

Taxonomic and nomenclatorial revision within the Neotropical genera of a subtribe Odontochilina W. Horn in a new sense – 5. A new species of the genus *Pentacomia* from Costa Rica (Coleoptera: Cicindelidae)

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MORAVEC J. & BRZOSKA D. 2013: Taxonomic and nomenclatorial revision within the Neotropical genera of the subtribe Odontochilina W. Horn in a new sense – 5. A new species of the genus *Pentacomia* from Costa Rica (Coleoptera: Cicindelidae). *Acta Musei Moraviae, Scientiae biologicae* (Brno) **98(1)**: 75–84. – *Pentacomia* (*Mesochila*) *wappesi* sp.nov. is described as a new species to science, representing the second species of the genus to be recorded from Costa Rica. By the pattern of the whitish elytral maculation and mandibles with only three teeth, this new species resembles *P. (M.) skrabali* Duran et Moravec, 2013 described from Panama, but *P. (M.) wappesi* sp.nov. clearly differs both in its external and internal characters, immediately in having nearly smooth and shiny pronotum with only several, mostly fine transverse median wrinkles. Examination of type specimens of relevant species of *Pentacomia* has confirmed that by the complex of its characters, *P. (M.) wappesi* sp.nov. is markedly distinguished from all known species in the genus. It represents an intermediate link between the subgenera *Pentacomia* s. str., *Mesochila* Rivalier, 1969, and *Beckerium* Rivalier, 1969. Particularly due to the tridentate mandibles, both *P. (M.) skrabali* and *P. (M.) wappesi* sp.nov. may represent a separate subgenus. Illustrations of the habitus and diagnostic characters of the new species and distinguishing external characters of *P. (M.) skrabali* are presented in colour photographs.

Key words. Coleoptera, Cicindelidae, *Pentacomia*, taxonomy, new species, Costa Rica, Central America

Introduction

This paper is a continuation of the ongoing taxonomic revision of Neotropical genera of the subtribe Odontochilina W. Horn, 1899 in a new sense by the first author. The aim of this series of papers (see also MORAVEC 2012a,b,c, DURAN & MORAVEC 2013, MORAVEC 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.

Similar to neighbouring Panama, Costa Rica is a country with tremendous biodiversity, including a rich diversity of tiger beetle genera and species. Nevertheless, despite numerous specimens of tiger beetles which have been recently collected namely by the second author and other colleagues in Costa Rica, only one species of *Pentacomia*, *P. (Pentacomia) cupriventris* (Reiche, 1842) has been recorded from this country (PEARSON *et al.* 1999, ERWIN & PEARSON 2008). Thus *Pentacomia (Mesochila) wappesi* sp.nov. described here represents the second species of *Pentacomia* to be recorded from Costa Rica. While the type locality in the province of Puntarenas lies near the Panamanian border, other adults were caught mostly at higher altitudes in the provinces

of San José and Cartago, a rather long way from the type locality. They differ from the adults from the type locality in having brownish and almost translucent elytra, nearly lacking the metallic pigment, being probably juvenile adults caught soon after their metamorphosis. Their head, pronotum and lateral and ventral portions are of the same metallic coloration as in the adults from the type locality, and basically correspond with their diagnostic characters. Therefore, they have been included into the paratype series.

Regarding the subtribe *Odontochilina* W. Horn, 1910 as discussed by MORAVEC (2012a,c), the subtribe is here defined exclusively for the Neotropical genera, and tentatively separated from the subtribe *Prothymina* W. Horn, 1910 sensu RIVALIER (1969, 1971). The reason for such a classification is that in contrast to the characters given by RIVALIER (1969, 1971) for his wide concept of the subtribe *Prothymina*, many species of the Neotropical *Odontochilina* placed within *Prothymina* by Rivalier, possess a setal vestiture, developed to various degrees. Alternatively, the wider concept of the subtribe *Prothymina* may be maintained, but newly defined regarding the chaetotaxy, and thus extended to include genera with well developed setal vestiture.

