

**The Australasian *Chrysosoma aeneum* (Fabricius)  
group (Diptera: Dolichopodidae: Sciapodinae)**

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**Австралийская группа видов *Chrysosoma aeneum*  
(Fabricius) (Diptera: Dolichopodidae: Sciapodinae)**

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**Abstract.** The *Chrysosoma aeneum* species group is revised and comprises five species: *Ch. aeneum* (Fabricius), *Ch. leopoldi* Parent, *Ch. maculipenne* Guérin-Méneville, and *Ch. olegi* **sp. nov.**, all from the New Guinea region, and *Ch. interruptum* Becker from the Northern Territory of Australia. *Chrysosoma fasciatum* Guérin-Méneville (the type species of the genus) and *Ch. cognatum* Parent are considered junior synonyms of *Ch. aeneum*. *Chrysosoma bicolor* Parent from the Solomon Islands is excluded from the *Ch. aeneum* group. A dedication to Oleg Pavlovich Negrobov is included.

**Key words.** Sciapodinae, New Guinea, Australia, new species, new synonym, key.

**Резюме.** Ревизована группа видов *Chrysosoma aeneum*, которая включает пять видов: *Ch. aeneum* (Fabricius), *Ch. leopoldi* Parent, *Ch. maculipenne* Guérin-Méneville, и *Ch. olegi* **sp. nov.** (все с Новой Гвинеи и соседнего острова Малуку), и *Ch. interruptum* Becker из Северной территории Австралии. *Chrysosoma fasciatum* Guérin-Méneville и *Ch. cognatum* Parent признаны новыми младшими синонимами *Ch. aeneum*. *Chrysosoma bicolor* Parent с Соломоновых островов исключен из группы видов *Ch. aeneum*. Введение содержит посвящение Олегу Павловичу Негробову.

**Ключевые слова.** Sciapodinae, Новая Гвинея, Австралия, новый вид, новый синоним, определитель.

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## Introduction

The genus *Chrysosoma* Guérin-Méneville, 1831 (Diptera: Dolichopodidae: Sciapodinae) has a long and complex taxonomic history. The presence of an apical arista was the traditional key character used to separate *Chrysosoma* from other genera of the subfamily Sciapodinae. However, examination of the large

heterogeneous assemblage previously considered to be *Chrysosoma* revealed that the apical arista alone was not a reliable character for generic definition. At least some species in all other major sciapodine genera have independently evolved an apical arista, and some had been placed incorrectly in *Chrysosoma* (see discussion in Bickel, 1994). Like many other sciapodine genera, *Chrysosoma* is not strongly defined, and may not be strictly monophyletic. However, it acts as a “holding genus” for some 215 valid species from the Old World tropics and Oceania (Wikipedia contributors, 2021), and many more species certainly await both collection and description, especially from the tropical montane Orient and Australasia.

Although *Chrysosoma* itself may not be monophyletic, distinct monophyletic species groups can be delimited within this complex genus. One such group is the Australasian *Chrysosoma aeneum* (Fabricius) species group, which is confined to New Guinea and across the Arafura Sea in Arnhem Land, Australia. This group also contains the type species of the genus, *Chrysosoma fasciatum* Guérin-Ménéville.

A new species from this group, *Chrysosoma olegi*, is here dedicated to the memory of Oleg Pavlovich Negrobov. I (DJB) first met Oleg in March, 1982 at the Zoological Institute in Leningrad (currently St. Petersburg). My Ph.D. thesis research at Cornell University was a revision of the Nearctic fauna of *Medetera* Fischer von Waldheim, 1819. It is a genus of forestry interest since females of many species lay their eggs at the gallery entrances of bark beetles (Curculionidae: Scolytinae), and after hatching the larvae move through the galleries, preying on the beetle larvae. Hence *Medetera* is important in the biological control of these forest pests, and specimens are often abundant in rearings from bark beetle infested logs. The Nearctic *Medetera* fauna was very poorly resolved. Based the genitalic figures and descriptions in Negrobov and Stackelberg’s (1971–1977) large *Medetera* monograph in “Die Fliegen der palaarktischen Region”, it was evident that the genus did not comprise separate Nearctic and Palaearctic faunas but comprised many groups and species complexes with a circumboreal distribution. I was therefore fortunate to obtain a small travel grant from the National Science Foundation to study *Medetera* types in European institutions. The Zoological Institute in Leningrad was a major focus since many types of Negrobov and Stackelberg were housed there.

After obtaining the necessary travel permits from Intourist, I eventually took a train from Helsinki to the famous Finland Station in Leningrad. I stayed at the Hotel “Evropeiskaya” on Nevsky Prospect and had two days to wander around that great city, visiting the Russian Museum and the Hermitage, sampling the food and observing city life. In early March, Leningrad was still quite cold and wintery. I spent almost four days at the Zoological Institute and had a warm welcome and met the dipterists Vadim F. Zaitzev, Emilia P. Nartshuk, and Kirill B. Gorodkov. Oleg Negrobov flew from Voronezh to meet me, and although he spoke little English and I spoke no Russian, we were able to communicate in German, which we both had learnt as a second language at school. This actually worked fairly well as we used simple textbook phrasing (and indeed, Negrobov had written his “Die Fliegen” fascicles in German). One night he took me to a restaurant where I drank too much sweet Georgian wine and vodka, and I woke up the next morning with a terrible hangover and missed a day at the Institute. However, I was able to complete my work and was grateful for his generous assistance and hospitality. The only other time I met him was in the 1980 at Dipterological Congress in Bratislava, Slovakia, where he greeted me warmly. Negrobov contributed so much to the study of the family Dolichopodidae, and he had an open personality. Vale, Oleg.

## Materials and methods

The repositories of material studied or cited in this revision use the following acronyms: AMS – Australian Museum, Sydney, Australia; ANIC – Australian National Insect Collection, CSIRO, Canberra, Australia; BMNH – The Natural History Museum, London, U.K.; BPBM – Bishop Museum, Honolulu, U.S.A.; RBINS – Institut Royal des Sciences Naturelles, Brussels, Belgium; MLUH – Martin Luther Universität, Halle am Salle, Germany; MNHN – Museum National d’Histoire Naturelle, Paris, France; (RMNL) – Naturalis Biodiversity Center, Leiden, The Netherlands; SAM – South Australian Museum, Adelaide, Australia; ZMUC – Zoologisch Museum, Universitets Copenhagen, Denmark; ZSI – Zoological Survey of India, Calcutta, India.

