c); and from *D. carrilloi* n. sp. by apical pygidial margin (ventral view) sinuated (Figure 9f).

**Description.** Color black. Head punctation strong, punctures separated by less than one diameter; punctures smallest between the medial teeth (Figure 9a). Pronotal punctation variable in size, punctures smallest in disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles straight; pronotal medial lateral angle rounded (Figure 9b). Hypomeral punctures variable in size; hypomeral punctures in the disc denser than the anterior and lateral margins; hypomeral punctures most dispersed toward the posterior and procoxal margins; hypomeral punctures separated by less than one diameter (Figure 9b). Striae fine, striae with almost the same width than the distance between internal and external margins of each interstitial puncture; striae without internal line, and with the same depth as interstitial punctures; surface of the interstriae with mixed

bright points and punctures; interstitial punctures smaller than striae punctures and the punctures of the pronotal posterior margin; interstitial punctures occupying about 1/11 of the distance between each stria (measured in the middle of the elytral length, in the fifth interstria); interstriae punctures separated by one or less than one diameter (diameter measured in the middle of the width of the interstria) (Figure 9c). Carina of the 9th interstria extending to the middle of the elytral length. Apical posterior margin (between the dorsal and ventral faces) of the posterior femur excavated (Figure 9d). Pygidial punctures transversely oval (Figure 9e); apical pygidial margin (ventral view) sinuated (Figure 9f).

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres; internal sac sclerites as in Figure 10.

**Sexual dimorphism.** Males with posterior tibiae curved near the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with tubercle on the ventral face of middle femur and elytral disc more convex than females.

**Distribution** (Figure 33). Panama, Colombia (Antioquia, Chocó, Nariño), Ecuador (Esmeraldas), Costa Rica (Howden 1966; Howden & Young 1981; Medina et al. 2001; Kohlmann et al. 2007).

**Remarks.** In the males there is some variation in the size of the ventral tooth in the anterior tibiae, depending on the development of the individual.

Howden (1966) described this species as subspecies of *D. gibbosum*; however, striae shape, excavation in the metafemora, sexual dimorphism (males without humps)



and male genitalia (aedeagus and internal sac sclerites) are different in *D. gibbosum* and *D. panamensis* **n. status**; based on these characteristics the new status (*D. panamensis* **n. status**) is proposed.

***Deltochilum (Hybomidium) carrilloi* n. sp.**  
(Figures 11, 12, 34)

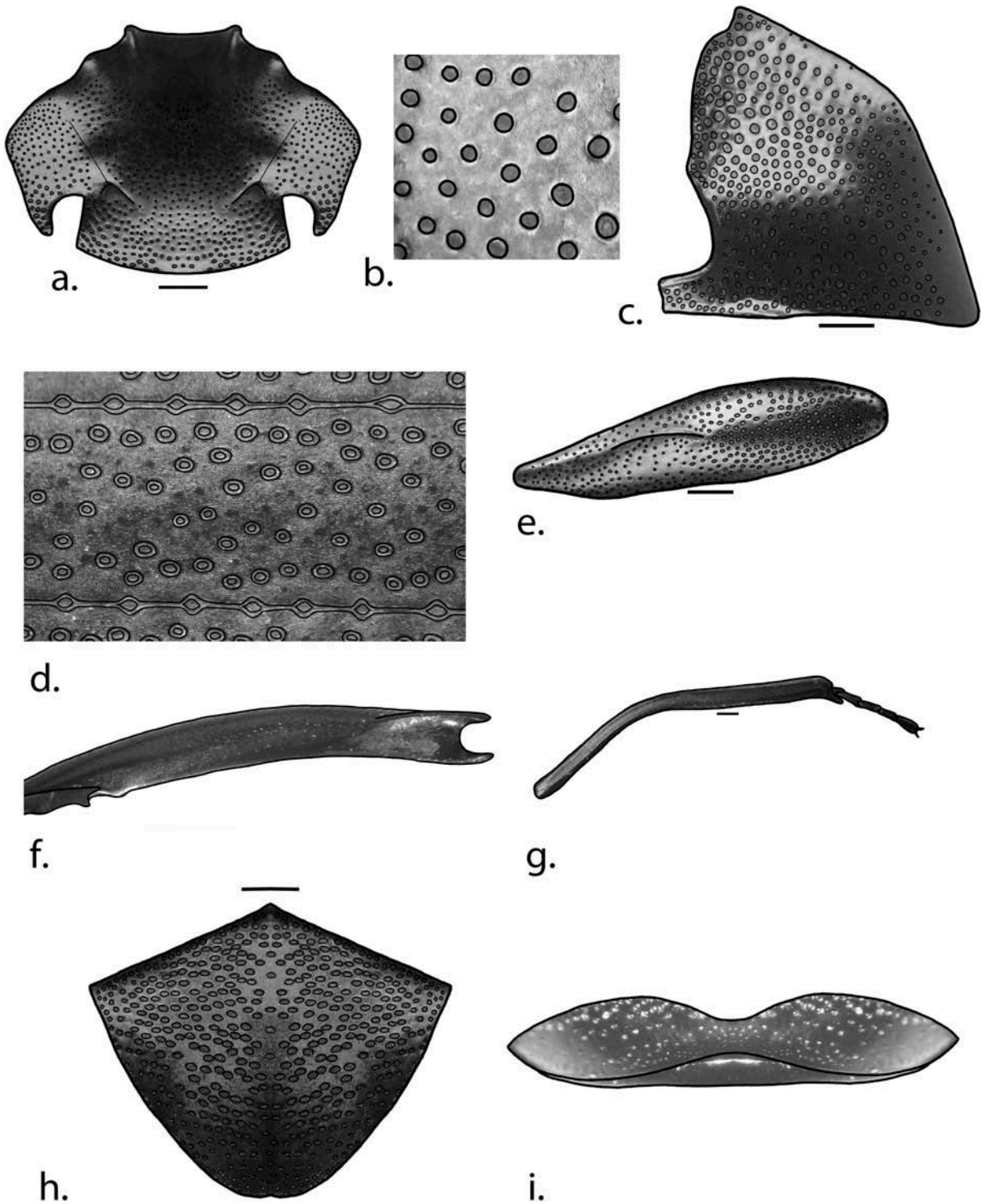
**Holotype.** ♂ **MEXICO: Jalisco**, San Cristóbal de la Barranca, Rancho el Tablón, 21°3'36"N, 103°25'50"W, 850 m, 31.VII.2004, Nicolade, Carrillo & F.Z. Vaz-de-Mello / HOLOTYPE, *Deltochilum, carrilloi* Gonz & VdM, des. F. Z. Vaz-de-Mello 2014 [red label] [CEMT].

**Paratypes.** **BELIZE (BR. HONDURAS):** Caves Branch, 23–29.VIII.1972, S & J Peck [1 ♂ CMN]. **GUATEMALA: Petén:** Parque Nac. Tikal, 5–6.IX.1995, Pescado shuco 1, Monitoreo 1, Area 1- B, G. Orellana [1 ♂ 2 ♀ CEMT]. **MEXICO: Chiapas:** Boca del Chajul, 28.VIII.1984, Coprotrampa [1 ♀ CEMT]; Lluvia Diario [1 ♂ CECC]; Reforma Agraria, Sendero las Guacamayas, 18.X.2006, S. Alto, T. Necro 4, F. Escobar [1 ♀ CECC]; Reserva de Montes Azules, 1783377 N, 15721562 E, 28.VIII.2005, G. Ponce [2 ♀ CEMT], [1 ♂ CECC]; Vicente Guerrero, Mun San Fernando, 4.VII.2006, trampa 16 calamar, Selva baja caducifolia, V. Caballero & M. Grum [3 ♂ 1 ♀ CECC]; 15 mi. W Ocozocuatla, 800', 25.VII.1971, A. Newton [1 ♂ CMN]; **Guerrero:** 200'4 mi. N Mezcala, 6.IX.1971, A. Newton 390 [1 ♂ CMN]. **Jalisco:** Casimiro, Castillo, Entrada al Parotal, Ejido Barranca de la Naranjera, 19°35' 10"N, 104°24'43"W, 29.VII.2004, Nicolade Carrilo & F.Z. Vaz-de-Mello [1 ♀ CEMT]; Casimiro, Castillo, camino al Ejido, Barranca de la Naranjera, 19°35'10"N, 104°24'43"W, 550 m, 29.VII.2004, Nicolade Carrillo & F.Z Vaz-de-Mello [1 ♀ CEMT]; San Cristobal de la Barranca, Rancho el Tablón, 21°3'36"N, 103°25'50"W, 850 m, 31.VII.2004, Nicolade Carrilo & F.Z. Vaz-de-Mello [2 ♂ 2 ♀ CEMT], [1 ♂ 1 ♀ IAvH]; Unión de Tula, Km. 131 carr. Guadalajara, Barra de Navidad, 19°52'46"N, 104°18'58"W, 1110 m, 30. VII.2004, Nicolas de Carrillo & Vaz-de-Mello [1#f CECC]; 3300'5.5 mi. NE Autlán, 19.IX.1971, A. Newton 425 [1 ♂ CMN]. **Morelos:** Yautepec, 31.VII.1963, FD Parker LA Stange [1 ♂ CMN]. **Oaxaca:** 12 mi. S. Valle Nacional, 3000', 17.V.1971, H. Howden [1 ♀ CMN]; **Quintana Roo:** Puerto Edo, Carrillo, IX.1984, A. Martínez [1 ♀ CEMT]; **Veracruz:** Catemaco, Papiapan, Parque de la Flora y Fauna Silvestre Tropical, 600, VIII.1991, NTP, Selva. Med. Per., F. Capistran [1 ♂ CEMT], [1 ♂ CECC]; Catemaco, Papiapan, Parque de la Flora y Fauna Silvestre Tropical, 600, 19. IV.1991, NTP, Acanual, F. Capistran [1 ♀ CEMT]; 33 km NE Catemaco, 160 m, S.&J. peck, Los Tuxtlas Biological Station, 1.VII–1.VIII.1983, FIT ravine rainforest [1 ♂ CMN]; Uxpanapa, Bajo Grande, 23.X.2006, S. Alto, Trampa de Luz UV, 10:30 pm, E. Mora & F. Escobar [1 ♂ CEMT]; Uxpanapa, Desviación hacia Liberales, La Orqueta,

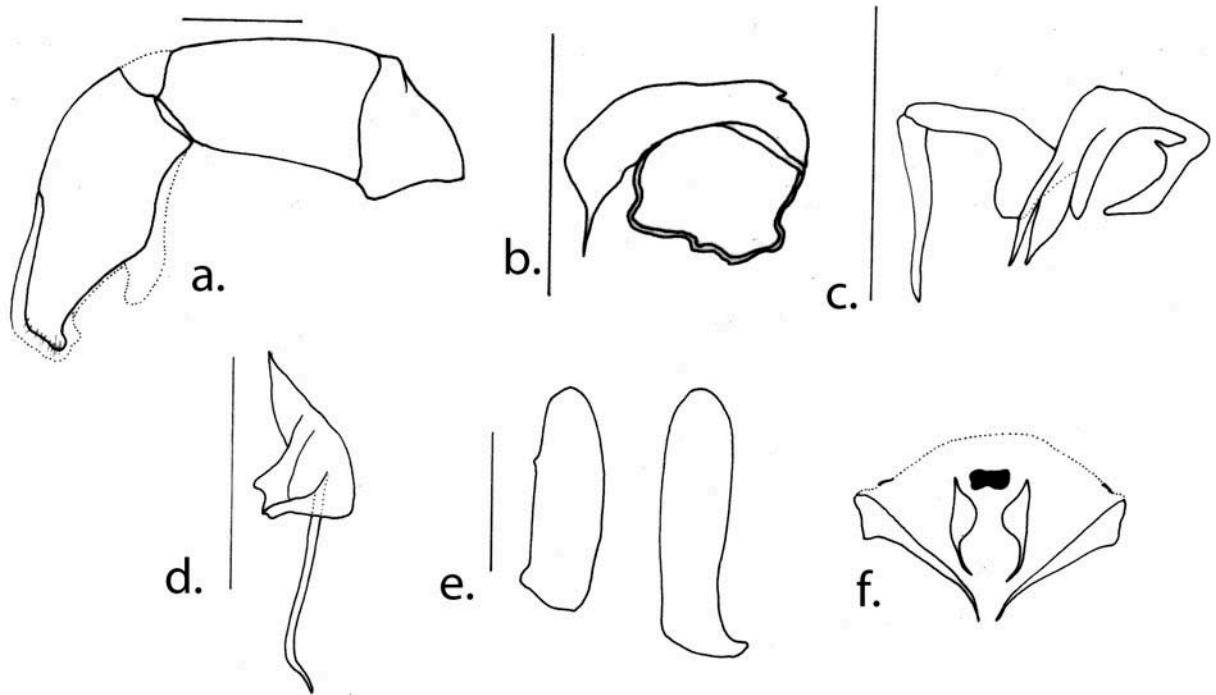
23.X.2006, Araceas, E. Mora & F. Escobar [2 ♀ CEMT]; Uxpanapa, Nuevo Soteapa, Espinazo del Diablo, 26.X.2006, S. Alto, t. necro Calamar, E. Mora & F. Escobar [2 ♀ CEMT], Copro Humana [1 ♀ CECC]. **NICARAGUA: Río San Juan:** 8 km SE El Castillo, Refugio Bartola, 30 m rnf, 10°56.6'N, 84°20.4'W, 6FITs, 25–1.V.2002, S. Peck #09 [1 ♂ CMN]. Paratypes IAvH-E-147828, IAvH-E-147829, IAvH-E-147830 with tissue preserved in IAvH-CT (tissue collection).

**Diagnosis.** Closely related to *D. gibbosum*, *D. sublaeve* **n. status** and *D. panamensis* **n. status** by surface of the interstriae mixed with bright points and punctures (Figure 11d), but distinguishable from *D. gibbosum* by striae deep, striae with the same depth as interstitial punctures (Figure 11d); from *D. sublaeve* **n. status** by fine striae, striae narrower than the distance between internal and external margins of each interstitial puncture, and striae without internal line (Figure 11d); from *D. panamensis* **n. status** by apical posterior margin (between dorsal and ventral faces) of the posterior femur shallowly excavated (Figure 11f), apical pygidial margin (ventral view) straight (Figure 11i) and males with elytral humps.

**Description.** Holotype male. Color black. Head punctuation strong, punctures separated by more than one diameter; punctures smallest between the medial teeth (Figure 11a); punctures in the vertex separated by more than one diameter (Figure 11a); Pronotal punctuation variable in size, punctures smallest in disc and gradually largest on posteriorly and laterally. Surface of the pronotal disc, between punctures, smooth and with small points (visible at 30×) (Figure 11b). Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 11c). Hypomeral punctures dense, punctures separated by less than one diameter, except in the lateral external margins (separated by one diameter) (Figure 11c). Disc elytral with humps. Striae deep, same depth as interstitial punctures; striae fine, striae narrower than the distance between internal and external margins of each interstitial puncture; striae without internal line; surface of the interstriae with mixed bright points and punctures; strial punctures with the same size as interstitial punctures; interstitial punctures occupying about 1/12 of the distance between each stria (measured in the middle of the elytral length, in the fifth interstria); interstitial punctures separated by more than one diameter (diameter measured in the middle of the width of the interstria) (Figure 11d). Carina of the 9th interstria extending until before the middle of the elytral length. Metasternum with two posterior tubercles and anteriorly of these another smaller tubercle. Front tibiae with small ventral tooth, almost parallel to basal dorsal tooth. Ventral face of middle (Figure 11e) and posterior



**Figure 11.** External morphology of *D. carrilloi* n. sp.: **a**, head; **b**, pronotal disc sculpture; **c**, hypomeron; **d**, elytral sculpture; **e**, middle femur of the male; **f**, lateral view posterior femur; **g**, posterior tibia of the male; **h**, pygidium; **i**, ventral view of the last abdominal ventrite and pygidium.



**Figure 12.** Male genitalia of *D. carrilloi* n. sp.: a, aedeagus; b, circular basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

femora with punctation separated by less than one diameter; ventral face of middle femur with tubercle (Figure 11e). Apical posterior margin (between the dorsal and ventral faces) of the posterior femur shallowly excavated (Figure 11f); posterior tibiae curved in the middle of their length (Figure 11g). First abdominal ventrite expanded medially, second to fourth abdominal ventrites visible only laterally. Pygidial punctures transversely oval and punctures variable in density (Figure 11h); apical pygidial margin (ventral view) straight (Figure 11i).

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres, apex of the parameres with setae; internal sac sclerites and genital segment as in Figure 12.

**Variation.** Paratypes vary in sexual features, females with posterior tibiae not curved in the middle; females with the first abdominal ventrite not expanded medially, second to fourth abdominal ventrites visible medially; anterior tibiae of the females without or with very small ventral tooth, if present more basal than males; females without tubercle in the ventral face of the middle femur; elytral disc in females without humps. Also in paratypes, the ventral tooth of the protibiae varies in size; this tooth is very small in underdeveloped males. The elytral humps vary in size depending on development of the individual, underdeveloped males with elytral humps with the same size (just noticeable) as in well-developed females. Some fragments of the striae have an internal line, but never in all the strial length; moreover, the

majority and the great part of striae do not have an internal line. The pronotal disc points, between the punctures, in some specimens are very difficult to see (30×).

**Etymology.** This species is dedicated to Pablo Carrillo Reyes, Mexican botanist, friend, and collector of part of the type series.

**Distribution** (Figure 34). West Mexico (Jalisco).

***Deltochilum (Hybomidium) lobipes* Bates 1887**  
(Figures 13, 14, 35)

*Deltochilum lobipes* Bates 1887: 37

**Type material examined.** Lectotype ♂, designated by Howden (1966), examined [NHML]; **Paralectotypes:** 1 ♂ Chontales, Nicaragua (handwritten)/ *Deltochilum lobipes* male symbol (handwritten)/ H.W. Bates, Biol. Cent. Amer./ *D. lobipes* Bates, Paulian vid. (handwritten)/ R. PAULIAN, vidit/ [green label] Museum Paris, ex. Coll., R. Oberthur [MNHN]; 1 ♂ Tehuantepec, Pacific side (handwritten)/ *Deltochilum, lobipes*, Bates male symbol (handwritten)/ H.W. Bates, Biol. Cent. Amer. [MNHN]; 1 ♀ [green label] Tehuantepec (handwritten)/ Mexico., Salle-Coll./ *Deltochilum, elevata* apud Sallé (handwritten)/ H.W. Bates, Biol. Cent. Amer. [MNHN]; 1 ♀ Tehuantepec, Pacific side (handwritten)/ *Deltochilum, lobipes*, Bates female symbol (handwritten)/ H.W. Bates, Biol. Cent. Amer. [MNHN].

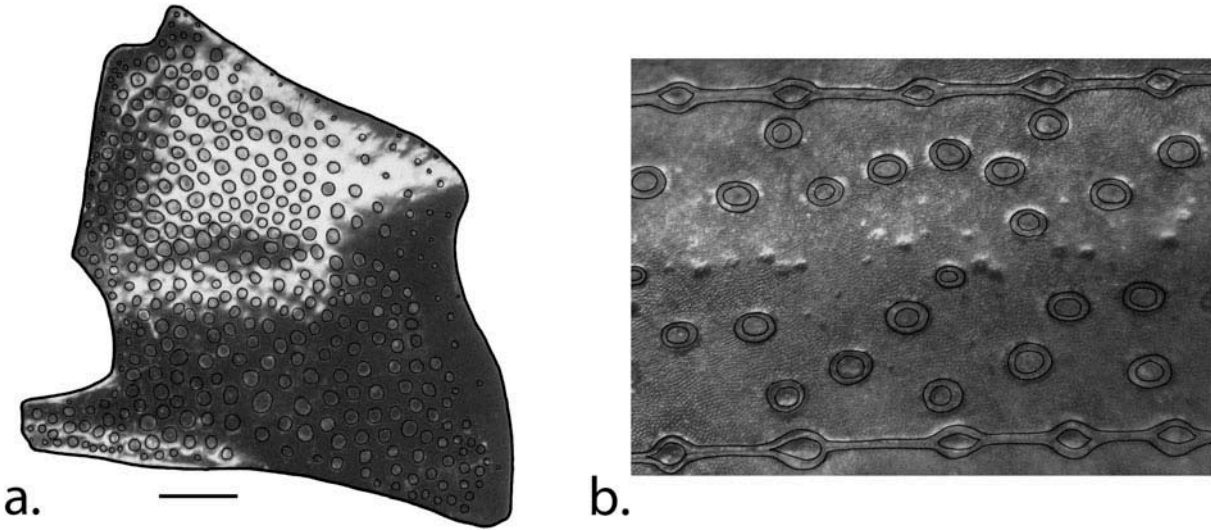


Figure 13. External morphology of *D. lobipes*: a, hypomeron; b, elytral sculpture.

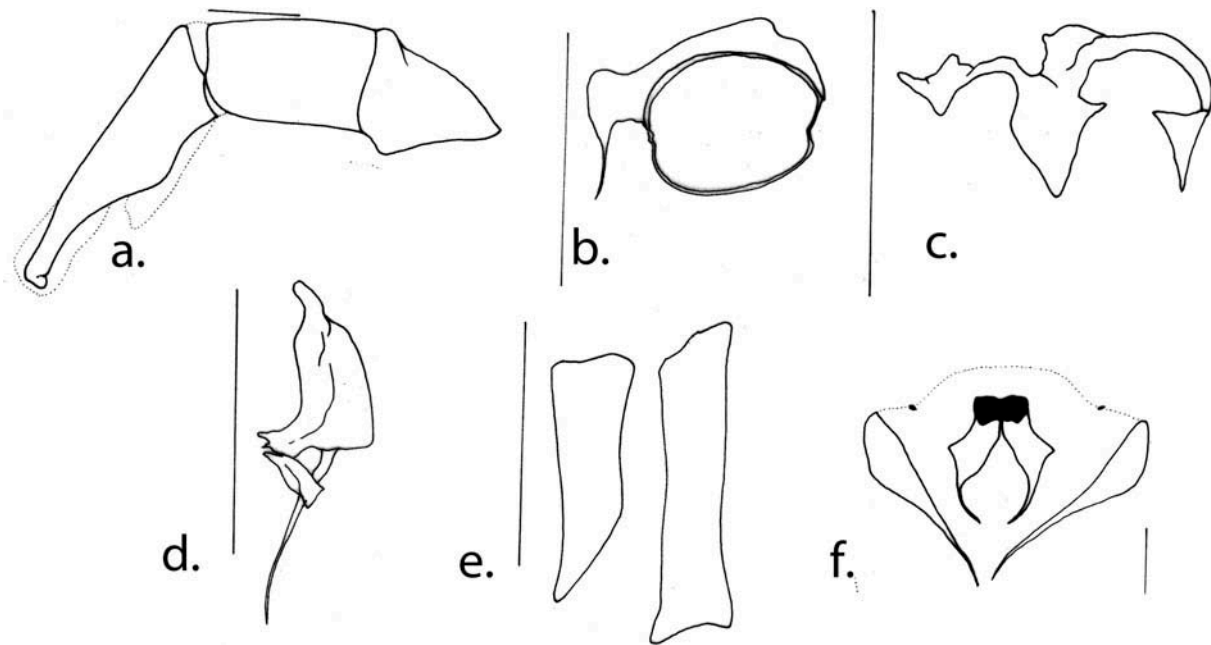


Figure 14. Male genitalia of *D. lobipes*: a, aedeagus; b, circular basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

**Non-type material examined.** Nevinson coll, 1918-14, coll. Boucomont [1 ♀ MZUSP]. **BELIZE:** Caves Branch, 23-29.VIII.1972, S & J Peck [1 ♂ CMN]; Indian Church, 29.V.1976, J. Arnason & J. Lambert [1 ♀ CMN]. **EL SALVADOR:** 12 km W La Libertad, 13.V.1971, HF Howden [1 ♀ CMN]. **GUATEMALA:** **Petén:** Chuntuqui, 15.V.1923, Harry Malleis collector; L.W Saylor Colln [1 ♂ MZUSP]; Pacomon, 2-8.VI.1923, Harry Malleis collector; L.W Saylor Colln [1 ♂ MZUSP]; Pacomba, 2-8.VI.1923, H.