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 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:

ACMT	.....	Jim Wappes Collection, American Coleoptera Museum San Antonio, Texas, U.S.A.
BMNH	.....	The Natural History Museum, London, United Kingdom
CCJM	.....	Collection Cicindelidae Jifi Moravec, Adamov, Czech Republic
CSRC	.....	Collection Steve Roman, Champlin, Minnesota, U.S.A.
DBCN	.....	David W. Brzoska Collection, Naples, Florida, U.S.A.
INBIO	.....	Instituto Nacional de Biodiversidad, San José, Costa Rica
IRSNB	.....	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.
NHMW	.....	Naturhistorisches Museum Wien, Vienna, Austria
RLHC	.....	Collection of Ronald L. Huber, Bloomington, Minnesota, U.S.A.
SDEI	.....	Senckenberg Deutsches Entomologisches Institut, Müncheberg (formerly DEI, Eberswalde), Germany
USNM	.....	Smithsonian Institution, Entomology, Washington, D.C., U.S.A.

Taxonomy

Pentacomia (Mesochila) wappesi sp.nov.

(Figs 1–16)

Type locality. Costa Rica: Puntarenas province, Wilson Botanical Garden (Las Cruces) near San Vito, Costa Rica's southern Pacific range near the Panamanian border, 1120–1400 m.a.s.l.

Type material. Holotype ♂ in INBIO, labelled: “COSTA RICA: Puntarenas / Wilson Botanical Garden / west bank and Loop Trails / D. Brzoska 14-VI-1997” [printed]. Allotype ♀ in DBCN (later NHMK) with same label data. Paratypes. 1 ♀ in DBCN: “COSTA RICA: Puntarenas / San Vito – Wilson Bot. / Garden / D. Brzoska 20-VI-1990” [printed]. 1 ♂ in CSRC: “Costa Rica / E. B. Las Cruces, / Wilson Gardens / 05-21-2004,” // “leg S. J.Roman” [printed]. 1 ♀ in RLHC: “C. RICA, Puntarenas / Wilson Garden-jct Rio / Jaba trail & Gamboa / Crest trail – on leaf” // “11 May 1996 / R. L. Huber / overcast sky” [printed]. 1 ♀ in CCJM (ex ACMT): “COSTA RICA, Prov. Puntarenas, Fila / Cruces, Fca. I lama, 1200m, 13 MAY / 1996, I. A. Chacón. / L_S_303100_568250 ♂8239” [printed] // “COSTA RICA INBIO / CRI002 / 448161” [photo-print, with linear code]. 1 ♀ in ACMT (ex INBIO): “COSTA RICA, Prov. Puntarenas, Fila / Cruces, Laguna Gamboa, 1400m, 20 / May 1996, I. A. Chacón. / L_S_304200_574850 ♂8241” [printed] // “COSTA RICA INBIO / CRI002 / 448216” [photo-print, with linear code]. 1 ♂ in CCJM (ex ACMT): “COSTA RICA, Prov. San José Est / Santa Elena, Send. El Ilano, 1600 – / 1850m. 6 AGO 1997, E. Alfaro. / L_S_371500_509800 ♂47877” [printed] // “COSTA RICA INBIO / CRI002 / 561642” [photo-print, with linear code]. 1 ♀ in DBCN (ex ACMT ex INBIO): “COSTA RICA, Prov. San José Est / Santa Elena, Send. La Bota, 3.5 / Km al SE. del Cerro Chucuyo. / 1690m. 17 ABR 1996, B. Gamboa. / L_S_373400_507300 ♂46362” [printed] // “COSTA RICA INBIO / CRI002 / 540120” [photo-print, with linear code]. 1 ♀ in DBCN (ex ACMT, ex INBIO): “COSTA RICA, Prov. San José, / Sendero El Gringo, Est Las Nubes / de Santa Elena, 1500m. 10 JUN / 1997, E. Alfaro. / L_S_370700_508850 ♂46796” [printed] // “COSTA RICA INBIO / CRI002 / 541659” [photo-print, with linear code]. 1 ♀ in DBCN (ex ACTM ex INBIO): “Est Santa Elena, Sendero La Bota, / San Jose, Costa Rica, 1690m. 25 ABR / 1996, E. Alfaro, L_S_373400_507300 / ♂7344” [printed] // “COSTA RICA INBIO / CRI002 / 397901” [photo-print, with linear code]. 1 ♂ in INBIO: “COSTA RICA Prov. Cartago, Tayutic, / Send Cascadas, 900–1000m, 26 ABR / 2003, J. S. & J. Williams, R. Vives, / W. Flowers, Libre / I. N. 199600 585500 a 75909” // “INBIO003791862 / INBIOCRI COSTA RICA” [printed, with linear code]. All type specimens labelled: “HOLOTYPE (ALLOTYPE or PARATYPE respectively) / *Pentacomia (Mesochila) wappesi* sp.nov. / det. Moravec & Brzoska 2013” [red, printed].

