

**Taxonomic and nomenclatorial revision within  
the Neotropical genera of the subtribe Odontochilina.  
6. *Odontocheila fraternum* sp. nov., a new species  
sister to *O. gilli* (Coleoptera: Cicindelidae)**

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**Abstract.** Two species of *Odontocheila* Laporte de Castelnau, 1834, both from Panama, are reviewed. *Odontocheila fraternum* sp. nov. is described as a new species from three disjunct localities, and a detailed redescription of the related species *O. gilli* Johnson, 2000 is given. Illustrations of the habitus, diagnostic characters and variability of these two species are presented in colour photographs.

**Key words.** Coleoptera, Cicindelidae, *Odontocheila*, new species, Panama, Neotropical Region

### Introduction

This paper is a continuation of the ongoing taxonomic revision of Neotropical genera *Odontocheila* Laporte de Castelnau, 1834, *Pentacomia* Bates, 1872, and eight other related genera by the first author. The aim of this series of papers (see also MORAVEC 2012a,b,c, 2013; DURAN & MORAVEC 2013; MORAVEC & BRZOSKA 2013) is to publish significant taxonomic and nomenclatorial changes or descriptions of new species that will be available before the completion of the final comprehensive publication. The subtribe Odontochilina is here defined exclusively for the Neotropical genera, thus tentatively separated from the subtribe Prothymina W. Horn, 1910 sensu RIVALIER (1969, 1971).

As discussed in DURAN & MORAVEC (2013), Panama is a country with tremendous biodiversity, including a rich diversity of tiger beetle genera and species. A large number of *Odontocheila* and *Pentacomia* specimens have been recently collected as part of a survey of Panamanian tiger beetles conducted by the second author jointly with Don Windsor of the Smithsonian Tropical Research Institute (STRI, Panama), the results of which are being

prepared for publication. Numerous material was also contributed by David Brzoska (Naples, Florida) along with several other specimens from other colleagues (see Type material).

The genus *Odontocheila* presently comprises approximately 80 taxa including a number of subspecies that are under review by the first author and will be addressed in entirety in the final completed revision of the genus. Many of the type specimens, namely of taxa described by Walther Horn were not examined by RIVALIER (1969), and these were not included in his brief and incomplete revision. In the present revision of the genus some of the taxa have been synonymized, two new species described, and several taxonomic and nomenclatorial changes published (MORAVEC 2012a, 2013); other new taxa and changes including a new, more accurate infrageneric classification with keys to the taxonomic groups and species are being prepared for the concluding publication.

In the present paper *Odontocheila fraternum* sp. nov. is described as a new species to science representing the eleventh species of the genus known from Panama. This new species is compared to another Panamanian species *Odontocheila gilli* Johnson, 2000. The brief original description by JOHNSON (2000) was based merely on male holotype and female allotype and only external characters were illustrated (in line drawings); the aedeagus which possesses a distinctive shape to its apex is illustrated here for the first time.

## Material and methods

The body length is measured as the distance from the anterior margin of the clypeus to the elytral apex, including the sutural spine. The width of the pronotum is measured to include the lateral margins of the proepisterna. The width of the head is measured as the distance between the outer margins of the eyes. All dimensions of the aedeagi are measured in their left lateral position where the basal portion points to the right while the left lateral outline (with dorsoapical orifice) faces dorsally. The treatment and mounting of the aedeagi in order to observe the structure of the internal sac were performed as described in MORAVEC (2002, 2010). The colour photographs were taken by the first author with a Nikon digital camera Coolpix 990 through an MBS-10 binocular stereo-microscope.

Labels are cited in the following manner: lines on the same label are separated by slash /, separate labels are indicated by double-slash //. The colour of the label and mode of writing appear in square brackets.

Following abbreviations of type status are used in legends under the illustrations: HT = holotype, PT = paratype, AT = allotype.

Abbreviations for the collections:

BMNH	The Natural History Museum, London, United Kingdom;
CCJM	Collection Cicindelidae Jiří Moravec, Adamov, Czech Republic;
CMNC	Canadian Museum of Nature, Ottawa, Canada;
DBCN	David W. Brzoska Collection, Naples, Florida, U.S.A.;
DPDC	Daniel P. Duran Collection, Philadelphia, Pennsylvania, U.S.A.;
IRSN	Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;
MFNB	Museum für Naturkunde – Leibniz Institute for Research on Evolution and Biodiversity at the Humboldt University, Berlin, Germany;
MNHN	Muséum national d'Histoire naturelle, Paris, France;
NHMK	Natural History Museum, University of Kansas, Lawrence, Kansas, U.S.A.;

NMPC	National Museum, Prague, Czech Republic;
RLHC	Ronald L. Huber Collection, Bloomington, Minnesota, U.S.A.;
STRI	The Smithsonian Tropical Research Institute, Panama;
USNM	Smithsonian Institution, Entomology, Washington, D.C., U.S.A.;
WJCM	Walter Johnson Collection, Minneapolis, Minnesota, U.S.A.

## Taxonomy

### *Odontocheila gilli* Johnson, 2000

(Figs 1–2, 7–21)

*Odontocheila gilli* Johnson, 2000: 14, 15–17, Figs 1–2.

**Type locality.** Panama, San Blas province, Chepo-Carti Road, 400 m a.s.l., El Llano-Carti area, San Blas Foothills.

**Type material.** HOLOTYPE: ♂, “Panama: Panama / Chepo-Carti Rd. / 6.VI. 1982 / B. Gill 400 m” [printed, date partly handwritten] // “*Odontocheila* II / or III cf *mexicana* / cf *quadrina*” [handwritten] // “HOLOTYPE” [red with doubled black frame, printed] // “HOLOTYPE / *Odontocheila gilli* / W. Johnson” [yellow-green, printed] // “CANADIAN / MUSEUM / OF NATURE / LP2012-0171” [printed, with coloured circular logo] // “Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00011499” [printed and with QR code] (CMNC). ALLOTYPE: ♀ with same locality label and: “ALLOTYPE / *Odontocheila gilli* / W. Johnson” [yellow, printed] (WJCM). Both type specimens are pinned, the allotype is of a rather bad shape.

