

# Taxonomic Revision of the *Anomala cuprascens*-Species Group of Sulawesi and the Papuan Region: The Species with Unidentate Protibiae (*A. chlorotica*-Subgroup) (Coleoptera: Scarabaeidae: Rutelinae)

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## > Abstract

The *chlorotica*-subgroup (species with unidentate protibiae) of the *Anomala cuprascens*-group (Coleoptera: Scarabaeidae: Rutelinae: Anomalini) from Sulawesi and the Papuan Region is revised. The *cuprascens*-group and *chlorotica*-subgroup are morphologically defined. The *chlorotica*-subgroup includes 28 species, 18 of which are described as new. The new species are: *Anomala madangensis*, *A. malukana*, *A. kuekenthali*, *A. durvillei*, *A. fergussonensis*, *A. denticulata*, *A. irianensis*, *A. bruggei*, *A. merkli*, *A. biakensis*, *A. butensis*, *A. ophthalmica*, *A. sarmiensis*, *A. toxopei*, *A. papuensis*, *A. aruensis*, *A. sulana*, *A. tahunensis*. The following names are placed in synonymy: *A. aeneiventris* var. *fuscipennis* Ohaus, 1915 (= *A. aeneiventris* Fairmaire, 1883), *A. bandarra* Ohaus, 1916 (= *A. maculicollis* Hombron & Jacquinet, 1846), *A. resecta* Ohaus, 1916 (= *A. maculicollis* Hombron & Jacquinet, 1846), *A. stigmatica* Ohaus, 1916 (= *A. maculicollis* Hombron & Jacquinet, 1846), *A. ternatana* Lansberge, 1879 (= *A. aeruginosa* Boisduval, 1835), *A. aerea* Blanchard, 1851 (= *A. aeruginosa* Boisduval, 1835). Lectotypes are selected for the nominal taxa *Anomala aeneiventris* Fairmaire, 1883, *A. pygidialis* Kirsch, 1876, *A. chlorotica* (Guérin-Ménéville, 1838), *A. maculicollis* Hombron & Jacquinet, 1846, *A. stigmatica* Ohaus, 1916, *A. resecta* Ohaus, 1916, *A. bandarra* Ohaus, 1916, *A. aerea* Blanchard, 1851, *A. cassiana* Ohaus, 1923. Neotypes are designated for *Anomala bousqueti* LeGuillou, 1844 and *A. aeruginosa* Boisduval, 1835. The examination of endophalus structures allows discrimination of species and is indicative of relationships between these species. Descriptions and a key to all taxa treated are included. Figures of the aedeagi and endophalli as well as distribution maps for all taxa are provided.

## > Key words

Sulawesi, Papuan Region, *Anomala cuprascens*-species group, *A. chlorotica*-subgroup, taxonomy, distribution.

## 1. Introduction

The present paper is part of an ongoing taxonomic revision of the *Anomala* Samouelle, 1819 species of Sulawesi and the Papuan Region (for the geographical definition see below). The typological genus concept of *Anomala* Samouelle, 1819 was adopted from MACHATSCHKE (1957, 1972) and PAUCAR-CABRERA (2003). It appears obvious that a world-wide phylogenetic analysis of the Anomalini is highly needed. This is reflected by the introduction and synonymization of numerous subgenera of *Anomala* that could not be satisfyingly defined based on morphological apomorphies. The nearly world-wide distribution, morphological uniformity and species richness make it almost impossible to overlook the genus *Anomala*. More than 600 valid species are known from the Palaearctic and Oriental region alone, and many yet undescribed species can be expected. MACHATSCHKE (1957, 1972) subdivided *Anomala* into several species groups. He failed, how-

ever, in making the systematic structuring of *Anomala* more transparent since he did not provide verifiable characters on which this classification was based. The category “species group” is used in this publication not with the intention to anticipate a phylogenetic analysis of *Anomala* but as a basis for discussing a future subgeneric concept based on phylogenetic results. The presumed apomorphic characters employed for the definition of the *cuprascens*-species group or the *chlorotica*-subgroup respectively are discussed herein and additional diagnostic characters are given. In the outlining of the species groups not only the species of Sulawesi and the Papuan Region but also all other Asian *Anomala* species known to the author were taken into account. The “*Anomala cuprascens*-group” appears to be one of the largest Asian *Anomala* lineages and can be subdivided into subgroups. One of them, the *chlorotica*-subgroup, is revised in this study.

Numerous single descriptions of taxa of the *cu-prascens*-species group published by different authors preceded this revision. The most important contributions were made by OHAUS (1915, 1916, 1924, 1926b, 1930, 1936), who described by far most of the known *Anomala* species of the region under study. Recent taxonomic contributions to the knowledge of the Anomalini of Sulawesi were made by MIYAKE (1996, 2000) and WADA (1998, 1999, 2000, 2002) focusing on the genera *Malaia* Heller, 1891, *Popillia* Dejean, 1821 and *Callistethus* Blanchard, 1851.

The major part of this revision is based on historical collection material. With the exception of the numerous Rutelinae collected in 1985 during the 'Wallace Project' (KNIGHT & HOLLOWAY 1990) in northern Sulawesi, only few recently collected specimens were available for examination to the author. The whole south-eastern part of Sulawesi including the islands Muna and Buton, most of Halmahera and the southern part of New Guinea remain little known with no or only few *Anomala* specimens recorded. Therefore, some chorological findings like the apparent absence of *Anomala* in the southern part of New Guinea must be regarded with caution.

Fifteen nominal species of the *Anomala chlorotica*-subgroup as defined below were known up to now. While some existing names were found to be synonyms of other taxa, *Anomala aeneiventris*, *A. aeruginosa* and *A. luctuosa* auctorum proved to be large complexes of many similar yet unnamed species. Given the morphological uniformity of these species and the less complex tegmen, the endophallus structures proved to yield the most informative diagnostic characters within the *chlorotica*-subgroup. Internal sac structures of *Anomala* were presented for the first time by SHARP (1912). Several subsequent studies have shown the taxonomic value of endophallus characters within the Anomalini (PILLERI 1948, 1951, 1954; MACHATSCHKE 1955; SABATINELLI 1993, 1994, 1996; WADA 2002). JAMESON (1997), however, found the internal sac structures only moderately useful for the identification of *Rutela* Latreille, 1802 species because of extensive intraspecific variation. In the present paper, for the first time endophallus structures are presented in the context of a revision of an *Anomala* species group. Their significance for higher level systematics within the Anomalini should be tested in the future.

The present revision is focusing on the species occurring on Sulawesi and the islands of the Papuan Region. Two species from the Philippines which have been recognized as members of the *chlorotica*-subgroup are also included. The term "Papuan Region" is used in the (wide) sense of GRESSITT (1982) and comprises the island groups of the Moluccas in the west, New Guinea (the northern part of the Australian zoogeographic region), as well as the Bismarck Archipel-

ago and the Solomons in the east. The outlined region extends along one of the distribution boundaries of the almost globally distributed genus *Anomala*. *Anomala antiqua* (Gyllenhal, 1817) and *A. aeneotincta* Fairmaire, 1883 are the only species of this genus found further south-east in Australia (CARNE 1958). The area under study covers parts of the 'Wallacea', which is characterized by a mixed fauna composed of Oriental and Australian elements in many animal groups and by a high degree of endemism on genus and species level (COX & MOORE 1985). Because of the overall absence of the Anomalini in Australia (with the exceptions mentioned above) the Anomalini of Sulawesi and the Papuan Region must be considered of Asian origin. Interestingly, the typical Australian members of the Rutelinae, the Anoplognathini, are almost completely absent in the Papuan Region. Of more than 100 species of Australian Anoplognathini only two species, *Anoplognathus punctulatus insularis* Ohaus, 1898 and *Calloodes atkinsoni* Waterhouse, 1868, occur in New Guinea (CARNE 1957; SMITH 2003). Thus, the actual boundary between the Oriental and Australian ruteline fauna is well-defined and situated between Australia and New Guinea.

The region in the focus of this study is geographically very heterogeneous. It is characterized by the presence of a few thousand islands, 52 of them with more than 500 km<sup>2</sup>. Among them are plain coral atolls and sand islands as well as the highest elevations in Asia south of the Himalayas (Puncak Jaya, 5030 m, on New Guinea). High mountain ranges are also present on Sulawesi with the Gunung Rantemario (3455 m) as highest elevation as well as on Buru (2736 m) and Seram (3027 m).

## 2. Material and Methods

### 2.1. Examined specimens

This study is based on the examination of ca. 840 specimens, housed in the following collections:

BMNH	Natural History Museum, London
CCZ	Collection Carsten Zorn, Gnoien, Germany
CFA	Collection Fernando Angelini, Francavilla Fontana, Italy
CKW	Collection Kaoru Wada, Tokyo
DEIM	Deutsches Entomologisches Institut, Müncheberg
IRSN	Institut Royal des Sciences Naturelles de Belgique, Bruxelles
HNHM	Hungarian Natural History Museum, Budapest
MNHN	Muséum National d'Histoire Naturelle, Paris

MNHB	Museum für Naturkunde der Humboldt-Universität, Berlin
NME	Naturkundemuseum Erfurt
RMNH	National Museum of Natural History, Leiden
MTD	Museum für Tierkunde, Dresden
ZMAN	Zoölogisch Museum Amsterdam

## 2.2. Type labels

The type specimens of the species described new to science in this paper are bearing the following labels: “Holo/Paratypus *Anomala* [species epithet] sp. n. det. Zorn 200x”. Lecto-, Paralecto- and Neotypes are bearing a label of the following form: “Lecto/Paralecto/Neotypus *Anomala* [species epithet, author, year] des. Zorn 200x”.

## 2.3. Endophallus preparation procedure

The aedeagus was heated in KOH (10 %) for ca. 1 minute and immediately rinsed in aqua dest. The median lobe was carefully pushed through the parameres and the 2nd connecting membrane was cut. The isolated median lobe containing the invaginated endophallus was again heated in KOH until all soft tissue was macerated. A blunt injection needle of suitable size was inserted into the median lobe through the basal ostium between the temones and V-shaped piece. The needle should fill the basal ostium as good as possible to achieve enough pressure during the inflation. The endophallus was everted by gentle pressure on the syringe attached to the injection needle filled with aqua dest. The dissection was rinsed in aqua dest. and transferred into a glycerin containing microvial which was attached to the insect pin below the dissected specimen. A representative number of specimens of each species were dissected to obtain information about the degree of variability.

## 2.4. Line drawings

Line drawings were done with the help of a camera lucida attached to a stereo microscope (GSM ZEISS). The original pencil drawings were traced onto tracing paper with technical ink pens and mounted onto cardboard. The images are based on individual specimens and are not schematized.

## 2.5. Character standards

Body length: Measured from the apex of the clypeus to the apex of the elytra.

Puncture size: Defined as small/fine if 0.03 mm or less, moderately small/fine if 0.03–0.07 mm, moderately large if 0.07–0.1 mm, and large if 0.1 mm or more.

Ratio interocular width/head width: Measured in dorsal view at greatest width of head and nearest interocular distance (usually on anterior frons).

Enumeration of elytral striae: The terminological concept of the elytral surface structure follows that of ARROW (1917), OHAUS (1897, 1902, 1933) and MACH-ATSKHE (1957). It is based on the presence of 6 primary costae bordered laterally by primary striae. The suture and lateral margin correspond to the most inner and outer primary striae. Thus, 10 primary striae are present on the elytral disc forming 6 ‘costae’ (also termed so if not elevated) and 5 interstices between them (see also POTTS 1976). The most inner interstice is called ‘subsutural interstice’. Apart from an irregular micropunctuation additional punctuation does usually appear in interstices forming secondary striae or being irregular (Fig. 1). The term ‘interval’ as used in this paper is referring to any space between two neighbouring striae.

Endophallus structures: The terminology of the endophallus structures follows D’HOTMAN & SCHOLTZ (1990a,b). Some major types of armatures can be distinguished in the *Anomala* species of this paper as there are more or less sharply defined hair patches, sclerotized plates and other sclerites of various shapes (Figs. 7, 9, 10). Solitary spines or spine fields do not occur in the species treated here but are present in other *Anomala* species of this region. When the internal sac is subdivided the terms ‘main sacculus’ (bearing the copulatory piece) and ‘accessory sacculus’ are used. Smaller sac-like appendages were called ‘diverticle’.

## 3. Systematics

### 3.1. The *Anomala cuprascens*-group

**Diagnosis.** Postero-dorsal margin of the mesotibia showing a doubled carina in the area of the apical constriction (Fig. 2); the more ventral, primary carina usually bearing numerous erect setae; secondary carina situated on the dorsal face of the tibia; metatibia usually massive and stout, never slender and elongated; body shape elongate-ovoid, often appearing somewhat tapered anteriorly in dorsal view; pronotum usually anteriorly attenuated, straight or a little sinuate behind the anterior angles in dorsal view; basal marginal line of pronotum entire or only a little indistinct in the middle; elytra regularly punctate-striate with more or less distinct additional micro-punctuation; intervals usually moderately elevated, sometimes flat (e.g. *Anomala cuprascens* (Wiedemann, 1823)); pygidium not tumid,

transversely rugose or granulose and in many species with decumbent setae; abdominal sternites often with a lateral hair patch on each side; protibia uni- or bidentate; modified claw of pro- and mesotarsi apically bifid; body color: brownish tints from light yellowish brown to almost black predominating, usually with weak metallic green shine but not iridescent; rarely with conspicuous color patterns (e.g. *A. sarassinorum* Ohaus, 1930; *A. novoguineensis* Ohaus, 1916); aedeagus relatively short, parameres simple and symmetric (exceptions: *A. dissimilis* Zorn, 1998; *A. wahnesi* Ohaus, 1926a); sometimes parameres bifid in lateral view (e.g. *A. cuprascens*, *A. despumata* Ohaus, 1910b); ventral plate usually only a little longer than broad, almost always with a strong apical hook, sometimes also with a basal hook.

**Distribution.** The *cuprascens*-group appears to be one of the largest lineages of Asian *Anomala* in an area covering the Malay Peninsula, Greater and Lesser Sunda Islands, Sulawesi, the Philippines and the Papuan Region including the Solomon Islands. Some very conspicuous species occur in the Himalayan region ('Section V' in ARROW 1917, with *A. merula* Arrow, 1917, *A. trochanterica* Arrow, 1917, *A. validipes* Arrow, 1917 and *A. fuscicauda* Lin, 1999). Before final statements can be made the *Anomala* fauna of large areas of Asia must be revised.