Description. Body (Fig. 1) small, length 7.20–9.40 (holotype 8.50, allotype 9.40) mm, width 2.30–3.10 (holotype 2.70, allotype 3.00) mm, females usually larger than males; all adults almost uniformly shaped with markedly wide head and small, glossy pronotum, those from type locality dorsally shiny metallic black-green both on head, pronotum and elytra, with copper to reddish-cupreous lustre particularly on head and faintly also on pronotum; adults from San José province with pale brown, partly translucent elytra, with only traces of metallic-green coloration (juvenile adults).

Head (Fig. 2) large with pronounced eyes, generally slightly narrower than body but notably wider than pronotum, width 2.25–2.80 mm, metallic black-green with cupreous lustre, all head portions glabrous.

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

Vertex metallic black-green with cupreous to reddish-cupreous lustre particularly on median and juxtaorbital areas, almost flat in middle; anteromedian area irregularly rugulose to transverse-arcuate striate, median area usually with rather deep rounded impression surrounded by irregularly arcuate rugae passing to longitudinal-wavy rugae running posteriad, becoming usually effaced on posteromedian area; sublateral and large juxtaorbital areas longitudinally parallel-striate, striae on sublateral areas deeper and more wavy, running towards the temples; occipital area convex, finely irregularly rugulose, rugae mostly transverse-wavy or vermicular, usually almost effaced in middle.

Genae bright green or blue-green, almost smooth with a few fine striae on anterior area and a few striae running on juxtaorbital and postgenal area (passing there from vertex).

Clypeus metallic-green, sometimes with cupreous iridescence, slightly bulged in middle, finely irregularly wrinkled, particularly on sublateral areas.

Labrum 4-setose, sexually dimorphic in shape and coloration; male labrum (Figs 8–9) ochraceous to ochre-testaceous with indistinctly darkened margins of basomedian convexity, rather long, length 0.90 mm width 1.05–1.20 mm, lateral margins rounded to moderately arcuate with indistinct lateral indentation; anterolateral teeth distinct, rounded to subacute; anterior lobe short (in holotype) or more prolonged anteriad (in paratype), with right-angled lateral margins (blunt anterolateral teeth), and raised anterior margin (indicated median tooth); female labrum (Fig. 10) much longer and darker, length 1.30–1.40 mm, width 1.25–1.35 mm, similarly shaped as in male but with distinctly projecting acute or subacute median tooth, brownish-testaceous to reddish-brown, usually with black-darkened basolateral areas.

Mandibles normally shaped but rather long, 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; male mandibles (Fig. 2) ochre-ivory with brown-darkened teeth, those in female (Fig. 3) much darker, brownish-testaceous to reddish-brown.

Palpi. Maxillary palpi normally shaped, ivory-ochraceous, in male (Fig. 2), with darkened ochre-testaceous terminal palpomeres, in female (Fig. 3) with testaceous to brownish-darkened penultimate and terminal palpomeres; labial palpi ochraceous with testaceous-darkened terminal palpomere; penultimate (longest) palpomere of labial palpi in both sexes elongate and narrow, only indistinctly enlarged towards apex (width 0.13–0.15 mm).

Antennae in male very long, reaching two thirds of elytral length, in female shorter, reaching elytral half; scape pale brownish-testaceous (usually darker in females) with only one apical seta, pedicel dark brownish-testaceous with blackish apical areas (in

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 5–7 testaceous (in adults from type locality) or greyish-brown, 8–11 smoky-black, with usual micropubescence.