**Other specimens examined.** 1 ♂, “Panama – San Blas / Nusagandi Reserve 350m / D. Brzoska, 17-V-1999” // “*Odontocheila gilli* / det. D. Brzoska 2001” (DBCN).

**Description.** Body (Figs 1–2) small, length 8.10–8.60 (holotype 8.20, allotype 8.60) mm, width 2.40–2.80 (holotype 2.40, allotype 2.80) mm, median area of pronotum and elytra shiny metallic yellow-green with bronze-cupreous lustre or golden-cupreous, sublateral areas bright green to green-blue, and lateral areas purple-violaceous.

Head (Fig. 7) notably large with pronounced eyes, as wide as the body, 2.45–2.80 mm wide, all head portions glabrous.

Frons rather steeply sloped towards clypeus, with convex median area, clearly delimited from clypeus and separated from vertex by distinct, transverse, rather sharp edge; frons surface dark copper on lateral areas which are almost smooth or only indistinctly finely longitudinally wrinkled, median area ornamented by short, irregularly transverse to arcuate-arranged wavy rugae; supraantennal plates smooth, metallic green-blue with cupreous lustre.

Vertex with usual juxtaorbital sensory seta (on each side), almost flat, reddish cupreous in middle with well delimited bright greenish-blue sublateral areas and green-blue to violaceous postero-lateral areas passing onto temples; anteromedian area with irregularly transverse-wavy and arcuate rugae passing from frons and forming a rather distinct ornament, large juxtaorbital areas cupreous, distinctly longitudinally parallel-striate, striae on sublateral areas more irregular and wavy, divergent posteriad passing onto temples and postgenae; occipital area very finely irregularly vermicular-rugulose.

Clypeus iridescent green with bluish lateral areas, irregularly wrinkled.

Genae metallic green-blue, almost smooth with barely recognizable, shallow, parallel striae.

Labrum 4-setose, male labrum (Figs 8–9) rather long, length 0.65–0.70 mm, width 1.05–1.10 mm, ochre-testaceous, with brown to black-brown darkened basal and sublateral areas (more obvious so in holotype), labral shape remarkable within the genus, possessing

rounded lateral teeth, larger right-angled or rounded anterolateral teeth and prominent, acute anterior teeth of a horn-like shape; anterior margin between these teeth shallowly emarginate; female labrum (Fig. 10) much longer, length 1.10 mm, width 1.15 mm, much darker, reddish brown with larger black basal and anterior marginal areas, with rounded lateral and anterolateral teeth and prominent, acutely tridentate median lobe with wider and more protruding median tooth.

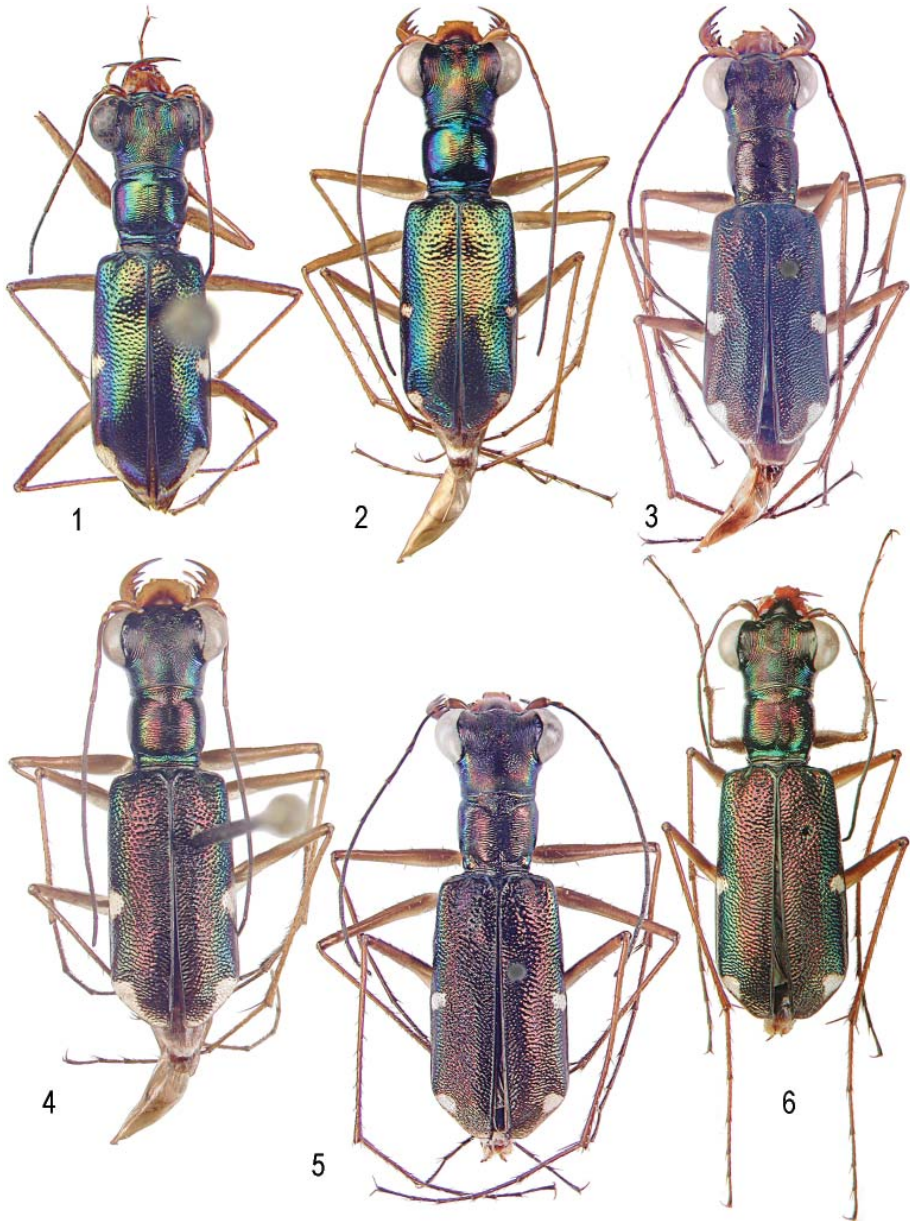
Mandibles (Fig. 7) normally shaped with arcuate lateral margins, ochre to brownish-testaceous in male, dark brownish in female, subsymmetrical, each mandible with four teeth (and basal molar), left mandible with second and third tooth of approximately same size, fourth tooth smaller; right mandible with third tooth somewhat smaller than the second, fourth tooth markedly smaller.