Species are defined based on the male genitalia and male secondary sexual characters (MSSC). Keys are based on non-genitalic characters where possible, although accurate identification often requires male postabdominal characters. Since the male genitalia are external in Sciapodinae, clearing the hypopygium usually is not necessary. Species descriptions are condensed to avoid unnecessary repetition. Photographs were made with a Leica M205A photomontage system. The left lateral view of the hypopygium or male genital capsule is shown for most species. In describing the hypopygium, 'dorsal' and 'ventral' refer to morphological position prior to genitalic rotation and flexion. Thus, in figures showing a lateral view of the hypopygium, the top of the page is morphologically ventral, while the bottom is dorsal.

Morphological terminology follows McAlpine (1981), except for the male hypopygium where terms of Cumming et al. (1995) are used. Measurements were made on representative dry specimens (usually the holotype). Body length of males is measured from the base of the antennae to the tip of the seventh abdominal segment. The position of features on elongate structures such as leg segments is given as a fraction of the total length, starting from the base. The relative lengths of the podomeres are representative ratios and not measurements, and they are given for each leg in the following formula and punctuation: trochanter + femur; tibia; tarsomere 1/ 2/ 3/ 4/ 5.

The following abbreviations and terms are used: MSSC – male secondary sexual character(s), non-genitalic characters found only on male body; I, II, III – pro-, meso-, metathoracic legs; C – coxa; T – tibia; F – femur; ac – acrostichal setae; ad – anterodorsal; av – anteroventral; dc dorsocentral setae; dv – dorsoventral; hm – postpronotal setae; npl – notopleural setae; pa – postalar setae; pd – posterodorsal; pm – presutural supra-alar setae; ppl – proepisternitesl setae; pv – posteroventral; sa – postsutural supra-alar setae; sr – presutural intra-alar setae; t – tarsus; t<sub>1-5</sub> – tarsomeres 1 to 5.

## Taxonomic part

### Genus *Chrysosoma* Guérin-Ménéville, 1831

*Chrysosoma* Guérin-Ménéville, 1831: pl. 20, fig. 6. Type-species: *Chrysosoma fasciatum* Guérin-Ménéville, 1831 (= *Dolichopus aeneus* Fabricius, 1805, **syn. nov.**), designated by Enderlein (1912: 373).

**Remarks.** *Chrysosoma* has many generic synonymies, discussed in Bickel (1994). A further change is added here. Enderlein (1912) designated *Chrysosoma fasciatum* Guérin-Ménéville as the type species of the genus, and this species is newly placed in synonymy with *Dolichopus aeneus* Fabricius. As noted in the Introduction, *Chrysosoma* is a complex Old World genus that is possibly a polyphyletic assemblage. However, the Australasian *Chrysosoma aeneum* species group is defined by several synapomorphies and is treated below.

### The *Chrysosoma aeneum* species group

**Diagnosis.** Head. Male with fine black setae on lateral frons (MSSC); female frons bare except for strong vertical seta; face bulging in males (MSSC); postpedicel of male allantoid (sausage-shaped), more than 3.0 times as long as wide (MSSC), with long apical seta; postpedicel of female shorter, usually subtriangular, not more than twice as long as wide.

Thorax. Mesoscutum usually with matt brown or bronze stripes over ac band and laterally above notopleuron; 3 to 4 pairs strong ac present; male with 2 strong posterior dc and only weak hair-like dc anterior (MSSC); female either with 5 strong dc, or with 2 strong posterior dc and gap with 1 strong dc just anterior to mesonotal suture; lateral scutellar setae short.

Legs. Coxa I with 3 strong black distolateral setae; femur I without long ventral setae although females of some species with group of 34 short black basoventral setae; leg I tarsomere 1 elongate, only slightly shorter than tibia I; male leg I tarsomeres 2–5 on some species short and modified (MSSC).

Wing. Usually with similar dark brown maculation patterns in both sexes; veins M<sub>1</sub> and R<sub>4+5</sub> strongly converging at wing apex and sometimes joined subapically; crossvein m-cu strongly sinuous.

Abdomen. Relatively long in both sexes, with length of the abdomen greater than length head + thorax; male tergite and sternite 7 both well-developed; epandrial lobe sometimes strongly developed, with bristles modified as blade-like setae; male cercus various.

**Remarks.** The *Chrysosoma aeneum* species group is most diverse in New Guinea, but one species also occurs across the Arafura Sea in Arnhem Land, Northern Territory, Australia. The group is distinguished by the allantoid male postpedicel (MSSC), maculated wings, very short lateral scutellar setae, thoracic vittae, male femora without strong ventral setae, male basitarsus elongate, only slightly shorter than length of tibia I, relatively long abdomen in both sexes, where the abdomen length greater than the length head + thorax, and 3 strong black distolateral setae on coxa I.

Two species, *Chrysosoma leopoldi* and *Ch. maculipenne* are sister species, sharing the synapomorphies of similar modified male tarsomeres 2 and 3 on leg I. Also females of three species in *Ch. aeneum* group have only 3 dc setae, 2 posterior dc and 1 near the mesonotal suture. In almost all other *Chrysosoma* species, including the two other species in the group, females have 5 strong dc setae.

*Chrysosoma bicolor* Parent, 1937 from the Solomon Islands was previously included in the *Ch. aeneum* species group (Bickel, 1994) based on its elongate antennal postpedicel and maculated wings. However, I have seen photographs of the holotype (BMNH) and it belongs elsewhere, possibly in the *Ch. lacteimicans* species group.

#### The following species are included in the *Chrysosoma aeneum* group:

***Chrysosoma aeneum*** (Fabricius, 1805: 268) (*Dolichopus*). “Java”; Indonesia: Maluku, Papua & West Papua; Papua New Guinea.

*Ch. variipennis* (Walker, 1861: 238) (*Psilopus*). Indonesia: Papua.

*Ch. fasciatum* Guérin-Ménéville, 1831: pl. 20, 1838: 293. “New Guinea”, **syn. nov.**

*Ch. cognatum* Parent, 1929: 200. Maluku (Aru Islands), **syn. nov.**

***Chrysosoma interruptum*** Becker, 1922: 177. Australia (Northern Territory).

***Chrysosoma leopoldi*** Parent, 1932: 23. Indonesia: West Papua; Papua New Guinea.

***Chrysosoma maculipenne*** Guérin-Ménéville, 1831: pl. 20, 1838: 294. “Sumatra”; Indonesia: Maluku, Papua & West Papua; Papua New Guinea.

*Ch. benedictus* Walker, 1859: 91 (*Psilopus*). Indonesia: Maluku.