**Discussion.** MACHATSCHKE (1957, 1972) already introduced the name '*cuprascens*-group', but only some of the species listed in his work match the morphological definition of this group as defined in the present paper. Many of the species of the *cuprascens*-group can be identified by their external appearance. In contrast to the broadly ovoid body shape, which is typical for many Asian *Anomala*, species of the *cuprascens*-group usually appear to be more elongated and somewhat tapered in the anterior body part. The coloration pattern is variable among the many species of this group but brownish colors with more or less distinct metallic shine (mostly greenish) are prevailing. The middle and hind legs, especially the metatibiae, are always short and often appear to be stout and massive. The presence of a doubled marginal carina distally on the mesotibia (Fig. 2) is a strong hint that the *cuprascens*-group represents a monophyletic unit. This very distinctive character is, however, only weakly expressed in some members of the *Anomala chlorotica*-subgroup. In addition, a double carina of the mesotibia was probably developed more than once within *Anomala* as it can be present in some species clearly not belonging to the *cuprascens*-group, e.g. *A. cuprea* (Hope, 1839), *A. anoguttata* Burmeister, 1844, *A. proxila* Arrow, 1910, *A. teretina* Ohaus, 1932 and *A. kinabalensis* Ohaus, 1910a. Combinations of the characters mentioned in the diagnosis section can be used to exclude such species from the *cuprascens*-group.

### 3.2. The *Anomala chlorotica*-subgroup

**Diagnosis.** Lateral tooth of the protibia reduced, sometimes indistinctly marked; poorly developed sexual dimorphism: in males modified claw of the protarsi only slightly larger than in females, without ventral tooth or angle; terminal tooth of the protibia only a little larger and longer in females than in males; excision of the last abdominal sternite of the males weakly developed; ground color usually orange to reddish brown with a weak to moderate metallic green shine; elytra usually light yellowish brown; in some species or specimens of variable species darker brown to black coloration; successive punctures of elytral striae separated, not confluent to a regular line; pygidium almost always with decumbent setation, sometimes leaving out the central parts, or pygidium only with suberect setation near apex and basal margin; abdominal sternites with denser setation laterally and more or less distinct lateral hair patches; double carina of distal mesotibia (diagnostic character of the *cuprascens*-group) often indistinct; endophallus usually divided into two sacculi (here called main and accessory sacculus) or simple in a few species, without spines or spine fields.

**Distribution.** Members of this subgroup occur from Sulawesi in the west to the Solomon Islands in the east and have representatives on the northern and southern Moluccas and in the southern Philippines. Most species can be found in New Guinea.

**Discussion.** A tridentate protibia is the plesiomorphic character state in the Rutelinae. Most Anomalini show a bidentate protibia because of a reduction of the basal tooth. The unidentate protibia represents an apomorphic character state and supports the *chlorotica*-subgroup as a monophyletic unit. This character appears to be unique within *Anomala* but the reduction of both basal teeth of the protibia can be observed also in other genera of the Anomalini (e.g. males of some *Callistethus* Blanchard, 1851 and *Spilopopillia* Kraatz, 1892 species).

### 3.3. Key to the *Anomala* species of the *cuprascens*-group with unidentate protibiae (*chlorotica*-subgroup)

Some of the characters used in the following key show a certain degree of variation in some species. This concerns especially the length of the setation of the abdominal sternites, the markedness of the lateral hair patch on the abdominal sternites and the presence of a trace of the protibial lateral tooth. Therefore in some cases the species identification might not be possible with final certainty without the preparation of the aedeagus.



- 1 Subsutural interstice with anteriorly doubled stria; anterior angles of pronotum obtuse to slightly acute, not or slightly (*A. butensis*) rounded, more distinctly marked than the rounded hind angles; abdominal sternites with a less dense setation becoming gradually denser laterad, setae forming poorly defined lateral hair patches; parameres ventrally with membranous area ..... 2
- Subsutural interstice irregularly punctate; the rounded and obtuse anterior angles of pronotum not more marked than hind angles; abdominal sternites with denser setation, with dense white lateral hair patches, which are poorly or distinctly defined; parameres without ventral membranous area ... 17
- 2 Eyes large; ratio interocular space/width of head:  $\sigma\sigma$ : 0.48–0.58;  $\varphi\varphi$ : 0.52–0.58(0.61), if ratio > 0.56 then anterior angles of pronotum very obtuse and somewhat rounded; decumbent setation of pygidial disc missing or reduced at basal and central parts; parameres laterally with a long carina ..... 3
- Eyes smaller; ratio interocular space/width of head: 0.57–0.65; if ratio < 0.59 then anterior angles of pronotum square or almost square and distinctly marked; parameres laterally with a short carina or not carinated ..... 5
- 3 Eyes moderately large; ratio interocular space/width of head:  $\sigma\sigma$ : 0.50–0.58;  $\varphi\varphi$ : 0.53–0.58(0.61); antennal club slightly longer than the funicle in males; elongate; pronotum more strongly curved at ca. 1/3 of length behind the anterior angles; anterior angles very obtuse and very narrowly rounded; decumbent setation of pygidial disc missing ..... 13. *A. butensis*
- Eyes very large; ratio interocular space/width of head:  $\sigma\sigma$ : 0.48–0.51;  $\varphi\varphi$ : 0.52–0.53; antennal club distinctly longer than the funicle in males; pronotum more widely curved a little before the middle; anterior angles obtuse, a little produced and distinctly marked ..... 4
- 4 Decumbent setation of pygidial surface present in lateral and posterior marginal parts; parameres in dorsal view widened before the apex; species from western New Guinea ..... 15. *A. sarmiensis*
- Decumbent setation of pygidial disc entirely missing; parameres in dorsal view not widened before the apex; species from eastern New Guinea ..... 14. *A. ophthalmica*
- 5 Many setae of the abdominal sternites 2–4 distinctly surpassing the distal margin of their sternite (Fig. 4); anterior angles of pronotum obtuse; parameres with or without ventro-apical tooth or spine ..... 6
- Most of the setae of the abdominal sternites 2–4 usually not or only shortly surpassing the distal margin of their sternite (Fig. 3); anterior angles of pronotum obtuse, square or slightly acute; parameres without ventro-apical tooth or spine ..... 10
- 6 Parameres without ventro-apical tooth or spine ..... 7
- Parameres with ventro-apical tooth or spine ..... 8
- 7 Protibia with a very obtuse small angle indicating the lateral tooth; parameres ventrally not flattened; species from central northern New Guinea ..... 4. *A. irianensis*
- Protibia without trace of a lateral tooth; parameres ventrally flattened; species from southern Molluccas ..... 8. *A. malukana*
- 8 Ventro-apical tooth of the parameres long, spine-like, directed backwards; accessory sacculus of endophallus with a C-shaped patch of hairs; protibia without trace of lateral tooth ..... 7. *A. denticulata*
- Ventroapical tooth of the parameres shorter, directed more inwards; accessory sacculus of endophallus with differently shaped patches of hair; protibia with more or less distinct trace of lateral tooth ... 9
- 9 Ventro-apical tooth of parameres very short; lateral carina of the parameres strongly developed; connection membrane between ventral plate and dorsal part of phallobase well sclerotized; protibia with less distinct trace of a lateral tooth (character may vary); species from the Trobriand Islands and d'Entrecasteaux Islands ..... 6. *A. fergussonensis*
- Ventro-apical tooth of parameres moderately long; lateral carina of parameres not as strongly developed as in *A. fergussonensis*; connection membrane between ventral plate and dorsal part of phallobase only weakly sclerotized; protibia with a very obtuse small angle indicating the lateral tooth (sometimes missing); species from eastern New Guinea ..... 5. *A. durvillei*
- 10 Abdominal segments lateral with a few accumulated setae but not dense setation forming a hair patch ..... 11
- Abdominal segments with setation becoming denser laterad, forming poorly defined lateral hair patches ..... 12
- 11 Setation of pygidial disc present on the whole surface; species from northern Molluccas ..... 3. *A. kuekenthali*
- Setation of pygidial disc usually reduced in central area (see also at 12); species from Bismarck Archipelago and Solomon Islands ..... 1. *A. aeneiventris*
- 12 Lateral tooth of protibia indicated by a small very obtuse angle (Fig. 6); anterior angles of pronotum square to obtuse; always with distinct coloration contrast between pronotum and elytra ..... 13
- Protibia without trace of a lateral tooth (Fig. 5) ... 14
- 13 Parameres in dorsal view broadened before the apex; basal marginal line of pronotum relatively broadly indistinct in the middle (ca. as broad as the scutellum); lateral setation of the abdominal sternites more distinct ..... 10. *A. bruggei*

- Parameres short and compact, in dorsal view not broadened before the apex; basal marginal line of pronotum narrowly indistinct in the middle; lateral setation of the abdominal sternites less distinct ..... **12. *A. biakensis***
- 14** Anterior angles of pronotum square to a little acute; dorsal body surface often almost unicolorous (orange brown head and pronotum, light yellowish brown elytra); species from central north and west New Guinea and Misool Island ..... **15**
- Anterior angles of pronotum obtuse; no known almost unicolorous variations but with almost black specimens; species from eastern New Guinea, Bismarck Archipelago and Solomon Islands ..... **16**
- 15** Pygidial setation less conspicuous; abdominal sternites 3–5 with one transverse row of setae; parameres with broader ventral membranous area; smaller species (body length: 9.0–10.8 mm) from central north New Guinea ..... **11. *A. merkli***
- Pygidial setation dense, setae somewhat thickened; abdominal sternites 3–5 usually with two rows of setae in the middle and a rather dense lateral hair patch; parameres with an only small membranous ventral area; ventral margins of parameres concave, leaving a wide opening; mean body size larger (9.9–12.4 mm); species from western New Guinea, Waigeo and Misool ..... **9. *A. pygidialis***
- 16** Central part of pygidium usually without setae; abdominal sternites laterally with some accumulated setae; parameres in dorsal view apically attenuated; without apical bulge; species from Bismarck Archipelago and Solomon Islands ..... **1. *A. aeneiventris***
- Setation also present in central part of pygidial disc; abdominal sternites with poorly defined lateral hair patches; parameres in dorsal view apically attenuated and with an apical bulge; species from eastern New Guinea ..... **2. *A. madangensis***
- 17** Surface of elytra and pronotum opaque, with distinct microsculpture (30×); pronotum of the females with short suberect setation next to the lateral margins and lateral part of basal margin (often indistinct) ..... **19. *A. bousqueti***
- Surface of elytra and pronotum shining, without distinct microsculpture; pronotum of the females with the usual erect setae at the lateral margin but without additional suberect setation ..... **18**
- 18** Lateral hair patches of the abdominal sternites distinctly defined; elytra with irregular striae in the lateral area and small rugae between the striae (exception: *A. calpurnia* from the Philippines, which is also included here); antennal club not longer than the funicle in males and females; species usually darker red brown with dark margins; sometimes head, pronotum and elytra orange brown colored, occasionally specimens almost entirely black; abdominal sternites almost always with the anterior part black; endophallus with separated main and accessory sacculus of similar size, the latter bearing a long and pointed terminal sclerite; small to large species from 10.5–17.5 mm ..... **19**
- Setation of the abdominal sternites becoming gradually denser laterad, forming dense, but poorly defined lateral hair patches; striae of elytra distinct also in the lateral area; elytra without rugae between the striae; antennal club longer than the funicle in males, approximately as long as the funicle in females; color testaceous to orange brown, species smaller than 14 mm ..... **21**
- 19** Very small, body length 10.5 mm; striae of elytra not irregular in the lateral area; parameres somewhat oblong with their ventral margins parallel sided; species from the northern Philippines ..... **28. *A. calpurnia***
- Usually larger than 10.5 mm; lateral striae of elytra irregular; parameres rather short with the ventral margins not parallel sided ..... **20**
- 20** Accessory sacculus of endophallus bearing two pointed sclerites, one situated basal, the other terminal; 11.4–14.3 mm; southern Philippines ..... **27. *A. cassiana***
- Accessory sacculus of endophallus bearing one pointed apical sclerite  
20. *A. aeruginosa*, 21. *A. papuensis*, 22. *A. luctuosa*,  
23. *A. aruensis*, 24. *A. sulana*, 25. *A. tahunensis*, 26. *A. toliensis*  
These extremely similar allo- or parapatric species can only be discriminated by the shape of the aedeagus and endophallus structures.
- 21** Epipleurae of elytra not darkened; parameres in dorsal view apically conspicuously broad in dorsal view, endophallus with the accessory sacculus much larger than the main sacculus; sclerotized plate of the latter very small; 2<sup>nd</sup> ‘costa’ rarely with additional punctures ..... **16. *A. chlorotica***
- Epipleurae of elytra often darkened; parameres in dorsal view apically not conspicuously broad; main and accessory sacculus of endophallus of similar size; 2<sup>nd</sup> ‘costa’ often with an additional row of punctures ..... **22**
- 22** Parameres apically cropped, with flattened area; endophallus with sclerotized plate on the main sacculus; sometimes with dark patches on pronotum and elytra with broad dark margins ..... **18. *A. maculicollis***
- Parameres apically without flattened area; endophallus without sclerotized plate; no darkened specimens known; distribution: Buru ..... **17. *A. toxopei***

### 3.4. *Anomala aeneiventris* Fairmaire, 1883

- *Anomala aeneiventris* Fairmaire, 1883: 6
- *Anomala aeneiventris* var. *fuscipennis* Ohaus, 1915: 108 **syn.n.**

**Description.** *Length.* 9.5–12.3 mm. *Width.* 6.0–7.3 mm. *Color.* Variable; reddish brown with metallic green shine; elytra light yellowish brown; often blackened in central parts; margins usually lighter; in dark specimens also ventral surface somewhat darker; in extreme cases whole body dark brown to black with weak metallic shine with only anterior parts of ventral surface and humerus lighter. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.60–0.64; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked; posterior angles obtuse, narrowly rounded; punctation moderately large (sometimes moderately fine in the middle); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin; central part usually hairless. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming usually weakly developed hair patches which are sometimes reduced to some accumulated setae; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs.* Protibia slightly sinuate before the terminal tooth; postero-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the pro-tarsi. *Tegmen.* Figs. 21–23. *Endophallus.* Fig. 104.

**Diagnosis.** *Anomala aeneiventris* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with obtuse anterior angles which are more marked than the rounded posterior angles; subsutural interstice with an anteriorly doubled stria; central part of pygidium usually without setae; abdominal sternites with one transverse row of setae in the middle; lateral hair patches weakly developed, sometimes reduced to some accumulated setae; most of the setae of abdominal sternites 2–4

not surpassing the posterior margins of their sternites; parameres with ventral membranous area, in dorsal view apically attenuated; without apical bulge; endophallus with separated accessory and main sacculus; the former with a basal and indistinctly divided apical hair patch, main sacculus with one or two oblong hair patches and a conspicuous sclerotized plate.

**Distribution.** Bismarck Archipelago: Admiralty Islands, New Britain, New Hannover, Nusa Island, New Ireland, Duke of York Island, Mioko Island, Bougainville Island; Salomon Islands: Shortland Islands, New Georgia Islands, Santa Isabel, Russell Island, Savo Island, Florida Islands, Guadalcanal, Santa Ana Island, Viti [= Viti Levu, Fiji ?]; no records from Long Island, Tolokiwa Island and Umboi Island.