Palpi (Fig. 7). Both maxillary and labial palpi with normal (elongate) shape of terminal palpomeres, in male yellow-ochre with gradually brownish-testaceous darkened terminal palpomeres, in female much darker and with apices of palpomeres blackish darkened, in female also whole labial palpi blackish darkened ventrally; penultimate (longest) palpomere of labial palpi rather narrow and elongate with only slightly and gradually dilated lateral margins towards apex (width 0.15–0.16 mm).

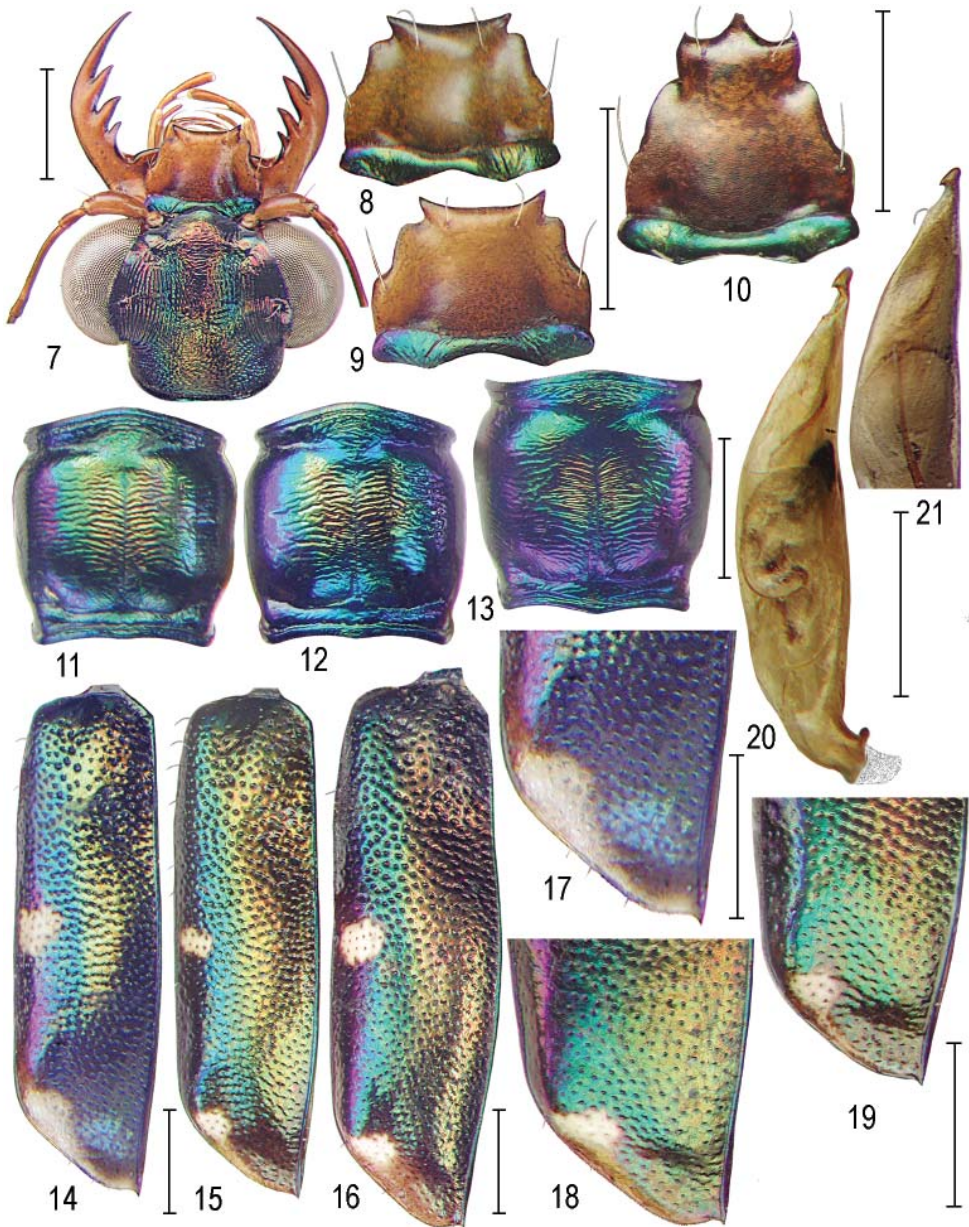
Antennae very long, in male reaching elytral anteapical angle (the holotype missing last three antennomeres), in female somewhat shorter (incomplete in the allotype); scape with only subapical seta, in male ochre-testaceous to brownish-testaceous with faint mahogany lustre, in female almost black with feeble metallic-green lustre; antennomeres 2–4 in male brownish-testaceous with mahogany lustre, in female much darker with almost black pedicel; antennomeres 5–11 dark brownish, gradually smoky-black darkened with normal micropubescence; all antennomeres with indistinct short apical setae.

Thorax. Pronotum (Figs 11–13) as long as wide, length and width 1.60–1.70 mm, both anterior and posterior sulci well pronounced; anterior lobe metallic-green with violaceous lateral areas, wider than the posterior, irregularly wavy-rugulose with a transversely vermicular rugulose ornament in middle; disc with lateral margins (including those of dorsally visible proepisterna) moderately convex and subparallel in middle (including inconspicuous but well obvious notopleural sutures); discal surface on median area bright bronze-cupreous with rather distinct transverse rugae, while iridescent blue-green sublateral areas are covered with much shallower rugae which become effaced towards smooth, shiny, purple-violaceous lateral areas; posterior lobe with rather distinct dorsolateral bulges and double-sutured posterior rim, iridescent green-blue with violaceous lustre, irregularly rugulose; all thoracic sterna glabrous; prosternum, mesosternum and metasternum smooth, metallic black-blue with green, bronze, cupreous and violaceous lustre; proepisterna smooth, shiny metallic-black with strong, cupreous lustre; mesepisterna and metepisterna metallic black-green, metepisterna indistinctly coriaceous-wrinkled; female mesepisternal coupling sulci unrecognizable, in form of longitudinal sulcus only somewhat deeper than in male.

