

## A new species of the genus *Pentacomia* from Panama (Coleoptera: Cicindelidae)

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**Abstract.** *Pentacomia (Mesochila) skrabali* sp. nov. is described as a new species in the genus *Pentacomia* Bates, 1872, and it represents the fourth species of the genus to be recorded from Panama. Examination of type specimens of relevant species of *Pentacomia* has confirmed that *P. (M.) skrabali* sp. nov. differs markedly from all known species in the genus (and related genera), and represents an intermediate link between the subgenera *Pentacomia* s. str. and *Mesochila* Rivalier, 1969. Illustrations of the habitus and diagnostic characters of the new species are presented in colour photographs.

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

### Introduction

This paper is a continuation of the ongoing taxonomic revision of Neotropical genera *Odontocheila* Laporte, 1834, *Pentacomia* Bates, 1872, and eight other related genera by the second author. The aim of this series of papers (see also MORAVEC 2012a,b,c) 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.

Despite its small geographic size, Panama is a country with tremendous biodiversity, including a rich diversity of tiger beetle genera and species. Although to date only several species of *Odontocheila* and three species of *Pentacomia* have been recorded from Panama, a new species of *Odontocheila* was recently described by JOHNSON (2000). Moreover, a large number of *Odontocheila* and *Pentacomia* specimens have been recently collected as part of a survey of Panamanian tiger beetles conducted by the first author and Don Windsor of the Smithsonian Tropical Research Institute (STRI, Panama); the results of which are being prepared for publication. Numerous specimens were also contributed by

David Brzoska (Naples, Florida) along with additional material from other colleagues (see Type specimens).

In the present paper, *Pentacomia (Mesochila) skrabali* sp. nov. is described as a new species to science (based upon 19 males and eight females), representing the fourth species of the genus to be recorded from Panama.

The incomplete revision of *Odontocheila* and *Pentacomia* (including *Mesochila*) by RIVALLIER (1969) contains several errors and inconsistencies (see MORAVEC 2012a) and as such, a key to all the species cannot be provided for the time being. However, even in the absence of a key, the new species is easily distinguishable from all other species of the genus.

### 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 (in this species these and the notopleural sutures are visible in dorsal view). The width of the head is measured as the distance between the outer margin 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 second author with a Nikon digital camera Coolpix 990 through an MBC-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;
DBCN	David W. Brzoska Collection, Naples, Florida, U.S.A.;
DPDC	Daniel P. Duran Collection, Philadelphia, Pennsylvania, U.S.A.;
JWSA	Jim Wappes Collection, San Antonio, Texas, U.S.A.;
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.;
NHMW	Naturhistorisches Museum Wien, Vienna, Austria;
NMPC	National Museum, Prague, Czech Republic;
RLHC	Ronald L. Huber collection, Bloomington, Minnesota, U.S.A.;
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg (formerly DEI, Eberswalde), Germany;
STRI	The Smithsonian Tropical Research Institute, Panama;
USNM	Smithsonian Institution, Entomology, Washington, D.C., U.S.A.

## Taxonomy

### *Pentacomia (Mesochila) skrabali* sp. nov.

(Figs 1–18)

**Type locality.** Panama, Continental Divide Trail (8°47.76'N, 82°14.75'W) passing between the provinces of Chiriqui and Bocas del Toro, a part of the Nature Reserve La Fortuna in the Cordillera de Talamanca mountain range area.

**Type material.** HOLOTYPE: ♂, “PANAMA – CHIRIQUI / BOCAS DEL TORO / Continental Divide Trail / D. Brzoska 23-V-1995” [printed] (USNM). ALLOTYPE: ♀, same label data as holotype except for: “21.V.1995” (NHMK). PARATYPES: 4 ♂♂ 4 ♀♀, same label data as holotype (3 ♂♂ 3 ♀♀ in DBCN, later in NHMK; 1 ♂ in CCJM; 1 ♂ in NMPC); 3 ♂♂ 2 ♀♀, same label data as holotype except for: “31.V.2004 / leg. Daniel Duran” (2 ♂♂ 2 ♀♀ in DPDC; 1 ♂ in CCJM); 4 ♂♂ 1 ♀, same label data as allotype (3 ♂♂ in DBCN, later in NHMK; 1 ♂ 1 ♀ in CCJM); 1 ♂, “PANAMA – CHIRIQUI / Hydrological Trail / (8.7 km N – la Suiza) / D. Brzoska 21.V.1996” (DBCN, later in NHMK); 1 ♂, “PANAMA Chiriqui prv. / Cont'l Divide Trail / 3-4-VII.-1997 / Wappes & Morris” [printed] // “Pentacomia / (Poecilochila) / new species / det. Sumlin, 1997” [green, printed] (JWSA); 1 ♂, “PANAMA – Chiriqui Prov. / Reserva Fortuna / Continental Divide Trail, V-30-1994 / Andrews & Gilbert” [printed] (RLHC); 1 ♂, same label data except for: “VI-1-1994” (RLHC); 2 ♂♂ 1 ♀, “PANAMA, PANAMA / D. Chiriqui, Fortuna / day & night “V-19-1978 C.W. O’Brien / & G.B. Marshal” (RLHC). All type specimens labelled: “HOLOTYPE (ALLOTYPE or PARATYPE respectively) / *Pentacomia (Mesochila) skrabali* sp. nov. / det. Duran & Moravec 2013” [red, printed].