Thorax. Pronotum (Figs 11–12) glabrous, notably small, metallic-green, usually with reddish-cupreous lustre, always slightly longer than wide, length 1.40–1.75 mm width 1.35–1.70 mm, sulci well pronounced; anterior lobe only slightly wider than the posterior, irregularly, finely rugulose, rugae mostly vermicular to transverse wavy; disc subglobose with distinctly convex lateral margins (including clearly visible proepisterna), notopleural sutures thin but obvious in dorsal view; medial line shallow; discal surface notably glossy and shiny-green or blue-green, with only a few, very shallow and sparse irregular wrinkles which become slightly deeper towards the median line; juxtannotopleural area smooth and shiny-green; posterior lobe almost smooth or with a few irregular rugae, with distinct posterior rim; all ventral and lateral sterna glabrous and nearly smooth, proepisterna, mesepisterna and metepisterna metallic black with green or blue lustre, female mesepisternal coupling sulci indistinct, in form of a longitudinal furrow which is only somewhat deeper than the shallow furrow in male, lacking any pit; prosternum, mesosternum and metasternum metallic black-green to black-blue, smooth and shiny.

Elytra (Figs 13–16) elongate, length 4.50–5.80 mm, with rounded to subangular humeri, outer elytral margins moderately dilated in subhumeral area, than almost subparallel, anteapical angles widely arcuate and running obliquely towards rounded to subacute apices; sutural spine small, mostly indistinct; microserrulation indistinct, nearly absent or extremely fine and irregular; elytral dorsal surface moderately convex, humeral impressions short but distinct, basodiscal convexity distinct and clearly delimited by deep, posteriad prolonged discal impression; anteapical-apical impressions rather deep; additional, shallow impression present on each elytron in the area of white sublateral-median macula; elytral coloration (in holotype and specimens from type locality) shiny metallic black-green with dark-copper or brighter cupreous areas, sometimes with purple lustre within humeral impressions; whole elytral surface almost regularly punctate, punctures isolated, larger on elytral base (Fig. 13), but only very rarely anastomosing, becoming smaller and very shallow on posterior declivity and posterolateral areas, often nearly effaced on bulged area of anteapical angles; 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 on subhumeral areas, and several scattered along the margin of apices; elytral maculation whitish, consisting of three maculae: rounded humeral macula which is only partly visible from above, and is smaller, darker or entirely absent in female, sublateral-median macula which is rounded, rarely narrower and somewhat mesad-prolonged, and anteapical-apical lunule which is markedly wide in its anteapical portion, then narrowed towards suture.

Legs. Pro- and mesocoxae metallic-green with brownish tinge, densely whitish setose; metacoxae metallic-green with one central seta and densely clustered setae on lateral areas; trochanters glabrous, ochre to ivory yellow; femora in male dorsally

brownish-testaceous, ventrally ochre-testaceous, in most females much darker, brownish-testaceous with mahogany lustre; femoral surface covered with rather sparse, short, whitish to rusty, semierect setae which are almost brownish on metafemora; tibiae concolorous with femora, usually with 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-green to green-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 4–7) elongate, widest in middle, length 2.10–2.40 mm, width 0.40–0.50 mm, ventral outline almost regularly arcuate including basal portion, apical portion prolonged into narrow, cylindric, rounded and moderately ventrally directed apex; internal sac (Figs 6–7 well developed, containing two, elongate sclerites near dorsal orifice, basal spine dilated in middle, basodorsal irregularly triangular piece, ventral spur with large triangular base and elongate projection (in the examined aedeagus much better obvious in right lateral aspect), and partly membranous central-upper tooth).

Variability. The probably juvenile adults from Santa Elena with brownish elytra (lacking the metallic pigment), possess darker antennomeres 5–11, in contrast to testaceous antennomeres 5–7 in adults from the type locality. The male from Tayutic also has brownish elytra, but its antennae and labrum correspond with those in adults from the type locality; nevertheless, its body is smaller and the transverse median wrinkles on its pronotum are coarser. The labrum of the only existing male from Santa Elena is more prolonged anteriad, but this is within usual variability occurring in other species of the genus. Elytral apices are either rounded or almost subacute independently of sex and locality. Humeral macula in females can be entirely absent independent of the locality; elytra of the adults from Santa Elena have mostly recognizable only the anteapical part of the anteapical-apical lunule, while its prolongation along the apical margin towards the suture is barely visible due to the translucent elytral apices of these probably juvenile adults.