*Ch. persuadens* Walker, 1861: 149 (*Psilopus*). Indonesia: Maluku.

*Ch. diversifrons* de Meijere, 1913: 345 (*Psilopus*). Indonesia: Papua.

***Chrysosoma olegi* sp. nov.** Papua New Guinea.

#### Key to the *Chrysosoma aeneum* species group

The following key separates males of the *Ch. aeneum* group in the context of other New Guinea Sciapodinae. However, due to the diversity of the fauna, this key should be regarded as provisional (also see: Bickel, 1994; Bickel, Martin, 2020).

1. Vertex strongly excavated on either side of ocellar tubercle, or if weakly excavated, then vein M often distinctly branched, with M<sub>2</sub> present at least as a fold on membrane; mesonotum short, about as wide as long; hypopygium exerted and distinctly pedunculate; posterior mesonotum never flattened (subfamily Sciapodinae) ..... 2
- Vertex not excavated, vein M<sub>2</sub> usually absent; other characters various ..... other Dolichopodidae
2. Vein M branched and vein M<sub>2</sub> present, even if as fold on membrane; if unbranched, then males with anterior dc setae as weak hairs; other features various ..... 3
- Vein M unbranched but with gentle anterior bend beyond crossvein dm-cu; vein M<sub>2</sub> totally absent, without fold or indication on membrane; all dc setae strong in both sexes .. ***Mesorhaga*** Schiner, 1868
3. Arista usually apical on triangular postpedicel (if female, sometimes, with distinctly dorsal arista, then TI with strong dorsal and ventral setae, and lateral scutellar setae strong), usually long, more than half body length in females; male arista sometimes with apical flag; crossvein dm-cu often sinuous; TI often with long setae ..... 4
- Arista usually distinctly dorsal on subrectangular postpedicel and rarely longer than head width; crossvein dm-cu usually straight; TI rarely with long setae ..... other Sciapodinae

4. Lateral scutellar setae usually less than 1/3 length of medians; male frons usually without abundant hairs; halter usually yellow in both sexes; wing usually hyaline or with distinct brown maculations ..... 5
  - Lateral scutellar setae long, about 2/3 length of medians; male frons with dense abundant hairs; halter black in both sexes; wing smoky coloured ..... *Krakatauia* Enderlein, 1912 (part; see: Bickel, Martin, 2020)
5. Frons usually with pruinosity; male frons often with hairs on lateral slope; male scape rarely swollen and vase-like; CI without strong lateral spine-like setae (*Chrysosoma* Guérin-Méneville, 1831) .... 6
  - Frons polished metallic blue-green; male frons bare or with single weak vertical seta only; male scape often swollen and vase-like; FI and TI in both sexes usually without major setae; CI with either 3–7 strong lateral spine-like setae (stronger in females than males), or CI with 3 strong black distolateral setae ..... *Plagiozopelma* Enderlein, 1912 (see: Bickel, Martin, 2020)
6. Lateral scutellar setae reduced to setulae or lost; FI with only weak ventral setae; male postpedicel allantoid, more than 3.0 times as long as wide (Figs 2B, 2F); tarsomeres 2–5 of leg I often relatively short; abdomen longer than length of head + thorax (Fig. 2D); wing maculated (Melanesia, Australia) (*Chrysosoma aeneum* group) ..... 7
  - Lateral scutellar setae strong, at least 1/3 length of median scutellar setae, or if weak, then FI with strong ventral setae; male postpedicel usually short and triangular; other characters variable ..... other *Chrysosoma* groups (see: Bickel, 1994)
7. Tarsomeres of leg I modified, with ventral setal rows, distinctly shorted tarsomeres and/ or outstanding ventral setae ..... 8
  - Tarsomeres of leg I simple, without distinct modifications ..... 10
8. Tarsomere 1 of leg I with strong spine-like ventral seta at 3/5; distal tarsomeres of leg I unmodified; wing with brown transverse band from costa to dm-cu crossvein beyond mid-length; abdomen very long, almost twice length of head + thorax; hypopygium short, subrectangular; cercus short, digitiform (Figs 2D–H) (Papua New Guinea) ..... *Ch. olegi* **sp. nov.**
  - Tarsomere 1 of leg I without strong ventral seta; tarsomere 3 of leg I almost spheroidal and tarsomere 4 with ventral mound (Figs 1I, 2C); other characters various ..... 9
9. Wing brownish, without strong dark brown bands; surstylus broad, without projection, with tapering blade-like seta; cercus broad, basally setose with cluster of long dorsal setae at mid-length, and subapically flattened with dense short dark brown setae (Figs. 1F–I) (New Guinea) ..... *Ch. leopardi* Parent
  - Wing with distinct brown infuscation along distal third of wing and anterior crossvein dm-cu; surstylus with projection bearing tapering blade-like seta; cercus as elongate narrow arm with 4–5 subapical ventral setae. (Figs 2A–C) (New Guinea) ..... *Ch. maculipenne* Guérin-Méneville
10. Wing with dark brown infuscation across much of the distal half; cercus broad, elongate subtriangular and tapering with ventral surface bearing dense row of erect short setae along length (Figs 1A, B). (New Guinea) ..... *Ch. aeneum* (Fabricius)
  - Wing hyaline with brown clouding along anterior margin and over veins M<sub>1</sub>, M<sub>2</sub> and crossvein dm-cu; cercus as clavate arm with apical tooth-like setae (Figs 3A–C) (Australia) ... *Ch. interruptum* Becker

***Chrysosoma aeneum* (Fabricius, 1805)**

(Figs 1A, B)

*Dolichopus aeneus* Fabricius, 1805: 268.

*Chrysosoma fasciatum* Guérin-Méneville, 1831: pl. 20, 1838: 293, **syn. nov.**

*Chrysosoma cognatum* Parent, 1929: 200, **syn. nov.**

**Remarks about type material.** *Dolichopus aeneum* was described from “Java” but since the type(s) is lost, the true locale is not known. I have not seen specimens of this species west of Weber’s Line, and in the early 19th century many specimens arriving from the Dutch East Indies would have been exported from Batavia, Java. Becker (1922) summarized the uncertain taxonomic history of the species, and based on the work of previous authors, he provided accurate figures of the wing and male postabdomen of a species from

New Guinea. Parent (1934) regarded *Psilopus variipennis* Walker, 1861 from the Aru Islands as a synonym of *Chrysosoma aeneum*. Based on Becker's concept, Bickel (1994) designated a neotype for *Dolichopus aeneus* Fabricius, male, with label "Wewak, New Guinea, F.H. Taylor" (ANIC).