**Description.** Body (Fig. 1) small but rather stout, length 7.75–9.60 (holotype 8.40, allotype 9.30) mm, width 2.40–2.95 (holotype 2.60, allotype 2.90) mm, females usually (not always) larger than males; all adults almost uniformly shaped, dorsally metallic black-brown, rather shiny with reddish-cupreous, bronze and green lustre more intense on head and pronotum (as observed also in the holotype and allotype), rarely with prevailing strong green lustre also on elytra.

Head (Fig. 9) with pronounced large eyes, generally as wide as the body, width 2.55–2.90 mm, black-cupreous with reddish-cupreous or green lustre, all head portions glabrous.

Frons in both sexes distinctly convex in middle, then steeply sloped towards clypeus and clearly separated from it and confluent with vertex, black with greenish, or cupreous lustre, lateral areas longitudinally finely parallel-striate, median convex area with very fine, irregular, mostly transverse-wavy rugae; supraantennal plates irregularly triangular, smooth and shiny-green, their apex forming short lateral frons-vertex edge, or sometimes merging with coarser frons-vertex sculpture.

Vertex almost black with green, bronze or cupreous lustre which is much brighter and more intense on anterior-sublateral areas, almost flat in middle; surface sculpture rather fine, anteromedian area irregularly wavy rugulose, rugae towards posteromedian area becoming almost longitudinal-wavy, divergent posteriorly; sublateral and large juxtaorbital areas longitudinally parallel-striate, striae on sublateral areas more irregular, running towards the temples; occipital area convex, finely irregularly rugulose, rugae mostly transverse-wavy or vermicular.

Genae shiny green or blue-green, smooth in middle, finely striate on anterior area and with few striae running on juxtaorbital and postgenal area (passing there from vertex).

Clypeus metallic-green, sometimes with bronze iridescence, bulged in middle, finely wrinkled on sublateral areas.

Labrum 4-setose, sexually dimorphic in shape and coloration; male labrum (Figs 10–11) ochraceous to ochre-testaceous with indistinctly darkened margins of basomedian convexity,

0.75–0.85 mm long, 1.10–1.20 mm wide, lateral margins moderately arcuate with indistinct lateral indentation; anterolateral teeth distinct, rounded, right-angled or subacute; anterior lobe short, with blunt, right-angled lateral margins (blunt anterolateral teeth), and small, blunt, or more distinct and subacute or acute median tooth; female labrum (Figs 12–13) much longer and darker, length 1.10–1.20 mm, width 1.20–1.25 mm, brownish-testaceous with more expanded black coloration on lateral areas of basomedian convexity, similarly shaped but with longer median lobe and distinctly projecting acute or subacute median tooth.