Differential diagnosis. Resembling *Pentacomia (Mesochila) skrabali* Duran et Moravec, 2013, particularly by the pattern of white elytral maculation and the mandibles with only three teeth (and basal molar), but immediately distinguished by its glossy, metallic-green pronotum, and much finer and regular pattern of elytral punctation. In contrast, *P. (M.) skrabali* has whole surface of its pronotum densely vermicular-rugulose, and the elytral punctures much coarser and commonly anastomosing, forming a cavernous sculpture on anterior elytral area (compare Figs 11–12 to Fig.18 and Fig.13 to17 here). Moreover, the new species has very different sclerites within the internal sac of its aedeagus. By the complex of characters, *P. (M.) wappesi* sp.nov. is distinguished also from all other species of the genus.

For the glossy pronotum and body coloration this new species may also resemble *Pentacomia* (*Beckerium*) *leptalis* Bates, 1881, but this Mexican endemic clearly differs in having immaculate elytra and mandibles with four teeth, as well as by the shape and internal sac of its aedeagus.

Etymology. Named after Jim Wappes (San Antonio, Texas), who kindly sent some of the specimens for our study.

Biology and distribution. Known from the two provinces in Costa Rica. The type locality in the province of Puntarenas is the area of the well known Wilson Botanical Garden near San Vito, the rain forest of Las Cruces in the southern Pacific range near the Panamanian border. The holotype, allotype and one paratype female were taken there along a several trails in the rainforest. Five other paratypes are from the same area, while four, probably juvenile adults from the province of San Jose, come from a rain forest of several places of Santa Elena (east of San Isidro de El General), including Las Nubes Biological Station east of Santa Elena (9°23'N;83°35'W). The locality of the only male from Tayutic is in the Cartago province southeast of Turrialba and La Suiza (9°47.6'N;83°33.8'W).

P. (M.) wappesi sp.nov. appears to be found at altitudes above 1000 metres and is extremely rare species. Despite good weather conditions during our trip to Costa Rica in the second half of the May 2013, our intense research in the localities of this new species was unsuccessful.

Remarks. Although their diagnostic characters basically correspond with those for the subgenus *Mesochila*, both *P. (M.) wappesi* sp.nov. and *P. (M.) skrabali* Duran et Moravec, 2013 have an outstanding position within the subgenus erected by RIVALIER (1969), and particularly due to tridentate mandibles they may represent a separate subgenus. As mentioned by MORAVEC (2012a,b,c) and DURAN & MORAVEC (2013), some discrepancies, both in external and internal characters, stated by RIVALIER (1969) for individual subgenera, occur in some other species within the five subgenera of *Pentacomia*. It should be mentioned also here that the infrageneric classification of *Pentacomia* deserves a further examination, and may result to some changes after the complete revision. As the incomplete revision of *Odontocheila* and *Pentacomia* (including the subgenus *Mesochila*) by RIVALIER (1969) contains several errors and inconsistencies (see MORAVEC 2012a), a key to all the species cannot be provided for the time being. Nevertheless, even in the absence of a key, the new species is easily distinguishable from all other species of the genus.