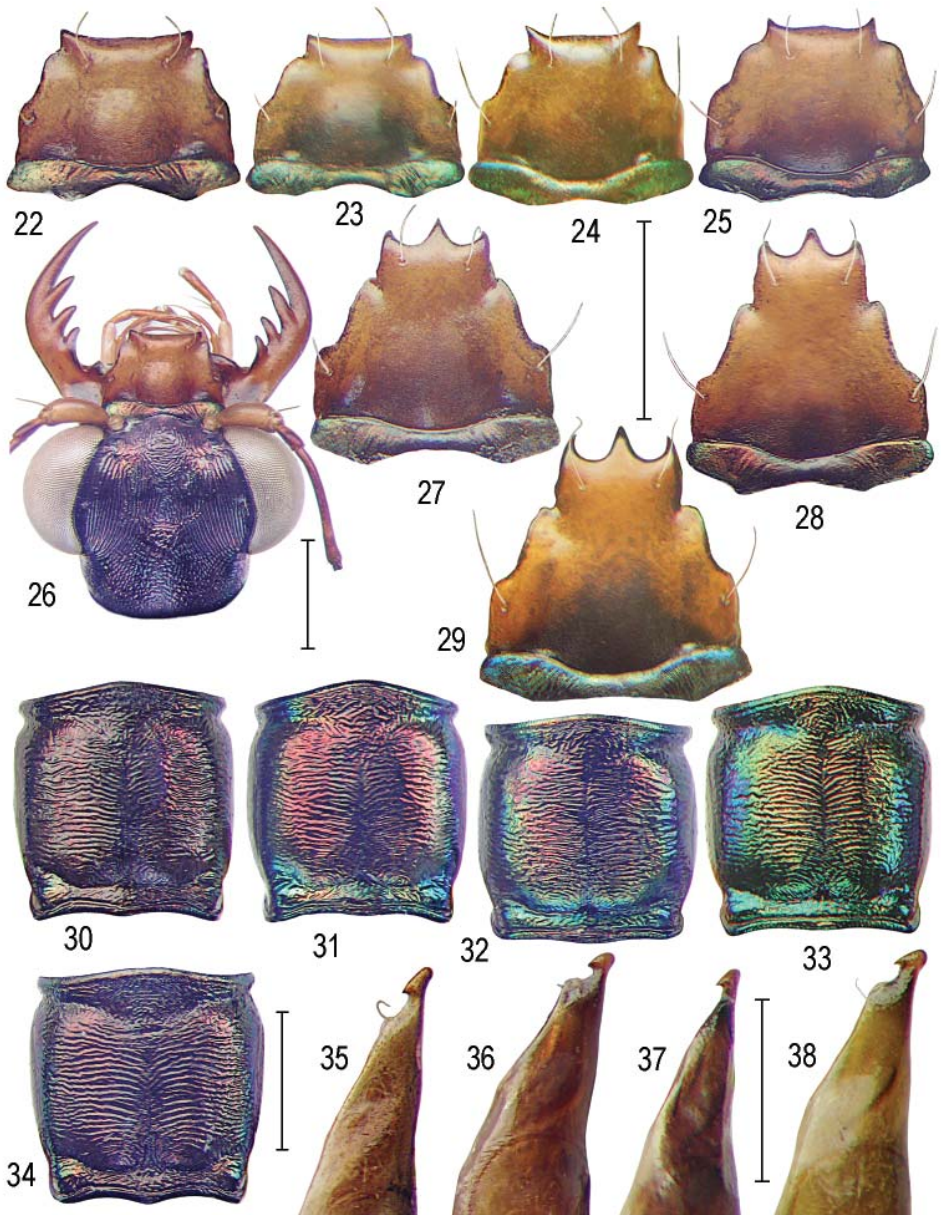
Elytra (Figs 14–19) elongate, length 4.80–5.20 mm, with rounded to subquadrate humeri, lateral margins subparallel, anteapical angles arcuate, then obliquely running towards apices which are in male subacute (only shortly rounded towards sutural spine) in female almost rounded; sutural spine short but distinct; microserrulation indistinct and very irregular;