Guérin-Ménéville's species *Chrysosoma fasciatum* was described from a female (MHNP, examined) collected at Indonesia: "Papua Offack, Waigeo" (the only New Guinea stop on Duperry's 1823 *La Coquille* voyage along the north coast of New Guinea). Enderlein (1912) designated *Chrysosoma fasciatum* as the type species of *Chrysosoma*, and Parent (1926) redescribed the female holotype.

Both de Meijere (1913) and Becker (1922) regarded *Chrysosoma fasciatum* as a synonym of *Ch. aeneum*, but Parent regarded the two species as distinct. Parent (1929) described *Chrysosoma cognatum* based on a male from the Aru Islands (MLUH, Figs 1C–E), and later placed this species in synonymy with *Ch. fasciatum*. However, the cercus of *Ch. cognatum* (Fig. 1D) has the distinctive ventral row of setal "teeth" as *Ch. aeneum* (Fig 1B), and the wing patterns of the species are similar, so I regard *Ch. cognatum* as a synonym of *Ch. aeneum* (along with *Ch. fasciatum*).

**Diagnosis.** *Male.* Length of body 11.5 mm; wing length x width = 11.1 x 3.6 mm (Fig. 1A)

Head. Vertex strongly excavated; vertex and frons metallic blue-green and with grey pruinosity; row of 6–7 short black postocular seta along edge of dorsal postcranium, with strong postvertical seta present at apex of row; lateral frons with group of 9–10 fine whitish setae (MSSC), and without distinct vertical seta; upper face slightly bulging under antennae; face and clypeus with and covered with dense silvery pruinosity; clypeus free from eye margin; palp and proboscis yellow; scape and pedicel dull yellow; pedicel subequal to scape, and with distal corona of short setae, with dorsal setae longer; postpedicel ventrally yellowish but dorsally brown, elongate and allantoid, gradually tapering, and as long as face height (MSSC); arista apical, almost twice as long as head height; lower postcranium with field of dense white hairs.

Thorax. Metallic blue-green with dark bronze vittae over ac band almost to scutellar margin, and laterally above notopleural area; setae black; four pairs strong ac present; pleura with dense silvery pruinosity; dc row with 2 strong posterior setae and 3 weaker setae anteriorly; 1 pa, 2 sa, 2sr, 2npl, 1 pm, 1 weak hm present; median scutellar setae strong, with lateral setae short, about one-eighth length of medians.

Legs. Coxa and trochanter I yellow with dusting of silvery pruinosity; coxae and trochanters II and III dark brown with silvery pruinosity; femora and tibiae I and II mostly yellow, tibia III dark brown; tarsi brown; CI with white anterior hairs and 3 strong black apicolateral setae; CII with black and white anterior setae; CIII with group of long white setae on dorsal half, with strong black lateral seta at mid-length; I: 11.6; 11.4; 10.1/ 3.5/ 2.4/ 1.2/ 1.0; FI with row of erect white ventral hairs along length, and with black subapical pv seta; TI with dorsal setae at 1/6, 1/3 and 2/3 (strong), and with erect whitish ventral hairs along basal half; tarsus I not modified; II: 13.2; 19.0; 14.9/ 4.2/ 2.9/ 1.2/ 1.0; FII with white ventral hairs along basal half, and with group of 5–6 fine black av along distal sixth; TII with ad setae at 1/10, 1/4, 1/2, and 2/3, shorter pd setae at 1/5 and 1/2, ventral setae near 1/4, 2/5 (short) and 2/3, and subapical circlet of ad (long), av (long), pv and pd setae; III: 16.0; 21.1; 11.8/ 5.2/ 3.7/ 1.3/ 1.1; FIII with white ventral hairs along length; TIII with ad setae at 1/10 (short), 1/6, 3/10, and 3/5, 7–8 dorsal setae spaced along length, and subapical circlet of dorsal, ad, and av setae; III<sub>1</sub> with strong ventral seta near base.

Wing. Mostly hyaline with smoky brown infuscation along costal cell, basally in cell r3 and r5, along distal vein CuA, and with dark brown infuscation across much of the distal half of wing, leaving only apical area and posterior margin of wing hyaline; vein R<sub>2+3</sub> joining costa beyond 9/10; veins M and R<sub>4+5</sub> strongly diverging from wing base, with M<sub>1</sub> separating from M<sub>2</sub> near 3/4 and curving strongly, almost meeting R<sub>4+5</sub> before joining costa anteriorly of wing apex; crossvein dm-cu distinctly sinuous, convex near center; lower calypter yellow with brown rim and fan of pale yellow setae; halter yellow.

Abdomen. Elongate; tergite 1 metallic blue-green, and tergites 2–5 metallic blue-green with wide matt brown bands across anterior and posterior tergite margins, i.e., basal half and distal fifth of each tergite covered by matt brown band; metallic blue-green cuticle with silvery pruinosity; tergites 5 to 8 dark metallic black with violet reflections; tergite 1 with white lateral hairs and 4 strong black marginal setae; tergites 2–6 with erect black setae and row of stronger setae along posterior margin; segment 7 external with black hairs; sternite 8 over left lateral hypopygial foramen and with abundant black hairs; hypopygium (Fig. 1B) entirely dark brown; epandrium short, subrectangular; epandrial lobe prolonged distally and with apical dagger-like seta reaching almost to apex of cercus; surstylus digitiform but apically blunt; cercus broad, elongate subtriangular and tapering with ventral surface bearing dense row of erect short setae along length.

*Female.* Similar to male except lacks MSSC and as noted: face not bulging; lateral frons without white setae, but with strong vertical seta; clypeus adjacent to eyes; postpedicel mostly dark brown and tapering triangular, not allantoid, 5 strong dc present.

**Remarks.** *Chrysosoma aeneum* is widespread in New Guinea, primarily lowland localities in Papua New Guinea, and Indonesia: Maluku, Papua and West Papua. The male hypopygium (Fig. 1B) is striking, with a large tapering jaw-like cercus with a dense row of ventral tooth-like setae. The wide dark brown band across most of the distal wing is also diagnostic. The male legs have no obvious leg MSSC.

## *Chrysosoma leopoldi* Parent, 1932

(Figs. 1F–I)

*Chrysosoma leopoldi* Parent, 1932: 23.