Mallela [1 ♀ CMN]; Parque Nac. Tikal, área # 1-B, 5-6. IX.1995, Pescado shuco 1, Monitoreo, G. Orellana [1 ♂ 2 ♀ CEMT]. **HONDURAS:** F. Morazán, 6 km SE Zamorano, 850 m, 8.VI.1994, thorn scrub, H&A Howden [1 ♂ CMN]. **MEXICO:** **Campeche:** Xpujil, 26.VII.1995, J.L. Moreno & T. Mestre [1 ♂ 1 ♀ CECC], carne serpiente [1 ♂ 2 ♀ CEMT]. **Oaxaca:** 1 mi E Reforma, 100', 15.VIII.1973, A. Newton [1 ♀ CMN]. **Quintana Roo:** Puerto Edo, Carrillo, IX.1984, A. Martínez [1 ♂ CEMT]; Reserva Sian Ka'an, km. 12 Camino



Nuevo hacia El Ramonal, 10 m, NTP 80, Bosque Tropical Subcaducifolio, 19.VI.1984, O. Canul J.F. Camal [1 ♂ 1 ♀ CEMT], 10.V.1985 [1 ♂ CEMT], 11.II.1985 [1 ♂ CEMT]. **Tamaulipas:** Adolfo López Mateos, Cerro el Chamalito, 22° 54'57"N, 99°9'37"W, 14–17.IX.2003, Parada 2, Selva baja caducifolia, Cervantes Santiago [1 ♀ CECC], L. Cervantes & Q. Santiago, NTP 80 [1 ♂ CEMT], [1 ♀ CECC], NTP 80 Calamar [3 ♂ 1 ♀ CEMT]; Adolfo López Mateos, Cerro el Chamalito, IX.2003, L. Cervantes & Q. Santiago [2 ♂ 2 ♀ CEMT]. **Veracruz:** Catemaco, La Victoria, IX.2006, S. Rodríguez [1 ♂ CECC].

**Diagnosis.** Closely related to both *D. molanoi* n. sp. and *D. pseudoicarus* by pronotal medial lateral angle projected (Figure 13a), but distinguishable from the first by interstriae calluses smaller than interstitial punctures, and by interstitial punctures occupying about 1/8 of the distance between each stria (Figure 13b); and from *D. pseudoicarus* by interstriae with calluses; in *D. pseudoicarus* the interstriae are costate.

**Description.** Color black. Head punctation strong, punctures separated by one diameter; punctures smallest between the medial teeth. Pronotal punctation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles sinuated; pronotal margin between medial lateral and posterior angles strongly sinuated; pronotal medial lateral angle projected (Figure 13a). Hypomeral punctures variable in size, punctures separated by less than one diameter (Figure 13a). Striae deep; interstriae with bright calluses in the central one-third of their width; interstitial calluses with the same size or, always the majority, smaller than interstitial punctures; interstitial punctures with the same size (rarely smaller) as stria punctures; interstitial punctures occupying about 1/8 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria) (Figure 13b). Carina of the 9th interstria extending until before the middle of the elytral length. Pygidial punctation deep and punctures separated by less than one diameter.

In lateral view, apex of the parameres about 1/4 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 14.

**Sexual dimorphism.** Males with posterior tibiae curved near the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with tubercle on the ventral face of middle femur and with humps in the elytral disc.

**Distribution** (Figure 35). East Mexico (Tamaulipas, Quintana Roo, Veracruz), Guatemala (Petén), Honduras, Costa Rica, Nicaragua (Bates 1887; Blackwelder 1944; Vulcano & Pereira 1964; Howden 1966; Padilla & Halffter 2007; Paulian 1938; Verdú et al. 2007; Halffter & Arellano 2001; Deloya et al. 1987; Kohlmann et al. 2007).

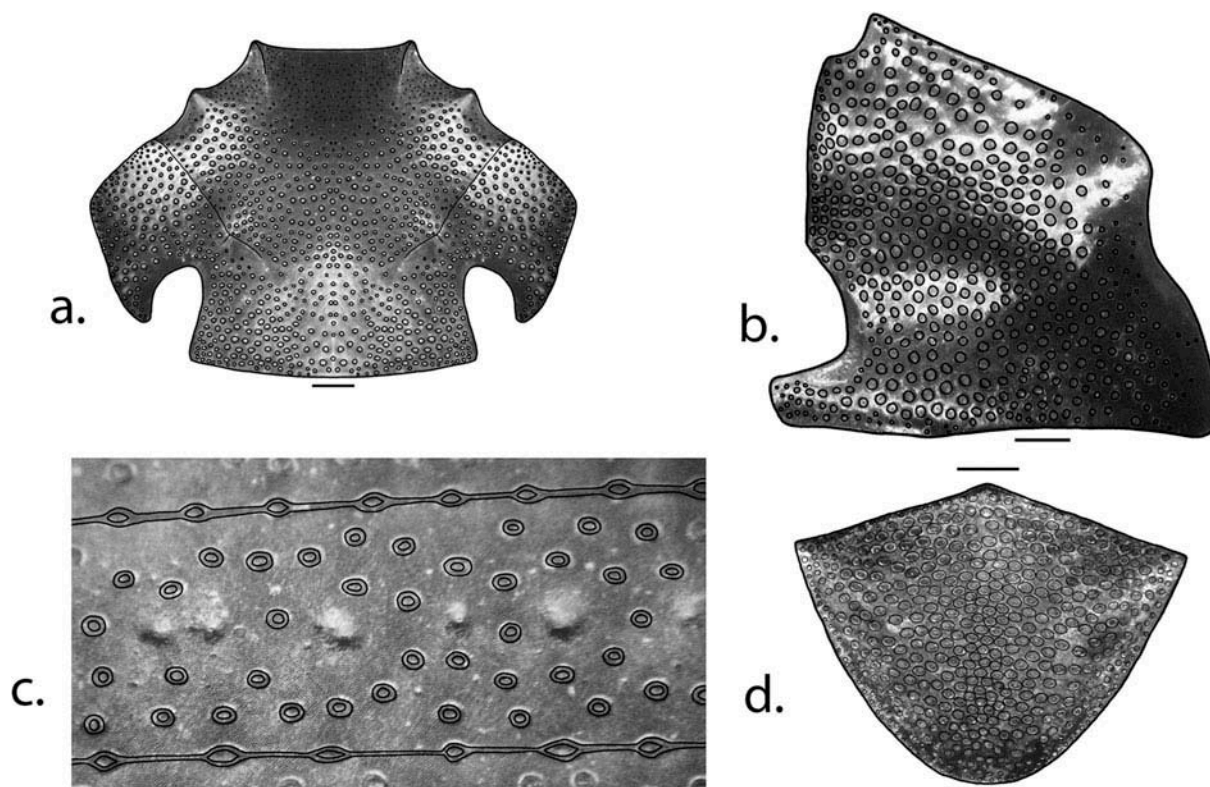
**Remarks.** In the males, there is some variation in the size of the elytral humps and the tubercle of the ventral face of middle femur; underdeveloped males with elytral humps with the same size (just noticeable) as in females. Well-developed males have very strong interstitial punctures, making the elytra look wrinkled. This species has been reported in Colombia (Medina et al. 2001; González et al. 2009) however it is a misidentification.

***Deltochilum (Hybomidium) molanoi* n. sp.**  
(Figures 15, 16, 36)

**Holotype.** ♂ Colombia, Caldas, Norcasia, Vda. San Roque, Reserva Natural Río Manso, 05°39'40"N, 74°46'98"W, 160–220 m, Bosque, Trampa excremento humano #86, 6–8.VIII.2004, E. González, L. Arango & A. Montes [IAvH]; second label: IAvH-E 72317; third label (handwritten): Norcasia TCE 86 Deltochl!/HOLOTYPE, *Deltochilum molanoi* Gonzalez & Vaz-de-Mello, des. A. Gonzalez 2014 [red label] [IAvH].

**Paratypes. COLOMBIA: Caldas:** Norcasia, Vda. San Roque, Reserva Natural Río Manso, 05°39'40"N, 74°46'98"W, 160–220 m, Bosque, Trampa de caída #67, 6–8.VIII.2004, E. González, L. Arango & A. Montes, IAvH-E 72323 [1 ♂ IAvH]. Norcasia, Vda. San Roque, Reserva Natural Río Manso, 05°39'40"N, 74°46'98"W, 160–220 m, Bosque, Trampa de caída #76, 6–8.VIII.2004, E. González, L. Arango & A. Montes, IAvH-E 72321 [1 ♀ IAvH]. **Huila:** Garzón, Vereda El Espinal, Reserva Taky-Huaylla, Transición Bosque seco y bosque montano bajo, 2°17'45" N, 76°35'37"W, 1000 m, Trampa de excremento humano 4, 18.IX.2002, Ospina, M & A. Sierra [1 ♂ 1 ♀ CEMHNLGA], Trampa de excremento humano 5 [1 ♀ CEMHNLGA], Trampa de excremento humano 17 [2 ♀ CEMHNLGA], Trampa de excremento humano 12 [1 ♀ CEMHNLGA], Trampa de excremento humano 2 [1 ♂ CEMHNLGA], Trampa de excremento humano 3 [1 ♂ 1 ♀ CEMHNLGA]; Garzón, Reserva Natural Privada Taky-Huaylla, 02°17'00"N, 75°35'00"W, 830–1100 m, Bosque seco tropical, Transecto 1, Trampa de excremento humano 1, IX.2002 M, Ospina & A. Santamaría [1 ♀ IAvH]; Garzón, Vda. El Espino, Reserva Taky-Guaylla, Transición Bosque seco-Montano bajo, 2°17'N, 75°35'W, 1000 m, T.Ecx.H 58, 16–18.IX.2002, Ospina M. [1 ♂ 1 ♀ IAvH]; **Santander:** Serranía de las Quinchas, Reserva el Paujil, XI.2006, Santos-Zarate [1 ♂ CEMT]. Paratypes IAvH-E-124529, IAvH-E-124528, IAvH-E-72321 with tissue preserved in IAvH-CT (tissue collection).

**Diagnosis.** Closely related to both *D. pseudoicarus* and *D. lobipes* by the pronotal medial lateral angle projected (Figure 15b), but distinguishable from *D. pseudoicarus* by interstriae with bright calluses in the central one-third of their width (Figure 15c), and from *D. lobipes* by interstriae with calluses larger than interstitial punctures,



**Figure 15.** External morphology of *D. molanoi* n. sp.: **a**, head; **b**, hypomeron; **c**, elytral sculpture; **d**, pygidium.

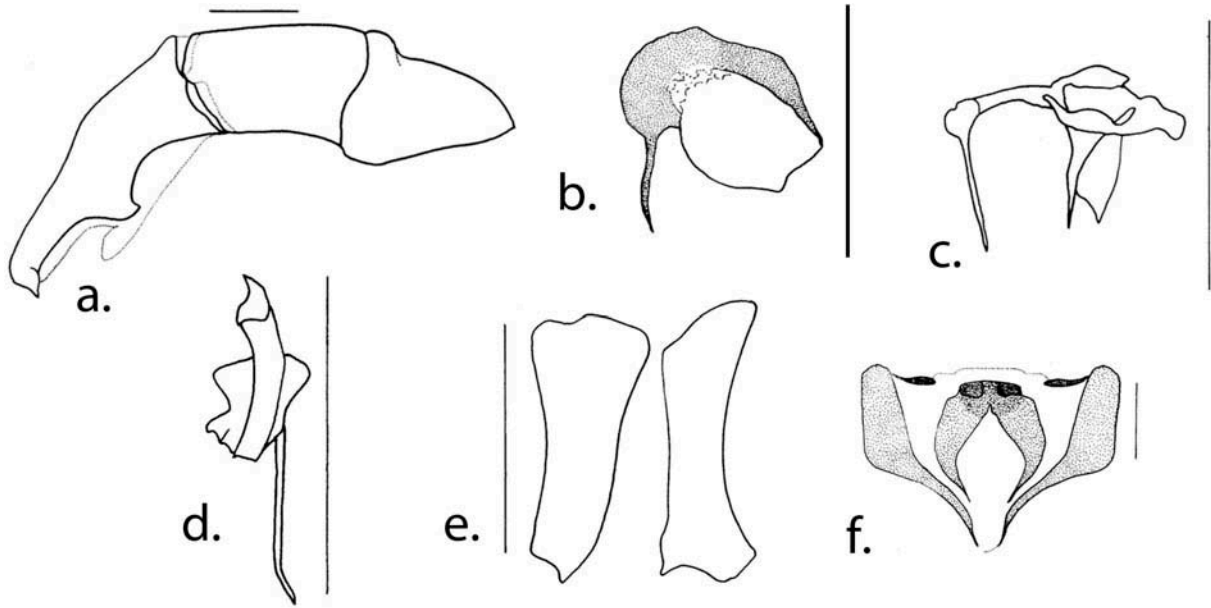
and by interstitial punctures occupying about 1/10 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria) (Figure 15c).

**Description.** Holotype male. Color black, with cupreous shine on the interstriae. Head punctation strong and punctures separated by less than one diameter; punctures smallest between the medial teeth (Figure 15a). Pronotal punctation variable in size, punctures smallest in disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles about straight; pronotal margin between medial lateral and posterior angles strongly sinuated; pronotal medial lateral angle projected (Figure 15b). Hypomeral punctures variable in size, punctures smallest toward the lateral external margins; hypomeral punctures separated by less than one diameter, except toward the pronotal margin between anterior and medial lateral angles, where the punctures are more dispersed (Figure 15b). Elytral disc with humps. Striae deep; interstriae with bright calluses in the central one-third of their width; interstitial calluses larger than interstitial punctures, principally in the interstriae 5–7; stria punctures with the same size as interstitial punctures (Figure 15c); interstitial punctures occupying about 1/10 of the distance between each stria (measured in the middle of the elytral length, in the fifth interstria) (Figure 15c). Carina of the 9th interstria extending until before the middle of the elytral length. Metasternum with two posterior tubercles and

anteriorly of these another smaller tubercle. Front tibiae with small ventral tooth, almost parallel to the basal dorsal tooth. Ventral face of middle and posterior femora with punctation separated by less than one diameter; ventral face of middle femur with tubercle; posterior tibiae curved in the middle. First abdominal ventrite expanded medially, second to fourth abdominal ventrites visible only laterally. Pygidial punctation deep, punctures separated by less than one diameter (Figure 15d).

In lateral view, apex of the parameres about 1/3 the width of the base of the parameres, internal sac sclerites and genital segment as in Figure 16.

**Variation.** Paratypes vary in sexual features, females with posterior tibiae not curved in the middle. Females with first abdominal ventrite not expanded medially, second to fourth abdominal ventrites visible medially; anterior tibiae of the females without or with very small ventral tooth, if present more basal than males. Females without tubercle in the ventral face of the middle femur; elytral disc in females without humps. Also in paratypes, the interstriae calluses vary in size; in some individuals, the calluses in interstriae 2–4 have the same size or are smaller than the interstitial punctures, but in interstriae 5–7 the size is always the same size or larger than interstitial punctures. These individuals are closely related to *D. lobipes*; but in *D. lobipes*, the calluses in all interstriae are smaller than



**Figure 16.** Male genitalia of *D. molanoi* n. sp.: a, aedeagus; b, circular basal sclerite; c, plate-shaped sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

interstitial punctures. The ventral tooth in the anterior tibiae, in underdeveloped males, is very small.

**Etymology.** A patronym honoring Fredy Molano Rendón, scarabaedologist, teacher and friend of the first author.

**Distribution** (Figure 36). Colombia (Caldas, Huila and Santander).

**Remarks.** This species was misidentified by González et al. (2009) as *D. lobipes*.

*Deltochilum (Hybomidium) orbigny orbigny*  
(Blanchard 1846)

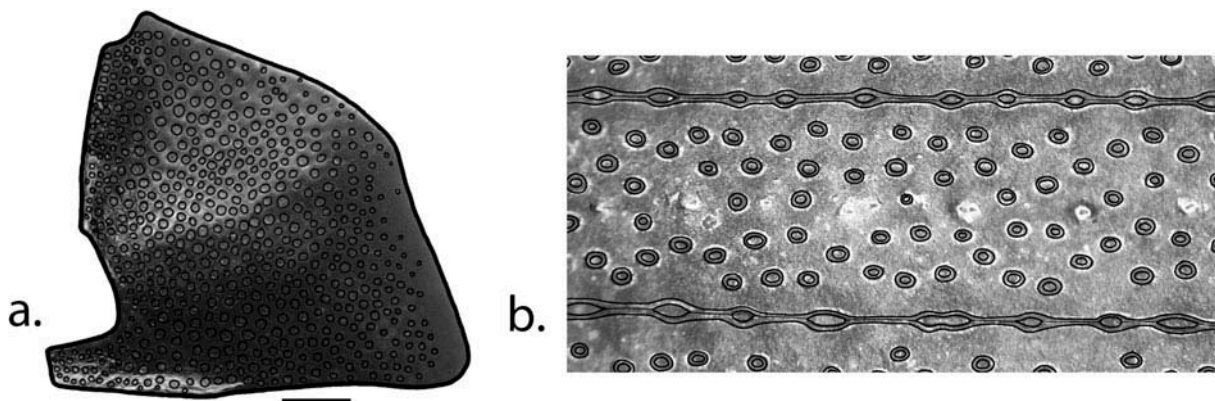
(Figures 17, 18, 37[squares])

*Hyboma orbigny* Blanchard 1846: 156

**Type material examined. Holotype:** 1 ♀ [green label] *Deltochilum, orbigny*, Blanch. (handwritten)/ [circular label] 5799, 34 (handwritten)/ [red label] TYPE / [MNHN].

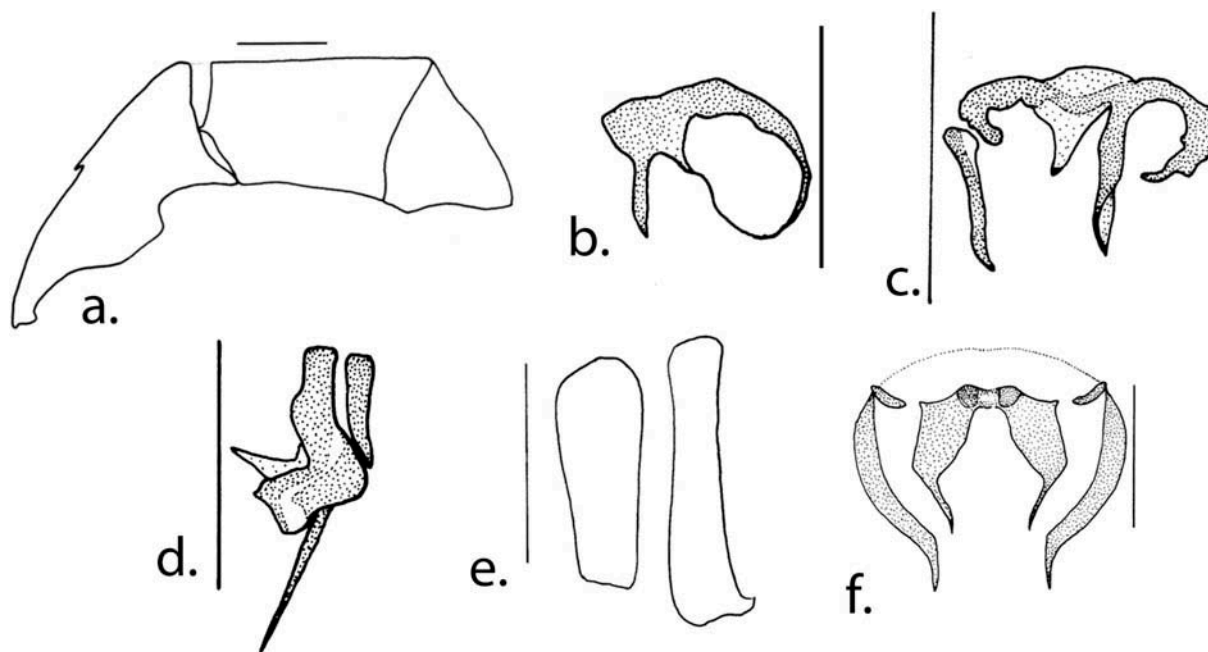
**Remarks.** According to the original description and also to the catalogue of specimens of d’Orbigny expedition housed at MNHN, this specimen was collected in Corrientes province, Argentina.

**Non-type material examined. ARGENTINA: Salta:** El Tunal, J.V. González, Salado riv, 20.I.2010, Snidek (1 ♂ CEMT); **BOLIVIA: Santa Cruz:** Buenavista, II.1956 [1 ♂ MZUSP], II.1950 [1 ♀ MZUSP]; Buenavista, Peia. Ichilo, II.1950 A. Martínez leg. [2 ♂ 3 ♀ MZUSP]; Guanay, X.1992 [1 ♂ CEMT], Paracti III.1993 [2 ♂ CEMT]; Ichilo, Río Ichilo, Steinbach [1 ♂ CMN]; Santa



**Figure 17.** External morphology of *D. orbigny orbigny*: a, hypomeron; b, elytral sculpture.





**Figure 18.** Male genitalia of *D. orbigny orbigny*: **a**, aedeagus; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

Cruz de la Sierra, Jardín Botánico, Km 8 1/2 carretera a Cotoca, 17°45'51.3"S, 63°39'30.8"W, 10–12.XI.2006, Scarabnet team [2 ♀ CEMT]; 3.7 km SSE Buena Vista, Hotel Flora y Fauna, 17°29'S, 63°3'W, 7–12.V.2004, A. Cline collr FIT [1 ♂ CMN].

**Diagnosis.** Closely related to *D. lobipes*, *D. molanoi* n. sp., *D. loperae* and *D. guildingii* by interstriae with bright calluses in the central one-third of their width (Figure 17b), but distinguishable from the *D. lobipes* and *D. molanoi* n. sp. by pronotal medial lateral angle rounded (Figure 17a), from *D. loperae* by interstitial punctures smaller than strial punctures (Figure 17b) and from *D. guildingii* by interstitial calluses with the same size or smaller than interstitial punctures (Figure 17b).

**Description.** Color black cupreous. Head punctation strong, punctures separated by less than one diameter; punctures smallest between the medial teeth. Pronotal punctation variable in size, punctures smallest in the disc and gradually largest posteriorly laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles almost straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 17a). Hypomeral punctures variable in size, punctures smallest toward lateral external margins; hypomeral punctures separated by less than one diameter (Figure 17a). Striae with longitudinal oval punctures; interstriae with bright calluses in the central one-third of their width; interstitial calluses with the same size or smaller than interstitial punctures, sometimes in interstria 3 with calluses larger than

interstitial punctures; interstitial punctures with the same size or smaller than strial punctures (Figure 17b). Carina of the 9th interstria extending until before the middle of the elytral length. Pygidial punctation deep, punctures smallest in the lateral and apical margins; pygidial punctures separated by less than one diameter. Ventral face of middle and posterior femora with punctation smallest basally, gradually largest and most dense at apex.

In lateral view, apex of the parameres about 1/6 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 18.

**Sexual dimorphism.** Males with posterior tibiae curved in the basal one-third, anterior tibiae with ventral tooth larger and more apical than females; males with small tubercle in the ventral face of middle femur and humps in the elytral disc.

**Distribution** (Figure 37 squares). Bolivia, Santa Cruz, Buenavista.

**Remarks.** There is some variation in the size of the elytral humps, underdeveloped males with elytral humps with the same size (just noticeable) as in females. Well-developed females with ventral tooth in the anterior tibiae, nearly the same size as in underdeveloped males, but always, in the females, it is more basal. Some individuals have large calluses in some interstriae, but the calluses never are larger than interstitial punctures.

Paulian (1938) observed the types of *D. orbigny* and *D. chalcea* and proposed the synonymy between them, and he stated that the type of *D. orbigny* is one individual



of Corrientes, with indistinguishable elytral reliefs. The lectotype of *D. chalcea* have interstitial calluses larger than interstitial punctures, and in the holotype of *D. orbignyi* the interstitial calluses are smaller than interstitial punctures; therefore, the synonymy between these two species is invalidated and the synonymy between *D. chalcea* and another species is proposed (see *D. guildingii*).