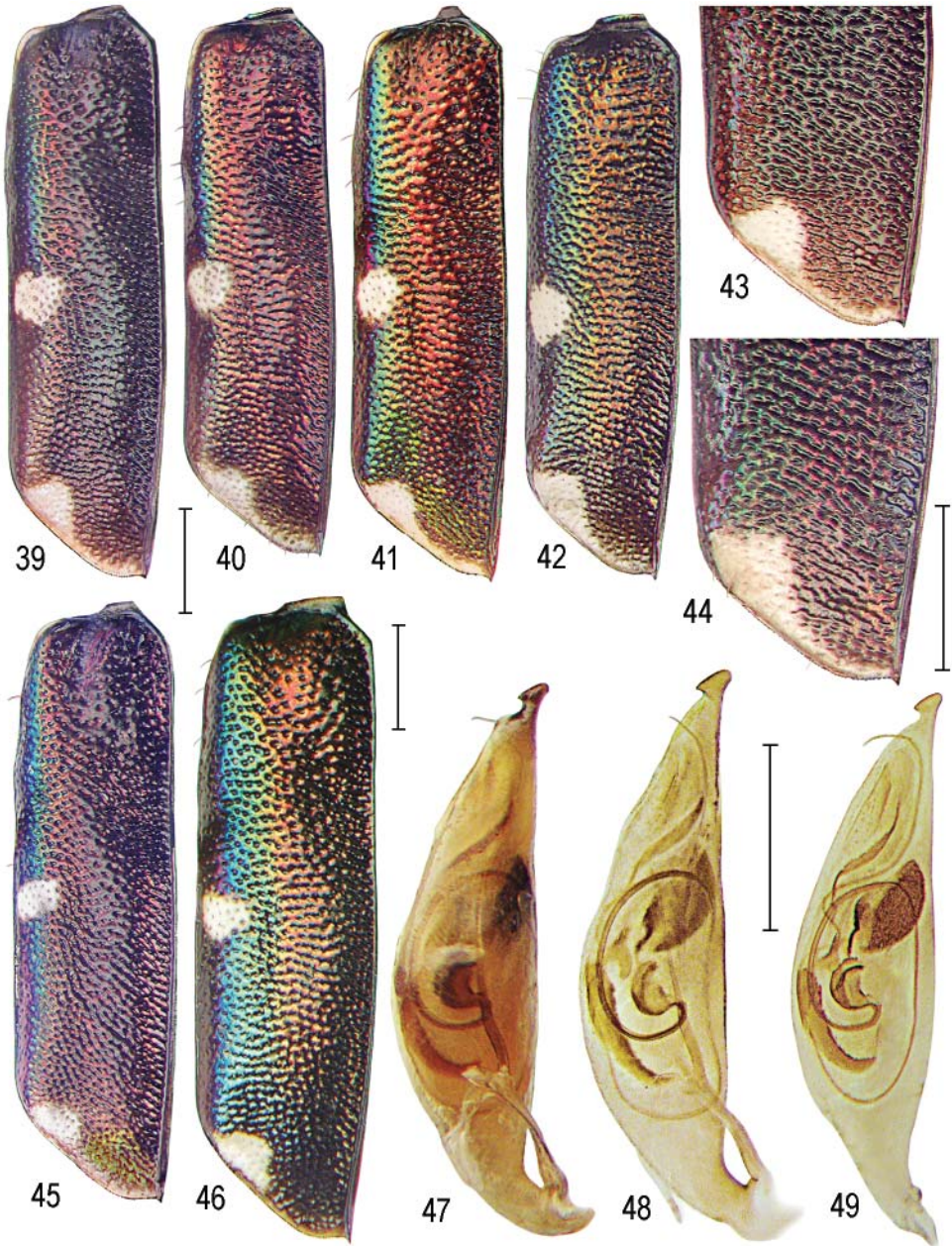
Figs 1–6. Habitus of two species of *Odontocheila* Laporte de Castelnau, 1834. 1–2 – *O. gilli* Johnson, 2000: 1 – male, 8 mm, Chepo-Carti Road, HT (CMNC); 2 – male, 8.1 mm, Nusagandi (DBCN). 3–6 – *O. fraternum* sp. nov.: 3 – male, 8.9 mm, Darien, HT (USNM); 4 – male, 8.6 mm, Altos de Campana, PT (CCJM); 5 – female, 9.1 mm, Darien, AT (DBCN); 6 – female, 10 mm, Altos de Campana (CCJM).



Figs 7–21. *Odontocheila gilli* Johnson, 2000. 7 – head, male, Nusagandi (DBCN); 8–10 – labrum: 8 – male, Chepo-Carti Road, HT (CMNC); 9 – male, Nusagandi; 10 – female, Chepo-Carti Road, AT (WJCM). 11–13 – pronotum: 11 – male, HT; 12 – male, Nusagandi; 13 – female, AT. 14–16 – elytron: 14 – male, HT; 15 – male, Nusagandi; 16 – female, AT. 17 – elytral apex, male, HT; 18–19 – elytral apex, back illumination: 18 – male, Nusagandi; 19 – female, AT. 20–21 – aedeagus: 20 – HT; 21 – Nusagandi. Scale bars = 1 mm.



Figs 22–38. *Odontocheila fraternum* sp. nov. 22–25 – male labrum: 22 – Darien, HT (USNM); 23–25 – Altos de Campana, PT (23 – DPDC; 24–25 – CCJM). 26 – head, HT. 27–29 – female labrum: 27 – Darien, AT (DBCN); 28 – Darien, PT (CCJM); 29 – Altos de Campana, PT (DBCN). 30–33 – male pronotum: 30 – HT; 31 – Darien, PT (DBCN); 32–33 – Altos de Campana, PT (32 – DBCN; 33 – CCJM). 34 – female pronotum, AT. 35–38 – aedeagus (apex): 35 – HT; 36 – Darien, PT (CCJM); 37–38 – Altos de Campana, PT (CCJM). Scale bars = 1 mm.



Figs 39–49. *Odontocheila fraternum* sp. nov. 39–42 – male elytron: 39 – HT; 40–41 – Darien, PT (DBCN); 42 – Altos de Campana, PT (DBCN). 43–44 – elytral apex, back illumination: 43 – HT; 44 – Altos de Campana, PT (DBCN). 45–46 – female elytron: 45 – Darien, AT; 46 – Altos de Campana, PT (CCJM). 47–49 – cleared aedeagus showing internal sac: 47 – Altos de Campana, PT (CCJM); 48 – Darien, PT (CCJM); 49 – Altos de Campana, PT (DPDC). Scale bars = 1 mm.



elytral dorsal surface regularly convex on posterior half of elytral disc, humeral impression moderate, discal impression rather distinct, clearly delimiting moderate basodiscal convexity; apical impression distinct; elytral surface punctate, punctures mostly isolated and notably larger within humeral impressions and on basodiscal convexity, indistinctly anastomosing into chains within the discal impression, becoming much smaller, isolated and sparser posteriorly and very shallow on posterior declivity towards apices, nearly effaced on anteapical angles; appearance of the punctation varies depending on angle of illumination: the isolated punctures on apical elytral third are much more obvious in back illumination (Figs 18–19); elytral surface glabrous except for a few usual hairlike sensory setae indistinctly scattered mostly on basal area, and a few others adjacent to epipleura; elytral coloration on elytral disc shiny metallic yellow-green with bronze-cupreous lustre, sublateral areas bright green to green-blue, and lateral areas purple-violaceous (coloration varies depending on angle of illumination), white elytral maculation in male consisting of only sublateral-median macula and anteapical-apical lunule which in female appears as only anteapical macula because its lunule-like prolongation along the apical margin is in female barely recognizable; humeral macula is absent in both sexes.