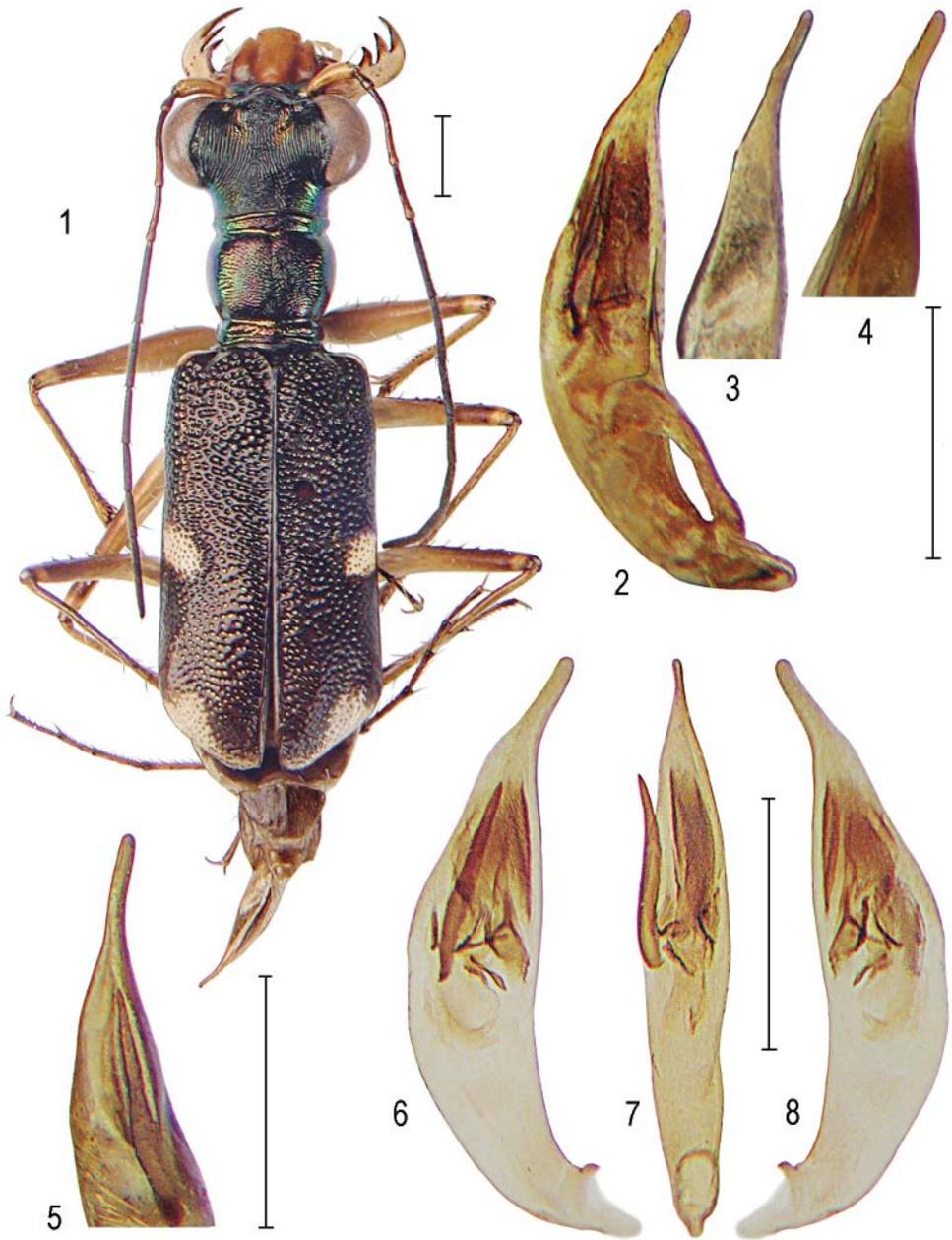
Mandibles (Fig. 9) medium-sized, ochraceous (darker in female) with brownish or mahogany brown teeth, subsymmetrical; each mandible in both sexes with only three teeth (and basal molar), the two inner teeth in left mandible almost of the same size, while third tooth in right mandible much smaller than the second.

Palpi (Fig. 9). Both maxillary and labial palpi normally shaped and almost unicoloured, in male ivory, or pale ochraceous to ochre with ochre-testaceous terminal palpomeres, in female somewhat more testaceous-darkened; penultimate (longest) palpomere of labial palpi in both sexes elongate and rather narrow, only indistinctly enlarged towards apex (width 0.15 mm).