***Deltochilum (Hybomidium)***  
***orbignyi amazonicum* Bates 1887 n. status**  
**(Figure 37 [triangles])**

*Deltochilum amazonicum* Bates 1887: 37

*Deltochilum gibbosum amazonicum* Kolbe 1905: 534

**Type material examined. Lectotype ♂, here designated:**

Pebas, Amaz. (handwritten)/ *Deltochilum, amazonicum*, Bates male symbol major (handwritten)/ Ex Musæo, H.W. BATES 1892/ R. PAULIAN, Vidit / LECTOTYPE, *Deltochilum, amazonicum*, Bates, des. F.Z. Vaz-de-Mello 2014 [red label] [MNHN]; **Paralectotypes:** 1 ♂ Ega (handwritten)/ *amazonicum*, Bates (handwritten)/ Ex Musæo, H.W.BATES 1892/ R. PAULIAN, Vidit / PARALECTOTYPE, *Deltochilum, amazonicum*, Bates, des. F.Z. Vaz-de-Mello 2014 [yellow label] [MNHN]; 1 ♀ Ega (handwritten)/ Ex Musæo, H.W.BATES 1892/ R. PAULIAN, Vidit/ PARALECTOTYPE, *Deltochilum, amazonicum*, Bates, des. F.Z. Vaz-de-Mello 2014 [yellow label] [MNHN]; 1 ♀ Ega (handwritten)/ Ex Musæo, H.W. BATES 1892 / PARALECTOTYPE, *Deltochilum, amazonicum*, Bates, des. F.Z. Vaz-de-Mello 2014 [yellow label] [MNHN]; 1 ♀ Ega (handwritten)/ *Deltochilum, amazonicum*, Bates female symbol (handwritten)/ Ex Musæo, H.W.BATES 1892/ R. PAULIAN, Vidit / PARALECTOTYPE, *Deltochilum, amazonicum*, Bates, des. F.Z. Vaz-de-Mello 2014 [yellow label] [MNHN].

**Non-type material examined,** Amazonas, Comp. Standi 1901 [1 ♀ MZUSP]; Fac. MEDICINA S.B. Pessoa of 1944 [1 ♀ MZUSP]; Rio Parauary, III.1937, Worontzow, Fac. MEDICINA S.B. Pessoa of 1944 [2 ♂ 1 ♀ MZUSP], II.1937 [7 ♂ 3 ♀ MZUSP]; Parauary, Amaz., III.1937 [1 ♂ 1 ♀ MZUSP]; Rio Parauary, Amaz., 15.III.1937 [1 ♀ MZUSP]. **BRAZIL: Acre:** Feijó, XII-1956, Werner col. [2 ♂ MZUSP]; Rio Branco, Parque Zoobotânico, Universidade Federal do Acre, II.1997, Fezes, F.Z Vaz-de-Mello [1 ♂ 2 ♀ CEMT], [1 ♂ CECC]; Rio Branco, Sec. For. PZ – UFAC, II.1997, F.Z Vaz-de-Mello [1 ♀ CEMT]; Senador Guimard, Fazenda Catuaba, II.1997, Carcaça, F.Z Vaz-de-Mello [1 ♀ CEMT]. **Amazonas:** Benjamin Constant, Nova Aliança, 13.III.2004, Floresta, P.H. Silva [1 ♂ CEMT]; Borba Lago Acará, IX.1943, Coleção Campos Seabra, A. Parko [1 ♀ MZUSP]; BR 319 km. 350, 5°12'56.4"S, 61°50'22.6"W, 30.VII-2.VIII.2007, H. Gasca [1 ♂ 1 ♀ CEMT]; Carauari, Res. Des. Sust. Uacari, 5.44337S, 67.27773W, 12.IX.2008, E.S. Nichols

[3 ♂ 1 ♀ CEMT]. **Mato Grosso:** Alta Floresta, Ceplac, 6.XI.2009, Fezes humanas, V. Gonçalves [1 ♀ CEMT]; Cotriguaçu, Fazenda São Nicolau, 9°50'18"S, 58°15'2"W, 250 m, X.2009, Fezes humanas, Matinha, F.Z. Vaz-de-Mello et al. [1 ♀ CEMT], 8.X.2009 [1 ♂ CEMT], 9°51' 11"S, 58°13'29"W, 195 m, 5.X.2009, Mata do Juruena [1 ♀ CECC], 9°50'26"S, 58°15'10"W, 245 m, 8.X.2009, Pitfall Fezes Humanas Mata, F.Z. Vaz-de-Mello [5 ♂ CEMT]; Cotriguaçu, Fazenda São Nicolau, 5–8.X.2009, Matinha, Prainha, F.Z Vaz-de-Mello [1 ♂ CEMT], [1 ♂ CECC], 8. X.2009, Matinha [1 ♂ CEMT], X.2009, Prainha [1 ♂ CEMT], 8-X-2009, Fezes humanas, Matinha [1 ♀ CEMT], X.2009 [1 ♂ CEMT], MP [1 ♂ CEMT]; Paranaita, Rio Teles Pires, Fazenda Aragão, magem esquerda, 5°13'37"S, 56°59'56"W, 15.VI.2009, Pitfall com Fezes Humanas, M.F. Souza & M. Uehara-Prado [1 ♂ CEMT]; Sinop, Fazenda Continental, 23.XII.2009, Modulo I MIT2 P8, Armadilha 5, 1 ♂, 24.XII.2009, MI TI P5 Armadilha 5 [1 ♀ CEMT]; Sinop, Módulo PPBio I, 11°36'56"S, 55°14'42"W, 375 m, X.2009, M.F. Carvalho [1 ♂ CEMT]; Sinop, 24 h., 18.II.2010, MI TI P2 [1 ♂ CEMT]; Vila Rica, 8.X.1997, G. Skuket al- col. [2 ♂ 1 ♀ MZUSP]; Xingu, XI-1961, Alvarenga & Werner [1 ♀ MZUSP]. **Pará:** Jacareacanga, Rio Teles Pires, Ponto do meio margem direita, 9.VI.2009, Pitfall com Fezes Humanas, M.F. Souza & M. Uehara-Prado [1 ♂ 1 ♀ CEMT], Rio Teles Pires, Fazenda Aragão, magem direita, 9°14'3"S, 56°59'24"W, 14.VI.2009 [1 ♀ CEMT], Rio Teles Pires, Sete Quedas, Margem direita, 9°18'55"S, 56°46'44" W, 8.VI.2009, F.S Mateus & U.P Marcio [1 ♀ CEMT]; Pau-D'Arco, Fazenda Marajoara, 7°50'S, 50°15'W, 19. X.1998, human dung, logged forest, P.Y. Scheffler [1 ♂ CEMT], 7°50'S, 50°16'W, 25–27.XI.1998, carrion baited, intact forest [9 ♂ 6 ♀ CEMT], [1 ♂ CECC], 28–30. XI.1999 [6 ♂ 1 ♀ CEMT], [1 ♀ CECC], without data [2 ♂ 4 ♀ CEMT], 26–28.XI.1999, human dung, clear cut [2 ♂ CEMT], 29–31.X.1999, intact forest [1 ♀ CEMT], 21. X.1998, logged forest [1 ♂ CEMT]; R. guamá, 4.IX.1944, W.H. Valle [3 ♀ MZUSP]; Redenção, Fazenda Marajoara, 7°50'S, 50°16'W, X.1998, P.Y. Scheffler [1 ♂ 1 ♀ CEMT], Redenção, Pinkaiti Aik, 7°46'S, 51°58'W, X.1999, P.Y. Scheffler [2 ♂ 1 ♀ CEMT]; São Félix do Xingu, Área Indígena Kayapó, Pinkaiti Research Station, 7°45'S, 51° 57'W, 25–27.XI.1998, human dung, logged forest, P.Y. Scheffler [1 ♂ CEMT], clear cut [1 ♂ 5 ♀ CEMT], 21– 23.X.1999, carrion baited, intact forest [25 ♂ 5 ♀ CEMT], without data [1 ♂ 2 ♀ CEMT], 24–26.X.1999, human dung [4 ♂ 4 ♀ CEMT], 12–16.XI.1998 [3 ♀ CEMT], 11–13. VI.1999 [3 ♀ CEMT], 30.X–1.XI.1999 [1 ♂ 1 ♀ CEMT], 5–7.XI.1999 [2 ♀ CEMT], 23–25.X.1999 [1 ♂ CEMT], 28.XI.1998, logged forest [2 ♂ CEMT], without data [1 ♀ CEMT], 19–21.XI.1998, intercept trap, intact forest [1 ♂ CEMT], 11–13.VI.1999, human dung [3 ♀ CEMT], 31.X– 1.XI.1998 [2 ♂ 1 ♀ CEMT], human dung S1-5 [1 ♀ CEMT]. **Rondônia:** Porto Velho Uhe, Jirau-Caiçara, 24

h., 2.III.2010, Transecto III Parcela V, Margem Esquerda, Pitfall [1 ♂ CEMT]; V. Rondonia, 378 km S de P. Velho, 25.I-9.II.1961, Pereira e A. Machado [2 ♂ 1 ♀ MZUSP]; 62 km S Ariquemes, Fazenda Rancho Grande, XI.1996, Vulinec & Mellow [1 ♂ 1 ♀ CEMT]. **COLOMBIA:** **Amazonas:** Leticia, Comunidad Motine Arena, Noriega, J. [1 ♂ CECC]. **Boyacá:** Santa María, 900–1450 m, Sistemática Animal II [1 ♀ ICN]. **Caquetá:** Puerto Solano, PNN Serranía de Chiribiquete, Est. Puerto Abeja, 0°4'27"N, 72°27'0.5"W, 200 m, Álvarez, M. & Mejía, J. [2 ♀ IAvH]; Puerto Solano, PNN Serranía de Chiribiquete, Río Cuñare, 0°30'0"N, 72°37'50"W, 250 m, Ospina, M. & González, E. [6 ♂ 3 ♀ CEMHNLGA], [1 ♂ CEPJN], 0°31'3"N, 72°38'27.7"W, 250 m Ospina, M. & González, E. [4 ♂ 1 ♀ IAvH], 0°32'4"N, 72°37'57.5"W, 250 m, Ospina, M. & González, E. [1 ♀ IAvH]; Puerto Solano, PNN Serranía de Chiribiquete, Río Cuñare-Amú 0°13'3.4"N. 72°25'22.7"W, 250 m, Ospina, M. & González, E. [2 ♀ IAvH], 0°13'39.4"N, 72°26'38.2"W, 250 m, Ospina, M. & González, E. [1 ♂ 4 ♀ IAvH], 0°12'34.5"N, 72°24'55.1"W, 250 m, Ospina, M. & González, E. [3 ♀ IAvH], 0°12'47.8"N, 72°25'25.4"W, 250 m, Ospina, M. & González, E. [1 ♂ IAvH]; Puerto Solano, PNN Serranía de Chiribiquete, Río Mesay, Parte Alta La Reina, 300 m, Quevedo, F. [1 ♂ CEMHNLGA]; Puerto Solano, PNN Serranía de Chiribiquete, Río Sararamano, 0°9'26"N, 72°37'45"W, 250 m, González, E. [1 ♂ 2 ♀ CEMHNLGA], [1 ♂ 2 ♀ IAvH], 0°10'2"N, 72°36'35"W, 250 m, González, E. [2 ♂ 2 ♀ CEMHNLGA], [3 ♀ IAvH], 0°10'55"N, 72°36'3"W, 250 m, González, E. [1 ♂ 1 ♀ CEMHNLGA], 0°10'7"N, 72°36'35"W, 250 m, González, E. [1 ♂ CEMHNLGA], 0°10'47"N, 72°37'24"W, 250 m, González, E. [2 ♂ 2 ♀ IAvH], 0°10'54.8"N, 72°36'57.2"W, 250 m, González, E. [2 ♂ IAvH], 0°14'47"N, 72°37'24"W, 300 m, Gast, F. [1 ♂ IAvH]; Puerto Solano, PNN Serranía de Chiribiquete, Tagüita, Río Mesay, 0°14'54"N, 72°56'5"W, 250 m, Quevedo, F. [2 ♂ 1 ♀ CEMHNLGA], [1 ♂ 1 ♀ IAvH], 0°14'32"N, 72°56'15"W, 250 m, Quevedo, F. [3 ♂ 5 ♀ CEMHNLGA], [1 ♀ IAvH], 0°10'54.8"N, 72°36'57.2"W, 250 m, Quevedo, F. [2 ♂ IAvH], 0°15'38"N, 72°55'24"W, 250 m, Quevedo, F. [3 ♂ 5 ♀ IAvH], 0°16'13"N, 72°55'22"W, 250 m, Quevedo, F. [1 ♀ IAvH]. **Guaviare:** C. Moyano, C. Cocuy, 180 m, Escobar, F. [1 ♂ IAvH]; RN Nukak Maku, Río Irinida, Caño Cocuy, 2°10'35"N, 71°10'58"W, 250 m, Escobar, F. [3 ♂ 3 ♀ IAvH], [1 ♂ CEPJN], 2°10'2.4"N, 71°10'54.1"W, 200 m, Escobar, F. [1 ♂ IAvH]; San José del Guaviare, Fca. La Esmeralda, Hernández, H. [1 ♂ ICN]; San José del Guaviare, Puerto Ospina, Casto, J. [2 ♀ ICN]; San José del Guaviare, Santa Rosa, 2°34"N, 72°38"W, 200 m, Castro, J. [1 ♂ ICN]. **Nariño:** Caparu, Serranía, 100 m, Bello, J. [1 ♂ CECC]; Caparú, Terrazas, 100 m, Lopera, A. [1 ♂ IAvH], Amezquita, S. [1 ♀ IAvH], Lopera, A. [1 ♀ ICN], Amezquita, S. [1 ♂ CECC], [1 ♀ CECC]; Ipiales, caracterización del Territorio Kofán, Cuenca Alta Ríos Rumiayaco-Ranchería, 0°30'7"N, 77°13'43"W, 700 m, Escobar, F. [1 ♀ CEMHNLGA]; Ipiales, Territorio Kofán,

Cuenca Alta Ríos Rumiayaco-Ranchería, 0°3'N, 77°13"W, 700 m, Escobar, F. [1 ♀ IAvH], 1000 m. [1 ♂ IAvH]. **Vaupés:** RN Mosiro-Itajura (Caparú), 1°4'S, 69°31'W, 100 m, Amezquita, S. [1 ♀ IAvH], Bello, J. [1 ♂ IAvH], Lopera, A. [1 ♂ 1 ♀ IAvH], Forero, D. [2 ♂ 1 ♀ IAvH]. **ECUADOR:** Dureno, 150 m, 23–28.IX.1977, L. Peña [1 ♂ CMN]. **Fco. De Orellana:** Rodrigo Borja, IAMOE, 4.VI.2000, Ex. Pitfall Carroña, A. Dávalos [1 ♂ CEMT]. **Morona Santiago:** Bosque Domono, 1650 m, 21.VIII.1997, Trampa excremento humano, C. Carpio [1 ♂ CEMT]; Via Mendez-Paute km 8, 1250 m, 23.VIII.1997, Trampa excremento humano, C. Carpio [1 ♂ CEMT]. **Napo:** Tena, s/data, [2 ♂ 2 ♀ CEMT], [1 ♂ CECC]; 400 m Jatun, Sacha Biol. Station, 21 km E Puerto Napo, 21.VII.1994, F. Génier, virgin rainforest carrion tp [1 ♂ CMN]; 400 m 3.3 km E Puerto Napo, 13.VII.1994, F. Génier, 2nd grth veg. carrion tp [1 ♂ CMN]. **Pastaza:** 900 m, 9 km ESE Veracruz, 22–24.VIII.1975, R. Webster forest, dung traps [1 ♂ CMN]; **Zamora Chinchipe:** Via Zumbi-Yantzaza km 4, 900 m, 25.VIII.1997, Trampa excremento humano, C. Carpio [1 ♀ CEMT].

**Description.** Same as *D. orbignyi orbignyi*, but the body color in *D. orbignyi amazonicum* is black.

**Distribution** (Figure 37 triangles). Amazon (Colombia, Brazil, Ecuador, Peru) (Bates 1887; Celi et al. 2004; Paulian 1938; Blackwelder 1944; Vulcano & Pereira 1964, 1967; Vaz-de-Mello 1999, 2000; Scheffler 2005; Castellanos et al. 1999; Escobar 2000; Medina et al. 2001; Pulido et al. 2003; Padilla & Halfpeter 2007; González et al. 2009).

**Remarks.** There is some variation in the size of the elytral humps, underdeveloped males with elytral humps with the same size (just noticeable) as in females; underdeveloped males do not have tubercle in the ventral face of middle femur. Well-developed females with ventral tooth in the anterior tibiae, nearly the same size as in underdeveloped males, but always, in the females, it is more basal. Interstitial calluses in some individuals are very small, but always present.

The holotype of *D. orbignyi* and the lectotype of *D. amazonicum* only present difference in color: black cupreous and black respectively; however, the distribution of individuals that correspond to *D. orbignyi* is restricted (Bolivia, Santa Cruz, Buena Vista; Northern Argentina), while individuals that correspond to *D. amazonicum* are distributed throughout the Amazon Basin; these two populations are thoroughly separated, so *D. amazonicum* is proposed as subspecies of *D. orbignyi*.

***Deltochilum (Hybomidium) guildingii* (Westwood 1835) (Figures 19, 20, 38)**

*Hyboma guildingii* Westwood 1835: 372  
*Hyboma chalcea* Buquet 1844: 19 new synonymy

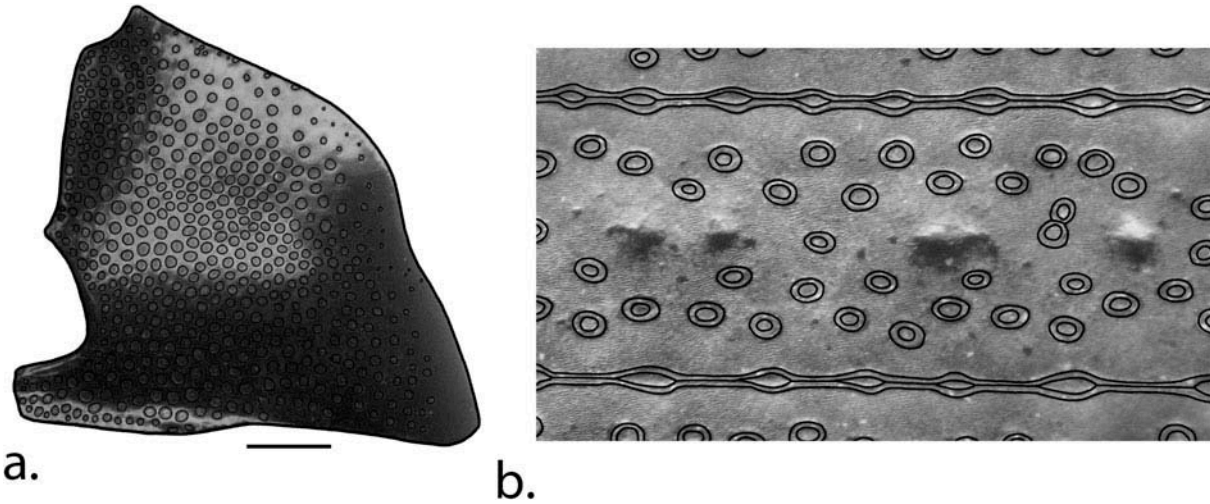


Figure 19. External morphology of *D. guildingii*: a, hypomeron; b, elytral sculpture.

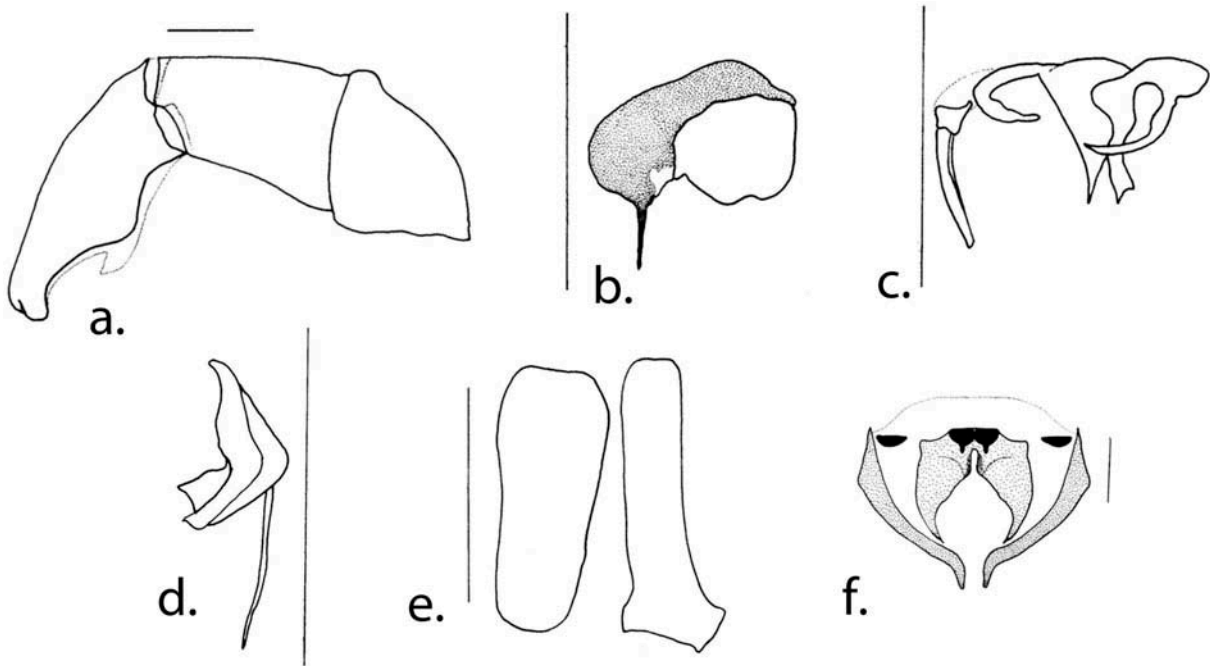


Figure 20. Male genitalia of *D. guildingii*: a, aedeagus; b, circular basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

**Type material examined: *Hyboma guildingii* Westwood:**

**Holotype** 1 ♂: America eq. (handwritten)/ *Deltochilum chalconum* Buq (handwritten), J.J.E. Gillet, t.1910–1912/standing over., *Deltochilum chalconum*, buquet, OX. UNI. MUS. NAT. HIST. (OUMNH)/ [red label] HOLOTYPE/ *Hyboma* HOLOTYPE, *guildingii*, Westw. in Partington 35 (handwritten), det F. Vaz-de-Mello, 2011 [OUMNH].

Museum Paris, ex. Coll., R. Oberthür [green label] / LECTOTYPE, *Hyboma chalconum* Buq, des. F.Z. Vaz-de-Mello 2014 [red label] [MNHN]; **Paralectotype** 1 ♂: *Columb* [handwritten] / Ex Musaeo, D. Sharp 1890 / Museum Paris, ex. Coll., R. Oberthür [white label] / PARALECTOTYPE, *Hyboma chalconum* Buq, des. F.Z. Vaz-de-Mello 2014 [yellow label] [MNHN].

***Hyboma chalconum* Buquet: Lectotype** 1. ♂, here designated: LAFERTÉ, 3624 / Ex Musaeo, D. Sharp 1890 /

**Remarks.** Searches for type specimens of this species were performed in NHML, OUMNH and MNHN, and

no candidate specimens were found, except for in the latter. According to Cambefort (2006), the Buquet collection was dispersed through numerous collections in France and England, and part was acquired by LaFerté, these last specimens arriving at MNHN via Oberthür. Specimens here designated correspond to those expected in antiquity and original pins (one was broken and was changed, that of the paralectotype) to Buquet's specimens, and were stored under *D. chalceum* in an Oberthür box.