**Abdomen.** Ventrites metallic-black with greenish, blue and violaceous lustre, in male with indistinctly testaceous areas on last three ventrites and apical pleurite, surface of the ventrites glabrous (except for usual, sparse and easily abraded hairlike sensory setae at their posterior margins).

**Legs.** Coxae in male with pro- and mesocoxae yellow to testaceous, in female dark testaceous, with only a few setae, metacoxae black with metallic-blue lustre and testaceous apices with only one central seta (lateral setae entirely absent); trochanters yellow-testaceous in male, dark testaceous in female, glabrous (except for usual easily abraded apical seta); femora in male yellow to testaceous, dorsally with feeble mahogany lustre, in female much darker, brownish-testaceous; femoral surface with only very sparse, short and indistinct, white to brownish semierect setae; tibiae concolorous with femora and with similar sparse setae and dense pad of greyish setae on basal third to half of pro- and mesotibiae; metatibiae with only sparse, semierect, short and stiffer setae; tarsi concolorous with tibiae except for darkened apices, first three tarsomeres in male with moderate dilatation and usual pad of dense, white setae.

**Aedeagus** (Figs 20–21) moderately voluminous in middle, 2.80 mm long, 0.65–0.70 mm wide, apical portion with almost straight ventral margin, gradually attenuated towards conspicuously shaped apex which is rounded, dorsally obliquely sloped and sharpened due to small but deep dorsal excision forming small, crochet hook-like shape. Internal sac not examined from cleared aedeagus, but when the aedeagus was observed re-hydrated by water, it showed usual sclerites and long convoluted flagellum characteristic of the genus.

**Differential diagnosis.** Immediately recognizable from externally similar *Odontocheila mexicana* Laporte de Castelnau, 1834 by the unusual shape of the male labrum and aedeagus, and absence of humeral lunule in both sexes. These characters and also its elytral sculpture differentiate *O. gilli* from the other similarly coloured Central American species *O. iodopleura* Bates, 1872.

*Odontocheila gilli* shares the characteristic shape of the labrum and aedeagus with *O. fraternum* sp. nov. described here, but immediately differs from the new species in having elytral punctures mostly isolated, sparser and smaller towards elytral apices, and by the absence of

humeral macula in both sexes. In addition, the labrum and palpi of the female allotype of *O. gilli* are much darker with blackish areas.

**Distribution and habitat.** *Odontocheila gilli* is a very rare species. Apart from two type specimens, only one other male was caught by David D. Brzoska (Naples, Florida) within the Nusagandi Indian Reserve, San Blas (Kuna Yala) region, situated near the type locality.

The habitat and collecting circumstances were mentioned by JOHNSON (2000) according to information given by the collector Bruce Gill (Ottawa, Ontario, Canada) that the two type specimens were taken in a “flight intercept trap” placed along trails within tropical rain forest of the El Llano-Carti site.

### *Odontocheila fraternum* sp. nov.

(Figs 3–6, 22–49)

**Type locality.** Panama, Darien province, Darien National Park, Pirre Camp, 1330 m.a.s.l., 0.7°45.8'N, 77°43.3'W.

**Type material.** HOLOTYPE: ♂, “PANAMA DARIEN / PN Darien – Cana Cerro / Pirre Camp 1330m / 0.7°45.8'N, 77°43.3'W / D. Brzoska 19-VI-2004” [printed] (USNM). ALLOTYPE: ♀, with same label data as holotype except for “550m” and “18-VI-2004” (DBCN, later in NHMK). PARATYPES: 4 ♂♂, with same label data as holotype (3 ♂♂ in DBCN, 1 ♂ in CCJM); 5 ♂♂ 2 ♀♀, with same label data as allotype (2 ♂♂ 1 ♀ in DBCN, 1 ♂ in NMPC; 1 ♂ in MNHN, 1 ♂ 1 ♀ in CCJM); 8 ♂♂, PANAMA, DARIEN PROV., / Estacion Cana, 500m.a.s.l. / 72°41'W; 07°44'N; / 15-22.VI.2004 / leg. D. Windsor & D. Duran” [printed] (5 ♂♂ in DPDC, 1 ♂ in NMPC, 2 ♂♂ in CCJM); 2 ♂♂ 5 ♀♀, “PANAMA: PANAMA / PN. Altos de Campana / D. Brzoska 18-V-1995” [printed] (1 ♂ 3 ♀♀ in DBCN, 1 ♀ in DPDC, 1 ♂ 1 ♀ in CCJM); 1 ♂ 1 ♀, “PANAMA: PANAMA / 850m, PN. Altos Campana / 08°41.1'N; 79°55.6'W / D. Brzoska 14-VI-2004” [printed] (DBCN); 1 ♂, “PANAMA: PANAMA / Res. Forest Cerro Jeffe / D. Brzoska 28-V-1995” [printed] // “*Odontocheila gilli* / det. D. Brzoska 2001” [handwritten] (DBCN); 5 ♂♂ 1 ♀, “PANAMA: Panama / Altos de Campana / 17.V.2003 / leg. Daniel Duran” [printed] (3 ♂♂ in DPDC, 2 ♂♂ 1 ♀ in CCJM). 1 ♂, “PANAMA / Cerro Campana / 18 May 1958 / W.J. Hanson” [printed] // “PANAMA STATE / Capiri District” [printed] // “n.sp. esp. see different labrum” [handwritten] (RLHC). All type specimens labelled: “HOLOTYPE (ALLOTYPE or PARATYPE respectively) / *Odontocheila / fraternum* sp. nov. / det. Moravec & Duran 2013” [red, printed].