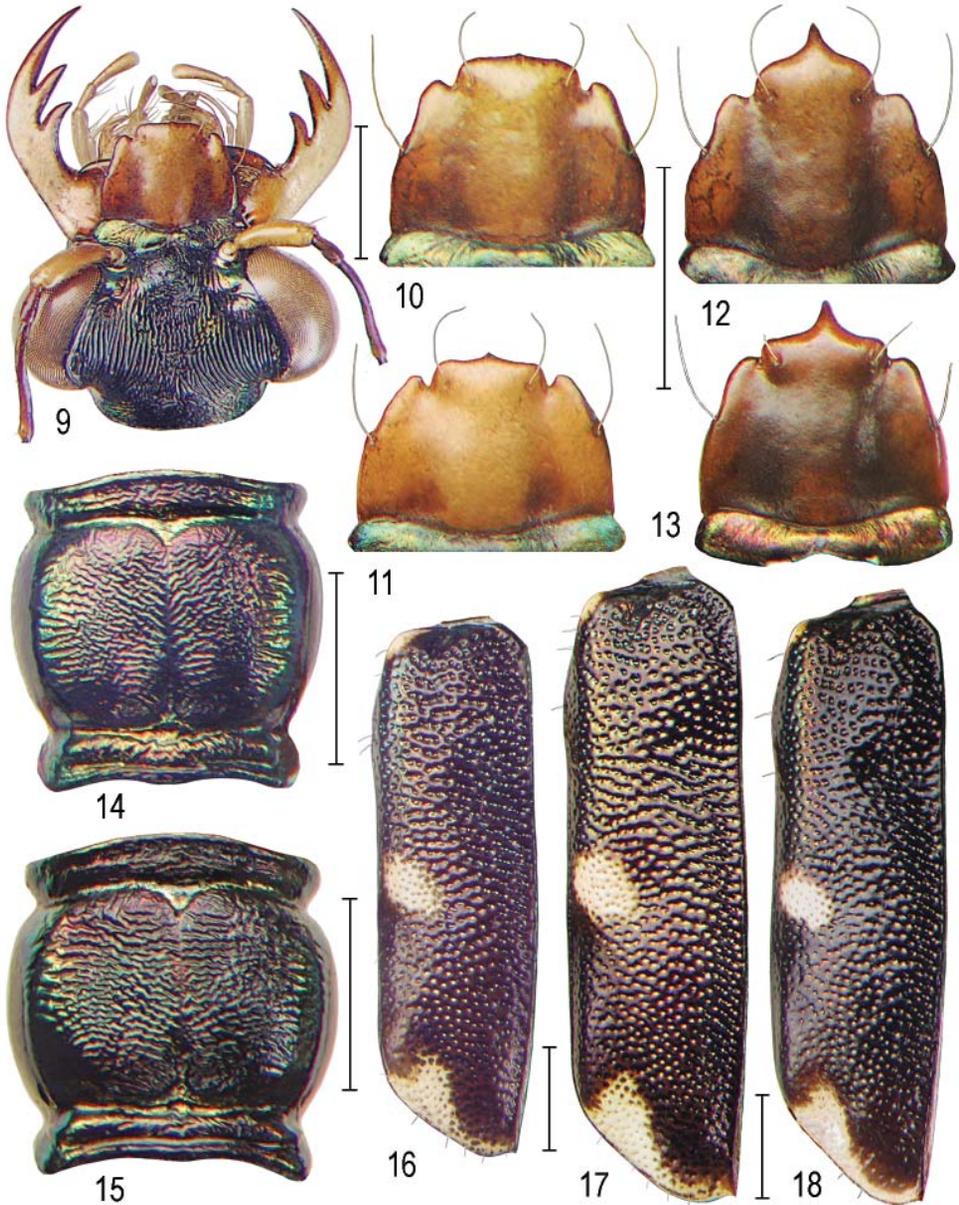
Antennae in male very long, reaching two thirds of elytron, in female much shorter, hardly reaching elytral half; scape notably pale ochre to ochre-testaceous (usually somewhat darker in female) with only one apical seta, pedicel dark brownish-testaceous to blackish-testaceous (in some females often almost black), glabrous, antennomeres 3–4 in male black-brown with ochre-testaceous apical third, in female almost black with feeble copper tinge on apices, with only very sparse and indistinct setae, antennomeres 5–11 smoky-black with usual micropubescence.

Thorax. Pronotum (Figs 14–15) glabrous, black-brown with coppery areas and reddish-cupreous and green lustre, sometimes green coloration prevailing, approximately as long as wide, 1.50–1.75 mm long, 1.45–1.75 mm wide, sulci well pronounced; anterior lobe only slightly wider than the posterior and usually low because separated from disc by notably deep anterior sulcus, irregularly, mostly vermicular to transverse wavy-rugulose; disc subglobose with distinctly convex lateral margins (including clearly visible proepisterna), very rarely subparallel in middle in some males, notopleural sutures thin but clearly obvious in dorsal view; medial line indistinct, often partly merging with surface sculpture; discal surface densely irregularly rugulose, rugae wavy or vermicular irregularly converging towards the median line and usually crossing it on posterior area; lateral rugae becoming coarser and more transverse, not reaching notopleural sutures, juxtannotopleural area smooth and shiny-green; posterior lobe usually more irregularly and sparsely rugulose; all ventral and lateral sterna glabrous and nearly smooth, proepisterna, mesepisterna and metepisterna metallic black with blue or dark violaceous lustre, rarely black-copper, female mesepisternal coupling sulci indistinct, in form of a longitudinal furrow which is deeper than the shallow furrow in male mesepisternum; prosternum, mesosternum and metasternum metallic-green to black-blue, smooth and shiny.