**Non-type material examined. BRAZIL: Amazonas:** Bôca de Tucano, Rio Cauburi, XI.1965, E. Dente [3 ♂ 6 ♀ MZUSP]; Serra da Neblina, Rio Tucano, 230 m, 4. XII.1965, E. Dente [1 ♀ MZUSP]; Tapuru-quara, Rio Negro, X.1965, E. Dente [1 ♀ MZUSP]. **Pará:** Canta Galo (Obidos), Dirings [1 ♂ MZUSP]; Óbidos, Bx. Amazonas, II.1969, Dirings [1 ♂ 2 ♀ MZUSP]; Obidos-Pará, Bajo Amazonas, Dirings [1 ♀ MZUSP]. **Roraima:** Apiaú, VII.1997, Floresta Primária, F.Z. Vaz-de-Mello [1 ♂ 1 ♀ CEMT], [1 ♀ CECC]; Amajari, Ilha de Maracá, 15. IX.1996, Fezes Humanas, Ribeiro & F.Z. Vaz-de-Mello [1 ♀ CEMT], I.IX.1996 [2 ♀ CEMT], IX.1996, Carcaça [1 ♀ CEMT], [1 ♂ CECC]; Pacaraima, 2 km S Vila Pacaraima, BV8, IX.1996, Fezes Humanas, Ribeiro & F. Z. Vaz-de-Mello [1 ♂ CEMT]; Pacaraima, 900 m, IX.1996, Floresta Primária, Fezes Humanas, Ribeiro & Vaz-de-Mello [1 ♂ CEMT], [1 ♂ CECC]; ~50 km N. Caracarai, prox. Rio Apiaú, VII.1997, Fezes Humanas, Ribeiro & F.Z. Vaz-de-Mello [1 ♂ 1 ♀ CEMT]; Ilha de Maracá, IX.1996, Ribeiro & Vaz-de-Mello [2 ♂ 3 ♀ CEMT]. **COLOMBIA: Bolívar:** Sambrano, Fc. Pizano, 100 m, Lopera, A. [4 ♂ 2 ♀ CECC]; Sambrano, Finca Pizarro, [1 ♀ ICN]; SFF Los Colorados, Villa Roca, 9°54' N, 75°7'W, 180 m, Deulufeut, E. [1 ♂ 3 ♀ CEMHNLGA], [1 ♂ 1 ♀ IAvH]; SFF Los Colorados, 9°51'33"N, 73°6'38" W, 300 m, Escobar, F. [5 ♂ 3 ♀ IAvH]; Zambrano, Fernández, F. [1 ♂ 1 ♀ CECC]; Zambrano, Hda. Monterrey, 9°37'48"N, 74°54'44"W, 120 m, Escobar, F. [7 ♂ 4 ♀ IAvH], [1 ♀ ICN], [1 ♀ CEPJN], [1 ♂ CECC]. **Cesar:** Valledupar, Ecoparque los Besotes, 10°43'30.9"N, 73°18'38"W, 500 m, Forero, F. [2 ♂ 2 ♀ IAvH]. **Guaviare:** 180 m, Escobar, F. [1 ♂ CECC]. **Magdalena:** PNN Tayrona, 11°17'41"N, 74°6'15"W, 155 m, Escobar, F. [2 ♂ 1 ♀ IAvH]; PNN Tayrona, Cañaberal, 11°20'N, 74°2'W, 300 m, Henriquez [1 ♀ IAvH]; Sierra Nevada de Santa Marta, Cerro Kenedy, Vda. Minas, 480 m, Noriega, J. [1 ♂ 1 ♀ CEPJN], [1 ♂ CECC]; Santa Marta, PNN Sierra Nevada de Santa Marta, Minca, Cuenca Río Gaira, Sector Pozo Azul, 11°8'17"N, 74°6'29"W, 740 m, Garcia, H. & Ospino, D. [1 ♀ CEMHNLGA]; Santa Marta, PNN Sierra Nevada de Santa Marta, RN La Tigrera, 11°9'4"N, 74°9'15" W, 310 m, Garcia, H. & Ospino, D. [1 ♀ CEMHNLGA], [2 ♂ 2 ♀ IAvH]. **Meta:** Macarena, 350 m, Noriega, J. [2 ♂ 1 ♀ CEPJN]; PNN Tinigüa, Río Duda, 2°40'N, 74°10'W, 350

m, Jiménez, I. [3 ♀ IAvH]; Puerto Colombia, Fca. El Naranjal, 1200 m, Lopera, A. & Amezcuita, S. [1 2 ♂ 1 ♀ 3 CECC]; Piñalito, El Esfuerzo, 200 m, Lopera, A. & Amezcuita, S. [1 5 ♂ 8 ♀ CECC]; Villavicencio, 28.II–5. III–1972, forest, dung trap, S&J Peck [1 ♀ CMN]; Villavicencio, Agrícola El Naranjal, carretera a Puerto Colombia, 4°3'7"N, 74°15'57"W, 350 m, Camacho, A. [6 ♂ 9 ♀ CEMHNLGA]; Villavicencio, Fca. El Naranjal, Vía Puerto Colombia, 4°2'91"N, 75°78'15"W, 150 m, Camacho, A. [4 ♂ 3 ♀ IAvH]; Villavicencio, Puerto López, Fca. El Naranjal, 4°5'14"N, 72°57'30"W, 220 m, Escobar, F. [1 ♂ 3 ♀ IAvH]; Vista Hermosa, Fca. El Esfuerzo, 3°2'44"N, 73°35'42"W, 200 m Lopera, A. [1 ♀ IAvH]. **Sucre:** San Benito, Abad, Vda. Santiago Apostol, Fca. Marbella, La Caimanera, Palmar, 9°02'25"N, 75°54' 25"W, 30 m, Sabana Arbustiva, 4–6.V.2009, T.Exc.H, Franco L.E. [8 ♂ 1 ♀ 8 IAvH]; Tolvujejo, Sector el Cañito, Monte de los navas, 9°34'39"N, 75°27'40"W, 40 m, Bosque seco, 11–13.V.2009, T.Exc.H., Franco L.E. [1 ♂ 1 ♀ IAvH]; Tolú Viejo, Bosque de los navas, Sector el Cañito, 9°34'39"N, 76°27'4"W, 40 m, Bosque seco tropical 11–13.V.2009, T.Exc.H., Franco L.E. [1 ♂ 2 ♀ IAvH]. **SURINAME:** 1901 [1 ♀ MZUSP]. **TRINIDAD:** Maracas Bay, 19.VI.1970, J Glaser, human feces in forest [1 ♂ CMN]. **VENEZUELA:** [1 ♀ MZUSP]. **Amazonas:** Caño Piojo, IV.2006, D. Garcia [1 ♂ CEMT]; Do. Antunes, El Infiernokm 25 a Gavilán, VI.1979, A. Martínez [1 ♂ 1 ♀ CMN]. **Bolívar:** 26 km N Guasipati, 24.VI–12.VII.1987, FIT sandy seasonally humid forest, S&J Peck [1 ♀ CMN]; Río Sipao, FIT, 110 km E Caicara, 17.VI–4.VIII.1987, S&J Peck [1 ♂ CMN]; 20 km E El Palmar 18.VI.1996, dung, H&A Howden [1 ♂ CMN].

**Diagnosis.** Closely related to *D. molanoi* n. sp., *D. lobipes*, and *D. loperae* by interstriae with bright calluses in the central one-third of their width (Figure 19b), but distinguishable from the *D. molanoi* n. sp. and *D. lobipes* by pronotal medial lateral angle rounded (Figure 19a) and from *D. lobipes* and *D. loperae* by interstitial calluses larger than interstitial punctures (Figure 19b).

**Description.** Color cupreous or black. Head punctation strong, punctures separated by less than one diameter; punctures smallest between the medial teeth. Pronotal punctation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles almost straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 19a). Hypomerall punctures variable in size, punctures smallest toward lateral external margins; hypomerall punctures separated by less than one diameter (Figure 19a). Striae deep; interstriae with bright calluses in the central one-third of their width; interstitial calluses larger than interstitial



punctures; interstitial punctures same size as strial punctures (Figure 19b). Carina of the 9th interstria extending until before the middle of the elytral length. Pygidial punctation deep, punctures variable in size and density. Ventral face of middle and posterior femora with punctation separated by less than one diameter.

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 20.

**Sexual dimorphism.** Males with posterior tibiae curved almost in the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with small tubercle on the ventral face of middle femur and with humps in the elytral disc.

**Distribution** (Figure 38). Colombia (Bolívar, Cesar, Magdalena, Meta), Brazil (Amazonas, Roraima, Pará), Suriname and Venezuela (Amazonas); it has been reported in Panama (Howden & Gill 1987) and Colombia (Amézquita et al. 1999; Medina et al. 2001) with the name *D. orbigny*; also for Colombia González et al. (2009) as *Deltochilum* sp.

**Remarks.** There is some variation in the size of the elytral humps, underdeveloped males with elytral humps the same size (just noticeable) as in females; underdeveloped males without tubercle in the ventral face of middle femur. Some interstitial calluses are smaller than interstitial punctures, but always with others calluses larger than the interstitial punctures.

Vulcano and Pereira (1964) listed *D. guildingii* as a synonym of *D. icarus*; *D. icarus* has interstriae costate, and in the holotype of *D. guildingii* it is evident that the interstriae are not costate and present large calluses; based on this statement, this synonymy is not valid. In the description of *D. chalcea* Buquet 1844 (before the present work, it was considered as a synonym of other species, see *D. orbigny*) is clear that the shape of interstriae (described), and the lectotype examined agreed with the holotype of the *D. guildingii*; therefore, synonymy between these species is proposed (*D. guildingii* = *D. chalcea* n. syn.).

*Deltochilum (Hybomidium) loperae*  
González & Molano 2009  
(Figures 21, 22, 39)

*Deltochilum loperae* González et al. 2009: 268

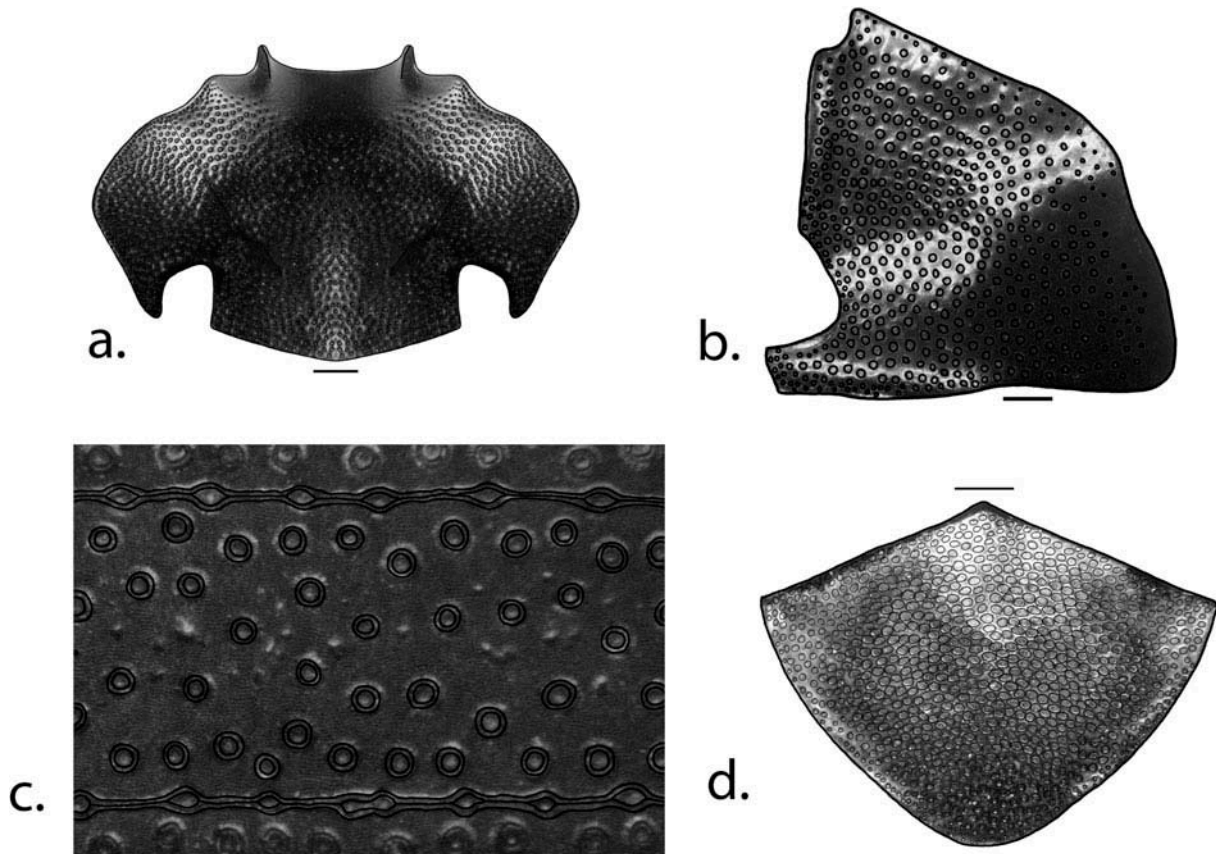
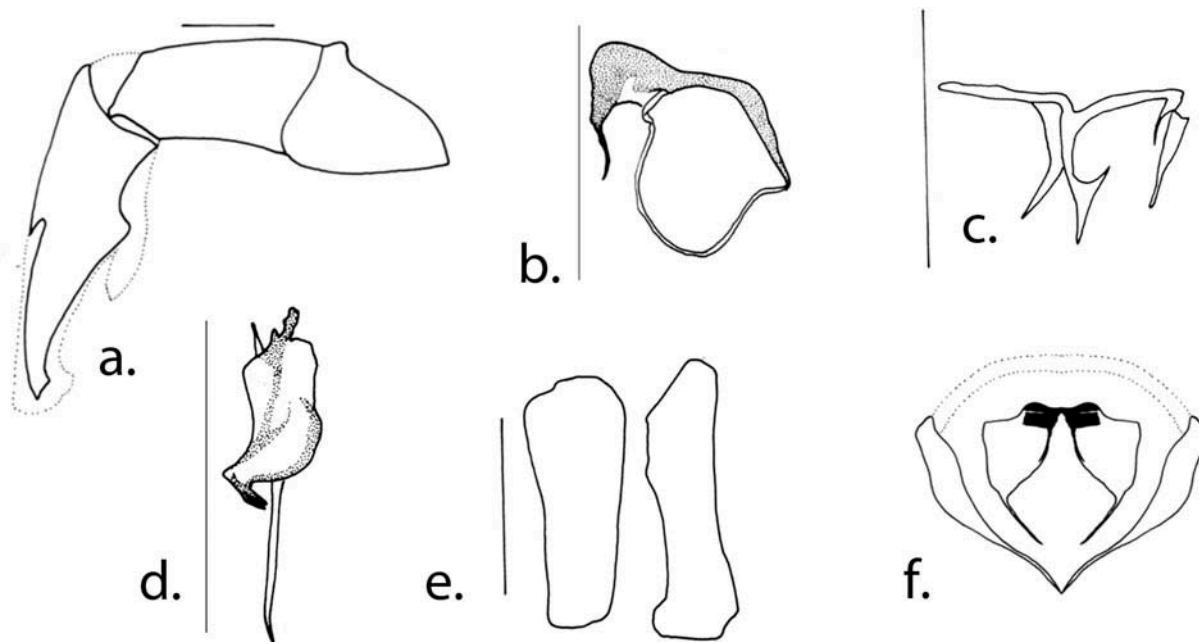


Figure 21. External morphology of *D. loperae*: a, head; b, hypomeron; c, elytral sculpture; d, pygidium.



**Figure 22.** Male genitalia of *D. looperae*: **a**, aedeagus; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

**Type material examined: Holotype:** ♂ **COLOMBIA: Valle del Cauca**, Estación forestal Bajo Calima, 50 m, 19–23.IV.1995, M. Hitchcox [CECC]. **Alotype:** ♀ **COLOMBIA: Valle del Cauca**, Estación forestal Bajo Calima, 50 m, 19–23.IV.1995, M. Hitchcox [CECC]. **Paratypes:** 4 ♂ 4 ♀ **COLOMBIA: Valle del Cauca**, Estación forestal Bajo Calima, 50 m, 19–23.IV.1995, M. Hitchcox [CECC].

**Non-type material examined. COLOMBIA: Chocó:** Lloró, Granja Universidad Tec. del Chocó, Bosque, 5° 30'39"N, 76°32'40"W, 90 m, Coprotrampa, 4–12.V.2003, H. Olaya. [5 ♂ 2 ♀ UNAB], [1 ♀ IAvH]. **Nariño:** El Diviso, Bmh-T, 520 m, Excremento Humano, IV.1995, F. Escobar [2 ♂ 1 ♀ IAvH]. **Valle del Cauca:** El Tagual, Bajo Calima, C.N.F. 10–18.IX.1992 L.C. Pardo [1 ♀ CEMT]; Escalereite, B. Dagua, 31.III–4.IV.1991, L.C. Pardo [1 ♀ CEMT]; Estación Forestal Bajo Calima, 50 m, 2.X.1995, A. Lopera [1 ♂ 1 ♀ IAvH], Tatabro Bp- T 50m, Excremento Humano, IX.1994, J. Aldana [1 ♂ 1 ♀ IAvH]; Río Azul, Bmh-T, 900 m, Excremento Humano, VII.1994, Aldana [1 ♀ IAvH]. **ECUADOR: Esmeraldas:** Cotopaxi, Guasaganda km 4, 500 m., 20.XII.1997, C. Carpio [1 ♂ CEMT]; Playa de Oro, Estero Pote, 0°51' 88"N 78°43'74"W, 12.II.1999, Ex. Pitfall carroña, A. Dávalos [1 ♂ 3 ♀ CEMT], [1 ♂ CECC]; Playa de Oro, Pote, 200 m, 11.XII.1998, Ex. Pitfall carroña, J. Celi [1 ♂ CEMT], [1 ♀ CECC]; Playa de Oro, ex. pitfall heces humanas, III.2001, M. Kellog [1 ♂ CMN].

**Diagnosis.** Closely related to *D. orbignyi*, *D. guildingii*, *D. molanoi* **n. sp.** and *D. lobipes* by interstriae with bright calluses in the central one-third of their width (Figure 21c), but distinguishable from *D. orbignyi* by strial punctures rounded and interstitial punctures with the same size as strial punctures (Figure 21c); from *D. guildingii* and *D. molanoi* **n. sp.** by interstitial calluses smaller than interstitial punctures (Figure 21c); and from *D. molanoi* **n. sp.** and *D. lobipes* by pronotal medial lateral angle rounded (Figure 21b).

**Description.** Color black. Head punctuation strong, punctures separated by one diameter; punctures smallest between the medial teeth (Figure 21a). Pronotal punctuation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 21b). Hypomerall punctures separated by less than one diameter. Striae deep; interstriae with bright calluses in the central one-third of their width; interstitial calluses smaller than interstitial punctures; strial punctures rounded; interstitial punctures same size as strial punctures (Figure 21c). Carina of the 9th interstria extending until before the middle of the elytral length. Pygidial punctuation separated by less than one diameter (Figure 21d).

In lateral view, apex of the parameres about 1/5 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 22.

**Sexual dimorphism.** Males with posterior tibiae curved near the middle of their length; anterior tibiae of the males with ventral tooth larger and more apical than females; males with small tubercle on the ventral face of middle femur and with humps in the elytral disc.

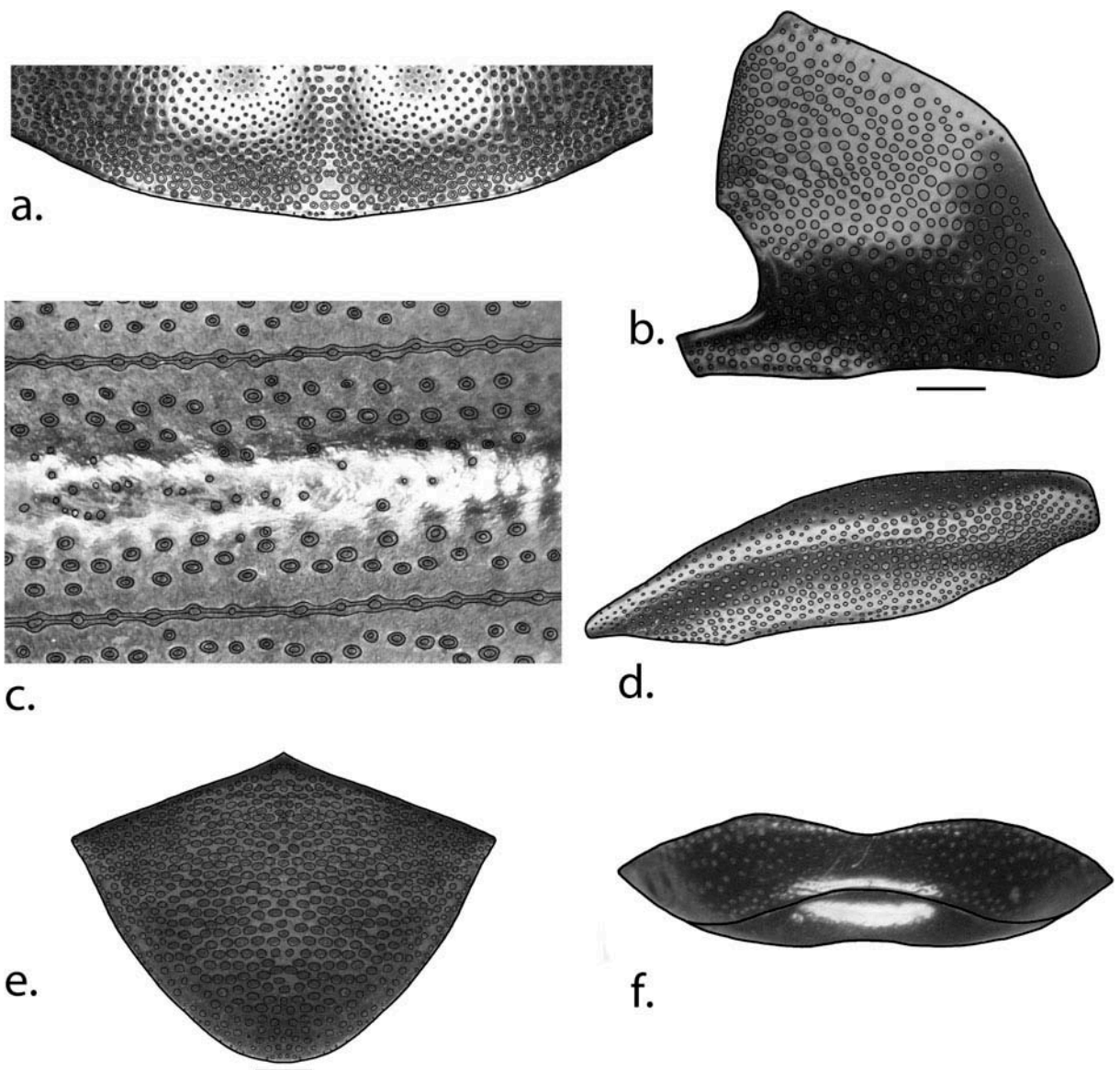
**Distribution** (Figure 39). South biogeographical Choco, Colombia (Chocó, Nariño, Valle del Cauca), Ecuador (Esmeraldas).

**Remarks.** In the males there is some variation in the size of the elytral humps, the tubercle in the ventral face of the middle femur and the ventral tooth in the anterior tibiae, depending on the development of the individual.

***Deltochilum (Hybomidium) icarus* (Olivier 1789)**  
(Figures 23, 24, 40)

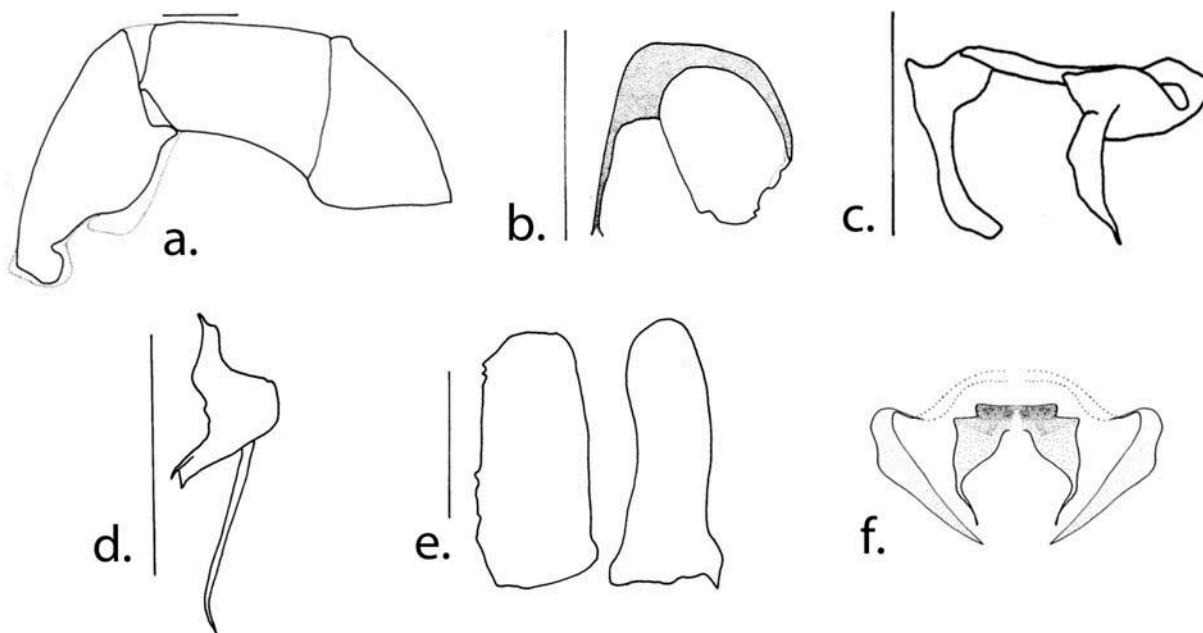
- Scarabaeus icarus* Olivier 1789: 155
- Copris icarus* Olivier 1790: 172
- Ateuchus icarus* Schönherr 1806: 65
- Hyboma icarus* Blanchard 1846: 157
- Deltochilum icarus* Burmeister 1848: 134

**Type material examined.** Lectotype ♂, here designated: [handwritten, illegible] / Lectotype [red label] / Lectotype *Scarabaeus icarus* Olivier des. J. Huijbregts 1984 / LECTOTYPE, *Scarabaeus, icarus*, Olivier, des. F.Z. Vaz-de-Mello 2013 [red label] [NHML]. Specimen housed in the Banks collection.