The record “Viti” (one ♂ from BMNH) possibly refers to Viti Levu of the Fiji. Such a distribution does not appear entirely impossible since as part of the ‘Outer Melanesian Arc’, the Fiji Islands and Solomon Islands belong geologically to the same island chain and dispersal via ‘island hopping’ might have been possible (ROSS 1956; DUFFELS 1983; HALL 1998). The locality “Berlinhafen” (= Aitape) is considered to be erroneous as long as not more material from the Papua mainland is available.

**Type material.** *A. aeneiventris*: Lectotype (**here designated**) ♀ “16092 | MUSEUM PARIS Collection Léon Fairmaire 1906 | *Anomala aeneiventris* Darma. D. of York [Fairmaire’s handwriting]” (MHNP). Note: In the collection of the MHNP only one single specimen from the type series could be found. The number of specimens used in the original description was not indicated by FAIRMAIRE (1883) and it is not certain that the original type series was monospecific. Therefore, a lectotype was designated. – *A. aeneiventris* var. *fuscipennis*: Syntypes: 1♂ “Ins. NUSA | Cotype | *Anomala aeneiventris fuscipennis* Ohs” (MNHB). 1♂ “Ins. NUSA | *Anomala aeneiventris fuscipennis* Ohs” (MNHB). Note: Ohaus attached type and cotype labels on several specimens but in the original description only “two pieces ... from the Island Nusa” are mentioned and accordingly considered to be syntypes.

**Additional material examined.** 1♂ “D.N.Guinea Admiral. Ins.” (MNHB). 1♂ “Mioko C. Ribbe” (MNHB). 1♂ “Iles Salomon I. Bougainville P. Hastert 1909” (MNHB). 1♂ “Mope, Neupommern. P.Jos. Schneider leg. 1936 6. II E.v.Steinwehr, Köln.” (MNHB). 1♂ “Matupi, Neu-Britannien M. Thiel leg.” (MNHB). 2♂ “Mioko” (MNHB). 1♂ “N. Mecklenburg” (MNHB). 1♂ “Baining-Berge” (MNHB). 2♂, 1♀ “N:Lauenburg Mioko C.Ribbe” (MNHB). 3♂, ♀ “Neu Pommern Kiniganang C.Ribbe” (MNHB, CCZ). 2♀ “D.N.-Guinea Simpsonhafen V. 09. H. Schoede S. G” (MNHB). 1♀ “Salomo Ins. N.” (MNHB). 1♀ “Salomon Ins.” (MNHB). 2♂, 1♀ “Neu-Pommern Herbertshöhe Matupi XII. 1900-V. 1901 Heinroth S.” (MNHB). 1♂ “Neu-Britannien Dr. O. Finsch.” (MNHB). 1♀ “RABAU N.Britain FHTaylor” (BMNH). 1♂, 1♀ “Neu-Britannien 9. Ralum 6.96 F.Dahl S.” (MNHB). 1♂ “D.N.Pommern Gazelle H.I” (MNHB). 1♂ “New Britan” (MNHB). 1♀ “Ulamona, Neupommern. P.Jos. Schneider leg. 1936. 13. III E.v.Steinwehr, Köln.”



(MNHB). 1♂, 1♀ “N.Pommern. Matupi, 12.00.-5.01. Heinroth.S.” (MNHB). 2♀ “Nieuw Pommeren” (ZMAN). 1♀ “New Britain Cotton & Webster” (MNHB). 1♀ “Neu Hannover, II. III. 97. (Webster).” (MNHB). 1♀ “Ins. Gerrit Denys. Biró 1900” (HNHM). 2♂, 1♀ “N.Mecklenbg. Namatanai” (HNHM). 1♂ “N. Irland Fissoa Biró 1900.” (HNHM). 2♂, 3♀ “Solomon Is I Ex-Musaeo H.W.Bates 1892 I Museum Paris ex coll. R. Oberthur” (MNHN). 2♂, 2♀ “Salomo Archip. Bougainville C.Ribbe” (MNHB). 3♀ “Salomo Archip. Shortlands Ins. C.Ribbe” (MNHB). 1♂ “N. Georgia. Solomon Is. 94-181” (BMNH). 1♀ “SOLOMON ISLES: Bougainville. 13. vii. 1922. E.A.Armytage. B.M. 1947-284.” (BMNH). 1♂ “SOLOMON IS. Kolombangara. forest env. 1965” (BMNH). 1♂, 1♀ “SOLOMON IS. New Georgia Gizo 95. 1963 P. GREENSLADE 8649” (BMNH). 1♂ “SOLOMON IS. New Georgia Barega 15: x: 1954 E.S.Brown 1347” (BMNH). 1♂ “SOLOMON IS. New Georgia Rua Valie 22: vi: 1954 E.S.Brown 393” (BMNH). 1♂ “Fauro I. 84.3” (BMNH). 1♂ “SOLOMON IS. Gizo 10.IX.1965” (BMNH). 1♀ “SOLOMON IS. San Jorge edge of Casvarinu forest at light 23.-27-IX. 1965” (BMNH). 1♀ “SOLOMON IS. Russell Is. Hirgatu 31:viii:1955. E.S.Brown 3675” (BMNH). 1♂ “SOLOMON IS. SAVO 5/4/62 PJM GREENSLADE” (BMNH). 3♂ “SOLOMON ISLES: Isle of Savo. E.A.Armytage. B.M.1947-284.” (BMNH). 1♂ “SOLOMON IS: Nggela. Bungana. 9.xi.1656. E.S.Brown. B.M.1957-201.” (BMNH). 2♂ “SOLOMON IS. Nggela Rara” (BMNH). 3♀ “SOLOMON IS. NGGELA TANATU 8/11/62 BM GREENSLADE.” (BMNH). 1♂ “SOLOMON ISLES: TUNAGI. 17. V. 1922. E.A.Armytage. B.M.1947-284.” (BMNH). 1♂ “Tulagi. British Solomons R.J.A. W.Lever 7. 1933” (BMNH). 1♂ “SOLOMON ISLES. TALAQI. II. V. 1922. E.A.Armytage. R.M.1947-284.” (BMNH). 1♀ “Solomon Islands Tulagi on Hibiscus 5. vii. 1933. H. T. Pagden.” (BMNH). 1♂ “Engl. Salomons. Tulagi Ins.” (MNHB). 1♀ “SOLOMON IS. KOOKOOM GUADALAND. 1931. R.A. LEVER.” (BMNH). 1♂ “SOLOMON IS. Guadalcanal Koilatumaria 7:IV:1955 E.S Brown 2750” (BMNH). 1♂ “Solomon Islands Guadalcanal Gotolaria Lunga Est. Saltiana. 10. vii. 1933. H. T. Pagden.” (BMNH). 1♂ “SOLOMON IS Gaudacanal I Honiara. 13-16.xi. 1953. J.D.Bradley.” (BMNH). 1♂ “SOLOMON IS. Guadalcanal 25:vi:1954 E. S.Brown 359.” (BMNH). 1♂ “SOLOMON IS. Guadalcanal Marau 20:vi:1955 E. S.Brown 3330.” (BMNH). 1♂ “SOLOMON IS. Guadalcanal Rua Valie 6: iv:1955 E. S.Brown 2790.” (BMNH). 2♂, 1♀ “SOLOMON IS. Guadalcanal Koilotumaria E. S.Brown 3662. (BMNH). 1♀ “SOLOMON IS. Guadalcanal Beranae 27:xi:1954 E. S.Brown 1627.” (BMNH). 1♂ “SOLOMON IS. HONIARA, TRAIWINQ COLL: 27/10/61 P.J.M.GREENSLADE.” (BMNH). 2♂, 1♀ “SOLOMON IS. Honiara BM GREENSLADE.” (BMNH). 1♂ “SOLOMON IS. Guadalcanal Honiara & Dist. vii. - viii 1965” (BMNH). 1♂ “S. Anna 84.3” (BMNH). 1♂ “Viti 81.50” (BMNH). 2♂, 1♀ “Berlinhafen D.N.Guinea” (MNHB).

### 3.5. *Anomala madangensis* sp.n.

**Description.** *Length.* 9.5–12.3 mm. *Width.* 5.6–7.0 mm. *Color.* Variable; lighter specimens reddish brown

with metallic green shine; elytra light yellowish brown with darker suture; dorsal and ventral surface often extensively blackened; darkest specimens with the whole body surface dark brown to black with metallic green shine, only lateral margins, humerus, fore and middle legs and antennae lighter. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent, sometimes very shallow punctures; ratio interocular width/width of head: 0.60–0.65; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked; posterior angles obtuse and narrowly rounded; punctation moderately large (sometimes moderately fine in the middle); punctures separated by 0.5–3 diameters, partly coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined hair patches; setae of abdominal sternites 2–4 not or rarely surpassing the posterior margins of their sternites. *Legs.* Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes indistinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 24–26. *Endophallus.* Fig. 105.

**Diagnosis.** *Anomala madangensis* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; pygidium usually entirely covered with setae; abdominal sternites with one transverse row of setae in the middle, becoming denser laterad and not forming dense hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; parameres with ventral membranous area, in dorsal view apically attenuated but with a small apical bulge (in contrast to the similar *A. aeneiventris*); endophallus very similar to that of *A. aeneiventris* but basal hair patch of accessory sacculus missing and apical hair patch not subdivided; main sacculus with sclerotized plate and two elongate hair patches. *A. madangensis* is highly variable in coloration, often darkened, with almost completely blackened specimens.



**Distribution.** Northeastern part of Papua New Guinea (PNG): Laing Island, Tami Island, Madang, Lae, Wau.

**Etymology.** The species is named after the province capital Madang in eastern PNG.

**Material.** Holotype: ♂ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., V.1981 Leg. J. Van Goethem I.G. : 26.373” (IRSN). – Paratypes: 1♂ “D.Neu-guineaMiss-Mus. Steyl | Coll. Veth | Museum Leiden Anomala aeneiventris Det: Fam.I Cat.No. 2 | RMNH Leiden Loan 11454” (RMNH). 1♂ “7/1 | 77118 | Neu-Guinea” (MNHB). 1♂, 1♀ “Stephansort Astrolabe B. D.N.Guinea (Kunzmann 1894)” (MNHB). 1♂ “Neu-Guinea Kaiser Wilh.-Land Stephansort Rohde S. | 110785 | ♂” (CCZ). 1♀ “Neu-Guinea Kaiser Wilh.-Land Hatzfeldhafen Grabowsky S. | 110787 | Ohaus determin.1915 Anomala aeneiventris Frm. ♀.” (MNHB). 1♀ “Neu-Guinea Kaiser Wilh.-Land Hatzfeldhafen Grabowsky S. | 110787 | ♀” (CCZ). 1♀ “Neu-Guinea Kaiser Wilh.-Land Hatzfeldhafen Grabowsky S. | ♀ | Anomala aeneiventris Fairm.” (MNHB). 4♂ “N. Guinea Biró 1899 | Ins. Cretin (Tami)” (HNHM). 1♂ “N.-GuineaBiró 1900 | Stephansort Astrolabe Bay [underside:]1900.IV.4.” (CCZ). 1♀ “N. Guinea Biró 1899. | Erima Astrolabe B.” (HNHM). 1♂ “N Guinea Biró 1899 | Sattelberg Huon Golf.” (HNHM). 1♂ “NEW GUINEA: LAE. 14.1.1960. | M.Tyler: B.M.1961-305.” (BMNH). 12♂, 4♀ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., II.1976 Leg. Prof. J. Bouillon I.G. : 25.484” (IRSN, CCZ). 5♂ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., U.V. light, 27.V.1978 Leg. J. Van Goethem I.G. : 25.848” (IRSN). 4♂, 4♀ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., U.V. light in bush, 12.VI.1978 Leg. J. Van Goethem I.G. : 25.848” (IRSN, CCZ). 4♂, 1♀ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., V.1978 Leg. J. Van Goethem I.G. : 25.848” (IRSN; CCZ). 1♂ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., Bush, V–VI.1978 Leg. J. Van Goethem I.G. : 25.848” (CCZ). 1♂ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., 25.V.1977 Leg. J. Van Goethem I.G. : 25.681” (IRSN, CCZ). 1♂ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Wau-Wei., Plantation, 22.V.1982 Leg. P. Grootaert I.G. : 26.480” (IRSN). 1♀ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., Pitfalls, 30.V.1982 Leg. P. Grootaert I.G. : 26.480” (IRSN). 14♂, 48♀ “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Laing Isl., Madang prov., V.1981 Leg. J. Van Goethem I.G. : 26.373” (IRSN, CCZ). 1♂ “Coll. R.I.Sc.N.R. Papua New Guinea Laing, st. 1009 28-IV-1982 P. Grootaert” (IRSN).

### 3.6. *Anomala kuekenthali* sp.n.

**Description.** *Length.* 9.5–10.5 mm. *Width.* 5.4–6.0 mm. *Color.* Reddish brown with metallic green shine; elytra light yellowish brown; sometimes elytra darker brown and also ventral surface diffusely blackened. *Head.* Clypeus subrectangular, with moderately fine and dense punctures; ratio interocular width/width

of head: 0.59–0.62; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked; posterior angles obtuse, narrowly rounded; punctuation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line indistinct in the middle (less broad as the scutellum) and here indicated by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstices with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming a little denser laterally; lateral hair patches reduced to accumulation of some hairs; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs.* Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 27–29. *Endophallus.* Fig. 106.

**Diagnosis.** *Anomala kuekenthali* is separated from similar species by the combination of the following characters: relatively small mean body size (length 9.5–10.5 mm); eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle; lateral hair patches poorly defined and reduced; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; parameres rather small; endophallus with well separated accessory and main sacculus and with a remarkable curved, narrow sclerite between them; accessory sacculus with two fused hair patches; main sacculus with a sclerotized plate and a small hair patch.

**Distribution.** Northern Mollucas: Ternate, Halmahera, Bacan, one specimen with the doubtful locality Ambon.

**Etymology.** The species is dedicated to the renowned German zoologist Willy Georg Kükenthal (1861–1922), who collected the holotype on an expedition to the Mollucas.

**Material.** Holotype: ♂ “Ternate 94 Kükenthal | Coll. Kraatz | Ohaus det. | A. aeneiventris v. fuscipennis Ohs.” (DEIM). – Paratypes: 1♂ “Ternate [underside:] 60.113” (BMNH). 1♂, 1♀ “Molucc. Ternate | Ex-Museo VAN LANSBERGE |

Museum Paris ex coll. R. Oberthur" (MNHN). 1♂ "Batchian Coll.Bruijn 1877 | Museum Paris ex coll. R. Oberthur" (MNHN). 3♀ "Ternate L.Laglaize | Museum Paris ex coll. R. Oberthur" (MNHN). 1♂, 1♀ "MUSEUM PARIS MO-LUQUES TERNATE RAFFRAY & MAINDRON 1878" (MNHN). 1♀ Halma-hera | ♀ | *Anomala aeneiventris* Fairm." (MNHB). 1♀ "Insel Batjan | ♀ | *Anomala aeneiventris* Fairm." (MNHB).