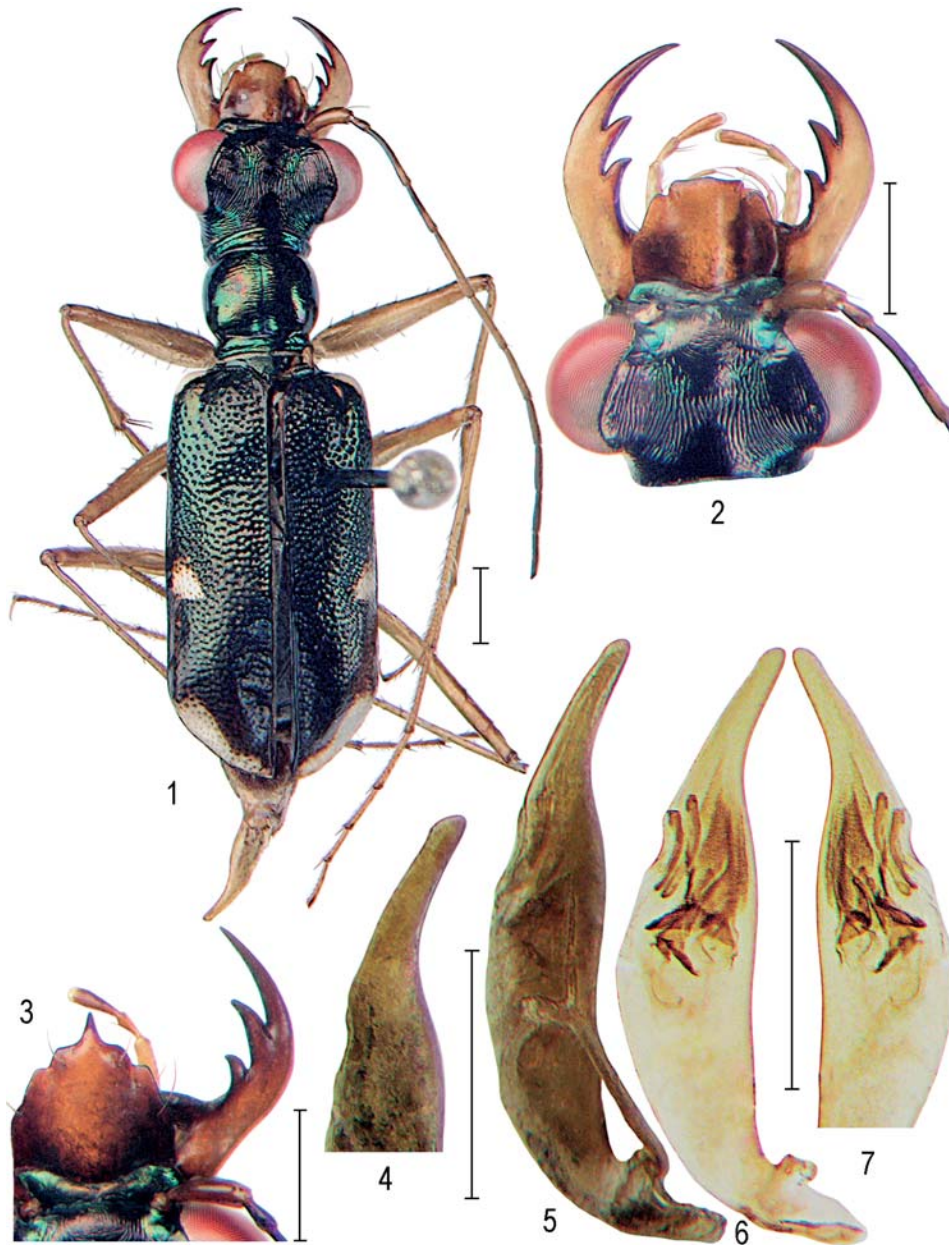
The specimens from Santa Elena and Tayutic are here considered juvenile adults due to their brownish elytra, but if their coloration proves to be constant when other adults are found in future, they may represent a geographical subspecies (see “Variability” in the description above).