**Figure 23.** External morphology of *D. icarus*: a, pronotal posterior margin; b, hypomeron; c, elytral sculpture; d, middle femur of the male; e, pygidium; f, ventral view of the last abdominal ventrite and pygidium.





**Figure 24.** Male genitalia of *D. icarus*: **a**, aedeagus; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

**Non-type material examined. BRAZIL: Amapá:** Serra do Navio, Cava Urucum-Amapari, 0°53'6"N, 51°52'53"W, 5.VII.2000, R. Ribon [1 ♀ CEMT], IX.2000 [1 ♂ CEMT], [1 ♀ CECC], Serra do Navio, X.1964, E. Dente [1 ♂ MZUSP]; Serro do Navio, Igarapé-sucurijú, X.1959, Bicelli col. [1 ♂ MZUSP]. **Amazonas:** Benj. Constant, Rio Javari, XII.1961, Dirings [1 ♀ MZUSP]; Itacoatiara, VI.1958, Dirings [1 ♂ 1 ♀ MZUSP], I.1958 [1 ♂ MZUSP]; Manaus, ReBio de Campina/BR-174 km 45, 2°35'29"S, 60°2'2"W, 20–22. II.2009, Pitfall com isca de fezes humanas, Area de Campina, FBP Gouveira, PCR Silvam, MLL Barbosa, BO Silva & EB Silva [1 ♂ CECC]; 90 km N Manaus, XI.1997, E. Andresen [2 ♂ 2 ♀ CEMT]. **Pará:** Alto, Parú Tiriós d'Oeste, I–II.1963, Machado & Pereira [1 ♂ 2 ♀ MZUSP]; Caninde, Rio Gurupí, XII.1964, Malkin [1 ♀ MZUSP]; Monte Dourado, Area 33, 0°79'S, 52°70'W, rain forest, XI.2005, dry season, dung pitfall trap, Ta Garden M.I.M Hernández [1 ♂ CECC]; Obidos, I.1970, Dirings [3 ♂ 2 ♀ MZUSP], II.1958 [1 ♀ MZUSP], XII.1955 [4 ♀ MZUSP], IX.1969 [1 ♂ 1 ♀ MZUSP]; Obidos, bx/Amazonas, Dirings [1 ♀ MZUSP], XI.1955 [1 ♂ 2 ♀ MZUSP], XII.1955 [1 ♀ MZUSP], I.1956 [2 ♂ MZUSP], III.1958 [1 ♂ 6 ♀ MZUSP], VI.1958 [1 ♂ 3 ♀ MZUSP], IV.1959 [1 ♂ MZUSP]; Traira, Obidos, XI.1955 Dirings [1 ♀ MZUSP]. **FRENCH GUIANA: Camopi:** 26.XI.1969, Bosque primario a la orilla del rio, Exc Dia y Noche, G. Halffter V [1 ♂ CEMT]; M. de Kaw, PK33, 15.XII.1988 [1 ♀ CEMT]; Cayenne [1 ♀ CMN]. **SURINAME:** Comp. Strandl, 1901 [1 ♂ MZUSP]. **VENEZUELA: Bolívar:** km 88, 28.XI.1988 [1 ♀ CMN]; 6 km S San Isidro (km 88), 25.VI–11.VII.1987, S&J peck, lowland rainforest FIT [1 ♂ CMN].

**Diagnosis.** Closely related to both *D. pseudoicarus* and *D. bezdeki* **n. sp.** by interstriae costate (Figure 23c), but distinguishable from the first by pronotal medial lateral angle rounded (Figure 23b), apical pygidial margins, laterally, not elevated (Figure 23e, f) and by males without denticles near the apical one-third of the posterior tibiae; from *D. bezdeki* **n. sp.** by pronotal posterior margin with punctures separated by less than one distance between internal and external margins of each puncture (Figure 23a), margin between pronotal anterior angle and hypomeral anterior angle (not visible from the pronotal view) straight or slightly concave (Figure 23b), ventral face of middle (Figure 23d) and posterior femora with punctation separated by less than one diameter, and by males without tubercle in the middle femur (Figure 23d).

**Description.** Color cupreous. Head punctation strong, punctures separated by less than one diameter; punctures smallest between the medial teeth. Pronotal punctation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal posterior margin with punctures dense, punctures separated by less than one distance between internal and external margins of each puncture (Figure 23a). Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 23b). Margin between pronotal anterior angle and hypomeral anterior angle (not visible from the pronotal view) straight or slightly concave (Figure 23b). Hypomeral punctures separated by less than one diameter (Figure 23b). Striae



deep; interstriae costate, central one-third of their width bright, and in lateral view more elevate than stria. Strial punctures with the same size as interstitial punctures, only a few punctures on the costate, being these smaller than the strial punctures (Figure 23c). Carina of the 9th interstria extending to middle of the elytral length. Ventral face of middle (Figure 23d) and posterior femora with punctuation dense, punctures separated by less than one diameter. Pygidial punctuation transversally oval (Figure 23e); apical pygidial margins, laterally, not elevated (Figure 23e, f).

In lateral view, apex of the parameres about 1/2 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 24.

**Sexual dimorphism.** Males with posterior tibiae curved in the basal one-third; males with anterior tibiae ventral tooth larger and more apical than females.

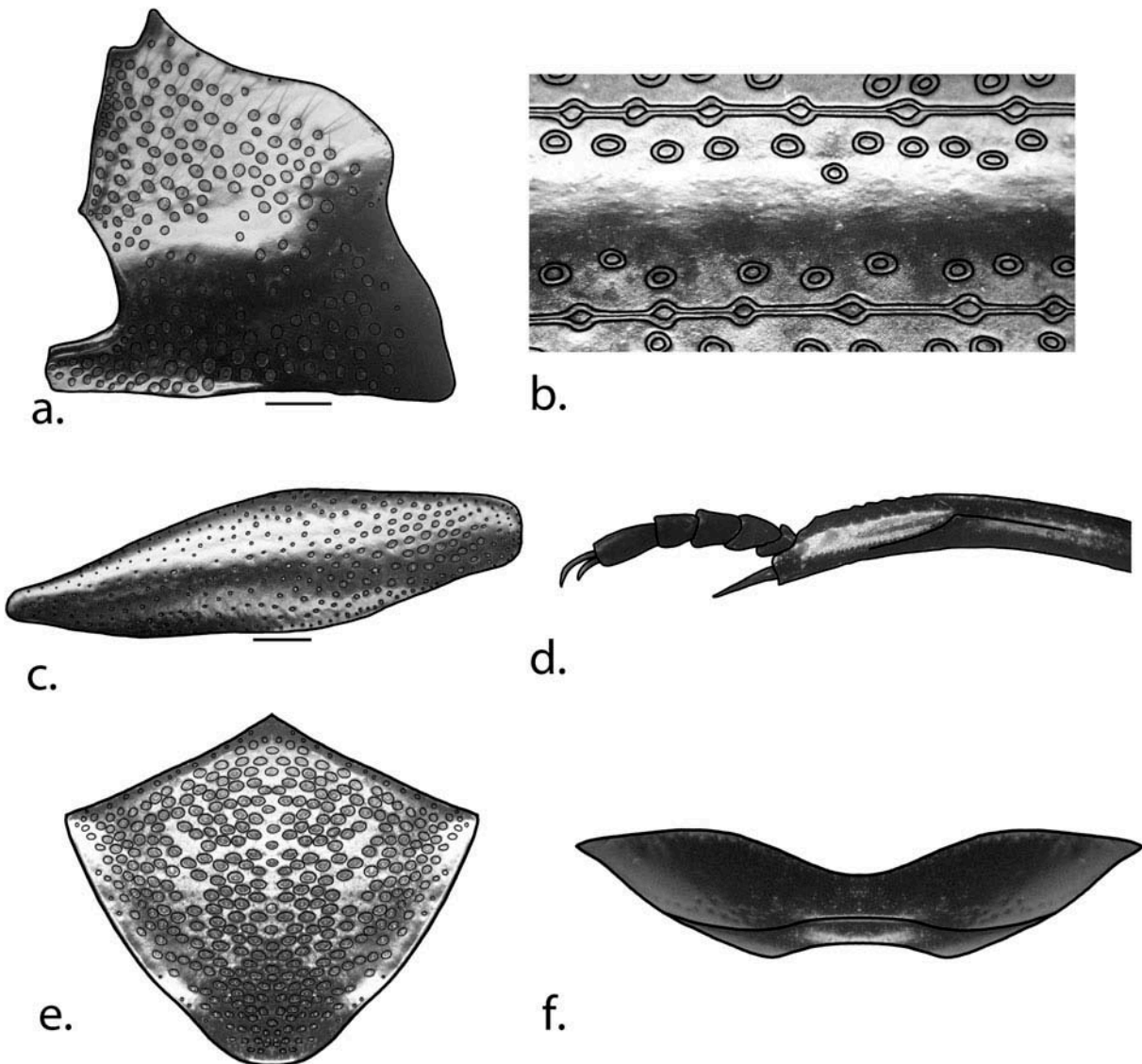
**Distribution** (Figure 40). Northeast Brazil (Amapá, Amazonas, Pará), French Guiana and Suriname.

**Remarks.** In the males there is some variation in the size of the ventral tooth in the anterior tibiae, depending on the development of the individual. The synonymy between *D. icarus* and *D. guildingii* is not valid (see remarks for *D. guildingii*).

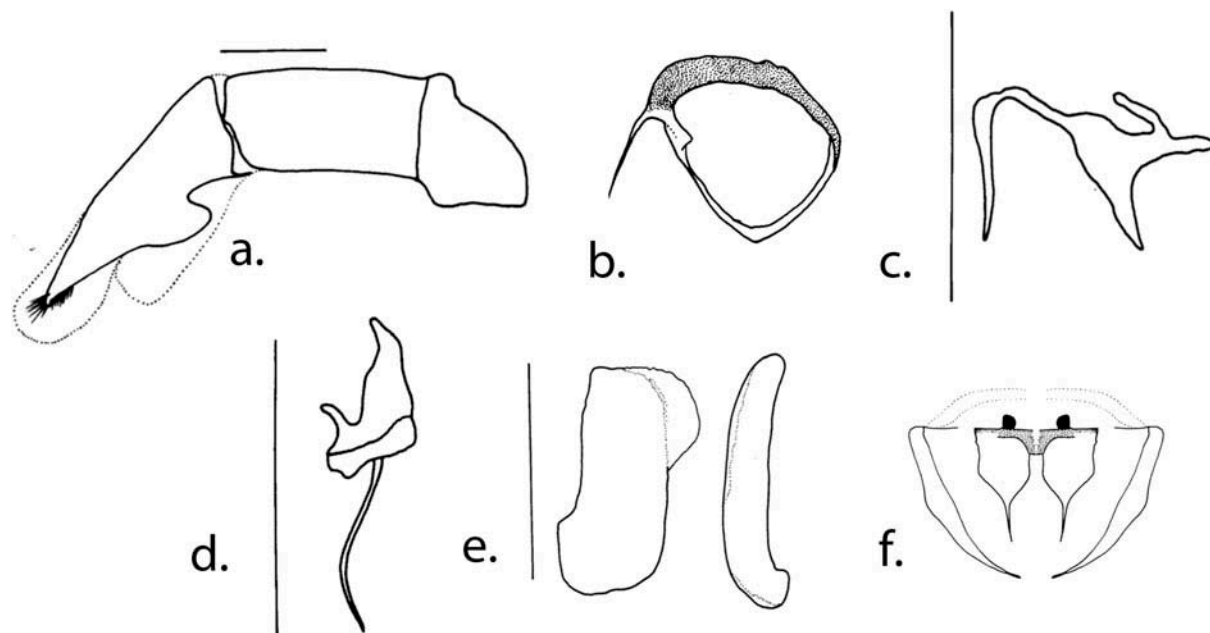
*Deltochilum (Hybomidium) pseudoicarus*  
**Balthasar 1939**  
**(Figures 25, 26, 41)**

*Deltochilum pseudoicarus* Balthasar 1939: 11

**Types material examined.** **Lectotype** ♂ (designated by Génier, 2001): San Bernardino, A. Fischer, S. G., 1911/TYPUS/ *pseudoicarus* m. [NMP].



**Figure 25.** External morphology of *D. pseudoicarus*: **a**, hypomeron; **b**, elytral sculpture; **c**, middle femur of the male; **d**, posterior tibia of the male; **e**, pygidium; **f**, ventral view of the last abdominal ventrite and pygidium.



**Figure 26.** Male genitalia of *D. pseudoicarus*: **a**, aedeagus; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

**Non-type material examined. ARGENTINA:** Chaco, Santa Fe, [1 ♂ MACN]; Formosa, C. Bruch [1 ♀ MACN]; Jujuy [1 ♂ MACN]; Misiones, col. A. Breyer [1 ♀ MACN]; Tucuman [1 ♂ 1 ♀ MACN], XII.1906, C. Bruch col. C. Bruch [1 ♂ MACN]. **Corrientes:** col. C. Bruch [2 ♂ MACN], I.1909, C. Bruch Col. C. Bruch [1 ♂ 1 ♀ MACN]; Ituzaingó, Villa Olivari, XII.1979, A Martínez [1 ♂ CMN]; **Salta:** Do. San Martín, Pocitos, I.1967, A Martínez [1 ♂ CMN]. **BOLIVIA: Santa Cruz:** Noel Kempff, Mercado National Park, S. Spector 1997 [1 ♂ CECC]; Prov. Chiquitos, 1.6 km ENE Santiago de Chiquitos, 18°20'10"S, 59°35'01"W, 622 m, 10–15. XI.2008, human feces, Chiquitano dry forest, W.D.E. Edmond & T. Vidaurre [5 ♂ 1 ♀ CEMT]; Prov. Chiquitos, 1.6 km ENE Santiago, 18°20'10"S, 59°35'01"W, 622 m, XI.2008, human feces, Chiquitano dry forest, W.D.E. Edmonds & T. Vidaurre [2 ♂ CEMT]; Prov. Chiquitos, 20 km NE. Santiago de Chiquitos, Tucavaca Valley, 18°14.59S, 59°27.907"W, 215 m, 10–15.XI.2008, human feces, Chiquitano forest, W.D.E. Edmond & T. Vidaurre [1 ♀ CEMT]. **BRAZIL:** Est. Ecol. Umubui-Una, 8°52'S, 44°57' W, 19–29.I.2001, Montinglli, G.G. Col [1 ♂ MZUSP]. **Bahia:** Barreiras, Distrito de Placas, Fazenda Girassol, 11° 49'37"S, 46°6'57"W, 827 mosl, 7.II.2010, Pitfall com Fezes Humanas, R.V. Nunes [7 ♂ 2 ♀ CEMT], [2 ♂ 2 ♀ CECC], [1 ♂ 1 ♀ CEMHNLGA]; Barreiras 150 km W Barreiras, 11°50' 35,47"S, 46°10'29,86"W, I.2003, P. Schmidt [1 ♂ 1 ♀ CEMT], I.2004 [1 ♂ 1 ♀ CEMT], XII.2003 [1 ♀ CEMT]. **Distrito Federal:** Sobradinho, Reserva Embrapa, (BR-C2C), XII.2008, Fezes humanas, Campo Sujo, R.V. Nunes

[1 ♀ CEMT]; Sobradinho, XII.1992, C. Gordinho [1 ♀ CEMT], XI.1992, Celso Jr. [1 ♀ CEMT]. **Goiás:** Bom Jardim de Goiás, II.1998 [2 ♂ CEMT]; Galeria Bom Jardim de Goiás, II.1997, F.Z Vaz-de-Mello [1 ♀ CEMT]; Jataí, 1955 [1 ♀ MZUSP]. **Maranhão:** Paulino Neves, 2°43' 9"S, 42°31'59"W, 4 m, 19–21.III.2009, D.V. Sampaio [1 ♂ CEMT]. **Mato Grosso:** Barra do Garças, VI.1968, J. Evangelista [2 ♀ MZUSP]; Cuiabá, Guia, Fazenda Santhidi, 28.IX.2008, Intercipitação de vôo (isca de fruta, banana), L.R. Silva [1 ♀ CEMT], 5–26.X.2008 [1 ♂ CEMT]; Cuiabá, Fazenda Santindi, 15°23'6"S, 56°6'42"W, 250 m asl, 5–26.X.2008, Intercetacao de vôo, L.R. Silva [1 ♂ CEMT]; Diamantino, Alto Rio Arinos, 24.I.2001, G.P. Almeida [1 ♀ CEMT]; Diamantino, 23–27.I.2001, E.A Pereira [1 ♂ CEMT]; Diamantino, Vale da Solidão, 14°22' 23"S, 56°7'25"W, 23–24.XII.2009, Inter. Vôo, D.C.T. Oliveira [2 ♂ CEMT], 31.I–14.II.2009, Fezes humanas [1 ♂ CEMT], 16–19.II.2009 [1 ♀ CEMT], 19.II.2009, Pitfall PT5, Cerrado [1 ♂ CEMT]; Diamantino, Vale da Solidão, 14°21'52"S, 56°7'23"W, 31.I–27.II.2009, Fezes humanas, D. C.T. Oliveira [1 ♂ CEMT], 28.II.2009 [1 ♀ CEMT], 26. I.2009, IVOO IV3, Cerrado [1 ♂ 2 ♀ CEMT]; Murtinho, XII.1929, coll. R. Spitz [1 ♂ MZUSP]; Porto Estrela, E. E. Serra das Araras, 30.IX.2008, Fezes humanas, V.P. Pacheco [1 ♀ CEMT]; Rio Arinos, 10–12.I.2001, E.A Pereira [1 ♀ CEMT]. **Mato Grosso do Sul:** Três Lagoas, Horto Moeda, MOF, II.2008, Intermediário, M. Uehara-Prado [1 ♀ CEMT], Borda [1 ♀ CEMT]. **Minas Gerais:** Águas Vermelhas, XI.1994, Arnaud, Bello & Grossi [1 ♂ 1 ♀ CEMT]; Buenópolis, Bimbarra, P. E. Serra do Cabral, 17°

53°7'S, 44°16'51"W, 1197 m, 15–17.IV.2008, Fezes Humanas, Campo limpo, F.S Mateus [1 ♀ CEMT]; Buenópolis, Buruti, P. E. Serra do Cabral, 17°55'15" S, 44°14'22"W, 1042 m, 14–16.IV.2008, Fezes Humanas, Campo limpo, F.S Mateus [1 ♂ 1 ♀ CEMT]; C. do Pará, VI.2000, D. C Chaves [1 ♀ CEMT]; Cerca a Paracatú [2 ♀ CEMT]; Cordisburgo, Fazenda Pontinha, 19°8'54"S, 44°11'51"W, I.1999, Falqueto & F.Z Vaz-de-Mello [1 ♂ CEMT]; Cordisburgo, Faz. Pontinha, I.1999, Falqueto Vaz-de-Mello [1 ♂ CEMT], Cordisburgo, Fazenda Potinha, XII.1999, Vaz-de-Mello [1 ♀ CECC]; Diamantina, 15.XII.2004, Carcaça, Cerrado, S.L. Assis Jr., Z [2 ♂ CEMT], 16.XII.2004 [1 ♂ CECC]; Ibitira XI.1988 [1 ♂ CEMT]; Diamantina, Parque do Rio Preto, 6–8.II.2001, Pastagem mista, S. Lourenço Jr. [1 ♂ CEMT], Vereda [1 ♀ CEMT]; Diamantina, P.E. Rio Preto, II.2001, Fezes Humanas, S.L. Assis Jr. [2 ♂ 1 ♀ CEMT], [1 ♀ CECC], Carcaça [1 ♂ CEMT], 8.II.2001 Fezes Humanas, Pé de serra [1 ♂ CEMT], 7.II.2001 [1 ♂ 1 ♀ CEMT]; Diamantina, P.E. Rio Preto, 18°8'16"S, 43°21'0.1"W, 936 m, 13.XII.2007, Fezes, Campo Rupestre, E. Bordoni [1 ♂ CEMT]; Juramento, Guia, 10.I.2003, Area de mata próximo a pastagem, L.C.D. Rocha [1 ♂ CEMT]; Montes Claros, I.2000, R2/P2 # 1a, Cerrado, Louzada & Louzada [1 ♀ CEMT], R2/P2 # 2a [1 ♀ CEMT], R2/P3 # 3 [1 ♂ CEMT], R2/P2 # 3a [1 ♂ CEMT]; Piauí, São Raimundo Nonato, P.N. Serra da Capivara, 1998, C.A. Matrangolo [3 ♂ 7 ♀ CEMT]. Pirapora [1 ♀ MZUSP]; Santana do Riacho, P.N. Serra do Cipó, II.2002, J.N.C Louzada [2 ♂ 1 ♀ CEMT]; Santana do Riacho, P.N. Serra do Cipó, 19°20'58"S, 43°37'8"W, 780 m, 21.I.2001, ex. Dung tp., open cerrado Vaz-de-Mello & Génier [1 ♂ CEMT]; São Roque de Minas, P.N. Serra da Canastra, Curral de Pedra, 20°13'14"S, 46°28'42"W, 1447 m, 5–7. XI.2007, Fezes Humanas, Campo limpo, M.F. Souza [1 ♂ CEMT], 1455 m 20°13'11"S, 46°28'41"W [1 ♂ CEMT]; Vazante, III.1998, Fezes Humanas, Cerrado, S.L Assis Jr. [1 ♂ CEMT], XI.1997 [5 ♂ 1 ♀ CEMT]. **Paraíba:** Mamanguape, Rebio Guaribas, 6°41'S, 35°10'W, XII.2001, Arm. Pitfall fezes, Tabuleiro A. & A. Endres [1 ♀ CEMT]. **Piauí:** S.R. Nonato, P.N.S. da Capivara, I.1999, C.A. Matrangolo [2 ♂ 2 ♀ CEMT], 16.XII.1998, C.A.R Matrangolo [2 ♀ CEMT]; Zabele, Parque Nacional Serra da Capivara, S. R. Nonato, 12.IV.2001, Pitfall, Caatinga, A. C.A. Moura [3 ♀ CEMT]. **São Paulo:** Itirapina, Estação Ecológica, 22°13'59"S, 47°53'24.7"W, 733 m, Pitfall com Fezes Humanas, Campo limpo, 30.I.2009, F. Silva [1 ♂ 1 ♀ CEMT], [1 ♀ CECC], 22°12'33"S, 47°50'48.8"W Campo Sujo [1 ♂ CECC], 22°12'55.6"S, 47°54'44.9"W [1 ♂ CEMT], 22°13'1.1"S 47°54'41.2"W [1 ♂ CEMT], 22°14'0.6"S, 47°53'15.6"W Campo limpo [1 ♀ CEMT]. **PARAGUAY:** [1 ♂ MACN]; Col. Antigua [1 ♂ MACN]; Colonia, Nueva Italia [1 ♀ MZUSP]; Villarrica, XI.1942, F. Schade [1 ♂ CMN]; **Boquerón:** Guairá, I.1995 [1 ♀ CEMT]; Villarrica, XI.1928, F. Shade [1 ♂ CEMT]; Zanja, Morotí, I.2006, E. Abadie [1 ♂ CEMT].

**Diagnosis.** Closely related to both *D. icarus* and *D. bezdeki* n. sp. by costate interstriae (Figure 25b), but distinguishable by pronotal medial lateral angle projected (Figure 25a), by apical pygidial margin, laterally, sinuated and elevated (Figure 25e and 25f), and by males with denticle in the apical one-third of the posterior tibiae (Figure 25d).