**Remarks about type material.** Parent (1932) described *Chrysosoma leopoldi* from a single male collected at “Sakoemi”, Netherlands New Guinea [= **Indonesia: West Papua: Sakoeni**, 2° 12' S 133° 21' E, 0, 50 m]. Although the male holotype is badly damaged (RBINS, see holotype image: [https://collections.naturalsciences.be/ssh-entomo/collections/BE-RBINS-ENT%20Collection-prince-leopold-of-belgium-expedition-1929/drawers/box\\_116/box-116.jpg/image](https://collections.naturalsciences.be/ssh-entomo/collections/BE-RBINS-ENT%20Collection-prince-leopold-of-belgium-expedition-1929/drawers/box_116/box-116.jpg/image)), Parent described and figured the species in detail and I am confident of its identity.

**Material examined.** PAPUA NEW GUINEA. *Morobe Province*: 1 male, Bulolo River, 700 m, 29.VII.1969, Y. Hirashima leg. (BPBM); 2 males, 5 females, Wau, 7.20° S 146.42° E, 600 m, 2–3.XI.1996, M.S. Moulds leg. (AMS); 2 females, Mt Kaindi, Wau, 7.24°S 146.44°E, 1150–2300 m, 22–28.XI.1992, canopy fog ex *Ficus* sp., Y. Basset leg. (BMBM); 1 female, Wau Ecology Institute, second growth montane forest, 1200 m, 25–31.VIII.1983, Malaise trap, S.E. & P.M. Miller leg. (BPBM); *Sandaun Province*: 1 male, Torricelli Mtns, 800 ft (= 240 m) I.1939, E.L. Cheesman leg. (SAM). *Western Province*: 1 male, SE slope of Mt. Akrik (= Ian), 15 km NW of Tabubil, 5.10°S, 141.09°E, 1625 m, 3.X.1993, 21–22.XI.1996, M.S. Moulds leg. (AMS); 1 male, Matkomrae Village, 50 km N of Kiunga, 5.49° S 141.09° E, 60 m, 3.X.1993, M.S. Moulds & S. Cowan leg. (AMS).

**Redescription.** *Male*. Length of body 10.2 mm; wing length x width = 8.7 x 2.3 mm (Fig. 1F).

Head (Fig. 1H). Vertex frons metallic blue-green and covered with grey pruinosity evident in dorsal view; row of 6–7 short black postocular seta along edge of dorsal postcranium, with strong postvertical seta present at apex of row; lateral frons with group of 9–10 fine white setae (MSSC), without distinct vertical seta; strong diverging ocellar setae present; upper face slightly; face and clypeus covered with dense silvery pruinosity; clypeus free from eye margin; eye facets uniform with tiny hairs between facets; palp yellow with black apical seta; proboscis yellow; scape and pedicel dull yellow; pedicel subequal to scape, and with distal corona of short setae, with dorsal setae longer; postpedicel ventrally yellowish but dorsally brown, elongate and allantoid, gradually tapering, and as long as face height (MSSC); arista apical, almost twice as long as head height; lower postcranium with field of dense white hairlike setae.

Thorax. Metallic blue-green with broad bronze vittae over ac band almost to scutellar margin, and laterally above notopleural area; scutellum blue-green with faint dusting of grey pruinosity; setae black; four pairs strong ac present; pleura with dense silvery pruinosity; dc row with 2 strong posterior setae and 3 weaker setae anterior; 1 pa, 2 sa, 2sr, 2npl, 1 pm, 1 weak hm present; median scutellar setae strong with lateral setae short, about one-eighth length of medians.

Legs. Coxa and trochanter I yellow with silvery pruinosity; coxae and trochanters II and III dark brown; femora and tibiae mostly yellow although distal TIII infuscated; basitarsi I and II yellow, with distal tarsomeres brown; tarsus III brown; CI with white anterior hairs and 3 strong black apicolateral setae; CII with black and white anterior setae; CIII group of long white lateral hairs seta on dorsal half, with strong black lateral seta at 1/2; I: 10.5; 10.0; 7.9/ 2.5/ 0.5/ 2.0/ 1.0; FI with row of erect white ventral hairs along length, and with fine black pv setae along distal fifth; TI with three short dorsal setae along basal third, strong dorsal at 3/5, short pv at 1/3 and pv seta at 3/5, and subapical pd seta, and ventrally flattened with whitish pile along length (MSSC) (Fig. 1I); It<sub>1</sub> with row 7–8 spaced ventral setae along length (MSSC); It<sub>2</sub> with dense ventral comb of very short black setae (MSSC); It<sub>3</sub> short, almost spheroidal (MSSC); It<sub>4</sub> with weak ventral mound near base (MSSC); II: 9.5; 14.3; 10.0/ 3.0/ 2.1/ 1.0/ 0.8; FII with row erect white ventral hairs along length, and with group of 5–6 fine black av along distal sixth; TII with ad setae at 1/10, 1/4, 1/2, and 2/3, shorter pd setae at 1/10, 1/5, and 1/2, ventral setae near 1/5, 1/3, 1/2, and 3/4, and subapical circlet of ad (long), av (long), pv and pd setae; III: 12.3; 21.3; 8.3/ 3.5/ 2.5/ 1.2/ 0.9; FIII with row 8–10 black ventral setae along distal two-thirds; TIII with ad setae at 1/10 (short), 1/6, 3/10, and 3/5, dorsal setae at 1/10, 1/3, 1/3, 2/3, and 7/8, and subapical circlet of dorsal, ad, and av setae; III<sub>1</sub> with strong ventral seta near base.

Wing. Mostly hyaline but with brown transverse band from costa to dm-cu crossvein beyond mid-length; vein R<sub>2+3</sub> joining costa beyond 9/10; veins M and R<sub>4+5</sub> strongly diverging from wing base, with M<sub>1</sub> separating from M<sub>2</sub> near 3/4 and curving strongly, almost meeting R<sub>4+5</sub> before joining costa anterior of wing apex; crossvein dm-cu sinuous, convex near center; lower calypter yellow with brown rim and fan of pale yellow setae; halter yellow.

Abdomen. Elongate; tergite 1 metallic blue-green, and tergites 2–5 metallic blue-green with wide matt brown bands across anterior and posterior tergite margins, i.e., basal half and distal fifth of each tergite covered by matt brown band; metallic blue-green cuticle only with silvery pruinosity, denser on lateral margins; tergites 5 to 8 dark metallic black with violet reflections; tergite 1 with white lateral hairs and 4 strong black marginal setae; tergites 2–6 with erect black setae and row of stronger setae along posterior margin, sternite 8 left lateral over hypopygial foramen and with abundant black hairs; hypopygium (Fig. 1G) dark brown; epandrium short subrectangular; epandrial lobe at base of surstylus with two strong setae; surstylus broad, subrectangular and expanded distally, but apically blunt, and with dorsal projection with tapering blade-like seta, and subapical rounded projection; cercus broad, with cluster of long dorsal setae at midlength, and subapically flattened with group of short subapical setae.