**Description.** Body (Figs 3–6) small to medium sized, males from both localities 8.40–9.50 (holotype 8.90) mm long, 2.50–2.90 (holotype 2.50) mm wide; females from type locality 9.10–9.50 (allotype 9.10) mm long, 2.60–2.80 (allotype 2.70) mm wide; females from Altos de Campana generally larger, 9.10–10.1 mm long, 2.90–3.10 mm wide. Body coloration in holotype and most adults from type locality dark copper with more or less intense metallic green-blue lateral areas on pronotum and elytra, which are much brighter green-blue in adults (more distinctly so in females) from Altos de Campana.

Head (Fig. 26) notably large with pronounced eyes, as wide as the body, 2.50–3.10 mm wide, all head portions glabrous.

Frons rather steeply sloped towards clypeus, with convex median area, clearly delimited from clypeus and separated from vertex by blunt transverse edge, frons surface black-copper, lateral areas almost smooth or only indistinctly finely longitudinally wrinkled, median area ornamented by short, irregularly vermicular and arcuate-arranged wavy rugae; supraantennal plates smooth or wrinkled, dark copper or dark metallic green-blue.

Vertex with usual juxtaorbital sensory seta (on each side), almost flat, black-copper, sometimes with brighter cupreous lustre and with more or less noticeable greenish-blue sublateral areas; anteromedian area with irregularly transversely wavy and arcuate-rugulose ornament (passing from frons), large juxtaorbital areas distinctly longitudinally parallel-striate, striae

on sublateral areas more irregular and wavy, but becoming much finer posteriad when passing onto temples; occipital area very finely irregularly vermicular-rugulose.

Clypeus dark copper or brighter cupreous with green or bluish lateral areas irregularly wrinkled.

Genae in holotype and adults from type locality black with strong iridescent green-blue and bronze lustre, in other adults primarily metallic green or blue, almost smooth with barely recognizable, shallow, parallel striae.

Labrum 4-setose, male labrum (Figs 22–25) of almost identical shape as in *O. gilli*, but paler, length 0.70–0.80 mm, width 1.10–1.15 mm, ochre-testaceous, with indistinctly brownish-testaceous darkened basal area; female labrum (Figs 27–29) much longer, length 1.10–1.20 mm, width 1.20–1.25 mm, shaped as in *O. gilli* but much paler, testaceous, only basomedian area brown to black-brown darkened.

Mandibles (Fig. 26) shaped as in *O. gilli*, ochre-testaceous to mahogany-testaceous in male, usually darker in female, brownish-testaceous, subsymmetrical, each mandible with four teeth (and basal molar), their mutual size as in *O. gilli*.

Palpi (Fig. 26). Both maxillary and labial palpi with normal (elongate) shape of terminal palpomeres, in both sexes yellow-ochre with gradually pale tawny darkened terminal palpomeres (only slightly darker in female); penultimate (longest) palpomere of labial palpi rather narrow and elongate with only slightly and gradually dilated lateral margins towards apex (width 0.14–0.17 mm).

Antennae rather long, in male exceeding two thirds of elytral length, in female shorter, slightly exceeding elytral half; scape with only subapical seta, in male ochre-testaceous, in female mostly darker, testaceous to brownish-testaceous with feeble mahogany lustre; pedicel dark brown with mahogany lustre and paler apical area; antennomeres 2–4 in male brownish-testaceous with mahogany lustre and usually notably pale-tawny subapical areas, in female concolorous, but generally darker; antennomeres 5–11 dark brownish, gradually smoky-black darkened, with normal micropubescence; all antennomeres with indistinct short apical setae.

Thorax. Pronotum (Figs 30–34) similar to that of *O. gilli*, but much darker and always at least slightly longer than wide, length 1.60–1.90 mm, width 1.40–1.80 mm, and the transverse rugae on disc are generally denser, covering wider area and becoming shallower only in juxtannotopleural areas; coloration in the holotype and most adults from the type locality dark metallic-copper with only indistinct green-blue sublateral areas, rarely bright reddish-cupreous in middle; all thoracic sterna glabrous; prosternum, mesosternum and metasternum smooth, metallic black with strong green, blue or violaceous lustre; proepisterna smooth, metallic-black with cupreous lustre; mesepisterna and metepisterna metallic black with cupreous or greenish lustre, metepisterna indistinctly coriaceous-wrinkled; female mesepisternal coupling sulci unrecognizable, in form of longitudinal sulcus only somewhat deeper than in male.

Elytra (Figs 39–46) elongate, length 5.20–6.10 mm, with rounded to subquadrate humeri, lateral margins almost parallel, anteapical angles arcuate, then obliquely running towards apices which are in male variably rounded or subacute, in female almost rounded; sutural spine short but distinct; microserrulation indistinct or very irregular; elytral dorsal surface uneven due to several impressions: humeral impressions rather deep, discal impression distinct, clearly delimiting rather distinct basodiscal convexity and usually prolonged posteriad, apical impression distinct, and additional, elongate sublateral impressions present; elytral surface

coarsely punctate to cristulate-punctate on whole elytral length, punctures larger within humeral impressions and on basodiscal convexity, commonly anastomosing on prevailing elytral area with intervals forming irregular transverse crests mostly on sublateral and discal area including apices; appearance of the sculpture depends on angle of illumination, the coarse cristulate sculpture on apical area is much more obvious in back illumination (Figs 43–44); elytral surface glabrous except for usual, a few hairlike sensory setae indistinctly scattered mostly on basal area, and a few others adjacent to epipleura; elytral coloration in holotype and adults from type locality dark copper with only indistinctly green-blue sublateral areas and violaceous juxtaepipleural areas, rarely with bright reddish-cupreous elytral disc and more expanded green to green-blue sublateral areas, very distinctly so in females from Altos de Campana; white elytral maculation in male consisting of three maculae: humeral macula (in female reduced and barely visible from above), sublateral-median macula, and antea-pical-apical lunule which in female appears as only antea-pical macula (its thin lunule-like prolongation along the apical margin is in female barely noticeable).

**Abdomen.** Ventrites metallic-black with greenish, blue and violaceous lustre, in male with indistinctly testaceous last ventrite (rarely three last ventrites) and apical pleurite, in female metallic black; surface of ventrites glabrous (except for usual, sparse and easily abraded hairlike sensory setae at their posterior margins).