### 3.7. *Anomala irianensis* sp.n.

**Description.** *Length.* 9.4–12.5 mm. *Width.* 5.4–7.4 mm. *Color.* Reddish brown, with metallic green shine; elytra light yellowish brown, with darkened suture; sometimes with the humerus black or an oblong dark mark on the elytra extending from the humerus to the apical rounding. *Head.* Clypeus subrectangular, with moderately fine and dense, occasionally almost confluent punctures; ratio interocular width/width of head: 0.59–0.64; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked; posterior angles obtuse and narrowly rounded; punctation moderately large or sometimes moderately fine in the middle; punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line indistinct in front of the scutellum and here indicated by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; sub-sutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstices with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with one or two rows; setae becoming denser laterally, forming poorly defined hair patches; setae of abdominal sternites 2–4 usually a bit surpassing the posterior margins of their sternites except in some bigger females. *Legs.* Protibia unidentate, lateral tooth indicated by a very obtuse small angle; lateral tooth sometimes weakly indicated; mesio-dorsal double carina of the apical mesotibia usually only poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 30–32. *Endophallus.* Fig. 107.

**Diagnosis.** *Anomala irianensis* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one trans-

verse row of setae in the middle; lateral hair patches of abdominal sternites poorly defined; setae of abdominal sternites 2–4 usually surpassing the posterior margins of their sternites (not so in some females); lateral tooth of protibia indicated by a very obtuse small angle; parameres rather short and ventrally somewhat flattened; parameres with a ventral membranous area, rather short and stout, apically with a small denticle between sclerotized and membranous part; endophallus with a well separated accessory sacculus bearing usually four isolated hair patches; main sacculus with a large hair patch and another small brush-like hair patch close to a sclerotized plate.

**Distribution.** West Papua: Sarmi, Ifaar, Jayapura, Yamna Island.

**Etymology.** The species is named after "Irian Jaya", the former Indonesian name for West Papua.

**Material.** Holotype: 1♂ "G. den Hoed Ned. Nw Guinea H'dia 6-58" (ZMAN). – Paratypes: 1♂ "Ned. Nw Guinea HOLLANDIA Jan–juli-1962 leg. R.W.Schmidt" (ZMAN). 2♂ "G. den Hoed Ifar 12-57" (ZMAN, CCZ). 4♀ "G. den Hoed Ned. Nw Guinea H'dia 6-58" (ZMAN, CCZ). 1♂ "Ned. Nieuw Guinea Sarmi Res. Sarmi 9 mrt. 1958 leg. R.T. Simon Thomas op licht" (ZMAN). 1♂ "Nd. N. Guinée Sarmeh J.B.Ledru 1901 | Museum Leiden ANOMALA (A) AENEIVENTRIS FAIRM. | RMNH Leiden Loan 11454" (RMNH). 1♂ "Humboldt Bay. Sept.–Oct. 1893. W.Doherty | ♂ | *Anomala aeneiventris* Fairm." (MNHB). 4♂, 1♀ "Nd. N.Guinée Ile Djamna J.B.Ledru 1901 | Museum Paris ex Coll. R. Oberthur" (MNHN). 3♂, 2♀ "Nd.N.Guinée Sarmeh J.B.Ledru 1901 | Museum Paris ex Coll. R. Oberthur" (MNHN). 2♂ "Tobati jayapura IRIAN JAYA 18 XI 1991 | Kaoru WADA Collection 2003 | Study No. 8 Kaoru WADA Collection 2006" (CKW). 1♂ "Skyline IRIAN JAYA 1 XI 1991 | Kaoru WADA Collection 2003 | Study No. 8 Kaoru WADA Collection 2006" (CKW).

### 3.8. *Anomala durvillei* sp.n.

**Description.** *Length.* 10.3–11.9 mm. *Width.* 6.0–7.3 mm. *Color.* Reddish brown with metallic green shine; elytra light yellowish brown, often more or less extensively darkened along suture and lateral margin; in extreme cases only the basal part remains lighter. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.60–0.65; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior and posterior angles obtuse; posterior angles rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra.* Surface with well defined, only apically

more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae; occasionally some punctures also on the 2nd costa. *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes usually distinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 33–35. *Endophallus*. Fig. 108.

**Diagnosis.** *Anomala durvillei* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles which are more marked than the rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle and small lateral hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites (shared only with *A. fergussonensis*, *A. denticulata*, *A. irianensis* and *A. malukana*); parameres with ventral membranous area and inwards directed ventro-apical tooth (shorter than in *A. denticulata*; longer than in *A. fergussonensis*); ventral plate with two horn-shaped apical appendices (not visible in Fig. 34); accessory sacculus of the endophallus with several more or less connected hair patches which reach from the base to the apex and two smaller elongate singular hair patches on the main sacculus.

**Distribution.** Southeastern part of Papua New Guinea from the Huon Peninsular in the north to Rossell Island in the south: Sattelberg, Finschhafen, Morobe, Milne Bay, Rossell Island, St. Aignan.

**Etymology.** The species is dedicated to Jules Sébastien César Dumont d'Urville (1790–1842), French navigator, who served as second-in-command on board of the corvette “La Coquille” during the circumnavigation expedition from 1822 to 1825. Later, he commanded this ship, renamed into “L'Astrolabe”, during the expedition 1826–1829.

**Material.** Holotype: 1♂ “Neu-Guinea Kaiser Wilh.-Land Finschhafen Rohde S. | 110786 | Ohaus determin.1915 *Anomala aeneiventris* Frm. ♂ [Ohaus' handwriting]” (MNHB). – Paratypes: 1♂ “Neu-Guinea Kaiser Wilh.-Land Finschhafen Rohde S. | ♂ | *Anomala aeneiventris* Fairm.” (MNHB). 7♂, 1♀ “Neu-Guinea Kaiser Wilh.-Land Finschhafen Rohde S. | ♂ | 110786” (MNHB, CCZ). 1♂

“Neu-Guinea Kaiser Wilh.-Land Finschhafen Rohde S. | ♂ | 110784” (MNHB). 3♂, 1♀ “Neu-Guinea Kaiser Wilh.-Land N-Guinea-Comp. V | ♂ | 110784” (MNHB). 2♀ “Neu-Guinea Kaiser Wilh.-Land N-Guinea-Comp. V | 110784 | ♀” (MNHB, CCZ). 1♂ “Neu-Guinea Kaiser Wilh.-Land N-Guinea-Comp. V | 110784 | Ohaus determin.1915 *Anomala aenei-ventris* Frm. ♂ [Ohaus' Handwriting]” (MNHB). 1♀ “Neu-Guinea Kaiser Wilh.-Land N-Guinea-Comp. V | 110784 | Ohaus determin.1915 *Anomala aeneiventris* Frm. ♀ [Ohaus' handwriting]” (MNHB). 1♂ “D. N. Guinea Sattelberg” (MNHB). 1♀ “D. N. Guinea Sattelberg | *A. aeneiventris* Frm. Oh” (MNHB). 2♂ “D. N. GUINEA Wahnes | *Anomala aeneiventris* Fairm.” (MNHB). 1♀ “Milne Bay British New Guinea 1898–'99” (MNHB). 1♂ “Milne Bay Brit.N.Guinea. | *Anomala aeneiventris fuscipennis* Ohs.” (MNHB). 1♂ “Rossell I., I.–III. 98. (Meek) | ex museo Tring | *Anomala aeneiventris* Fairm.” (CCZ). 1♀ “Rossell I., I.–III. 98. (Meek) | ex museo Tring | ♀ | *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “St. Aignan VIII – IX. 97. A. S. Meek. | Type | *A. aeneiventris* v. *fuscipennis* Ohs. [invalid type designation]” (MNHB). 1♀ “St. Aignan VIII – IX.97 A. S. Meek. | ♀ | *Anomala aeneiventris fuscipennis* Ohs.” (MNHB). 1♂ “Milne B N. Guinea | Nevins Coll. 1918-14.” (BMNH). 1♀ “Milne Bay N. Guinea | Nevins Coll. 1918-14.” (BMNH). 1♀ “PAPUA NEW GUINEA: Morobe Prov. coast, Buso 10. x. 1979 J.H. Martin coll. | BM. 1980-274” (BMNH). 1♂ “Stn. No. 5. | NEW GUINEA: Morobe Dist. Lae 13.ix.1964 | M.E. Bacchus. B.M. 1965-120” (BMNH).

### 3.9. *Anomala fergussonensis* sp.n.

**Description.** *Length*. 9.8–11.6 mm. *Width*. 5.9–6.6 mm. *Color*. Reddish brown, with metallic green shine; elytra light yellowish brown, sometimes darkened along lateral margin or with blackened humerus (probably with the same color variability as the next relative *A. durvillei*); *Head*. Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.60–0.63; frons punctured like the clypeus, vertex less densely punctured. *Pronotum*. Widest at base; widely curved a little before the middle; anterior and posterior angles obtuse; posterior angles narrowly rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally,



forming poorly defined small hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia usually distinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 36–38. *Endophallus*. Fig. 109.

**Diagnosis.** *Anomala fergussonensis* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles which are more marked than the narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle and small lateral hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites (shared with *A. durvillei*, *A. irianensis*, *A. malukana* and *A. denticulata*); parameres with ventral membranous area and small inwards directed ventro-apical tooth (much shorter than in *A. denticulata*; shorter than in *A. durvillei*); lateral carina of parameres more strongly developed than in the most similar species, *A. durvillei*; ventral plate with two horn-shaped apical appendices (not visible in Fig. 37); membrane between ventral plate and dorsal part of phallobase sclerotized; endophallus very similar to that of *A. durvillei* but hair patches of the accessory sacculus more concentrated to the apex and main sacculus with no or only one small hair patch.

**Distribution.** Probably an endemic species of the d'Entrecasteaux Islands and the Trobriand Islands: Goodenough Island, Fergusson Island, Kiriwina Island, Woodlark Island.

**Etymology.** The species is named after the type locality Fergusson Island.

**Remarks.** *Anomala fergussonensis* obviously represents the sister taxon of the extremely similar *A. durvillei* from eastern Papua New Guinea. The vicarious distribution pattern of the two taxa, makes a relation on subspecies level conceivable.

**Material.** Holotype: ♂ “Fergusson I., ix. x. xi.xii. 94 (A. S. Meek). | *Anomala aeneiventris* Fairm.” (MNHB). – Paratypes: 1♀ “Fergusson I., ix. x. xi.xii. 94 (A. S. Meek). | ♀ | *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “Kiriwini, Trobriand Is., iii. iv. v. 95. (A. S. Meek). | ex museo Tring | *Anomala aeneiventris* Fairm.” (MNHB). 1♀ “Kiriwini, Trobriand Is., iii. iv. v. 95. (A. S. Meek). | ex museo Tring | ♀ | *Anomala aeneiventris* Fairm.” (CCZ). 1♂ “Woodlark, Meek. 95. | ex museo Tring | *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “Woodlark, Meek. 95. | ex museo Tring | ♂ | *Anomala aeneiventris* Fairm.” (CCZ). 1♂ “Goodenough XII. 96. (A. S. Meek). ex museo Tring | *Anomala aeneiventris* Fairm.” (MNHB).

### 3.10. *Anomala denticulata* sp.n.

**Description.** *Length*. 10.1–10.6 mm. *Width*. 6.0–6.3 mm. *Color*. Reddish brown with metallic green shine; elytra light yellowish brown, with blackened humerus and an indistinct elongate mark near to the posterior lateral margin (variability unknown). *Head*. Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.59; frons punctured like the clypeus, vertex less densely punctured. *Pronotum*. Widest at base; widely curved a little before the middle; anterior and posterior angles obtuse; posterior angles narrowly rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites. *Legs*. Protibia unidentate, slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes usually distinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 39–41. *Endophallus*. Fig. 110.

**Diagnosis.** *Anomala denticulata* is separated from similar species by the combination of the following characters: dark marks on humerus and close to posterior lateral margin (probably variable); eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles which are more marked than the narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle and small poorly defined lateral hair patches; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites (shared with *A. durvillei*, *A. fergussonensis*, *A. irianensis*, *A. malukana*); parameres with ventral membranous area and a long, more backwards directed ventro-apical tooth (much longer than in *A. durvillei* and *A. fergussonensis*); lateral carina of parameres poorly developed; endophallus with a characteristic C-shaped hair patch on the accessory sacculus and a small brush-like hair patch on the rather small main sacculus.



**Distribution.** Northern coast of Papua New Guinea: Aitape, Wewak.

**Etymology.** The specific epithet is derived from the Latin word “denticulus” = “denticle” (diminutive of “dens” = “tooth”) and is referring to the ventro-apical tooth of the parameres.

**Material.** Holotype: ♂ “WEWAK N.Guinea FHTaylor” (BMNH). – Paratype: 1♂ “D.N. Guinea Berlinhafen H. Schoede S. G. | 110791 | ♂” (MNHB).

### 3.11. *Anomala malukana* sp.n.

**Description.** *Length.* 10.0–11.8 mm. *Width.* 5.4–6.3 mm. *Color.* Reddish brown with metallic green shine; elytra light yellowish brown with darkened suture; sometimes elytra more extensively darkened. *Head.* Clypeus subrectangular, with moderately fine and dense, occasionally almost confluent punctures; ratio interocular width/width of head: 0.59–0.65; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked; posterior angles obtuse and narrowly rounded; punctation moderately large or sometimes moderately fine in the middle; punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line indistinct in front of the scutellum and here indicated by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; setae of abdominal sternites 2–4 usually surpassing the posterior margins of their sternites. *Legs.* Protibia slightly sinuate before the terminal tooth; lateral tooth sometimes weakly indicated; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 42–44. *Endophallus.* Fig. 111.

**Diagnosis.** *Anomala malukana* is separated from similar species by a combination of the following characters: eyes not enlarged; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle; lateral hair patches

of abdominal sternites poorly defined; setae of abdominal sternites 2–4 usually surpassing the posterior margins of their sternites; parameres rather short and ventrally somewhat flattened; endophallus remarkable for its hook-shaped sclerite in combination with large hair patches on the well separated accessory sacculus; main sacculus with a single hair patch.

**Distribution.** Southern Molluccas: Kepulauan Aru, Ambon.

**Etymology.** The species epithet is derived from “Maluku”, the Indonesian name for the Molluccas.

**Material.** Holotype: ♂ “Aru-Inseln Ureiuning C.Ribbe 1894 | 87693” (MNHB). – Paratypes: 1♂ “ARU Ins. Schneider | *Anomala chlorotica* Guérin [Ohaus’ handwriting]” (MNHB). 1♂ “ARU Ins.Schneider | *Anomala aeneiventris* Fairm.” (CCZ). 1♀ “ARU Ins.Schneider | ♀ | *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “Amboina Dec. & Febr. Doherty” (CCZ). 1♂ “AMBOINA | *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “♂ | Aru Isl [underside:] 58.48” (BMNH). 1♂ “♂ | Aru | Bowring. 63.47\*” (CCZ). 1♀ “A.M.Lea. B.M.1927-447.” (BMNH). 1♂ “Aru 84.13 | ♂” (BMNH). 2♀ “I Aru | Ex-Museo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNH). 3♂ “Ex-Museo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNH). 1♀ “Arou | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNH).