**Description.** Color cupreous, cupreous with green shine, or rarely black. Head punctuation strong, punctures separated by one diameter; punctures smallest between the medial teeth; small setae between the medial teeth. Pronotal punctuation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles sinuated; pronotal margin between medial lateral and posterior angles strongly sinuated; pronotal medial lateral angle projected (Figure 25a). Hypomerale punctures variable in size, punctures smallest in the disc and toward the lateral external margins; hypomerale punctures most disperse in the disc; setose punctures in the anterior part of the hypomeron (Figure 25a). Striae deep; interstriae costate, central one-third of their width bright, and in lateral view more elevated than stria. Strial punctures with the same size as interstitial punctures, only a few punctures on the costate, these being smaller than the strial punctures (Figure 25b). Carina of the 9th interstria extending to the middle of the elytral length. Ventral face of middle (Figure 25c) and posterior femora with small punctuation separated by one diameter, except apical punctures being largest and most dense. Pygidial punctuation deep, punctures variable in size and density (Figure 25e), apical pygidial margin, laterally, sinuated and elevated (Figure 25e, f).

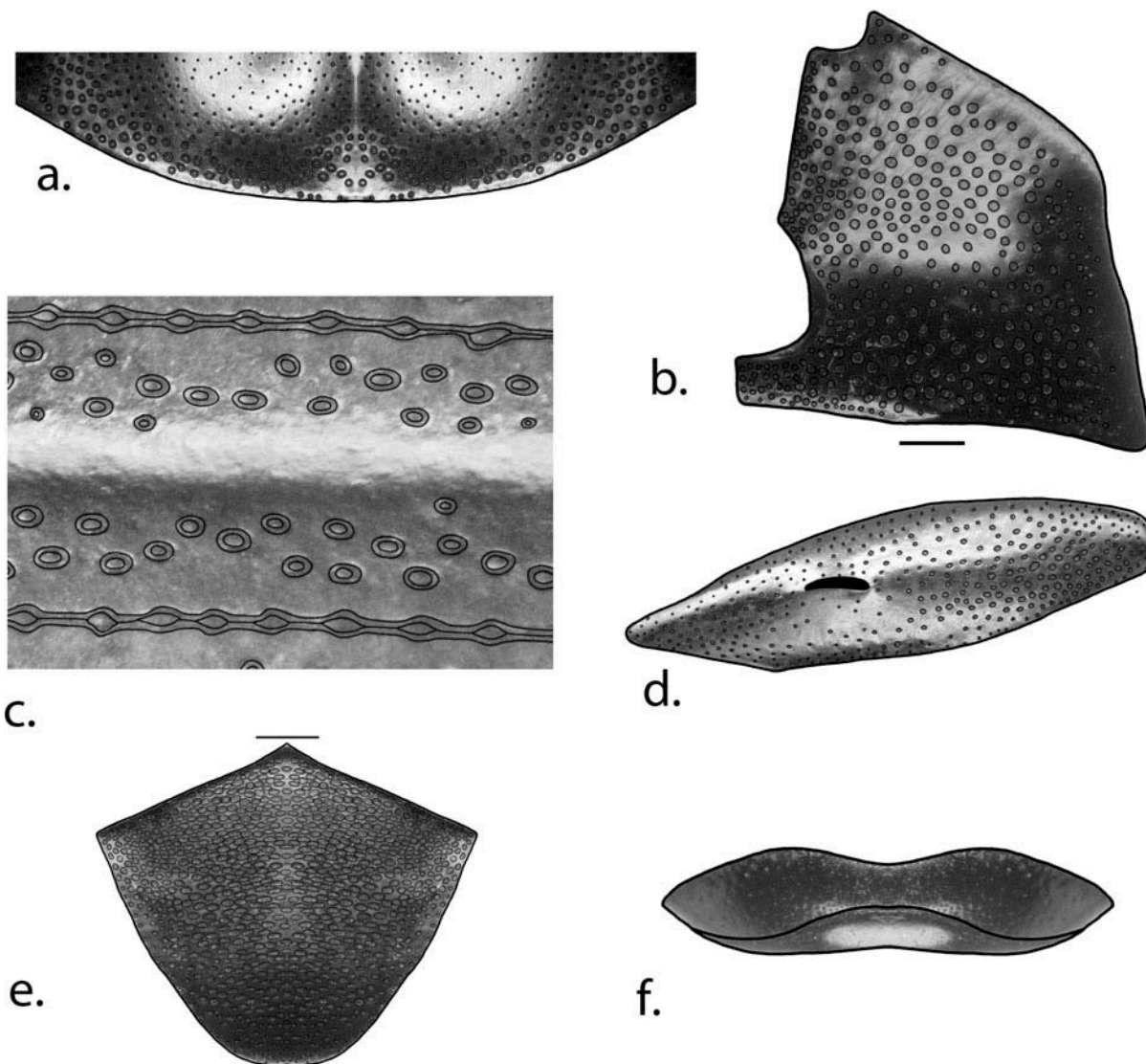
In lateral view, apex of the parameres about 1/9 the width of the base of the parameres; apex of the parameres with setae; internal sac sclerites and genital segment as in Figure 26.

**Sexual dimorphism.** Males with posterior tibiae curved in the middle and with denticle near the apical one-third (Figure 25d).

**Distribution** (Figure 41). Argentina, Brazil (Minas Gerais, Piauí, Bahia, Mato Grosso, Distrito Federal, Maranhão, Mato Grosso do Sul, Goiás, São Paulo, Paraíba), Bolivia (Santa Cruz) and Paraguay (Boquerón).

**Remarks.** Anterior tibiae of the females and males with or without ventral tooth, depending on the development of the individual; in large females this tooth is very small and in very small males it is not present. Also, there is some variation in the elevation of the elytral costate.

*Deltochilum (Hybomidium) bezdeki* n. sp.  
(Figures 27, 28, 42)



**Figure 27.** External morphology of *D. bezdeki* n. sp.: **a**, pronotal posterior margin; **b**, hypomeron; **c**, elytral sculpture; **d**, middle femur of the male; **e**, pygidium; **f**, ventral view of the last abdominal ventrite and pygidium.

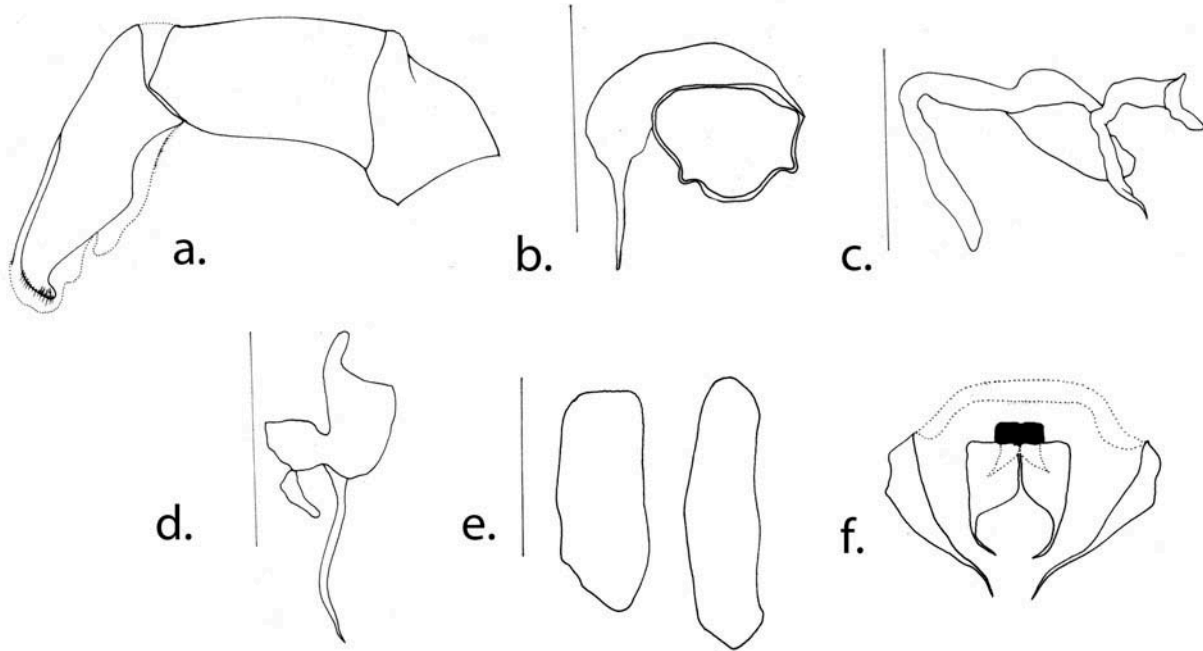
**Holotype.** ♂ BRAZIL: Minas Gerais, Uberaba, X.1995, F. Z. Vaz-de-Mello / HOLOTYPE, *Deltochilum bezdeki* Gonz & VdM, des. F.Z. Vaz-de-Mello 2014 [red label] [CEMT]

**Paratypes. BRAZIL: Minas Gerais:** Ingai, Boqueirão/ Reserva UNILAVRAS, 7.III.2003, Fezes Humanas, Campo R.J. Silva [1 ♀ CECC], 3.VII.2008, F. Frieiro [1 ♀ CEMT]; Lavras, 13.IV.2007, MGT-354, Rocha Sâmia Takahashi [1 ♀ CEMT]; Lavras, 18.I.1999, J.N. C Louzada [1 ♀ CEMT]; Pounso Alegre [1 ♂ 1 ♀ MZUSP]; Ribeirão Vermelho, Mata do Leleco, 21°11' 12"S, 45°4'10"W, XII.2001, G. Schiffler IAvH-E-147835 [1 ♂ IAvH]; Ribeirão Vermelho, Mata do Zé Pato, 21°11'7"S, 45°4'3"W, XII.2001, G. Schiffler [1 ♀

CEMT]; São Roque de Minas, P.N. Serra da Canastra, Jaguaré, 20°15'31"S, 46°25'W, 7–9.X.2007, Fezes Humanas, Campo limpo, M.F. Souza [1 ♀ CEMT], 20°15'30"S, 46°25'2"W [1 ♂ CEMT]; São Roque de Minas, P.N. Serra da Canastra, Nascente do São Francisco, 20°14'43"S, 46°26'30"W, 1385 m, 8–10. XI.2007, Pitfall, Campo Rupestre, M.F. Souza [1 ♂ CEMT], [1 ♂ CECC]; Vespasiano, XII.1951 [1 ♂ MZUSP], X-1952 [1 ♂ MZUSP], (without data) [1 ♀ MZUSP]. **S.P (São Paulo?):** Rio Claro, I.1943, coll. Claretiano [1 ♂ MZUSP]. Paratype IAvH-E-147835, with tissue preserved in IAvH-CT (tissue collection).

**Diagnosis.** Closely related to both *D. pseudoicarus* and *D. icarus*, by interstriae costate (Figure 27c) but





**Figure 28.** Male genitalia of *D. bezdeki* n. sp.: **a**, aedeagus; **b**, circular basal sclerite; **c**, plate-shape sclerite; **d**, elongate sclerite; **e**, medial sclerites; **f**, genital segment.

distinguishable from the first by pronotal medial lateral angle rounded (Figure 27b), apical pygidial margin, laterally, not elevated (Figure 27e, f) and by males without denticle in the apical one-third posterior tibiae; from *D. icarus* by pronotal posterior margin with punctures separated by more than one distance between internal and external margins of each puncture (Figure 27a), margin between pronotal anterior angle and hypomeral anterior angle (not visible from the pronotal view) concave (Figure 27b), ventral face of middle (Figure 27d) and posterior femora with punctation separated by more than one diameter, and by males with tubercle in the middle femur (Figure 27d).

**Description.** Holotype male. Color shiny cupreous. Head punctation strong, punctures separated by less than one diameter, except in the genae where the punctures are separated by one diameter; punctures smallest between medial teeth. Pronotal punctation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally; Pronotal posterior margin with punctures disperse, punctures separated by more than one distance between internal and external margins of each puncture (Figure 27a). Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral and posterior angles sinuated; pronotal medial lateral angle rounded (Figure 27b). Margin between pronotal anterior angle and hypomeral anterior angle (not visible

from the pronotal view) concave (Figure 27b). Hypomeral punctures separated by one diameter, except anterior punctures which are separated by less than one diameter; setose punctures in the anterior part of the hypomeron (Figure 27b). Striae deep; interstriae costate, central one-third of their width bright, and in lateral view more elevate than stria. Strial punctures with the same size as interstitial punctures, only a few punctures on the costate, being these smaller than strial punctures (Figure 27c). Carina of the 9th interstria extending to the middle of the elytral length. Metasternum with two posterior tubercles and anteriorly of these with another smaller tubercle. Front tibiae with ventral tooth, more basal than basal dorsal tooth. Ventral face of middle (Figure 27d) and posterior femora with disperse punctation, punctures separated by more than one diameter, except apical punctures being most dense. Ventral face of middle femur with small tubercle (Figure 27d). Posterior tibiae curved in the basal one-third. First abdominal ventrite expanded medially, second to fourth abdominal ventrites visible only laterally. Pygidial punctation deep, punctures transversally oval (Figure 27e); apical pygidial margin, laterally, not elevated (Figure 27e, f).

In lateral view, apex of the parameres about 1/3 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 28.

**Variation.** In paratypes the color could be cupreous dark or shiny. Paratypes vary in sexual features, females with posterior tibiae not curved in the basal one-third, ventral

face of the middle femur without tubercle, first abdominal ventrite not expanded medially, second to fourth abdominal ventrites visible medially. Anterior tibiae of the males with ventral tooth larger and more apical than females. In the males there is some variation in the size of the ventral tooth in the anterior tibiae, depending on the development of the individual.

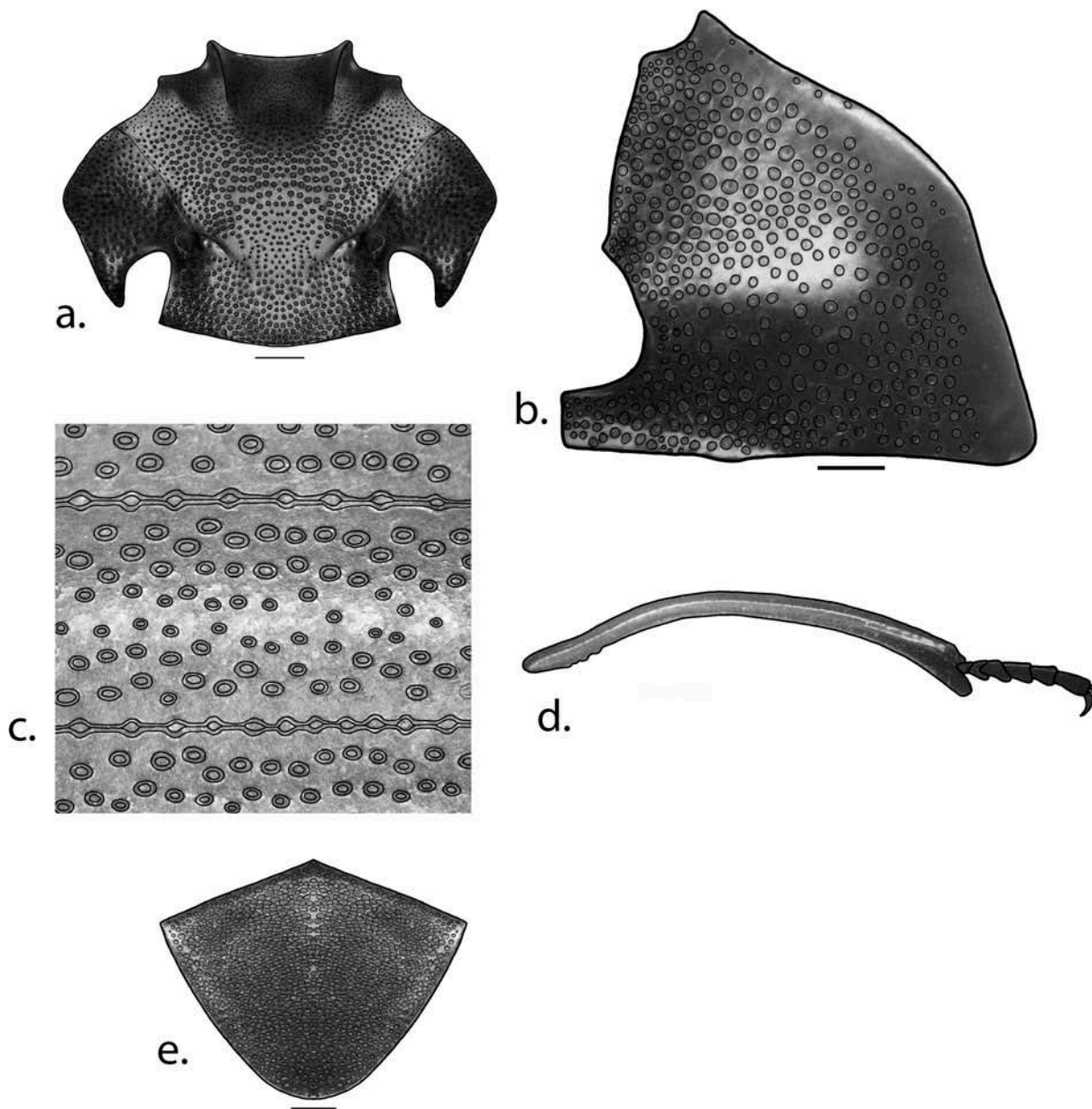
**Etymology.** This species is dedicated to A. Bezdek, who provided very detailed photographs of the lectotype of *D. pseudoicarus* and thus prevented us from misinterpreting the identity of this species.

**Distribution** (Figure 42). Brazil (Minas Gerais).

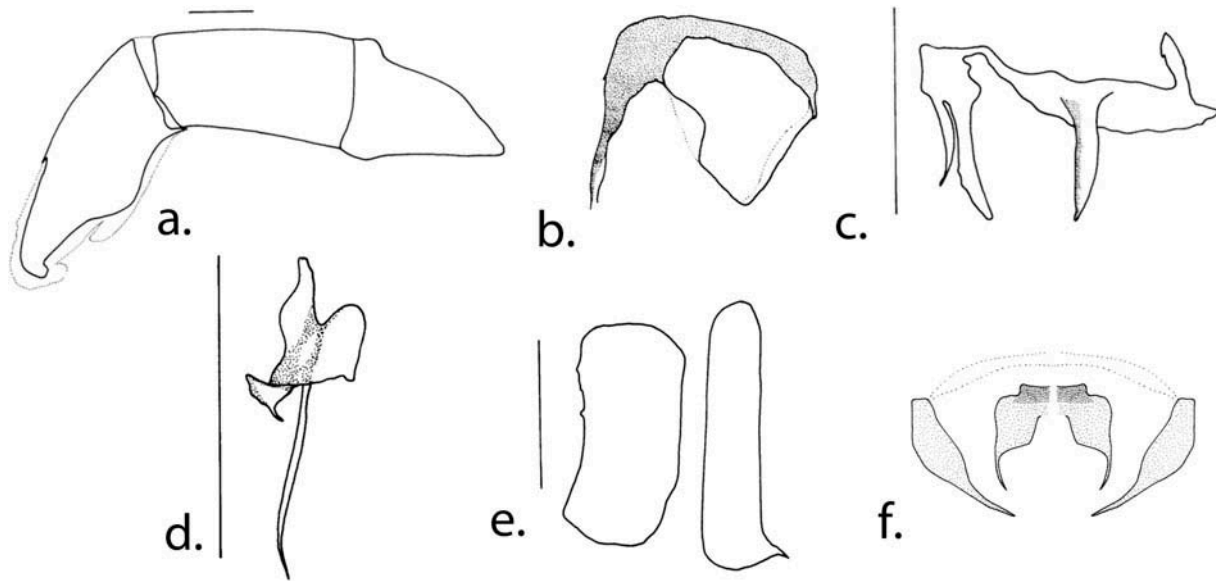
***Deltochilum (Hybomidium) louzadai* n. sp.**  
(Figures 29, 30, 43)

**Holotype.** ♂ BRAZIL: Minas Gerais. Viçosa, Mata do Paraíso, 20°48'2"S, 42°51'38"W, X.1998, carcaça, Falqueto & F.Z Vaz-de-Mello / HOLOTYPE, *Deltochilum, louzadai* Gonz & VdM, des. F.Z. Vaz-de-Mello 2014 [red label] [CEMT].

**Paratypes.** BRAZIL: Espírito Santo: Faz. Jerusalem, 11. XI.1914, J.F. Zikan [1 ♂ CEMT]; Linhares, IX.1972, Roppa & Alvarenga Coleção M. Alvarenga [1 ♂ MZUSP]. Minas Gerais: Ubá, 10.IV.2000, C.F. Gumier [1 ♂ CEMT]; Viçosa, G9 I.1996, carcaça, Louzada & Sperber IAvH-E-147831 [1 ♂



**Figure 29.** External morphology of *D. louzadai* n. sp.: **a**, head; **b**, hypomeron; **c**, elytral sculpture; **d**, posterior tibia; **e**, pygidium.



**Figure 30.** Male genitalia of *D. louzadai* n. sp.: a, aedeagus; b, circular basal sclerite; c, plate-shape sclerite; d, elongate sclerite; e, medial sclerites; f, genital segment.

IAvH]; Viçosa, Mata da Biologia, 20°45'28"S, 42°51'52"W, XII.1998, F.Z Vaz-de-Mello [2 ♀ CEMT], IAvH-E-147832 [1 ♀ IAvH] Viçosa, Mata do Paraíso, 20°48'2"S, 42°51'38"W, X.1998, carcaça, Falqueto & F.Z Vaz-de-Mello [2 ♂ 3 ♀ CEMT], [1 ♀ CECC], Fezes Humanas IAvH-E-147833 [1 ♂ IAvH] Carcaça, X.1997 [1 ♂ 1 ♀ CEMT], XII.2000, F.Z. Vaz-de-Mello [1 ♂ 1 ♀ CEMT]; Viçosa, P7, II.1996, Fezes Humanas, Louzada, Sperber & Lopes [1 ♀ CEMT]; Viçosa, 30.XII.1993, J.N.C. Louzada [1 ♀ CEMT], 22.I.1995 [1 ♂ CEMT], I.1995 [2 ♂ 1 ♀ CEMT]; Viçosa, 7.XII.1998, tr. Intercepción, J.L. Moreno & T. Mestre [1 ♂ CEMT]. Vicosa (Paraiso), X 1998, Falqueto & F.Z Vaz-de-Mello IAvH-E-147834 [1 ♀ IAvH] [1 ♀ ICN]. Vicosa, XII 1998 FZ-Vaz-de-Mello [1 ♂ ICN] [1 ♀ CECC]; Vicosa, Dic/98 [1 ♂ 1 ♀ CECC]. [1 ♂ CEMT]. Paratypes IAvH-E-147831, IAvH-E-147832 with tissue preserved in IAvH-CT (tissue collection).

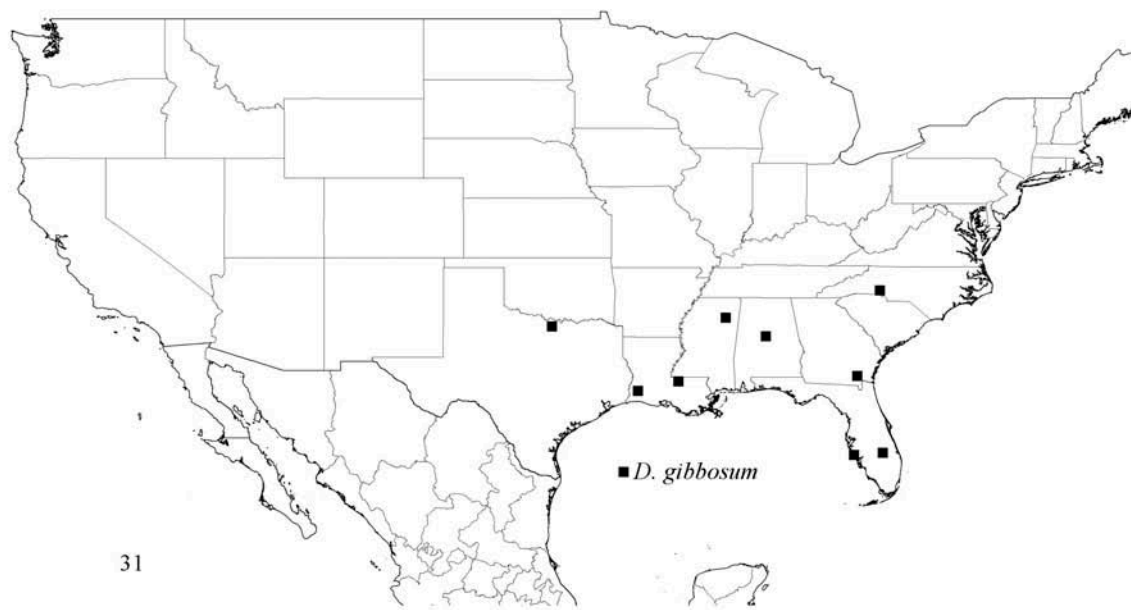
**Diagnosis.** Distinguishable from all species by interstriae pseudocostate, central one-third of their width bright, in lateral view never more elevated than stria (Figure 29c) and by basal one-third of the posterior tibiae in the posterior margin with denticles (Figure 29d).