**Fig. 1.** *Chrosoma aeneum* (Fabricius): A – male habitus (antennae missing), left lateral view; B – male postabdomen, left lateral view. *Ch. cognatum* Parent (holotype, male): C – thorax, left lateral view; D – hypopygium, left lateral view; E – label data of holotype (MLUH). *Ch. leopoldi* Parent: F – male habitus, left lateral view; G – male postabdomen, left lateral view; H – male head and thorax, left dorsal view; I – male leg I, distal tibia and tarsus.



*Female.* Similar to male except lacks MSSC and as noted: face not bulging; lateral frons without white setae, but with strong vertical seta; clypeus adjacent to eyes; postpedicel mostly dark brown and tapering triangular, not allantoid, 5 strong dc present; tibia I and tarsus I unmodified, with tarsomere ratio as 7.5/2.0/ 1.5/0.8/ 0.5.

**Remarks.** *Chrysosoma leopoldi* is widespread in New Guinea, and is very close to *Ch. maculipenne*, sharing similar modified male leg I tarsomeres, and females of both species have five strong dc setae.

***Chrysosoma maculipenne* Guérin-Méneville, 1831**

(Figs 2A–C)

*Chrysosoma maculipenne* Guérin-Méneville, 1831: pl. 20, 1838: 294.

*Psilopus benedictus* Walker, 1859: 91.

*Psilopus persuadens* Walker, 1861: 149.

*Psilopus diversifrons* de Meijere, 1913: 345.

**Remarks about type material.** Guérin-Méneville (1831) described *Chrysosoma maculipenne* based on a female specimen (MNHP, examined) from Ossak, Sumatra. The Sumatra type locality is almost certainly incorrect since I know of no other records west of Weber's Line.

However, like Guérin-Méneville's species *Chrysosoma fasciatum*, it may also have been collected in Indonesia: Papua: Offack, Waigeo, the only New Guinea stop on Duperry's 1823 La Coquille voyage. The species is found in collections from Indonesian Papua, Maluku, and West Papua, and Papua New Guinea. Parent (1926: 23) redescribed the female holotype of *Ch. maculipenne*. Edwards (1915: 407) suggested that *Psilopus benedictus* Walker, based on male and female syntypes from the Aru Islands (BMNH, examined) and *P. persuadens*, a male from Ambon (BMNH, examined) were possible synonyms of "*Psilopus maculipennis*". Becker (1922) summarized the work of previous authors, and provided a figure of the wing, but a rather inaccurate figure of the male postabdomen. Parent (1934) in his review of the Walker types confirmed these two synonymies of *Chrysosoma maculipenne*.

De Meijere described *Psilopus diversifrons* from two male syntypes collected in Alkmaar, West Papua (RMNL, examined). The male *Psilopus diversifrons* syntypes have genitalia and leg I identical to those of *Chrysosoma maculipenne* (cercus distally narrow with distinctive serrations). The only difference between *Ch. diversifrons* and 48 specimens of *Ch. maculipenne* (identified as *Psilopus benedictus*), all collected together at Alkmaar, West Papua (RMNL), is that the *P. diversifrons* specimens lack the apical wing maculation. However, the *Ch. maculipenne* series from the same site show wing maculation intensity varying from faint to dark. Therefore, the two syntypic specimens of *P. diversifrons* are regarded as teneral *Ch. maculipenne* and the name was placed in synonymy in Bickel (1994).

**Material examined.** PAPUA NEW GUINEA. *Central Province:* 1 male, Mori River, Cape Rodney, 4.XI.1960, L. & M. Gressitt leg. (BPBM); 1 male, Laloki, 10.VII.1985, J.W. Ismay leg.; 1 male, Koitaki, 5.12.1921, E.O. Pockley leg. (AMS). *East Sepik Province:* 1 male, Imbria, nr Maprik, XI.1963, D.K. McAlpine leg. (AMS); 1 male, 1 female, Pagel, Sepik River, III.1964, D.H. Colless leg. (ANIC). *Gulf Province:* 1 male, Orokol, X.1923, G.H. Murray leg. (AMS). *Milne Bay Province:* Trobriand Is, Kiriwina, G.H. Murray leg. (AMS). *Morobe Province:* 1 male, Wau, Malaise trap 2, VI–X.1972, B.S. Cheary leg. (AMS). *Oro Province:* 1 male, Popondetta District, Buri, near Sasambata, 30.X.1963, D.K. McAlpine leg. (AMS). *Sandaun Province:* 1 male, Torricelli Mtns, 800 ft (= 240 m) I.1939, E.L. Cheesman leg. (SAM). *Western Highlands Province:* 1 male, Sepik-Waghi Divide, 1700 m, N of Baiyer River, 7.VIII.1982, J.W. Ismay leg. (AMS).

**Diagnosis.** *Male.* Length of body 8.1 mm; wing length x width = 7.5 x 2.1 mm (Fig. 2A).

Head (Fig. 2B). Postpedicel mostly yellow but dorsally brownish, allantoid and gradually tapering, and as long as face height (MSSC).

Legs. Coxa and trochanter I yellow with dusting of silvery pruinosity; coxae and trochanters II and III dark brown with silvery pruinosity; femora and tibiae mostly yellow although distal TIII infuscated; basitarsi I and II mostly yellow, with distal tarsomeres brown; tarsus III brown; I: 10.0; 9.8; 7.0/ 2.0/ 0.5/ 2.7/ 0.8; FI and TI setation similar; tarsus I with modifications (Fig. 2C): It<sub>1</sub> with row short ventral setae along length (MSSC); It<sub>2</sub> ventrally with 9–10 short strong setae (MSSC); It<sub>3</sub> short, almost spheroidal with white ventral pile (MSSC); It<sub>4</sub> with weak ventral mound near base (MSSC); II: 9.4; 13.8; 9.8 3.0/ 2.1/ 1.0/ 0.8; FII and TII similar; III: 11.2; 18.0; 8.0/ 3.7/ 2.1/ 1.2/ 0.9; FIII and TIII similar; III<sub>1</sub> without strong basoventral seta.

Wing. With brown infuscation along anterodistal third of wing and along anterior crossvein dm-cu, but hyaline at wing apex.