**Legs.** Coxae in both sexes with pro- and mesocoxae yellow to testaceous, with only a few setae, metacoxae black with metallic-blue lustre and testaceous apices with only one central seta (lateral setae entirely absent); trochanters yellow-testaceous in both sexes, glabrous (except for usual easily abraded apical seta); femora yellow to testaceous, dorsally with feeble mahogany lustre, in female only slightly darker, mahogany-testaceous; femoral surface with only very sparse, short and indistinct, white to brownish semierect setae; tibiae concolorous with femora and with similar sparse setae except for dense pad of greyish setae on basal third to half of pro- and mesotibiae; metatibiae with only sparse, semierect, short and stiffer setae; tarsi brownish-testaceous and usually black-darkened, first three tarsomeres in male generally almost black with moderate dilatation and usual dense pad of short greyish-white setae.

**Aedeagus** (Figs 35–38, 47–49) shaped as in *O. gilli*, 3.00–3.10 mm long, 0.70–0.75 mm wide, apical portion with almost straight ventral margin, gradually attenuated towards conspicuously shaped apex which is rounded, dorsally obliquely sloped and sharpened due to deep dorsal excision forming small, crochet hook-like shape. Internal sac (Figs 47–49) containing sclerites characteristic of the genus, including the voluminous reniform ventral piece, and long, convoluted flagellum usually protruding from the dorsoapical orifice.

**Variability.** As stressed in the description and as obvious from the illustrations, the holotype and adults from the type locality are generally much darker coppery coloured, usually with only indistinctly green-blue sublateral areas, while the adults from Altos de Campana (particularly females which are usually notably larger) generally differ in having more conspicuous contrast between the reddish-cupreous elytral disc and iridescent green-blue lateral and apical areas, but two adults from Darien are even more brightly coloured than some males from Altos de Campana; the elongate sublateral elytral impressions are usually deeper in the holotype and adults from the type locality; elytral apices in males (independent of the locality) are rather

variably rounded, or subacute; there exists only slight variability in the shape of the labrum, independent of the locality.

**Differential diagnosis.** *Odontocheila fraternum* sp. nov. possesses almost identical shape of its aedeagus and labrum as in *O. gilli*, and adults (particularly females) from Altos de Campana may resemble it also due to rather similar (although darker) body coloration. Nevertheless, the new species immediately differs not only in the darker body coloration (much more distinctly in the holotype and adults from the type locality), but particularly in its elytral surface with much coarser punctate to cristulate-punctate sculpture covering whole elytral length, and possessing additional, longitudinal sublateral impressions (particularly deeper and therefore more conspicuous in adults from the type locality) forming uneven elytral surfaces. Moreover, the elytra of the new species possess humeral macula, the pronotum is slightly narrower, the labrum in both sexes paler, in female with only black-brown basal area, and both maxillary and labial palpi including penultimate (longest) palpomeres of labial palpi in female are much paler (lacking blackish areas present in female of *O. gilli*); the tarsi are much darker, but all other leg segments are generally paler than those in *O. gilli*.

Due to the coarse punctate-cristulate elytral sculpture the new species may resemble *O. quadrina* Chevrolat, 1835, a taxon described from Mexico, the type of which is not preserved, and which is considered by some authors (recently by ERWIN & PEARSON 2008) as a synonym of *O. mexicana* Laporte de Castelnau, 1834. However, this taxon immediately differs from *O. fraternum* sp. nov. in having smooth, shiny pronotum, even elytral surface, and very different shape of its labrum and aedeagus.

**Etymology.** Dedicated to the second author's two brothers, Andrew and Michael Duran. The three Duran brothers collected tiger beetles together on several occasions, including a trip to Altos de Campana. Most importantly they have helped the second author with their lifelong friendship.

**Distribution and habitat.** Known from three disjunct localities in Panama. The type locality is located in the southeastern Darien province, adjacent to the Colombian border, whereas the only other known populations occur at Altos de Campana and Cerro Jeffe in the province Panamá. Adults occur along light coloured heavy clay trails and openings through rainforests, above 500 m. When disturbed they are quick to alight on adjacent vegetation.

## Discussion

As mentioned in the Variability and Differential diagnosis above, adults from Altos de Campana are usually different in their dorsal coloration from the type locality (Darien) specimens. As such, this disjunct population may represent a separate subspecies or even a morphologically cryptic species, especially given the fact that Altos de Campana exists as an isolated "sky island" and there is an established biogeographic separation between this region and the Darien province (COATES & OBANDO 1996, COATES et al 2004). Nevertheless, because there is a great degree of variability in coloration independent of the locality, and as adults with intermediate coloration occur in both sites, we have included the adults from the area of Altos de Campana as paratypes. Interestingly, similar patterns of variation have been observed

in the recently described *O. davidbrzoskai* Moravec, 2013, where the Darien individuals are significantly darker coloured than those from central Panama (MORAVEC 2013).

Given the biogeography of the isthmus and the above ambiguity of the nature of the Altos de Campana population, future molecular-based phylogeographic work may be needed to determine whether two cryptic species exist within *O. fraternum* sp. nov.

The elytral sublateral impressions present in the new species, resembling those sometimes found in members of the genus *Pentacomia* Bates, 1872, are very rare in *Odontocheila*. Nevertheless, the internal sac of the aedeagi contains the main sclerites and long, convoluted flagellum characteristic of the genus *Odontocheila* as first demonstrated by RIVALIER (1969) in his revision in which he subdivided the genus to several species groups and separated from it the genera *Cenothyla* Rivalier, 1969, *Phyllodroma* Lacordaire, 1843 and *Pentacomia*.

Regarding the fact that the new species shares the same remarkable shape of its aedeagus with *O. gilli*, it should be noted here that there are several species within the genus (mostly those with hooked tips on their aedeagi) that differ solely in their external characters. These include for example *Odontocheila camuramandibula* Huber, 1999, *O. yunga* Huber, 1999 and *O. dilatoscapis* Huber, 1999 recently described from Bolivia. Although HUBER (1999) neither described nor illustrated the shape of their aedeagi, the examination of the type specimens revealed that their aedeagi are indistinguishable.

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