### 3.12. *Anomala pygidialis* Kirsch, 1876

· *Anomala pygidialis* Kirsch, 1876: 141

**Description.** *Length.* 9.8–12.3 mm. *Width.* 5.5–7.0 mm. *Color.* Variable; usually uniformly light orange brown with weak metallic green shine; abdomen, sometimes including the whole ventral surface, reddish brown; elytra light yellowish brown with dark suture; one specimen (Nabire) with the body except elytra reddish brown with stronger metallic green shine. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.57–0.63; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles square (sometimes a little obtuse), distinctly marked and somewhat produced; posterior angles obtuse, narrowly rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin;

decumbent setae a little thickened and in average relatively long. *Venter*. Abdominal sternites 2–5 with setae forming usually two transverse rows in the middle (sometimes abraded); setae becoming denser laterally, forming dense, but poorly defined hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes indistinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 45–50. *Endophallus*. Figs. 112, 113.

**Diagnosis.** *Anomala pygidialis* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked, somewhat produced square anterior angles and rounded obtuse posterior angles; basal marginal line indistinct only in the middle; subsutural interstice with an anteriorly doubled stria; setation of pygidium very distinct; setae relatively long in average and a little thickened; abdominal sternites with two transverse rows of setae in the middle; lateral hair patches rather dense, but poorly defined; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; parameres with a small membranous ventral area (in common with *A. butensis*); ventral margins of parameres concave, leaving a wide opening; accessory sacculus of the endophallus with a peculiar annular hair patch next to an interrupted transverse band of hairs (reduced in the two specimens from Misool); main sacculus with one or two scanty hair patches.

**Distribution.** Western part of West Papua: “Rubi [?], in the south of Geelvinksbai” (= Cenderawasih Bay) (locus typicus), Nabire, Sorong, Wasior, Misool Island.

**Remarks.** The two known specimens from Misool Island differ from all other examined specimens. They have a smaller body size and somewhat more attenuated parameres in dorsal view (Figs. 48–50). The endophallus has the same general structure but reduced setation. The typical ring-shaped sclerite of the accessory sacculus is indistinct (Fig. 113). The population from Misool Island might represent a distinct taxon but more material is necessary to evaluate the morphological differences.

**Type material.** Lectotype (**here designated**): ♀ “Rubi D. Meyer | 1537 | pygidialis Kirsch Typus [handwriting]” (MTD). Note: Because it is not certain that the description was based on a single specimen, a lectotype was designated.

**Additional material examined.** 1♂, 1♀ “INDONESIA, Irian Jaya Nabire distr., Wondiwai Mts., Yeretua IX.1998, 100 m NN leg. M. Balke | Sammlung NATURKUNDE-MUSEUM ERFURT” (NMEG). 1♂, 1♀ “N W New Guinea Sorong Kp. Baroe 8.vii – 14.viii.1948 M.A.Lieftinck |

RMNH Leiden Loan 11454” (RMNH). 1♀ “N W New Guinea Sorong Ramoi 15.viii – 27.viii.1948 M.A.Lieftinck | RMNH Leiden Loan 11454” (RMNH). 1♂ “N W New Guinea Sorong Kp. Baroe 28.viii – 6.ix.1948 M.A.Lieftinck | RMNH Leiden Loan 11454” (RMNH). 1♂, 2♀ “N W New Guinea Sorong Kp. Baroe 5.vi – 7.vii.1948 M.A.Lieftinck | RMNH Leiden Loan 11454” (RMNH). 1♀ “N W New Guinea Sorong Malano 5.vi – 7.vii.1948 M.A.Lieftinck | RMNH Leiden Loan 11454” (RMNH). 1♀ “Museum Leiden W. IRIAN: Wasior, 22-XII-1956 R. Neher | RMNH Leiden Loan 11454” (RMNH). 1♂, 4♀ “INDONESIA, Irian Jaya, Sorong, 29.IX–6.X.1992 leg. Balázs B.” (HNHM). 1♂, 1♀ “MISOOOL Id. (W.) 0–75m. Solal 8.ix – 20.x.1948. M.A. Lieftinck | RMNH Leiden Loan 11454” (RMNH). 1♂ “W-PAPUA, Raja Ampat Pr. N-Waigeo Isl., Lopintol Bayon River, 0°07’S 130°53’E, 11.I.2004, leg. A. Weigel, prim. jungle” (NME). 1♂, 1♀ “W-PAPUA, Raja Ampat Pr. Batanta Isl. bor., Waywesar, 0°45’26’’S 130°46’55’’E, 15.I.2004 leg. A. Weigel, prim. jungle” (CCZ, NME). 1♀ “W-PAPUA, Raja Ampat Pr. Waywesar/Batanta 2 km E, 0°45’17’’S 130°48’06’’E 18.I.2004, leg. A. Weigel” (NME).

### 3.13. *Anomala bruggei* sp.n.

**Description.** *Length*. 10.4–12.5 mm. *Width*. 6.1–7.1 mm. *Color*. Reddish brown with metallic green shine; elytra light yellowish brown with darkened suture. *Head*. Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.59–0.64; frons punctured like the clypeus, vertex less densely punctured. *Pronotum*. Widest at base; widely curved a little before the middle; anterior angles obtuse, sometimes almost square, distinctly marked; posterior angles obtuse and rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line relatively broadly interrupted in the middle (approximately as broad as the scutellum), here indicated by a row of punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; lateral tooth indicated by a very obtuse small angle; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper

branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 51–53. *Endophallus*. Fig. 114.

**Diagnosis.** *Anomala bruggei* is separated from similar species by the combination of the following characters: relatively large mean body size; eyes not enlarged; pronotum with distinctly marked obtuse to square anterior angles and rounded obtuse posterior angles; basal marginal line of pronotum relatively broadly interrupted (approximately as broad as the scutellum); subsutural interstice with an anteriorly doubled stria; abdominal sternites with one or two transverse rows of setae in the middle; lateral hair patches poorly defined; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; lateral tooth of protibia indicated by a very obtuse small angle; parameres with ventral membranous area, apically broad in dorsal view; endophallus very similar to that of *A. merkli* and *A. biakensis*, with indistinctly divided accessory and main sacculus; accessory sacculus relatively small, with two almost fused hair patches; main sacculus with a large basal hair patch and another very small apical hair patch; copulatory piece directed ventrally.

**Distribution.** Roon Island, Yapen Island, Manokwari, Sorong(?). The record from “Lae” (eastern Papua New Guinea) is probably wrong since all other specimens were collected in a relatively small area in north-western West Papua. Female specimens from Sorong (Bird’s Head Peninsula) which also might belong to this species were not included in the type series because no males from this locality were available.

**Etymology.** The species is dedicated to Ben J.H. Brugge, collection manager in the entomological section of the ZMAN who supported this work very much by giving on loan a large part of the unidentified *Anomala* material.

**Material.** Holotype: ♂ “Nov Guin S. Arfak. | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R.Oberthur” (MNHN). – Paratypes: 1♀ same data as holotype (MNHN). 1♂, 4♀ “Roon Island YENDE 60m, at light 7.XI.1993 | INDONESIA Irian Jaya A.J. de Boer A.L.M. Rutten & R. de Vos” (ZMAN, CCZ). 1♂ “Jobie N. G. W. Doherty | ♂ | *Anomala aeneiventris* Fairm.” (CCZ). 1♀ “Ins. Jobi N. Guinea (Doherty)” (MNHB). 1♂ “Nov. Guinea | Mus. Vratisl | 24435 | 121 | Det. F. Ohaus 1916 *Anomala aeneiventris* Fairm.” (MNHB). 1♂ “N. Guinea Pratt | LAE NG. 14. 1. 60. Spec Rel. no 90.” (BMNH). 1♀ “Mus. Leiden L.A. Brongersma eiland Room 20-III.-1952 op licht | RMNH Leiden Loan 11454” (RMNH).

### 3.14. *Anomala merkli* sp.n.

**Description.** *Length.* 8.9–10.6 mm. *Width.* 5.3–6.1 mm. *Color.* Very variable; orange brown with a weak metallic green shine; elytra light yellowish brown; sometimes extensively darkened with the whole body

reddish brown with metallic green shine; elytra with a lighter base and lateral margins and otherwise blackened. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.57–0.63; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles square, distinctly marked and a little produced; posterior angles obtuse and narrowly rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line interrupted in the middle, here indicated by a row of punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstices with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs.* Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia often only poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 54–56. *Endophallus*. Fig. 115.

**Diagnosis.** *Anomala merkli* is separated from similar species by the combination of the following characters: relatively small body size; uniformly light orange brown with light yellowish brown elytra or extensively darkened; eyes not enlarged; pronotum with distinctly marked square anterior angles and rounded obtuse posterior angles; subsutural interstice with an anteriorly doubled stria; abdominal sternites with transverse rows of setae in the middle; lateral hair patches poorly defined; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; parameres with ventral membranous area, apically not broadened in dorsal view; endophallus very similar to that of *A. bruggei* and *A. biakensis*, with weakly separated accessory and main sacculus; accessory sacculus with two almost fused hair patches; main sacculus with two small elongate hair patches; copulatory piece directed ventrally.

**Distribution.** Central part of north coast of New Guinea: Humboldt Bay, Jayapura, Aitape, But.

**Etymology.** The species is dedicated to Ottó Merkl, curator of the Coleoptera collection of the HNHN,



who has been very supportive of this study by providing numerous *Anomala* specimens.

**Material.** Holotype: ♂ “D N. Guinea But, II. 1910 H. Schoede S.G | Type | 110782 | Ohaus determin. 1915 *Anomala pallescens* Ohs. Type” (MNHB). – Paratypes: 1 ♀ “D N. Guinea But, II. 1910 H. Schoede S.G | Co-Type | 110782 | Ohaus determin. 1915 *Anomala pallescens* Ohs. Cotype” (CCZ). 1 ♂ “D N. Guinea But, II. 1910 H. Schoede S.G | *Anomala pygidialis* Kirsch m. d. Type vergl. Berlin 9. I. 1916 underside: Type ♀ unic. ex mus. Dresden | Type | *Anomala pallescens* Ohs” (MNHB). 1 ♂ “Humboldt Bay. Sept.-Oct. 1893. W.Doherty. | *Anomala aeneiventris* Fairm.” (MNHB). 1 ♂ “Neth. Ind.-Amer. New Guinea Exp. 1938-39. - m. Hollandia VII. 38 L.J.Toxopeus lg. | RMNH Leiden Loan 11454” (RMNH). 1 ♂, 1 ♀ “N.Guinea Biró 96 | Tamara Berlinhafen” (HNHM, CCZ). 1 ♀ “N.Guinea Biró 96 | I. Bertrand (Taravá) | coll. Dr.S.Endrödi” (HNHM). 3 ♀ “N.Guinea Biró 96 | Seleu Berlinhaf.” (HNHM). 1 ♂ “N.N.Guinea | 1746 | Coll. Dr F. LEEFMANS | *Anomala* ?” (ZMAN). 1 ♀ “N.N.Guinea | 1577 | Coll. Dr F. LEEFMANS | *Anomala*” (ZMAN). 1 ♀ “NEW GUINEA.(M.T.) Aitape. x-xi.1936. L.E.Cheesman. B.M.1936-271.” (BMNH). 3 ♂ “Tobati jayapura IRIAN JAYA 18 XI 1991 | Kaoru WADA Collection 2003 | Study No. 8 Kaoru WADA Collection 2006” (CKW).

### 3.15. *Anomala biakensis* sp.n.

**Description.** *Length.* 9.9–12.3 mm. *Width.* 5.6–7.1 mm. *Color.* Reddish brown with metallic green shine; elytra light yellowish brown with darkened suture. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.60–0.63; frons punctured like the clypeus, vertex less densely punctured. *Pronotum.* Widest at base; widely curved a little before the middle; anterior angles obtuse, sometimes almost square, distinctly marked; posterior angles obtuse and narrowly rounded; punctation moderately fine (middle) or moderately large (lateral parts); punctures separated by 0.5–3 diameters, sometimes coalescing laterally; basal marginal line indistinct in the middle and here indicated by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined small hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs.* Protibia unidentate, lateral tooth indicated by a very obtuse small angle; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed;

modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 57–59. *Endophallus.* Fig. 116.

**Diagnosis.** *Anomala biakensis* is separated from similar species by the combination of the following characters: eyes not enlarged; pronotum with distinctly marked obtuse to square anterior angles and rounded obtuse posterior angles; basal marginal line indistinct only in the very middle (in contrast to the otherwise very similar *A. bruggei*); subsutural interstice with an anteriorly doubled stria; abdominal sternites with one transverse row of setae in the middle; lateral hair patches poorly defined; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; lateral tooth of protibia indicated by a very obtuse small angle; parameres with ventral membranous area, relatively short and apically not broadened in dorsal view; endophallus very similar to that of *A. merkli* and *A. bruggei*; accessory and main sacculus almost fused to a sole large sacculus; the hair patches of the accessory sacculus, especially the lateral one much larger than in *A. merkli*. For *A. biakensis* no color variation is known.

**Distribution.** West Papua: Biak Island.

**Etymology.** The species is named after Biak Island, the place of occurrence.

**Material.** Holotype: ♂ “Mus. Leiden L.D.Brongerma W.J.Roosdorp Base - Biak 27 - III - 1952 op licht | RMNH Leiden Loan 11454” (RMNH). – Paratypes: 1 ♀ “Museum Leiden L. D. Brongersma en W. J. Roosdorp Base Biak 15 - IV - 1952 op licht | RMNH Leiden Loan 11454” (RMNH). 1 ♂ “Mus. Leiden A.Haap Biak 25 - II - 1952 op licht | RMNH Leiden Loan 11454” (CCZ). 1 ♀ “Mus. Leiden H. van Reek Biak, Base 3 - XII - 1953 | RMNH Leiden Loan 11454” (RMNH). 1 ♂ “INDONESIA Irian Jaya Biak, 10m N Bosnik 136°20'E, 01°05'S UWP 13.II.1998 leg.A.Weigel” (NMEG). 2 ♂ “IRIAN JAYA Biak Island KOREM 25.XI - 1.XII.1993 J. Kapitarauw” (ZMAN). 1 ♂, 1 ♀ “IRIAN JAYA Biak Island WARSA 28.XI - 2.XII.1993 J. Kapitarauw” (ZMAN, CCZ).