Abdomen. Hypopygium (Fig. 2C) entirely dark brown; epandrium short subrectangular; epandrial lobe at base of surstylus with two strong setae; surstylus broad, subrectangular and expanded distally, but apically blunt, and with dorsal projection bearing tapering blade-like seta, and rounded projection; cercus basally with black lateral setae, and as elongate narrow arm reaching beyond surstylus, and with 4–5 subapical ventral setae.



**Fig. 2.** *Chrysosoma maculipenne* Guérin-Ménéville: A – male habitus, left lateral view; B – male head and thorax, left lateral view; C – hypopygium and tarsus I, left lateral view. *Ch. olegi* sp. nov.: D – male habitus, left lateral view; E – male postabdomen, left lateral view; F – male head and thorax, left lateral view; G – male wing, dorsal view; H – female habitus, left lateral view.

*Female.* Similar to male except lacks MSSC and as noted: face not bulging; lateral frons without white setae, but with strong vertical seta; clypeus adjacent to eyes; postpedicel mostly dark brown and tapering triangular, not allantoid, 5 strong dc present; tarsus I unmodified.

**Remarks.** *Chrysosoma maculipenne* is widespread in lowland New Guinea, and surrounding islands. The wing maculation, male postabdomen, and the modified male tarsus I are diagnostic for this species.

***Chrysosoma olegi* Bickel, sp. nov.**

<http://zoobank.org/F1243BDB-47C2-4F1F-BD24-D67A4CDF37CD>

(Figs 2D–H)

**Type material.** *Holotype:* male, PAPUA NEW GUINEA, *Morobe Province:* Wau, 1200 m, Malaise trap, 18.II.1968, M. Sedlacek leg. (BPBM).

*Paratypes.* PAPUA NEW GUINEA. *Morobe Province:* 9 females, same as holotype but 23.IV.1965, 27.IX.1966, 20.III.1968, 18.II.1969, 10.III.1969; 17.XII.1969, 19.II.1970 and VI.1981; 1 female, Mt Kaindi, Wau, 7.24°S 146.44°E, 1150–2300 m, 4.XII.1992, canopy fog, Y. Basset leg. (BMBM); 6 females, Wau Ecology Institute, 1200 m, Malaise trap, second growth montane forest, 1–10, 11–23 and 23–31.VIII.1983, S.E. & P.M. Miller leg. (BPBM); 1 male, 1 female, Wau, Malaise trap 2, 14–21.VII.1972, B.S. Cheary leg. (AMS).

**Additional material examined.** PAPUA NEW GUINEA. *Morobe Province:* 1 female, Garaina, 830 m, 13–15.I.1958, M. Sedlacek leg. (BPBM).

**Description.** *Male.* Length of body 11.5 mm; wing length x width = 8.1 x 1.7 mm (Fig. 2D)

Head (Fig. 2F). Vertex strongly excavated; vertex and frons metallic blue-violet and covered with grey pruinosity; row of 6–7 short black postocular seta along edge of dorsal postcranium, with strong postvertical seta present at apex of row; lateral frons with group of 9–10 fine white setae, without distinct vertical seta; (MSSC); strong diverging ocellar setae present on prominent ocellar tubercle; upper face slightly bulging under antennae; face and clypeus covered with dense silvery pruinosity; clypeus free from eye margin; eye facets uniform with tiny hairs between facets; palp yellow with black apical seta; proboscis yellow; antenna mostly yellow; scape short and cup-like; pedicel subequal to scape, and with distal corona of short setae, with dorsal setae longer; postpedicel elongate and allantoid, gradually tapering, and as long as face height (MSSC); arista apical, as long as head height; lower postcranium with field of dense white hairs.

Thorax. Metallic blue-green with broad bronze vitta over ac band almost to scutellar margin, and laterally above notopleural area; scutellum blue-green with faint dusting of grey pruinosity; 3 pairs strong ac present; setae black; pleura with dense silvery pruinosity; 3 pairs long ac present; dc row with 2 strong posterior setae and 3 weak hair-like setae anterior; 1 pa, 2 sa, 2sr, 2npl, 1 pm, 1 weak hm present; median scutellar setae strong with lateral setae about one-eighth length of medians.

Legs. Coxa and trochanter I yellow with silvery pruinosity; coxae and trochanters II and III dark brown; femora and tibiae mostly yellow although distal TIII infuscated; basitarsi I and II mostly yellow, with distal tarsomeres brown; tarsus III brown; CI with white anterior hairs and 3 strong black apicolateral setae; CII with black and white anterior setae; CIII with group of white lateral seta with strong black lateral seta at 1/2; femora bare of major seta but with some short white ventral hairs; I: 9.0; 9.5; 5.7/ 1.8/ 2.1/ 1.2/ 0.9; TI with short dorsal setae at 1/5 and 2/5, 1/6, short ventral at 1/3 and 1/2, and some short subapical setae;  $It_1$  with strong spine-like ventral seta at 3/5 (MSSC); II: 9.5; 14.3; 10.0/ 3.0/ 2.1/ 1.0/ 0.8; TII with ad setae at 1/10, 1/4, 1/2, and 3/4, shorter pd setae at 1/10, 2/5, and 2/3, short ventral setae near 1/4, 2/5, and 2/3, and subapical circlet of ad (long), av (long), pv and pd setae; III: 12.3; 21.3; 8.3/ 3.5/ 2.5/ 1.2/ 0.9; TIII with ad seta at 1/10, nine sort spaced dorsal setae along length, 6 spaced anterior seta along length, and subapical circlet of dorsal, ad, and av setae;  $III_1$  with strong ventral seta near base.

Wing (Fig. 2G). Mostly hyaline but with brown transverse band from costa to dm-cu crossvein beyond mid-length; vein  $R_{2+3}$  joining costa beyond 9/10; veins M and  $R_{4+5}$  strongly diverging from wing base, with  $M_1$  separating from  $M_2$  near 3/4 and curving strongly, almost meeting  $R_{4+5}$  before joining costa anterior of wing apex; crossvein dm-cu distinctly sinuous, convex near center; lower calypter yellow with brown rim and fan of pale yellow setae; halter yellow but club infuscated.