**Description.** Holotype male. Color cupreous. Head punctuation strong, punctures separated by less than one diameter, except in the genae where the punctures are more disperse; punctures smallest between the medial teeth (Figure 29a). Pronotal punctuation variable in size, punctures smallest in the disc and gradually largest posteriorly and laterally. Pronotal anterior angle acute; pronotal margin between anterior and medial lateral angles straight; pronotal margin between medial lateral

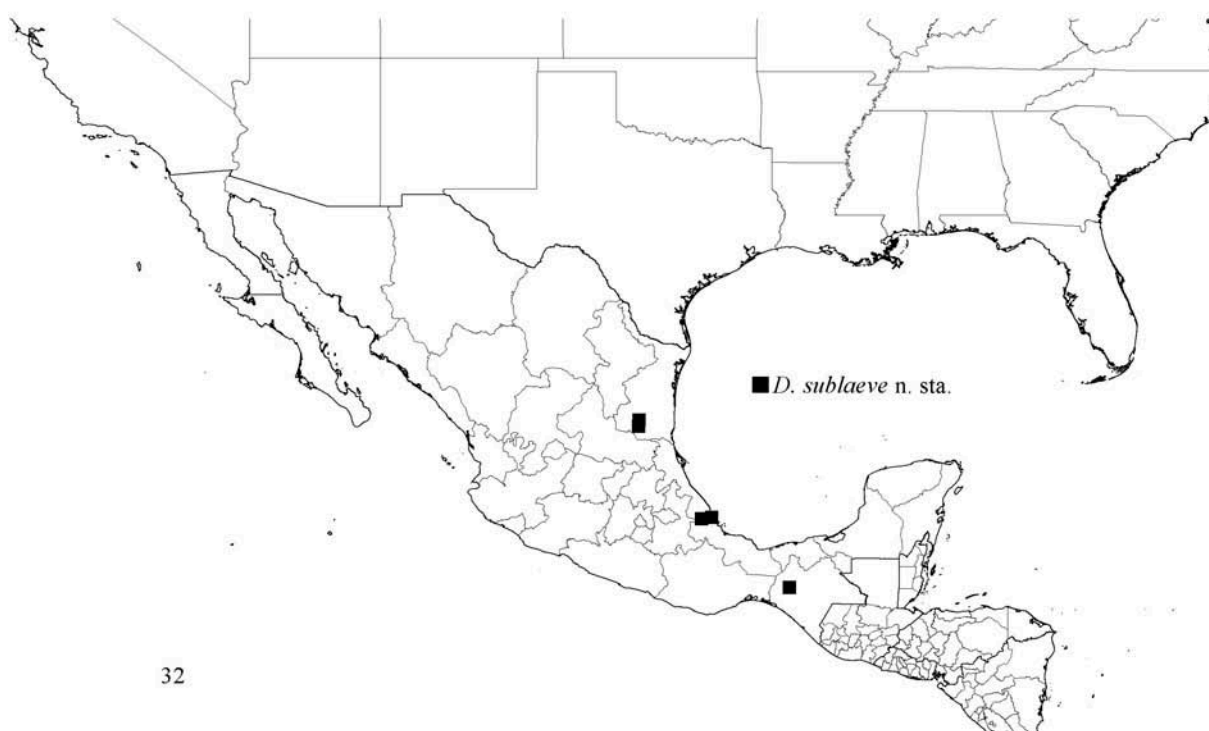
and posterior angles straight; pronotal medial lateral angle rounded (Figure 29b). Hypomeral punctures most disperse in the disc (Figure 29b). Elytral disc with humps just noticeable. Striae deep. Interstriae pseudocostate, central one-third of their width bright, in lateral view never more elevated than stria. Strial punctures with the same size or smaller than interstitial punctures (Figure 29c). Carina of the 9th interstria extending to the middle of the elytral length. Metasternum with two posterior tubercles and anteriorly of these with another smaller tubercle. Front tibiae with ventral tooth, almost parallel to the basal dorsal tooth. Ventral face of middle femur with punctures separated by more than one diameter, except in the apex and the posterior margin where the punctures are most dense; posterior femur with basal punctures separated by more than one diameter and becoming largest and most dense at apex. Ventral face of middle femur with tubercle. Posterior tibiae curved in the basal one-third (Figure 29d). Basal one-third of the posterior tibiae in the posterior margin with denticles (Figure 29d). First abdominal ventrite expanded medially, second to fourth abdominal ventrites visible only laterally. Pygidial punctuation transversally oval (Figure 29e).

In lateral view, apex of the parameres about 1/3 the width of the base of the parameres; internal sac sclerites and genital segment as in Figure 30.

**Variation.** Paratypes vary in sexual features, females with posterior tibiae not curved in the basal one-third, ventral face of the middle femur without tubercle, first abdominal ventrite not expanded medially, second to



31



32

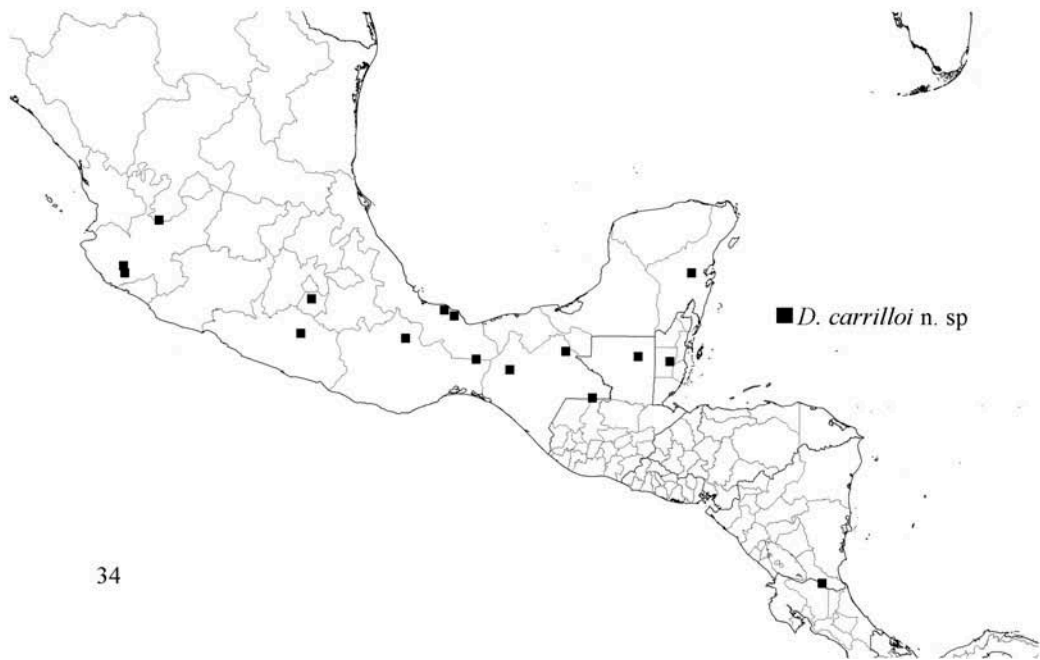
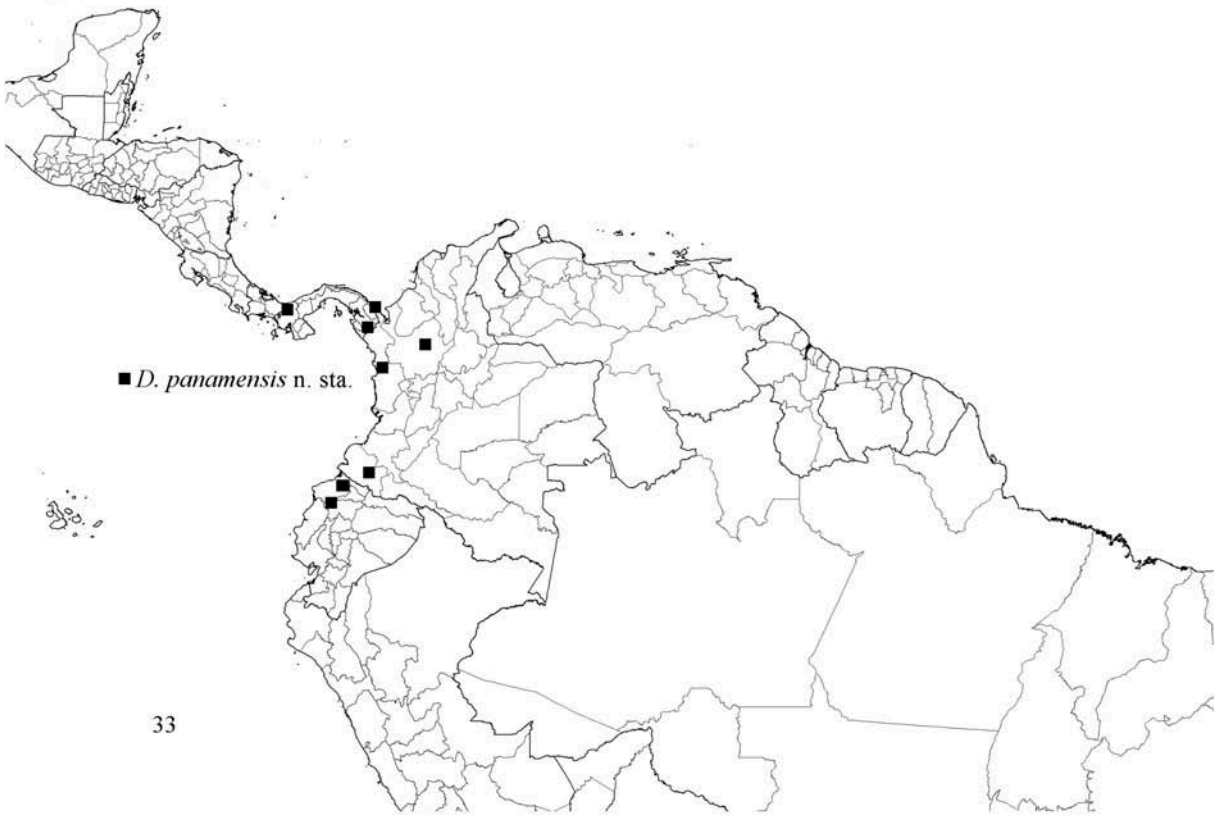
**Figure 31–32.** Distribution maps of **31**, *Deltochilum (Hybomidium) gibbosum* (Fabricius 1775); **32**, *Deltochilum (Hybomidium) sublaeve* Bates 1887s **n. status**.

fourth abdominal ventrites visible medially. Anterior tibiae of the males with ventral tooth larger and more apical than females. In males and females there is some variation in the size of the ventral tooth in the anterior tibiae, depending on the development of the individual. Underdeveloped males without humps on the elytral disc.

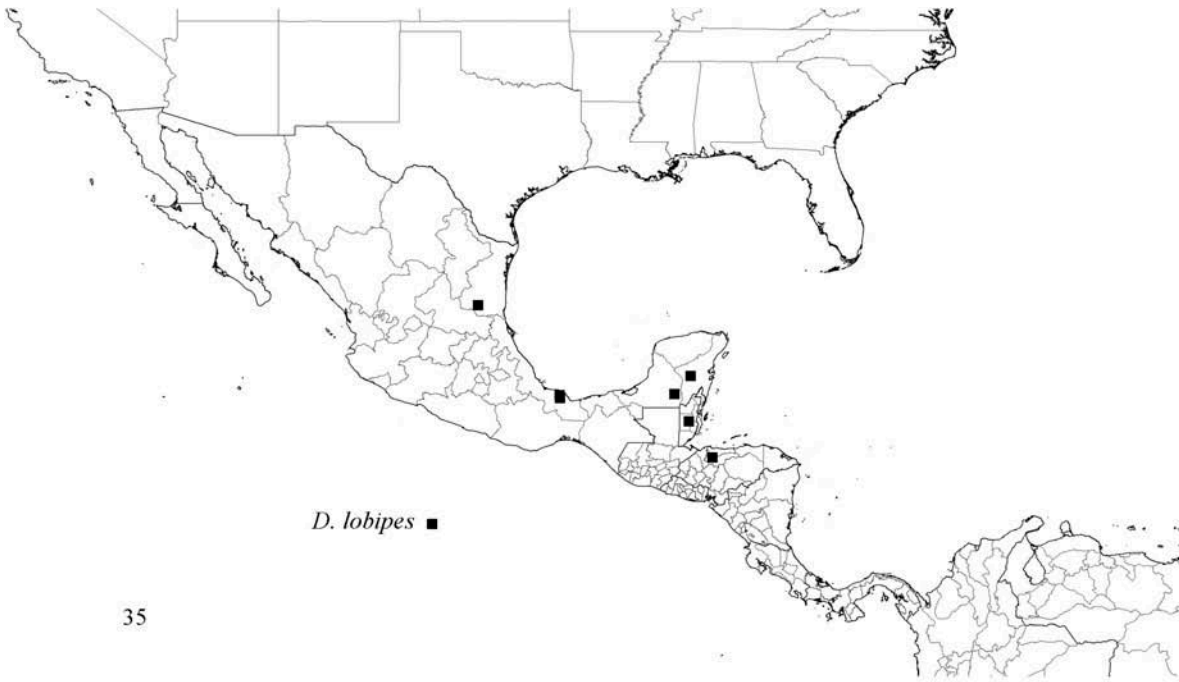
**Etymology.** This species is dedicated to Júlio Louzada, indefatigable scarab ecologist and enthusiast, with an indispensable role in the early origins of the present revision.

**Distribution (Figure 43).** Brazil (Minas Gerais, Espírito Santo).





**Figure 33–34.** Distribution maps of **33**, *Deltochilum* (*Hybomidium*) *panamensis* Howden 1966 n. status; **34**, *Deltochilum* (*Hybomidium*) *carrilloi* n. sp.



35



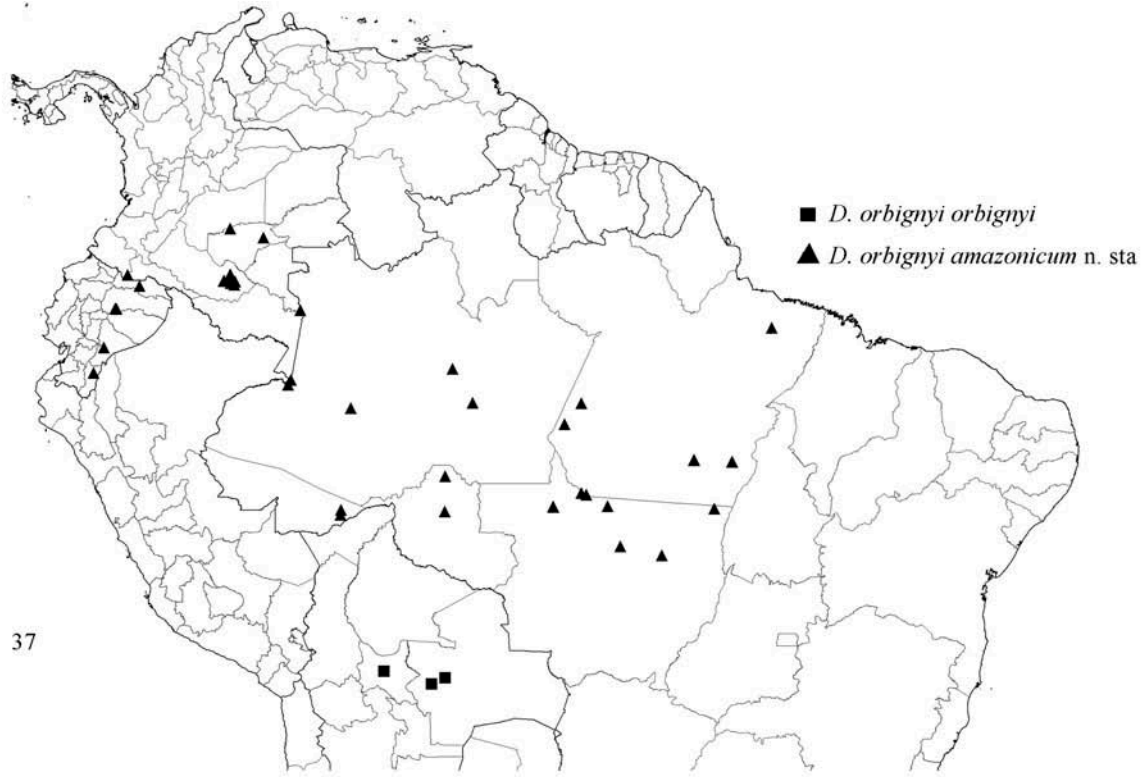
36

Figure 35–36. Distribution maps of 35, *Deltochilum (Hybomidium) lobipes* Bates 1887; 36, *Deltochilum (Hybomidium) molanoi* n. sp.

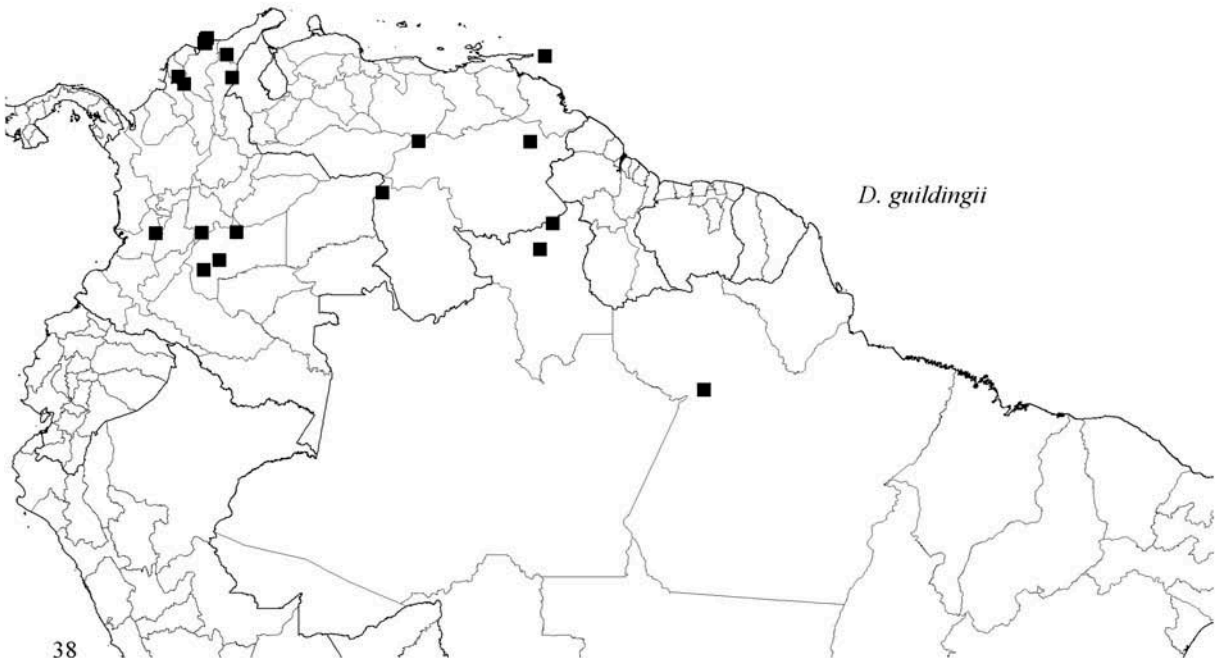
**Key to species of the subgenus *Hybomidium***

- 1. Interstriae costate (in lateral view, the central one-third of the interstria bright and more elevated than stria), the majority of interstitial punctures are between stria and costate, only a few punctures are on the costate, and these punctures are smallest (Figures 23c, 25b, 27c) ..... 2
- Interstriae not costate; interstriae with punctures mixed with bright points (Figures 5d, 7d, 9c, 11d), bright calluses (Figures 13b, 15c, 17b, 19b, 21c) or

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**Figure 37–38.** Distribution maps of 37, *Deltochilum* (*Hybomidium*) *orbignyi orbignyi* (Blanchard 1846) [squares], *Deltochilum* (*Hybomidium*) *orbignyi amazonicum* Bates 1887 n. status [triangles]; 38, *Deltochilum* (*Hybomidium*) *guildingii* (Westwood 1835).

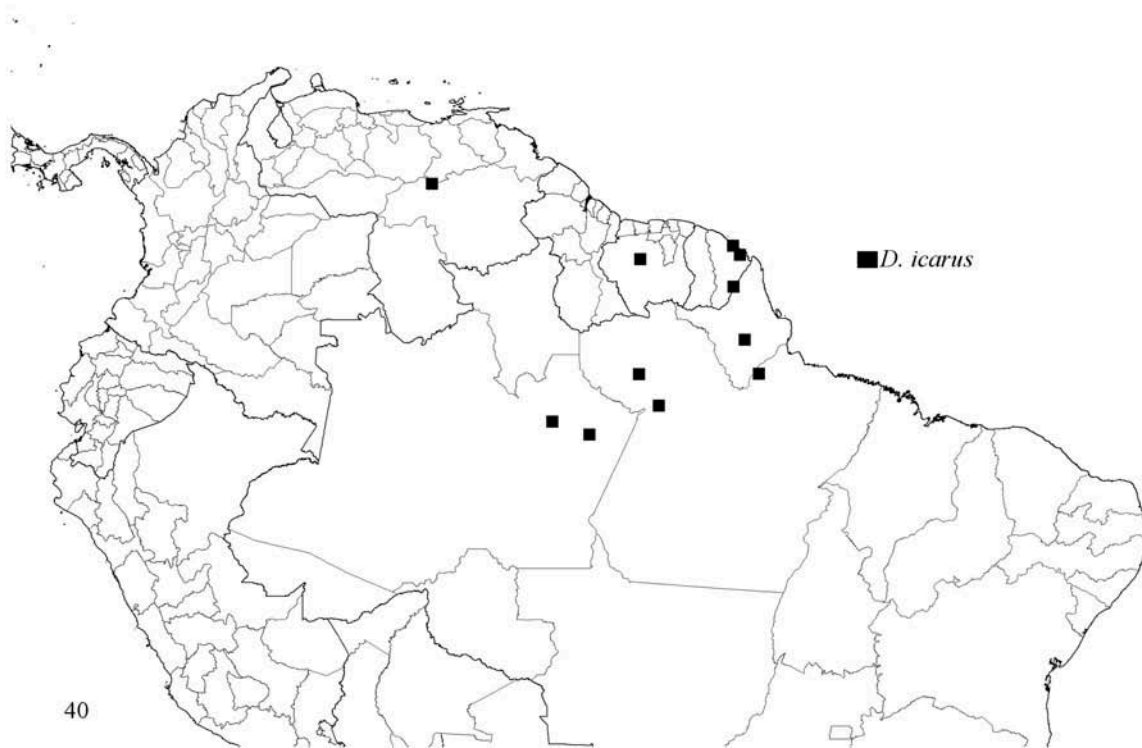
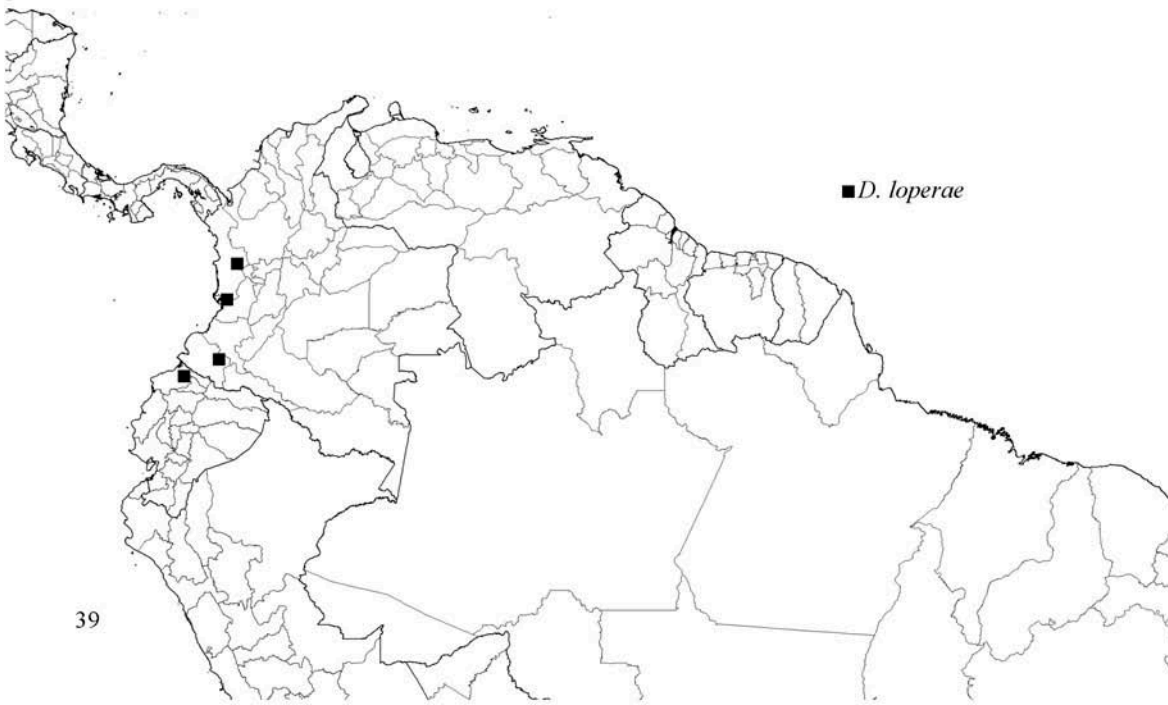


Figure 39–40. Distribution maps of 39, *Deltochilum* (*Hybomidium*) *loperae* González and Molano 2009; 40, *Deltochilum* (*Hybomidium*) *icarus* (Olivier 1789).