Elytra (Figs 16–18) elongate, length 4.70–5.80 mm, almost uniformly shaped in both sexes; humeri arcuate, outer elytral margins markedly dilated in subhumeral area, than almost subparallel, antepical angles widely arcuate and running obliquely towards rounded apices; sutural spine small, mostly indistinct; microserrulation indistinct, nearly absent or extremely fine; elytral dorsal surface moderately convex, humeral impressions distinct, basodiscal convexity distinctly convex, posteriorly well delimited by deep discal impression; antea-



Figs 1–8. *Pentacomia (Mesochila) skrabali* sp. nov. from type locality. 1 – habitus, male, HT (USNM). 2–4 aedeagi (or their apical portions) in left lateral view: 2 – PT (DDCP); 3 – HT; 4 – PT (CCJM). 5 – aedeagus in dorsal view showing its dorsal orifice with elongate spine, HT. 6–8 – cleared aedeagus showing internal sac, PT (CCJM): 6 – left lateral view; 7 – ventral view; 8 – right lateral view. Bars = 1 mm.



Figs 9–18. *Pentacomia (Mesochila) skrabali* sp. nov. from type locality. 9 – head, HT (USNM). 10–11 – male labrum: 10 – HT; 11 – PT (DBCN). 12–13 – female labrum: 12 – AT (NHMK); 13 – PT (DBCN). 14–15 – pronotum: 14 – male, HT; 15 – female, PT (DDCP). 16–18 – elytron: 16 – male, HT; 17 – female, AT; 18 – female, PT (DDCP). Bars = 1 mm.

pical-apical impressions distinct; additional two conspicuous impressions present on each elytron: deep sublateral impression placed in the area of white sublateral-median macula, and shallower lateral impression posteriad of the macula; elytral coloration mostly metallic black-copper with brighter cupreous areas, iridescent-green punctures, and usually purple lustre within humeral impressions and green iridescence on lateral areas; rarely entire elytra with strong green lustre; whole elytral surface coarsely punctate, punctures mostly isolated on elytral base, but larger punctures on other anterior elytral area, often anastomosing into chains and often, particularly in male, forming a very coarse cavernous sculpture; punctures on posterior and posterolateral areas are smaller and more isolate, often nearly effaced on bulged area of anteapical angles, while punctures on narrow juxtasutural area remain irregularly anastomosing, smaller but deep; elytral surface glabrous except for the usual, a few and often very indistinct hairlike sensory setae scattered mostly on anterior area, few of them at epipleura and several scattered along the margin of apices; elytral maculation whitish, consisting in both sexes of three rather large maculae: rounded humeral macula which is only partly visible from above and is smaller in female, sublateral-median macula which is rounded, somewhat mesad-prolonged, and anteapical-apical lunule which is markedly wide in its anteapical portion, then narrowed towards suture.

Legs. Procoxae and mesocoxae ochre-testaceous with greenish lustre which is prevailing on female mesocoxae, densely whitish setose; metacoxae metallic-green with two central setae and densely clustered setae on lateral areas; trochanters glabrous, ochre to ivory white; femora dorsally brownish-testaceous to testaceous with mahogany lustre except for yellowish base (pale area more extended on ventral area), and with distinct, ochre, apical belt; femoral surface covered with inconspicuous, very sparse, short, whitish to rusty setae and row of sparse, short thorn-like setae which are almost brownish on metafemora; tibiae ochre-testaceous with brownish-darkened apices, covered with scattered, semierect, whitish to rusty setae which are longer and almost thorn-like on metatibiae; apical-ventral area of protibiae and mesotibiae with dense whitish to rusty setose pad; tarsi testaceous with brown-darkened apices; first three dilated protarsomeres in male with dense greyish-white pad; claws testaceous.

Abdomen. Ventrites dark metallic black-blue except for ochre-testaceous apex of last ventrite and apical bilobed pleurite in male; surface of ventrites smooth and glabrous except for usual, long hairlike sensory seta (easily abraded) placed on each side at posterior margin of last three ventrites.