Abdomen. Elongate, almost twice length of head and thorax combined; tergite 1 metallic blue-green; tergites 2–5 metallic blue-green with wide matt brown bands across anterior and posterior tergite margins, i.e., basal half and distal fifth of each tergite covered by matt brown band; metallic blue-green cuticle only with silvery pruinosity, denser on lateral margins; tergites 5 to 8 entirely dark metallic black with violet reflections; tergite 1 with white lateral hairs and 4 strong black marginal setae; tergites 2–6 with erect black setae and row of stronger setae along posterior margin, segment 7 external with black hairs, sternite 8 left lateral over hypopygial foramen and with abundant black hairs; hypopygium (Fig. 2E); entirely dark brown to black; epandrium short subrectangular; hypandrial arm not extending beyond surstylus; surstylus short and wide with short projecting setae; cercus short digitiform.

*Female* (Fig. 2H). Similar to male except lacks MSSC and as noted: face not bulging; lateral frons without white setae, but with strong vertical seta; clypeus adjacent to eyes; postpedicel also allantoid, but shorter, about half length of male postpedicel; 3 dc present, 2 strong posterior dc, with 1 dc just anterior of mesonotal suture;  $It_1$  bare of strong ventral seta.

**Remarks.** *Chrysosoma olegi* is known only from Morobe Province, Papua New Guinea, with many records from the well-collected Wau area above 1000 m. It is characterized by a relatively long male abdomen, small hypopygium, and male tarsus I with a strong ventral seta on the basitarsus but distal tarsomeres unmodified. Females have only three dc setae, two posterior and one near the mesonotal suture. In almost all other *Chrysosoma*, females have 5 strong dc setae.

**Etymology.** The specific epithet “olegi” is a patronym honoring Oleg P. Negrobov for his great contribution to the understanding of that immense family Dolichopodidae.

### *Chrysosoma interruptum* Becker, 1922

(Figs 3A–C)

*Chrysosoma interruptum* Becker, 1922: 177.

**Remarks about type material.** Becker described *Chrysosoma interruptum* from one male and two females syntypes (ZSI, not seen) collected at Palmerston, North Australia (= Darwin).

**Material examined.** All collected in Arnhem Land and adjacent islands, Northern Territory, Australia (see records in: Bickel, 1994).

**Diagnosis.** *Male.* Length of body 7.98.0; wing length x width = 7.3 x 2.7. (Fig 3A).

Head. Antenna black; postpedicel elongate, allantoid (MSSC); arista apical, length about 1/2 head height.

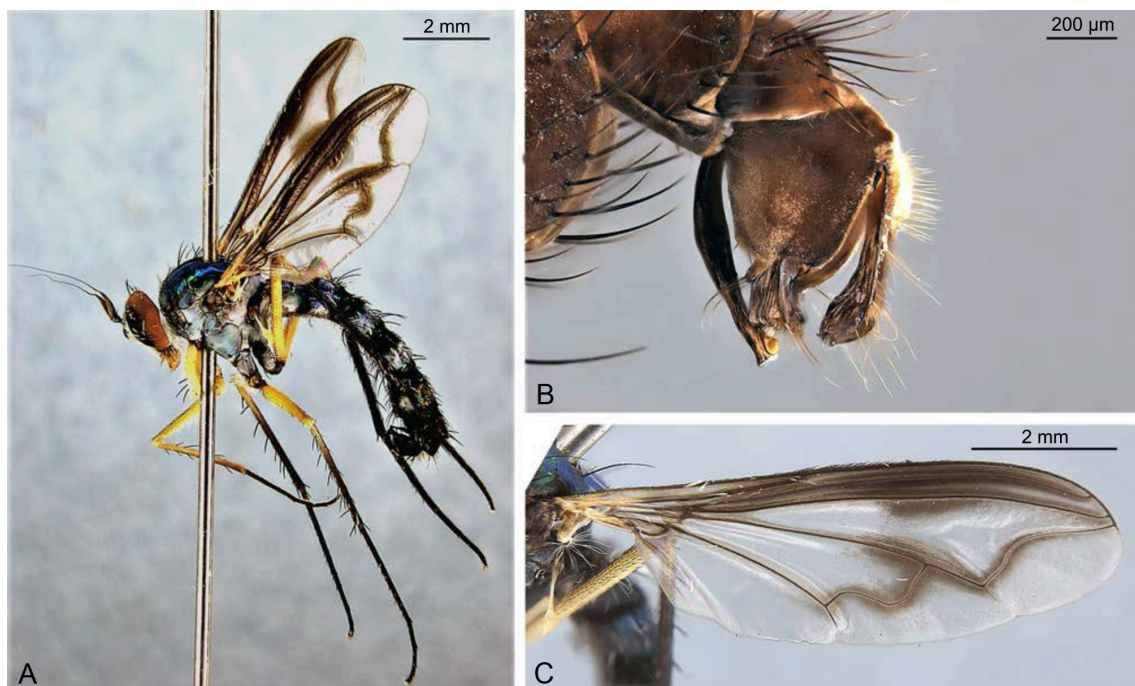
Thorax. Metallic green with bronze vitta over ac band and laterally above notopleura; scutellum blue-green; 3 pairs strong ac present; 1 pa, 2 sa; 2sr, 2 npl, 1 pm, 1 weak hm present.

Legs. Coxa I, all femora, tibiae I & II basal tibia III yellow; tibia I with 56 strong black dorsal and 3 ventral setae.

Wing (Fig. 3C). Hyaline with brown clouding along anterior margin between costa and  $R_{4+5}$  and over veins  $M_1$ ,  $M_2$  and crossvein dm-cu.

Abdomen. Hypopygium dark brown (Fig. 3B); epandrium subrectangular; 2 epandrial setae present; epandrial lobe with long apical and shorter subapical bristles; surstylus lobate and divided longitudinally with short dorsal projection which bears long apical seta; cercus as single clavate arm which bears long dorsal setae 2 blunt apical tooth-like setae and with long internal projection also with tooth-like seta.

*Female.* Similar to male except lacks MSSC; postpedicel not greatly, shorter and triangular; 3 dc present, 2 strong posterior dc, then gap with 1 strong dc just anterior to suture.



**Fig. 3.** *Chrysosoma interruptum* Becker: A – male habitus, left lateral view; B – hypopygium, left lateral view; C – male wing, dorsal view.

**Remarks.** *Chrysosoma interruptum* is found in monsoonal vine forest and woodland in Arnhem Land and islands in the Gulf of Carpentaria, Northern Territory, Australia. Surprisingly, I have not seen this species on Cape York Peninsula, which is much closer to New Guinea and was connected to it by a land corridor during low sea-levels in the Pleistocene. This species lacks obvious male leg modifications, and females have only 3 dc, 2 posterior dc setae and 1 near the mesonotal suture. In almost all other *Chrysosoma*, females have 5 strong dc setae.

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