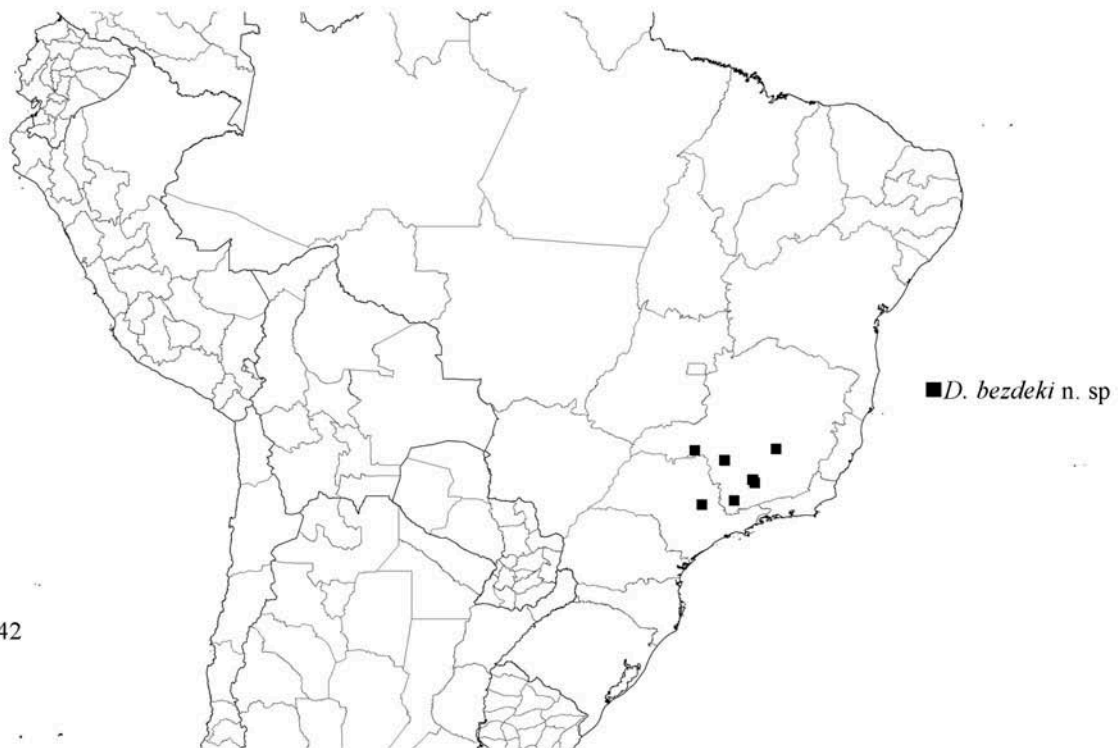
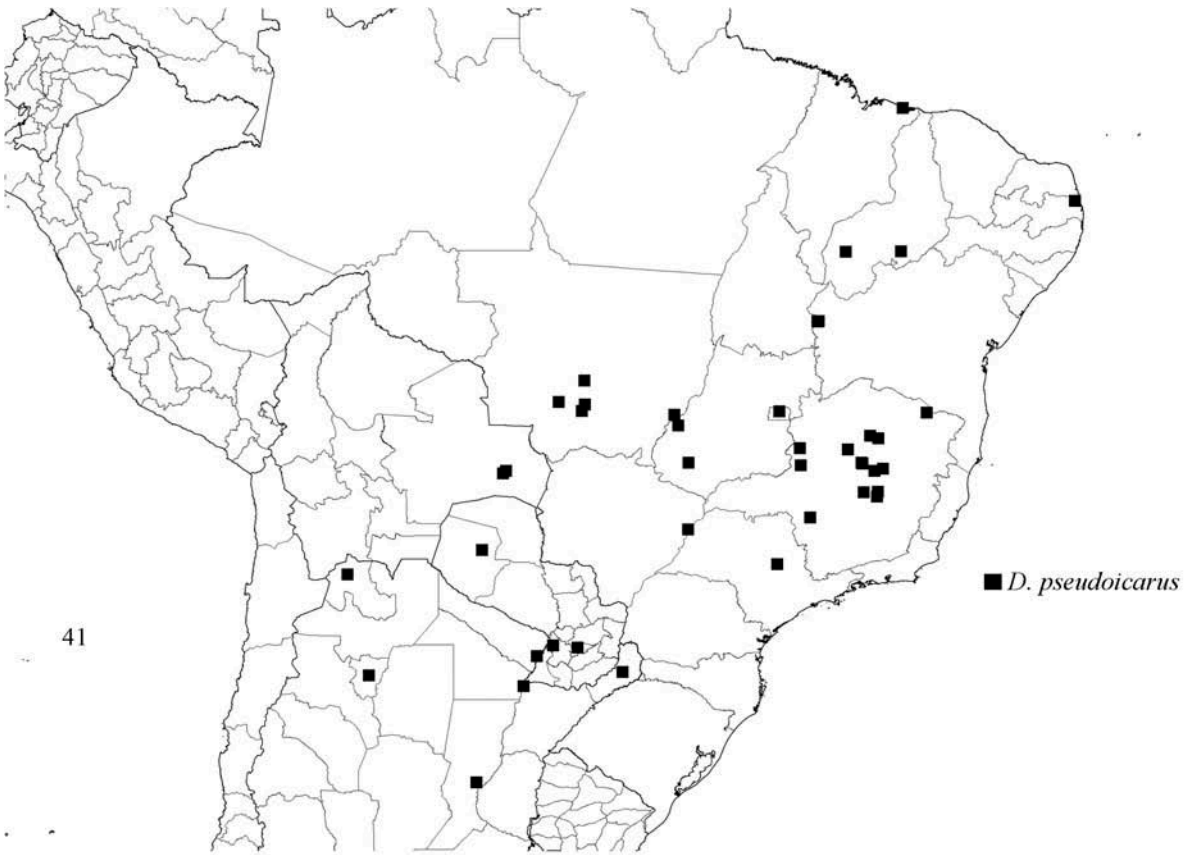


Figure 41–42. Distribution maps of 41, *Deltochilum (Hybomidium) pseudoicarum* Balthasar 1939; 42, *Deltochilum (Hybomidium) D. bezdeki* n. sp.



Figure 43. Distribution map of *Deltochilum (Hybomidium) louzadai* n. sp.

- pseudocostate (interstriae central one-third brighter and with smaller punctures than the rest of the interstria, and in lateral view central third of the interstria never more elevated than stria) (Figure 29c) ..... 4
2. Pronotal medial lateral angle projected; pronotal margin between medial lateral and posterior angles strongly sinuated (Figure 25a); apical pygidial margin, laterally, sinuated and elevated (Figure 25e, f); posterior tibiae of the males, near the apical one-third, with denticle (Figure 25d) [Argentina, Brazil (Minas Gerais, Piauí, Bahia, Mato Grosso, Distrito Federal, Maranhão, Mato Grosso do Sul, Goiás, São Paulo, Paraíba), Bolivia (Santa Cruz) and Paraguay (Boquerón)] .. ***Deltochilum pseudoicarus* Balthasar**
    - Pronotal medial lateral angle rounded; pronotal margin between medial lateral and posterior angles sinuated or subsinuated (Figures 23b, 27b); apical pygidial margin, laterally, not elevated (Figures 23e, f, 27e, f); posterior tibiae of the males, near the apical one-third, without denticle ..... 3
  3. Pronotal posterior margin with dense punctation, punctures separated by less than one distance between internal and external margins of each puncture (Figure 23a); margin between pronotal anterior angle and hypomeral anterior angle (not visible dorsally) slightly straight or few concave (Figure 23b); ventral face of middle (Figure 23d) and posterior femora with punctation separated by less than one diameter; ventral face of the middle femur of the males without tubercle (Figure 23d) [Northeastern Brazil (Amapá, Amazonas, Pará), French Guiana and Suriname] ..... ***Deltochilum icarus* (Olivier)**
    - Pronotal posterior margins with disperse punctation, punctures separated by more than one distance between internal and external margins of each puncture (Figure 27a); margin between pronotal anterior angle and hypomeral anterior angle (not visible dorsally) concave (Figure 27b); ventral face of middle (Figure 27d) and posterior femora with punctation separated by more than one diameter; ventral face of the middle femur of the males with tubercle (Figure 27d) [Brazil (Minas Gerais)] ..... ***Deltochilum bezdeki* n. sp.**
  4. Interstriae pseudocostate (Figure 29c), central one-third brightest and with punctures smaller than the rest of the interstria; basal one-third of the posterior tibiae in the posterior margin with denticles (Figure 29d) [Brazil (Minas Gerais, Espírito Santo)] . ..... ***Deltochilum louzadai* n. sp.**
    - Interstriae with bright points (in all interstria) (Figures 5d, 7d, 9c and 11d) or bright calluses (in the central one-third) (Figures 13b, 15c, 17b, 19b and 21c) mixed with the punctures; basal one-third of the posterior tibiae in the posterior margin without denticles ..... 5

5. Interstriae with bright calluses (in the central one-third) larger than interstitial punctures (Figures 15c and 19b) ..... 6
  - Interstriae with bright points (in all interstria) (Figures 5d, 7d, 9c, 11d) or with bright calluses (in the central one-third) smaller than interstitial punctures (Figures 13b, 17b, 21c) ..... 7
6. Pronotal medial lateral angle rounded; pronotal margin between medial lateral and posterior angles sinuated (Figure 19a) [Colombia (Bolívar, Cesar, Magdalena, Meta), Brazil (Amazonas, Roraima, Pará), Suriname and Venezuela (Amazonas)] ..... ***Deltochilum guildingii* (Westwood)**
  - Pronotal medial lateral angle projected; pronotal margin between medial lateral and posterior angles strongly sinuated (Figure 15b) [Colombia (Caldas, Huila)] ..... ***Deltochilum molanoi* n. sp.**
7. Interstriae with bright calluses (in the central one-third) smaller than interstitial punctures (Figures 13b, 17b, 21c) ..... 8
  - Interstriae with bright points (in all interstria) mixed with the punctures (Figures 5d, 7d, 9c and 11d) .... 11
8. Pronotal medial lateral angle projected; pronotal margin between medial lateral and posterior angles strongly sinuated (Figure 13a) [Eastern Mexico (Tamaulipas, Quintana Roo, Veracruz) Guatemala (Petén), Nicaragua and Honduras] ..... ***Deltochilum lobipes* Bates**
  - Pronotal medial angle rounded; pronotal margin between medial lateral and posterior angles sinuated (Figures 17a, 21b) ..... 9
9. Striae with oval punctures, interstitial punctures smaller than stria punctures (Figure 17b) [Amazonia (Colombia, Brazil, Ecuador or Bolivia Santa Cruz, Buenavista, Northern Argentina)] ..... 10
  - Striae with rounded punctures, interstitial punctures same size as stria punctures (Figure 21c) [Southern biogeographic Choco, Colombia (Chocó, Nariño, Valle del Cauca) and Ecuador (Esmeraldas)] ..... ***Deltochilum loperae* González & Molano**
10. Color black cupreous [Bolivia Santa Cruz, Buenavista, Northern Argentina, Figure 37 squares] .. ***Deltochilum orbignyi orbignyi* (Blanchard)**
  - Color black [Amazonia (Colombia, Brazil, Ecuador, Peru)] Figure 37 triangles] ..... ***Deltochilum orbignyi amazonicum* Bates n. status**
11. Striae narrower than the distance between internal and external margins of each interstitial puncture; striae shallower than interstitial punctures (Figure 5d); surface of the pronotal disc, between punctures, shagreened (Figure 5b) [Southern USA (Alabama, Florida, Louisiana, North Carolina, Texas and Illinois)] ..... ***Deltochilum gibbosum* (Fabricius)**
  - Striae slightly narrower or wider than the distance between internal and external margins of each interstitial puncture, but always the striae with the same depth as interstitial punctures (Figures 7d, 9c, 11d); surface of the pronotal disc, between punctures, smooth (Figures 7b, 11b) ..... 12
12. Striae wider than (almost double) the distance between internal and external margins of each interstitial puncture (Figure 7d); striae with internal line (Figure 7d); interstitial punctures same size as stria punctures (Figure 7d) and almost the same size as punctures of the pronotal posterior margin; interstitial punctures occupying about 1/8 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria) [Mexico (Chiapas, Sinaloa, Tamaulipas, Veracruz)] ..... ***Deltochilum sublaeve* Bates n. status**
  - Striae with the same size or slightly narrower than the distance between internal and external margins of each interstitial puncture; striae without internal line, if present never in the whole stria length (Figures 9c, 11d); interstitial punctures smaller than stria punctures (Figures 9c, 11d) and than punctures of the pronotal posterior margin; interstitial punctures occupying 1/11 or 1/12 of the distance between each stria (measure in the middle of the elytral length, in the fifth interstria) ..... 13
13. Apical posterior margin (between the dorsal and ventral faces) of the metafemur excavated (Figure 9d); apical pygidial margin (ventral view) sinuated (Figure 9f); male without elytral humps [Colombia (Antioquia, Chocó, Nariño), Panama (Darién), Costa Rica, and Ecuador (Esmeraldas, Pichincha)] ..... ***Deltochilum panamensis* Howden n. status**
  - Apical posterior margin (between the dorsal and ventral faces) of the metafemur shallowly excavated (Figure 11f); apical pygidial margin (ventral view) straight (Figure 11i); male with elytral humps [Belize (Br. Honduras), Guatemala (Petén), Mexico (Chiapas, Guerrero, Jalisco, Morelos, Oaxaca, Quintana Roo, Veracruz), Nicaragua (Río San Juan)] ..... ***Deltochilum carrilloi* n. sp.**

**Clave para las especies del subgénero *Hybomidium***

1. Interestrias costiformes (en vista lateral, el tercio central de la interestria brillante y más elevado que la estria), la mayoría de los hoyuelos se encuentran entre la estria y la costa, si hay hoyuelos en la costa más pequeños y menos densos que los del resto de la interestria (Figuras 23c, 25b, 27c) ..... 2
  - Interestrias no costiformes; interestrias con puntuación mezclada con puntos brillantes (Figuras 5d, 7d, 9c, 11d), callosidades brillantes (Figuras 13b,

- 15c, 17b, 19b, 21c) o pseudocostada (tercio central de la interestría más brillante y con hoyuelos más pequeños, en vista lateral tercio central de la interestría nunca más elevado que la estría) (Figura 29c) ..... 4
2. Ángulo medio lateral del pronoto proyectado; margen pronotal entre el ángulo medio lateral y el posterior fuertemente sinuado (Figura 25a), margen lateral apical del pigido sinuado y elevado (Figuras 25e, 25f); tibia posterior de los machos con denticulo cerca del tercio apical (Figura 25d) [Argentina, Brasil (Minas Gerais, Piauí, Bahia, Mato Grosso, Distrito Federal, Maranhão, Mato Grosso do Sul, Goiás, São Paulo, Paraíba), Bolivia (Santa Cruz) y Paraguay (Boquerón)] ..... ***Deltochilum pseudoicarus* Balthasar**
- Ángulo medio lateral del pronoto redondeado, margen pronotal entre el ángulo medio lateral y el posterior ligeramente sinuado o subsinuado (Figuras 23b, 27b), margen lateral apical del pigido no elevado (Figuras 23e, 23f, 27e, 27f); tibia posterior de los machos sin denticulo cerca del tercio apical ..... 3
3. Hoyuelos de la parte posterior del pronoto densos, separados por menos de una vez la distancia entre el margen interno y el externo de cada hoyuelo (Figura 23a), margen entre el ángulo anterior del pronoto y el ángulo anterior hipomeral (no visible desde la parte dorsal) subrecto o poco cóncavo (Figura 23b); hoyuelos de la cara ventral del fémur medio (Figura 23d) y posterior separados por menos de un diámetro; machos sin tubérculo en el fémur medio (Figura 23d) [Nororiente de Brasil (Amapá, Amazonas, Pará), Guayana Francesa y Surinam] ..... ***Deltochilum icarus* (Olivier)**
- Hoyuelos de la parte posterior del pronoto dispersos, separados por más de una vez la distancia entre el margen interno y el externo de cada hoyuelo (Figura 27a), margen entre el ángulo anterior del pronoto y el ángulo anterior hipomeral (no visible desde la parte dorsal) cóncavo (Figura 27b), hoyuelos de la cara ventral del fémur medio (Figura 27d) y posterior separados por más de un diámetro; machos con tubérculo en la cara ventral del fémur medio (Figura 27d) [Brasil (Minas Gerais)] ..... ***Deltochilum bezdeki* n. sp.**
4. Interestrias pseudocostadas (Figura 29c), tercio central de la interestría más brillante y con hoyuelos más pequeños; tercio basal de la tibia posterior en el margen posterior con denticulos (Figura 29d) [Brasil (Minas Gerais, Espirito Santo)] ..... ***Deltochilum louzadai* n. sp.**
- Interestrias con puntos brillantes (dispersos en toda la interestría) (Figuras 5d, 7d, 9c, 11d) o callosidades brillantes (en el tercio central) (Figuras 13b, 15c, 17b, 19b, 21c) entremezclados con los hoyuelos; tercio basal de la tibia posterior en el margen posterior sin denticulos ..... 5
5. Interestrias con callosidades brillantes (en el tercio central) más grandes que los hoyuelos de la interestría (Figuras 15c, 19b) ..... 6
- Interestrias con puntos brillantes (dispersos en toda la interestría) (Figuras 5d, 7d, 9c, 11d) o con callosidades brillantes (en el tercio central) más pequeñas que los hoyuelos de la interestría (Figuras 13b, 17b, 21c) .... 7
6. Ángulo medio lateral de pronoto redondeado; margen pronotal entre el ángulo medio lateral y el posterior sinuado (Figura 19a) [Colombia (Bolívar, Cesar, Magdalena, Meta), Brasil (Amazonas, Roraima, Pará), Surinam y Venezuela (Amazonas)] ..... ***Deltochilum guildingii* (Westwood)**
- Ángulo medio lateral de pronoto proyectado; margen pronotal entre el ángulo medio lateral y el posterior fuertemente sinuado (Figura 15b) [Colombia (Caldas, Huila).] ..... ***Deltochilum molanoi* n. sp.**
7. Interestrias con callosidades brillantes (en el tercio central) más pequeñas que los hoyuelos de la interestría (Figuras 13b, 17b, 21c) ..... 8
- Interestrias con puntos brillantes (dispersos en toda la interestría) entremezclados con los hoyuelos (Figuras 5d, 7d, 9c, 11d) ..... 11
8. Ángulo medio lateral de pronoto proyectado; margen pronotal entre el ángulo medio lateral y el posterior fuertemente sinuado (Figura 13a) [Oriente de México (Tamaulipas, Quintana Roo, Veracruz), Guatemala (Petén), Nicaragua y Honduras] ..... ***Deltochilum lobipes* Bates**
- Ángulo medio lateral de pronoto redondeado; margen pronotal entre el ángulo medio lateral y el posterior sinuado (Figuras 17a, 21b) ..... 9
9. Hoyuelos de las estrias ovalados y más grandes que los de las interestrias (Figura 17b) [Amazonia (Colombia, Brasil, Ecuador, Perú) o Bolivia, Santa Cruz, Buenavista, Northern Argentina] ..... 10
- Hoyuelos de las estrias redondeados y subiguales en tamaño que los de la interestría (Figura 21c) [Sur del Chocó biogeográfico, Colombia (Chocó, Nariño, Valle del Cauca) y Ecuador (Esmeraldas)] ..... ***Deltochilum loperae* González & Molano**
10. Color negro cobrizo [Bolivia Santa cruz, Buenavista, Northern Argentina, Figura 37 cuadrados] ..... ***Deltochilum orbignyi orbignyi* (Blanchard)**
- Color negro [Amazonia (Colombia, Brasil, Ecuador, Perú) Figura 37 triangulos] ..... ***Deltochilum orbignyi amazonicum* Bates n. status**
11. Estrias más angostas que la distancia entre el margen interno y el externo de cada hoyuelo de la interestría; estrias menos profundas que los hoyuelos de la interestría (Figura 5d); superficie del disco pronotal



- entre los hoyuelos chagrinada (Figura 5b) [Sur de Estados Unidos (Alabama, Florida, Louisiana, North Carolina, Texas e Illinois)] ..... *Deltochilum gibbosum* (Fabricius)
- Estrías más angostas o más anchas que la distancia entre el margen interno y el externo de cada hoyuelo de la interestría, pero siempre tan profundas como los hoyuelos de la interestría (Figuras 7d, 9c, 11d), superficie del disco pronotal entre los hoyuelos lisa (Figuras 7b, 11b) ..... 12
12. Estrías más anchas (casi el doble) que la distancia entre el margen interno y el externo de cada hoyuelo de interestría; estrías con línea interna (Figura 7d); hoyuelos de las interestrias del mismo tamaño que los de la estria (Figura 7d) y casi tan grandes como los del margen posterior del pronoto; hoyuelos de las interestrias ocupando cerca de 1/8 de la distancia entre cada estria (medido en la mitad longitudinal del élitro en la interestria 5) [México (Chiapas, Sinaloa, Tlaxcala, Veracruz)] ..... *Deltochilum sublaeve* Bates n. status
- Estrías del mismo ancho o más angostas que la distancia entre el margen interno y el externo de cada hoyuelo de la interestría; estrías sin línea interna, si presente nunca en la longitud total de la estrías (Figuras 9c, 11d); hoyuelos de las interestrias más pequeños que los de la estria (Figuras 9c, 11d) y que los del margen posterior del pronoto; hoyuelos de las interestrias ocupando cerca de 1/11 o 1/12 de la distancia entre cada estria (medido en la mitad longitudinal del élitro en la interestria 5) ..... 13
13. Margen apical posterior, entre la cara dorsal y ventral, del metafemur excavado (Figura 9d); margen apical del pigidio (vista ventral) sinuado (Figura 9f); machos sin gibas elitrales [Colombia (Antioquia, Chocó, Nariño), Panamá (Darién), Costa Rica, and Ecuador (Esmeraldas, Pichincha)] ..... *Deltochilum panamensis* Howden n. status
- Margen apical posterior, entre la cara dorsal y ventral, del metafemur debilmente excavado (Figura 11f); margen apical del pigidio (vista ventral) recto (Figura 11i); machos con gibas elitrales [Belice (Br. Honduras), Guatemala (Petén), México (Chiapas, Guerrero, Jalisco, Morelos, Oaxaca, Quintana Roo, Veracruz), Nicaragua (Río San Juan)] ..... *Deltochilum carrilloi* n. sp.

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