### 3.16. *Anomala butensis* sp.n.

**Description.** *Length.* 10.3–12.3 mm. *Width.* 5.9–6.9 mm. *Color.* Reddish brown with metallic green shine; elytra light yellowish brown with darkened suture. *Head.* Clypeus subrectangular (sometimes rectangular), with moderately fine (sometimes fine and very shallow) and moderately dense, occasionally almost confluent punctures; eyes moderately enlarged; ratio interocular width/width of head (singular maxima and minima in brackets): ♂♂ 0.53(0.50)–0.57(0.58); ♀♀ 0.55(0.53)–0.58(0.61); frons punctured like the clypeus, vertex less densely punctured; antennal club



distinctly longer than the funicle in males. *Pronotum*. Widest at base; more strongly curved at ca. 1/3 of length behind the anterior angles; anterior angles very obtuse, very narrowly rounded; posterior angles obtuse and narrowly rounded; punctation moderately large (occasionally moderately fine in the middle); punctures separated by 0.5–3 diameters, partly coalescing laterally; basal marginal line indistinct in front of the scutellum and here indicated by some punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstices with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; decumbent setation missing; discal surface hairless; with scattered suberect setae close to basal margin and towards apex and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, forming poorly defined hair patches; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; lateral tooth sometimes weakly indicated; mesio-dorsal double carina of the apical mesotibia usually only poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the pro-tarsi. *Aedeagus*. Figs. 60–62. *Endophallus*. Fig. 117.

**Diagnosis.** *Anomala butensis* is separated from similar species by the combination of the following characters: clypeus finely and less densely, rarely almost confluent punctured; eyes moderately enlarged (unique in this species, for measurements see above); sides of pronotum more strongly curved at ca. 1/3 of length behind the anterior angles; pronotum with very obtuse, very narrowly rounded anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; pygidium without decumbent setae, discal surface hairless, erect and suberect setae basally and along hind margin; abdominal sternites 3–5 with one transverse row of setae in the middle; lateral hair patches of abdominal sternites poorly defined, not dense; most of the setae of abdominal sternites 2–4 not surpassing the posterior margins of their sternites; parameres with a distinct lateral carina; ventral membranous area narrow; endophallus without distinct accessory sacculus (in common with *A. ophthalmica* sp.n. and *A. sarmiensis* sp.n.), very characteristic for its several hair patches; some of the patches with scale-like hairs.

**Distribution.** North New Guinea: Jayapura, Sissano, Aitape, Lemieng, Maprik, But, Monumbo (formerly Potsdam Harbour), Madang, Bogadjim (formerly Stephansort), Kelana Harbour, Simbang.

**Etymology.** The species is named after the holotype locality, the township of But in northeast Papua New Guinea.

**Material.** Holotype: ♂ “D. N. Guinea But, II. 1910 H. Schoede S.G. | 110789 | ♂” (MNHB). – Paratypes: 16♂, 2♀ same data as holotype (MNHB, CCZ). 1♂ “D. N. Guinea But, II. 1910 H. Schoede S.G. | 110789 | Ohaus determin.1915 *Anomala aeneiventris* Frm. ♂ [Ohaus’ handwriting]” (MNHB). 1♂ “D. N. Guinea But, II. 1910 H. Schoede S.G. | ♂ | *Anomala aeneiventris* Fairm.” (MNHB). 1♀ “D. N. Guinea But, II. 1910 H. Schoede S.G. | ♀ | *Anomala aeneiventris* Fairm.” (MNHB). 1♂, 1♀ “D. Neu-Guinea Stephansort” (MNHB). 1♂, 3♀ “Stephansort Astrolabe B. D.N.Guinea (Kunzmann 1894)” (MNHB, CCZ). 2♀ “D.N.-Guinea Berlinhafen-Eitape X. 09. Neuhauss S. G. | 110791 | ♀” (MNHB). 1♂ “Neu-Guinea Kaiser Wilh.-Land Stephansort Rohde S. | 110785 | Ohaus determin.1915 *Anomala aenei-ventris* Frm. ♂. [Ohaus’ handwriting]” (MNHB). 1♀ “Neu-Guinea Kaiser Wilh.-Land Stephansort Rohde S. | 110785 | ♂” (MNHB). 1♀ “D.N.-Guinea Sissanu IX. 09. Neuhauss S. G. | ♀ | 110794” (MNHB). 1♂ “D.N.Guinea Berlinhafen H.Schoede S.G. | 110791 | Ohaus determin.1915 *Anomala aeneiventris* Frm. ♂ [Ohaus’ handwriting]” (MNHB). 1♀ “D.N.Guinea Berlinhafen H.Schoede S.G. | 110791 | Ohaus determin.1915 *Anomala aeneiventris* Fairm. ♀ [Ohaus’ handwriting]” (MNHB). 1♂, 2♀ “D.N.Guinea Berlinhafen H.Schoede S.G. | 110791 | ♀” (MNHB). 1♂ “80. | 77120 | Neu-Guinea” (MNHB). 1♂ “Neu-Guinea Kais. Wilh.-Land Butauang, Kelana Rohde S. | 110788 | Ohaus determin.1915 *Anomala aeneiventris* Frm ♀ [Ohaus’ handwriting]” (MNHB). 1♂ “N. Guinea Astrolabe B. (Rhode)” (MNHB). 1♂ “Ned. Nieuw Guinea Noordwyk Res. Hollandia 27 - VII 1959 leg. R.T. Simon Thomas | RMNH Leiden Loan 11454” (RMNH). 1♂ “MUSEUM PARIS NOUV.GUINÉE BAIE DE HUMBOLDT ET DORLEY (J.-D. PASTEUR) O. K. PASTEUR 1906 | Ohaus determ. *Anomala aenei-ventris* Fairm. [Ohaus’ handwriting]” (MNH). 1♀ “Nov. Guin Missih. St. Gabr Monumbo 1906 | MUSÉUM PARIS 1944 Coll. E. BENDERITTER” (MNH). 2♂, 4♀ “N. Guinea Fenichel” (HNHM). 2♂ “N. Guinea Biró 1899. | Simbang Huon Golf” (HNHM). 1♂ “N. Guinea Biró 1900. | Stephansort Astrolabe Bay [underside:] 1900.IV.2.” (CCZ). 1♂, 1♀ “N. Guinea Biró 1899. | Stephansort Astrolabe Bay” (HNHM). 1♀ “N. Guinea Biró 1899 | Erima Astrolabe B. [underside:] X.7.99.” (HNHM). 1♀ “N. Guinea Biró 1899 | Erima Astrolabe B. [underside:] X.28.99.” (HNHM). 3♂ “N. Guinea Biró 1899 | Erima Astrolabe B. [underside:] X.30.99” (HNHM, CCZ). 1♂ “N. Guinea Biró 1899 | Erima Astrolabe B. [underside:] X.30.99 | coll. Dr.S.Endrödi” (HNHM). 1♂ “N. Guinea Biró 96 | Lemien Berlinhafen” (HNHM). 1♂ “N. Guinea Biró 1901 | Friedrich-Wilh.-hafen” (HNHM). 7♂ “Tobati jayapura IRIAN JAYA 18 XI 1991 | Kaoru WADA Collection 2003 | Study No. 17 Kaoru WADA Collection 2006” (CKW). 1♂ “Skyline IRIAN JAYA 1 XI 1991 | Kaoru WADA Collection 2003 | Study No. 17 Kaoru WADA Collection 2006” (CKW). 1♂ “NEW GUINEA Maprik VIII.1968 local coll.” (CFA). 1♀ “N. Guinea Biró 97. | Stephansort Astrolabe Bai” (CCZ).

### 3.17. *Anomala ophthalmica* sp.n.

**Description.** *Length*. 10.6–11.4 mm. *Width*. 5.8–6.3 mm. *Color*. Reddish brown with metallic green shine;

elytra light yellowish brown with darkened suture. *Head*. Clypeus (sub)rectangular, with moderately fine (sometimes fine and very shallow) and moderately dense, occasionally almost confluent punctures; eyes distinctly enlarged; ratio interocular width/width of head:  $\sigma\sigma$ : 0.48–0.49 ( $\varphi\varphi$  unknown); frons punctured like the clypeus, vertex less densely punctured. *Pronotum*. Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked and a little produced; posterior angles obtuse and narrowly rounded; punctation moderately large (occasionally moderately fine in the middle); punctures separated by 0.5–3 diameters, partly coalescing laterally; basal marginal line indistinct in front of the scutellum and here indicated by some punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; decumbent setation missing; discal surface hairless; with scattered suberect setae close to basal margin and towards apex and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, lateral hair patches only indicated by some accumulated setae, often reduced (abraded?); setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia usually only poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 63–65. *Endophallus*. Fig. 118.

**Diagnosis.** *Anomala ophthalmica* is separated from similar species by the combination of the following characters: clypeus finely and less densely, rarely almost confluent punctured; eyes distinctly enlarged (shared only with *A. sarmiensis* sp.n., for measurements see above); antennal club distinctly longer than the funicle in males; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; pygidium without decumbent setae, discal surface hairless, marginal with erect and suberect setae; abdominal sternites 3–5 with one transverse row of setae in the middle; lateral hair patches of abdominal sternites only indicated by some accumulated setae; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites; parameres with a distinct lateral carina, not widened before apex in dorsal view; ventral membranous area narrow; endophallus without distinct accessory sacculus (in common with *A. butensis* and *A. sarmiensis*), almost without hairs.

**Distribution.** Papua New Guinea: Sisimangum, Wau (Morobe province).

**Etymology.** The specific epithet is derived from the Greek noun ‘ophthalmos’ [= eye] and referring to the enlarged eyes in this species.

**Material.** Holotype:  $\sigma$  “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Sisimangum village, Madang prov., near river U. V. light, 1.VII.1981 Leg. J. Van Goethem I.G.:26.373” (IRSN). – Paratypes: 4 $\sigma$  same data as the holotype (IRSN, CCZ). 1 $\sigma$  “N. Guinea Biró 896 | N. GuineaFr. Wilhelmshafen.” (HNHM). 1 $\sigma$  “Coll. I.R.Sc.N.B. PAPUA NEW GUINEA, Wau, Morobe prov., Wau Ecology Institute, 1220m., Malaise trap TL. light, 18-22-VI.1981 Leg. J. Van Goethem I.G.:26.373” (IRSN). 1 $\sigma$  “D.NeuguineaMiss-Mus. Steyl | Coll. Veth | Museum Leiden *Anomala aeneiventris* Det: Fam. | Ohaus determin. 1916 *Anomala aeneiventris* Fairm. | Cat.No. 1 | RMNH Leiden Loan 11454” (RMNH).

### 3.18. *Anomala sarmiensis* sp.n.

**Description.** *Length*. 9.1–11.3 mm. *Width*. 4.9–6.0 mm. *Color*. Reddish brown with metallic green shine; elytra light yellowish brown with darkened suture. *Head*. Clypeus (sub)rectangular, with moderately fine (sometimes fine and very shallow) and moderately dense, occasionally almost confluent punctures; eyes distinctly enlarged; ratio interocular width/width of head (singular maximum in brackets):  $\sigma\sigma$  0.47–0.51;  $\varphi\varphi$  0.52–0.53(0.55); frons punctured like the clypeus, vertex less densely punctured; antennal club distinctly longer than the funicle in males. *Pronotum*. Widest at base; widely curved a little before the middle; anterior angles obtuse, distinctly marked and a little produced; posterior angles obtuse and narrowly rounded; punctation moderately large (occasionally moderately fine in the middle); punctures separated by 0.5–3 diameters, partly coalescing laterally; basal marginal line indistinct in front of the scutellum and here indicated by some punctures. *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice with anteriorly irregularly doubled stria; 2nd and 3rd interstice with abbreviated secondary striae. *Pygidium*. Surface fine and densely transversely rugose; with scattered decumbent setation on discal surface, leaving out the central parts; with scattered suberect setae close to basal margin and towards apex and longer, erect setae along hind margin. *Venter*. Abdominal sternites 3–5 with setae forming usually one transverse row in the middle; abdominal sternite 2 with two rows; setae becoming denser laterally, lateral hair patches only indicated by some accumulated setae; setae of abdominal sternites 2–4 slightly surpassing the posterior margins of their sternites. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia usually only poorly developed; modified claw

of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 66–68. *Endophallus*. Fig. 119.

**Diagnosis.** *Anomala sarmiensis* is separated from similar species by the combination of the following characters: clypeus finely and less densely, rarely almost confluent punctured; eyes distinctly enlarged (shared only with *A. ophthalmica*, for measurements see above); antennal club distinctly longer than the funicle in males; pronotum with distinctly marked, obtuse anterior angles and narrowly rounded posterior angles; subsutural interstice with an anteriorly doubled stria; pygidium with scattered decumbent setation, leaving out the central parts of discal surface, and erect and suberect setae basally and along hind margin; abdominal sternites 3–5 with one transverse row of setae in the middle; lateral hair patches of abdominal sternites only indicated by some accumulated setae; setae of abdominal sternites 2–4 surpassing the posterior margins of their sternites; parameres with a distinct lateral carina, widened before apex in dorsal view; ventral membranous area narrow; endophallus without distinct accessory sacculus (in common with *A. butensis* and *A. ophthalmica*), with a single hair patch and small sclerotized areas.

**Distribution.** West Papua: Sarmi, Yamna Island.

**Material.** Holotype: ♂ “Ned. Nieuw Guinea Sarmi Res. Sarmi 17 mrt 1950 leg. R.T. Simon Thomas | RMNH Leiden Loan 11454” (RMNH). – Paratypes: 1 ♀ “Ned. Nieuw Guinea Sarmi Res. Sarmi 15 mrt 1950 leg. R.T. Simon Thomas | RMNH Leiden Loan 11454” (RMNH). 3 ♂ “Nd.N. Guinée Ile Djamna J.B.Ledru 1901 | Museum Paris ex Coll. R. Oberthur” (MNHN). 4 ♂, 2 ♀ “Nd.N. Guinée Sarmeh J.B.Ledru 1901 | Museum Paris ex Coll. R. Oberthur” (MNHN).

### 3.19. *Anomala chlorotica* (Guérin-Méneville, 1838)

· *Euchlora chlorotica* Guérin-Méneville, 1838: 87

· *Anomala chlorotica*: Burmeister, 1844: 534

**Description.** *Length.* 11.0–12.0 mm. *Width.* 6.0–7.0 mm. *Color.* Entire body orange-brown, with a very weak metallic green shine; meso- and metathorax and abdomen somewhat darker brown; metatibiae and -tarsi dark reddish brown with a green shine. *Head.* Clypeus subrectangular, with moderately fine and dense punctures; ratio interocular width/width of head: 0.62–0.63; frons moderately fine and densely, sometimes rugosely punctured; antennal club longer than the funicle in males. *Pronotum.* Widest at base; anterior and posterior angles obtuse; anterior angles rounded, posterior angles marked, sometimes a little rounded; punctation moderately large, punctures separated by 0.5–2 diameters, partly coalescing laterally; basal marginal line almost complete, indistinct in the

middle and here marked by some punctures. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice irregularly punctate; 2nd–4th interstices with abbreviated secondary striae; one bigger female specimen with additional row of punctures on the 2nd costa. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 2–5 with rather dense setation (denser in ♂♂ than in ♀♀); setae forming two or three transverse rows in the middle, becoming much denser laterally, forming dense but poorly defined white lateral hair patches. *Legs.* Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 69–71. *Endophallus*. Fig. 120.