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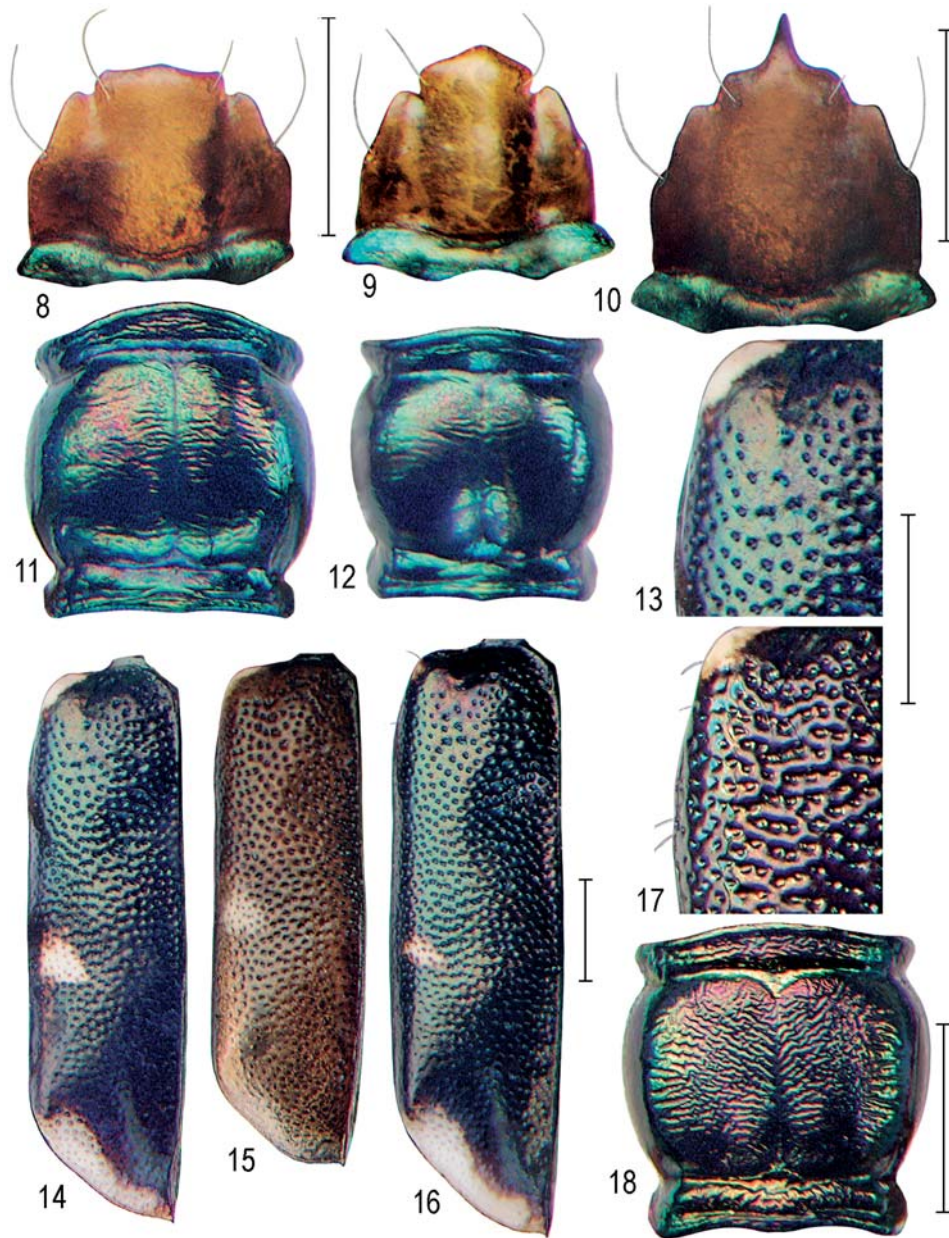
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Figs 1–7. *Pentacomia (Mesochila) wappesi* sp.nov. 1 – habitus, ♂, type locality, HT (INBIO); 2 – head, ♂, HT; 3 – right mandible and maxillary palpus, ♀, type locality, AT (DBCN, later NHMK); 4–5 – aedeagi (or their apical portion) in left lateral view (4 – HT; 5 – Santa Elena, PT (CCJM ex ACMT)); 6–7 – cleared aedeagus showing internal sac, Santa Elena, PT (CCJM ex ACMT) (6 – left lateral view; 7 – right lateral view). Bars = 1 mm.



Figs 8–18. Characters of two species of *Pentacomia* (*Mesochila*). 8–16: *P. (M.) wappesi* sp.nov.: 8–10 – labrum (8 – ♂, HT (INBIO); 9 – ♂, Santa Elena, PT (CCJM ex ACMT); 10 – ♀, AT (DBCN, later NHMK)); 11–12 – pronotum (11 – ♂, HT; 12 – ♂, Santa Elena, PT, (CCJM ex ACMT)); 13 – detail of elytral sculpture, ♂, HT; 14–16 – elytron (14 – ♂, HT; 15 – ♂, Santa Elena, PT (CCJM ex ACMT); 16 – ♀, AT). 17–18. *P. (M.) skrabali* Duran et Moravec, ♂, HT (USNM): 17 – detail of elytral sculpture; 18 – pronotum. Bars = 1 mm.