Aedeagus (Figs 2–8) elongate, widest in middle, length 2.30–2.45 mm, width 0.40–0.55 mm, ventral outline almost regularly arcuate including basal portion, apical portion conspicuously prolonged into narrow, cylindric and rounded apex, moderately ventrally directed; internal sac (Figs 6–8) well developed, containing conspicuous, elongate but rather thick dorsal spine which is in dorsal view (Fig. 5) obvious as closing dorsal orifice, and in ventral aspect of cleared aedeagus (Fig. 7) penetrating laterally; the base of this spine is supported by thin, ramiform dorsal and central spines; other sclerites consist of two thin basal sclerites, membranous longitudinal but rather voluminous upper-ventral tooth, and unusually shaped ventral spur with bifurcate base while its upper projection is less sclerotized, thus its shape in examined aedeagi is barely obvious.

**Variability.** Except for the coloration stressed in the description, no other important variability in characteristics was observed. Elongate apex of the aedeagus varies slightly in its diameter.

**Differential diagnosis.** Among species of the subgenus *Mesochila* Rivalier, 1969, this new species is immediately recognizable by its pattern of white elytral maculation, namely the presence of the antepical-apical lunule which reaches the suture. This character, in combination with the elongated apical portion of the aedeagus, entirely glabrous lateral and ventral sterna, and absence of a juxtaepileural cluster of dense white setae, distinguish *P. (M.) skrabali* sp. nov. from all other species of the entire genus *Pentacomia*. A similarly elongated apical lunule occurs only in some species of the nominotypical subgenus, but they possess other maculae that are very different: a humeral lunule and lateral-discal band or in some species also a discal macula. *Pentacomia (Mesochila) brasiliensis* Dejean, 1825 differs in having elytra with elongate humeral band, absence of apical lunule (only antepical macula present), different shape of its aedeagus and very different sclerites within the internal sac. The shape of the aedeagus and the large elongate dorsal spine within the internal sac of *P. (M.) skrabali* sp. nov. somewhat resembles those of *Pentacomia (Pentacomia) egregia* Chaudoir, 1835, but the latter is clearly distinguished by its completely developed elytral maculation (elongate humeral lunule, transverse median band and apical lunule), different shape and surface of its pronotum, much finer elytral punctation, and significant differences in the shapes of the other sclerites within the internal sac, namely the ventral spur with long filiform projection. *Pentacomia (Pentacomia) horni* (Schilder, 1953) has a similar pattern of the elytral punctation, but clearly differs in the pattern of its white elytral maculation and quite different shape of its aedeagus including the structure of the internal sac.

**Etymology.** Dedicated to Ing. Miroslav Škrabal (Horní Hrozenkov, Czech Republic) for his continued support to the second author during his many years of research on Cicindelidae.

**Distribution and habitat.** Known only from the type locality in Panama. Adults were observed flying along the path of the Continental Divide Trail in semi-shaded montane forest, and alighting on the neighbouring vegetation when disturbed. A few adults of *Pseudoxycheila tarsalis* Bates, 1869 were observed at the type locality along with the new *Pentacomia* (David W. Brzoska, pers. comm.). Larvae are unknown.

## Discussion

The genus *Pentacomia* is presently comprised of 41 species currently being revised by the second author of this paper. Through its combination of external and internal diagnostic characters, *P. (M.) skrabali* sp. nov. has a rather intermediate position among the five subgenera of *Pentacomia* presented by RIVALIER (1969). It is placed here into the subgenus *Mesochila* as its characters basically correspond with those of the subgenus. Nevertheless, the external characters and structure of internal sac of the aedeagus of this new species variously align its relationships between the known subgenera, namely between *Mesochila* and *Pentacomia* s. str. Some discrepancies, both in external and internal characters stated by RIVALIER (1969) for individual subgenera, occur in some other species within the five subgenera. In particular, the inconsistent combination of the structure of internal sac versus the elytral surface sculpture

and white maculation, and also the shape and coloration of the labrum complicate the relationships within *Pentacomia*. Moreover, within the genus there are very diverse shapes of the ventral spur within the internal sac (a sclerite of diagnostic importance), so this diagnostic character in some species does not correspond with the characters stated by RIVALIER (1969) for a given subgenus. Consequently, the infrageneric classification of *Pentacomia* deserves a further examination, and may result to some modifications after the complete revision.

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