**Diagnosis.** *Anomala chlorotica* is separated from similar species by the combination of the following characters: margins of pronotum and elytra and epipleurae not blackened; surface shining; clypeus subrectangular; antennal club longer than the funicle in males; pronotum with anterior angles rounded, not more marked than hind angles; subsutural interstice irregularly punctate; 2nd costa rarely with secondary punctures; abdominal sternites with rather dense setation; lateral hair patches dense but poorly defined; parameres without ventral membranous area, laterally grooved, apically broad in dorsal view, without apical flat area as in *A. maculicollis* Hombron & Jacquinet, 1846, endophallus with a large, finely setose accessory sacculus and a smaller main sacculus with hair patches and a tongue-shaped sclerotized plate; base of internal sac with a small diverticle.

**Distribution.** Southern Moluccas: Ambon, Seram.

**Type material.** Lectotype (**here designated**): ♂ “Amboina Durville” (MHNP). Note: Jules Sébastien César Dumont d’Urville served as second-in-command on board of the corvette “La Coquille” commanded by Louis Isidore Duperrey during the circumnavigation expedition from 1822 to 1825. The type material was collected during this journey. The lectotype was designated because neither GUÉRIN-MÉNEVILLE (1838) nor BLANCHARD (1851) stated how many specimens were used in the original description.

**Additional material examined.** 1 ♂ “Amboina Staudinger | *Anomala chlorotica* Guér. m.d. Type vergl. Paris 4.VII.11” (MNH). 1 ♂ “Ceram. | Museum Paris ex coll. R. Oberthur” (MNHN). 1 ♂, 1 ♀ “Molucc. Ambon | Ex-Museo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNHN). 1 ♀ “Molucc. Ceram. | Ex-Museo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNHN). 1 ♀ “Molucc. Ambon | *Chlorotica* Guérin | Ex-Museo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNHN). 1 ♂ “Amboina | Ex-Museo VAN



LANSBERGE | Museum Paris ex coll. R. Oberthur" (MNHN).

### 3.20. *Anomala toxopei* sp.n.

**Description.** *Length.* 11.5 mm (holotype) – 11.9 mm (paratype). *Width.* 6.8 mm. *Color.* Entire body orange-brown with a very weak metallic green shine; meso- and metathorax and abdomen somewhat darker brown; metatibiae and -tarsi dark reddish brown with a green shine; margins of pronotum and elytra darkened. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.63(holotype)–0.64(paratype); frons punctured like the clypeus, vertex less densely punctured; antennal club longer than the funicle in males. *Pronotum.* Widest at base; anterior and posterior angles obtuse; anterior angles narrowly rounded, posterior angles a little more distinct; punctation moderately large (moderately fine in the middle); punctures separated by 0.5–2 diameters, partly coalescing laterally; basal marginal line almost complete, very narrowly indistinct in the middle. *Elytra.* Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice irregularly punctate; 2nd–4th interstices with abbreviated secondary striae; with additional punctures (holotype) or an abbreviated stria (paratype) on the 2nd costa. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter.* Abdominal sternites 2–5 with setae indicating two (paratype) or three (holotype), somewhat irregular transverse rows in the middle, becoming much denser laterally, forming dense but poorly defined white lateral hair patches. *Legs.* Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia distinct; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 72–74. *Endophallus.* Fig. 121.

**Diagnosis.** *Anomala toxopei* is separated from similar species by the combination of the following characters: margins of pronotum and elytra and epipleurae blackened; surface shining, weakly microsculptured; clypeus subrectangular; antennal club longer than the funicle in males; pronotum with anterior angles rounded, not more marked than hind angles; subsutural interstice irregularly punctate; 2nd costa with a few punctures (variability unknown); abdominal sternites with two or three transverse rows of setae in the middle, lateral hair patches poorly defined; parameres apically with a small carinated edge; endophallus with a diverticle basal of the accessory sacculus; the latter unarmed; main sacculus without sclerotized plate.

**Distribution.** Buru.

**Etymology.** *Anomala toxopei* is named after the collector of the holotype, the Dutch entomologist Lambertus Johannes Toxopeus (1894–1951).

**Remarks.** Since females of *A. maculicollis*, *A. chlorotica* and *A. toxopei* can not be distinguished with certainty, the assignment of the above female paratype was made because it originates from the same locality as the holotype and neither *A. maculicollis* nor *A. chlorotica*, is known from Buru. The holo- and paratype are the two specimens cited by OHAUS (1926b) under *A. stigmatica*.

**Material.** Holotype: ♂ "L.J.TOXOPEUS Buru.Station 1 10.II-16.III'21 | *Anomala stigmatica* Ohs." (MNHB). – Paratype: 1 ♀ "L.J.TOXOPEUS Buru.Station 1 I-III.1922 | Ohaus determ. *Anomala stigmatica* Ohs. ♀." (ZMAN).

### 3.21. *Anomala maculicollis* Hombron & Jacquinet, 1846

- *Anomala maculicollis* Hombron & Jacquinet, 1846: plate 8, fig. 2.
- *Anomala maculicollis*: Blanchard, 1851: 191 (redescription)
- *Anomala maculicollis*: Blanchard, 1853: 113 (description referring to the illustration in atlas volume 1846)
- *Anomala stigmatica* Ohaus, 1916: 57 **syn.n.**
- *Anomala resecta* Ohaus, 1916: 58, fig. 10 **syn.n.**
- *Anomala bandarra* Ohaus, 1916: 59 **syn.n.**

**Description.** *Length.* 10.0–11.9 mm. *Width.* 5.6–7.3 mm. *Color.* Variable; lightest specimens uniformly light to orange brown with weak metallic green shine; margins of pronotum and elytra small blackened; posterior thoracic segment and abdomen somewhat darker; metatibiae and -tarsi dark reddish brown with a green shine; sometimes pronotum with a dark patch on each side of the middle (lectotype and paralectotype of *A. maculicollis*); in that case also posterior part of head, scutellum as well as suture and lateral margins of the elytra more extensively darkened; the lectotype of *A. bandarra* with the whole body surface except elytra, antennae, fore- and middle legs dark brown with green shine. *Head.* Clypeus subrectangular, with moderately fine and dense, sometimes confluent punctures; ratio interocular width/width of head: 0.60–0.64; frons moderately fine and densely, sometimes rugosely punctured; antennal club longer than the funicle in males. *Pronotum.* Widest at base; anterior and posterior angles obtuse; anterior angles rounded, posterior angles marked, sometimes a little rounded; punctation moderately large, punctures separated by 0.5–2 diameters, partly coalescing laterally; basal marginal line almost complete, indistinct in the middle and here marked by some punctures.



*Elytra*. Surface with well defined, only apically more impressed striae (Fig. 1); punctures moderately large; subsutural interstice irregularly punctate; 2nd–4th interstice with abbreviated secondary striae; usually with additional row of punctures on 2nd costa (absent in smaller specimens as in the lectotype and paralectotype of *A. maculicollis* and the lectotype of *A. bandararra*). *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc and longer, erect setae along hind margin. *Venter*. Abdominal sternites 2–5 with rather dense setation (denser in ♂♂ than in ♀♀); setae forming two or three, somewhat irregular transverse rows in the middle, becoming much denser laterally, forming dense but poorly defined white lateral hair patches. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 75–77. *Endophallus*. Fig. 122.

**Diagnosis.** *Anomala maculicollis* is separated from similar species by the combination of the following characters: margins of pronotum and elytra and epipleurae blackened; sometimes with dark patches on pronotum and also margins and suture of the elytra extensively darkened; surface shining, not microsculptured; clypeus subrectangular; antennal club longer than the funicle in males; pronotum with anterior angles rounded, not more marked than hind angles; subsutural interstice irregularly punctate; 2nd costa usually with secondary punctures; abdominal sternites with rather dense setation; lateral hair patches dense but poorly defined; parameres without ventral membranous area, laterally grooved, with apically cropped, with flattened area; endophallus very similar to that of *A. chlorotica*; accessory sacculus with a sharply defined hair patch, the sclerotized plate of the main sacculus spoon-shaped.

**Distribution.** Misool Island; Tevor Island [? not localizable]; southern Mollucas: Seram, Kepulauan Banda. The record Borneo given by BLANCHARD (1851) is erroneous.

**Type material.** *A. maculicollis* Hombron & Jacquinet: Lectotype (**here designated**): ♂ “398. 41. | MUSEUM PARIS | TYPE | *A. maculicollis*. Hombr. et Jacq. Warou. M. Jacquinet.” (MHNP). – *A. resecta* Ohaus: Lectotype (**here designated**): ♂ “Piroe Ceram | Type | *Anomala resecta* Ohs.” (MNHB). – *A. bandararra* Ohaus: Lectotype (**here designated**): ♂ “Banda Ins. | Type | *Anomala bandararra* Ohs.” (MNHB). – *A. stigmatica* Ohaus: Lectotype (**here designated**): ♀ “Ceram Illo C. Ribbe 1894. | ♀ | Type | *Anomala stigmatica* Ohs.” (MNHB). Note: The above 4 lectotypes were designated because in the original descriptions is not stated how many specimens belonged to the original series. For the availability of the names given in HOMBRON & JACQUINOT (1846) see ANTOINE et al. (2002), for the publication dates of the atlas volumes see CLARK & CROSNIER (2000).

**Additional material examined.** 1♂ “1590 41 | MUSEUM PARIS Borneo HOMBRON 1841 | TYPE | *A. maculicollis*. Hombr. et Jacquinet. Borneo. M. Hombron.” (MHNP). Note: This specimen was not mentioned in HOMBRON & JACQUINOT (1846) and does therefore not belong to the type material of this species. 1♂ “Ins. Gross Banda” (MTD). 1♂ “Misool Insel” (MNHB). 7♂, 2♀ “Tevor Ins.” (MNHB, CCZ). 1♂ “Malaisie?” | Ex Musaeo VAN LANSBERGE | Museum Paris ex coll. R. Oberthur” (MNHN).

### 3.22. *Anomala bousqueti* LeGuillou, 1844

· *Anomala bousqueti* LeGuillou, 1844: 223

**Description.** *Length*. 11.4–13.5 mm. *Width*. 6.1–7.8 mm. *Color*. Dorsally light orange-brown with a hardly perceptible metallic green shine; head and usually also scutellum darker; pronotum and usually also elytra with narrowly darkened margins; surface opaque, with distinct microsculpture (40x); ventral surface reddish brown, sometimes blackened; femora sometimes lighter brown; metatibiae and -tarsi dark reddish brown with coppery shine. *Head*. Clypeus subrectangular to trapezoidal, moderately fine and densely punctured; punctures sometimes very shallow and hardly perceptible between the microsculpture; ratio interocular width/width of head: 0.61–0.63; punctation of frons like that of clypeus. *Pronotum*. Widest at base or middle; anterior and posterior angles obtuse and rounded, posterior angles usually a little more marked than anterior angles; punctation moderately large; punctures separated by 0.5–3 diameters, becoming more coarse and partly coalescing laterally; basal marginal line almost complete, indistinct in the middle and here indicated by some punctures; with short suberect setation next to the lateral margins and lateral part of basal margin (more distinct in females, in males sometimes abraded). *Elytra*. Surface with well defined, only apically more impressed striae; punctures moderately large; subsutural interstice irregularly punctate; 2nd–4th interstice with abbreviated secondary striae; with additional punctures on the 2nd and 3rd costa (larger specimens). *Pygidium*. Surface fine and densely transversely rugose; with decumbent setation on disc (suberect in female) and longer, erect setae along hind margin. *Venter*. Abdominal sternites 2–5 with rather dense setation (denser in ♂♂ than in ♀♀); setae forming two or three indistinct transverse rows in the middle, becoming much denser laterally, forming dense but poorly defined white lateral hair patches. *Legs*. Protibia slightly sinuate before the terminal tooth; mesio-dorsal double carina of the apical mesotibia sometimes poorly developed; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus*. Figs. 78–79. *Endophallus*. Fig. 123.

**Diagnosis.** *Anomala bousqueti* is separated from similar species by the combination of the following characters: dorsal surface opaque, with microsculpture (unique within this group); margins of pronotum and elytra and mostly also epipleurae darkened; pronotum with short suberect setation next to the lateral margins and lateral part of basal margin (in males often indistinct); pronotum with anterior angles rounded, not more marked than hind angles; subsutural interstice irregularly punctate; abdominal sternites with rather dense setation; lateral hair patches dense but poorly defined; parameres without ventral membranous area; endophallus very similar to that of *A. aeruginosa* but accessory sacculus with two bulged sclerites; main sacculus diffusely setose, with a large, tongue-shaped sclerite; base of the internal sac with a small setose knob.

**Distribution.** Northern Sulawesi: Bunaken Island, Manado Tua Island, Manado, Labuanuki Paleleh, Tolitoli, Lutungan Island; southern Sulawesi: Ujung Pandang, Bantaeng; Selayar Island; no records from central or southeastern parts of Sulawesi.

**Type material.** Neotype (**here designated**): ♂ “S. Celebes. Bonthain. C.Ribbe.1882.” (MNHB). Note: The type material could not be traced in the MNHN and is considered to be lost. To preserve nomenclatorial stability a neotype from Bonthain (the today Bantaeng), which is close to the original type locality Macassar (Ujung Pandang), was designated.

**Additional material examined.** 1♀ “[illegible...] Mankaßar | Ohaus determ. *Anomala Bousqueti* Leguillou” (MNHN). 1♀ “Macasser | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♂, 2♀ “Nord-Celebes Toli-Toli Nov.-Dez. 1895 H.Fruhstorfer” (MNHB). 1♀ “Celebes Paleleh 15.12.30 G. Heinrich” (MNHB). 1♂ “SALEYER. Nov.95 A.Everett.” (MNHB). 1♂ “Celebes” (MNHB). 1♀ “Celebes Böttcher, Berlin C.2” (MNHB). 1♀ “Insula Lutungan” (MNHB). 1♂ “S.Celebes. Bonthain. C.Ribbe 1882.” (MTD). 1♂, 1♀ “Sulawesi Utara Bunaken Isl.. 15 km NW Manado 12.03.-14.03.00 leg. C. Zorn & A. Kallies” (CCZ). 5♀ “Manado Tua Isl.. 20 km NW Manado 12.03.-14.03.00 leg. C. Zorn & A. Kallies” (CCZ). 7♂, 7♀ “Sulawesi Utara, Bunaken Isl.. 15 km NW Manado M III-MIX.00 leg. C. Zorn” (CCZ). 11♀ “SULAWESI UTARA Labuanika 0°53'N, 123°57'E 24.ii.1985” (BMNH). 3♀ “SULAWESI UTARA Manado 20.xi.85” (BMNH). 3♀ “INDONESIA: SULAWESI UTARA, Dumoga-Bone N.P. February 1985.” (BMNH). 1♀ “Celebes Paleleh 15.12.30 G. Heinrich” (BMNH). 1♂ “Celebes” (BMNH). 3♂, 1♀ “Coll. I.R.Sc.N.B. Sulawesi-Utara Molosso Island Station 102 20-23.XI.1985 Leg. J. Van Stalle” (IRSN). 1♂, 1♀ “Coll. I.R.Sc.N.B. Sulawesi-Utara Molosso, light trap 22.XI.1985, station: 102 Leg. J. Van Stalle” (IRSN).

### 3.23. *Anomala aeruginosa* Boisduval, 1835

- *Anomala aeruginosa* Boisduval, 1835: 190, pl. 9, fig. 2

- *Anomala ternatana* Lansberge, 1879: 151 **syn.n.**
- *Anomala aerea* Blanchard, 1851: 192 (nec Perty, 1831); Machatschke, 1957: 52 [*A. aerea* is a synonym of *A. djampeana* Ohaus] **syn.n.**

**Description.** *Length.* 14.5–16.0 mm. *Width.* 8.1–8.8 mm. *Color.* Variable, usually the whole body orange brown or castaneous with almost no metallic shine; usually anterior part of the sternites and margins of pronotum, scutellum and elytra more or less extensively blackened; legs orange brown to black; tarsi usually blackened; lighter specimens with the upper surface uniformly orange brown and only the head darker; almost entirely black specimens as in the closely related *A. luctuosa* may also occur. *Head.* Clypeus subrectangular, moderately fine and densely punctured; ratio interocular width/width of head: 0.62–0.65; punctation of frons like that of clypeus. Length of antennal club subequal to the combined length of antennomeres 2–6. *Pronotum.* Widest at base; anterior and posterior angles obtuse, posterior angles more marked than anterior angles; punctation on disc moderately small; punctures separated by (1)2–3 diameters, becoming more coarse and partly coalescing laterally; basal marginal line almost complete, sometimes indistinct in the middle. *Elytra.* Striae rather indistinct (especially laterally) and connected by numerous small rugae; punctures moderately large; subsutural interstice irregularly punctate; 2nd–4th interstice and 2nd and 3rd “costae” with abbreviated secondary striae. *Pygidium.* Surface fine and densely transversely rugose; with decumbent setation on disc (suberect in females) and longer, erect marginal. *Venter.* Abdominal sternites 2–5 with rather dense setation; setae forming two or three transverse rows in the middle, becoming denser laterally, forming well defined, dense white lateral hair patches. *Legs.* Protibia slightly sinuate before the terminal tooth; modified claw of pro- and mesotarsi apically bifurcate with the upper branch slightly smaller than the lower one; males with weakly enlarged modified claw of the protarsi. *Aedeagus.* Figs. 80–81, 84. *Endophallus.* Figs. 92, 93, 124.

**Diagnosis.** *Anomala aeruginosa* is a member of a complex of externally very similar allo- or parapatric species to which *A. aeruginosa*, *A. papuensis* sp.n., *A. luctuosa* Lansberge, 1879, *A. aruensis* sp.n., *A. sulana* sp.n., *A. tahunensis* sp.n., *A. toliensis* Ohaus, 1916, *A. cassiana* Ohaus, 1923, and *A. calpurnia* Ohaus, 1923 belong. They are united by a very similar aedeagus and by the same general structure of the endophallus with an accessory sacculus subequal in size to the main sacculus, the first bearing a pointed sclerite, the latter with a sclerotized plate of varied shape. In general appearance these species differ from others by the combination of a larger body size (except *A. calpurnia*), darker ground color (orange brown, castaneous or black) al-

most without metallic shine and more irregular elytral punctation. Moreover, the lateral hair patch of the abdominal sternites is well defined. Within this complex *A. aeruginosa* can be discriminated from the most similar species (*A. papuensis*, *A. luctuosa*, *A. aruensis*) only by the shape of the parameres and endophallus armatures. The ventral edge of the parameres is less pointed than in *A. luctuosa* and *A. aruensis* but not as rounded as in *A. papuensis*. The sclerite of the main sacculus is not as drumstick-shaped as in *A. papuensis*, not as cropped as in *A. luctuosa* and not as broad as in *A. aruensis*.

**Distribution.** West Papua: Sorong, Waigeo, Roon, Morotai, Salawat, Bacan, Halmahera, Ternate.

**Remarks.** Some of the above mentioned taxa are closely related to *A. aeruginosa* and some might be classified on subspecies level, however, presently there is no evidence providing a justification to apply subspecies rank for any of these taxa. Most of these taxa are island endemics, only *Anomala aeruginosa* and *A. papuensis* occur both on New Guinea. The differences between some of the species might have a clinal distribution and their taxonomic status should be re-evaluated when more material becomes available.

Because of the small data set the populations of the northern Mollucas (*A. ternatana*), Waigeo and western New Guinea could not be morphologically discriminated from one another. There are minor differences in the endophallus structures of specimens from the above mentioned localities which may be due to intraspecific variability. Therefore, *A. ternatana* (described from Ternate) is here considered a junior synonym of *A. aeruginosa* (described from Waigeo).

**Type material.** *Anomala aeruginosa* Boisduval: Neotype (**here designated**): ♂ “Bernstein Waigeo. | Museum Leiden *Anomala ternatana* Lansb Det: | Cat No 6 | RMNH Leiden Loan 11454” (RMNH). Note: The original type material of *A. aeruginosa* Boisduval could not be traced despite intensive search at the MNHN (the most likely place of deposition) and other collections and is considered to be lost. To preserve nomenclatorial stability a neotype was designated. The neotype specimen is partly damaged but it was the only male available from the locus typicus (Waigeo). – *Anomala ternatana* Lansberge: Syntypes: 1♂ “Molucc. Ternate | Ternatana Lansb Type [Lansberge’s handwriting] | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♀ “Molucc. Halmahera | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♀ “Ternate. | v. Lansb. Ternata | *Anomala Ternatana* Lansb. [Lansberge’s handwriting] | Museum Leiden *Anomala ternatana* Lansb Det: | Cat No 1 | RMNH Leiden Loan 11454” (RMNH). 1♀ “Ternate | Ternate Lansb [Lansberge’s handwriting] | Collection E. CANDÈZE | Ternatana Lsb. Lsb. | Type | ternatana Lsb. Révision G.J.Arrow 1913” (IRSN). – *Anomala aerea* Blanchard: Lectotype (**here designated**): ♂ “CAP DE BONNE ESPERANCE | MUSEUM PARIS Afrique Delalande | Afrique Delalande | *Anomala aerea* Type Blanch. | *A. aerea*.

Cat. Mus. Cap de B. Esp. M. Delalande.” (MHNP). Note: Because it is not certain that the description was based on a single specimen a lectotype was designated. The lectotype specimen of *A. aerea* Blanchard, 1851 (♀) is morphologically identical with *A. aeruginosa* and *A. luctuosa*. Because it cannot be assigned to one or the other of these taxa with certainty, this synonymization is arbitrary.

**Additional material examined.** 1♀ “Bernstein Waigeo.” (RMNH). 1♀ “v. Lansb. Ternate” (RMNH). 1♀ “Bernst. Salawat” (RMNH). 1♂ “Bernstein Noord Halmahera.” (RMNH). 1♀ “Bernstein Morotai.” (RMNH). 1♀ “Museum Leiden W. IRIAN: Wasior, 25-X-1956 R. Neher” (RMNH). 1♀ “NW New Guinea Sorong Kp. Baroe 5. vi-7. vii. 1948 M.A. Lieftinck” (RMNH). 2♂ “NW New Guinea Sorong Malang 24-31.x.1948 M.A. Lieftinck” (RMNH). 1♀ “NW New Guinea Sorong Ramoi 28.viii-6. ix. 1948 M.A. Lieftinck” (RMNH). 1♀ “NW New Guinea Sorong Roegei 8. vii-14. viii. 1948 M.A. Lieftinck” (RMNH). 1♀ “Ned. Nieuw Guinea Deer Res Kofiau 16 Febr. 1957 leg. R.T. Simon Thomas” (RMNH). 1♀ “Halmahera-Süd Akelamo Juni 1931 G.Heinrich” (BMNH). 1♀ “Wallace, Mollucas north” (BMNH). 1♀ “Roon Stdgr.” (MNHB). 2♀ “Batjan Doherty” (MNHB). 1♂ “Tern. Wallace | Ex-Musaeo D.Sharp 1890 | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♂ “Halmahera *Anomala ternatana* Lansb. E. Benderitter, det. | R.I.Sc.N.B.16.117 L. Burgeon, coll. et det.:” (IRSN). 1♀ “Jilolo | Collection E. CANDÈZE | *Aequalis* Cdz Gilolo. | Det. F. Ohaus 1909 *Anomala luctuosa* Lansb. var. ♀” (IRSN).

### 3.24. *Anomala papuensis* sp.n.

**Description and Diagnosis.** *Anomala papuensis* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: medium to large body size (length 12.1–15.6 mm; width 6.8–8.9 mm); dark reddish brown color form predominating but wide coloration range from dark brownish black to lighter reddish brown, usually with the typical black markings, as described for *A. aeruginosa* (see above); parameres ventrally widely rounded, not dentate or angulate (Fig. 85); sclerite of the main endophallic sacculus almost drumstick-shaped (Figs. 94, 95).

**Distribution.** Eastern New Guinea: But, Monumbo, Bogia, Hatzfeldhafen, Madang, Bogadjim, Melanua Harbour, Sattelberg, Bongu, Finschhafen; New Britain; New Ireland

**Etymology.** The name of this species refers to its occurrence in Papua New Guinea.

**Remarks.** No male specimens from the central northern coast were available, where a transition zone to *A. aeruginosa* from western New Guinea might exist. Whether the discriminative character differences between *A. papuensis* and *A. aeruginosa* show a clinal distribution should be examined in the future.



**Material.** Holotype: ♂ “K.Wilhelm-Land, Bongu | *Anomala ternatana* Lansb.” (MNHB). – Paratypes: 1♂ “Neu Pommern | Museum Leiden verz.F.T.Valck Lucassen | *Anomala ternatana* Lsb det Ohaus 1928 | RMNH Leiden Loan 11454” (RMNH). 2♀ “Neu Pommern | Museum Leiden verz.F.T.Valck Lucassen | *Anomala ternatana* Lsb det Ohaus 1928 | RMNH Leiden Loan 11454” (RMNH). 3♂, 2♀ “Dtsch N.-Guinea” (MTD, CCZ). 1♂ “Sattelberg N. Guinea” (MTD). 1♂ “N. Mecklenburg” (MTD). 1♂ “Constantin Hafen (Neu Guinea) | Ohaus determin. 1919 *Anomala aeruginosa* Boisd” (DEIM). 1♂, 1♀ “Friedr. Wilhelmshafen D. N. G. | coll. Bennigsen” (DEIM). 1♀ “Friedr. Wilhelmshafen D. N. G. | *Anomala* n. sp. bei ovalis Burm. [Ohaus’ handwriting] | coll. Bennigsen” (DEIM). 1♀ “D. N. Guinea But, II. 1910 H. Schoede S.G. | ♀ | *Anomala ternatana* Lansb.” (MNHB). 1♂ “Neu-Guinea Fruhst. V.” (MNHB). 1♀ Neu-Guinea Fruhst. V. | *Anomala luctuosa* Lansbg. Determ:K.M.Heller.” (MNHB). 1♀ “Friedr. Wilhelmshafen D. N. G. | ♀ | *Anomala aeruginosa* Boisd.” (MNHB). 1♂ “Friedr. Wilhelmshafen D. N. G. | *Anomala ternatana* Lansb.” (CCZ). 1♀ “D.Neu-Guinea Stephansort” (MNHB). 2♂, 1♀ Stephansort Astrolabe B. D.N.Guinea (Kunzmann 1894)” (MNHB). 1♂ Bongu Dtsch.N.-Guin. | *Anomala aeruginosa* Boisd.” (MNHB). 1♂ “D. Neuguinea Monumbo Miss.-Mus. Steyl | Ohaus determ. *Anomala aeruginosa* Boisd. ♂. [Ohaus’ handwriting]” (MNHB). 1♀ D. Neuguinea Bogia Miss.-Mus. Steyl | ♀ | *Anomala ternatana* Lansb.” (MNHB). 1♀ “Neu-Guinea Friedr.Wilh.-Hafen I.-III.98 Ramu-Exped. | 10.II.98 | no 206 18. II. 98 Friedr. Wilh. Hafen Ramu Expedition.” (MNHB). 1♀ “Neu-Guinea Kaiser Wilh.-Land Hatzfeldhafen Grabowsky S. | 110783 | Ohaus determin. 1915 *Anomala aeruginosa* ? Boisd. ♀.” (MNHB). 1♂ “N.Pommern | Collection Ph. Wunderlich | *Anomala ternatana* Lansb.” (MNHB). 1♂ D.N.Guinea | *Anomala aeruginosa* Boisd. [Ohaus’ handwriting]” (CCZ). 1♂ “77119 | 44. | ♂ | 109 | Neu Guinea” (MNHB). 1♂ “Neu Guinea | 77117” (MNHB). 1♂ “Finschhafen NEU-GUINEA [illegible] | *Anomala fuscoviridis* Bl.” (MNHB). 1♀ “D. N. GUINEA Wahnes | ♀ | *Anomala ternatana* Lansb.” (MNHB). 1♂ “Dtsch N.-Guinea” (MNHB). 1♀ “Deutsch Neu-Guinea” (MNHB). 1♀ “D. N. Guinea | ♀ | *Anomala ternatana* Lansb.” (MNHB). 1♂ “Dtsch N.-Guinea | *Anomala ternatana* Lsb. | Coll. M. Martin Le Moulte vendit” (IRSN). 1♀ “FINSCHHAFFEN DR. BREHME.” (IRSN). 1♀ “Bongu D N G | ternatana Ls v Guin | R.I.Sc.N.B.16.117 L.Burgeon, coll. et det.:” (IRSN).

### 3.25. *Anomala luctuosa* Lansberge, 1879

· *Anomala luctuosa* Lansberge, 1879: 151

**Description and Diagnosis.** *Anomala luctuosa* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: larger body size (length 14.8–16.9 mm; width 8.0–9.4 mm) (in contrast to *A. sulana* and *A. tahunensis*); wide coloration range, from pitch black without reddish shine (typical for specimens from Ambon and Seram) to reddish brown with the

characteristic black markings as described at *A. aeruginosa*; parameres ventrally with a relatively long tooth (especially the left one) (Figs. 86, 87); main sacculus of the endophallus with a rather short, basally broad and apically often somewhat cropped sclerite (Figs. 96, 97); without sclerotized knob at the base of the internal sac.

**Distribution.** Ambon, Seram, Kei Islands.

**Type material.** Syntypes: 1♂ “Molucc. Ambon | *Luctuosa* Lansb Type [Lansberge’s handwriting] | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♀ “Molucc. Ambon | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♂ “Ambon [handwriting] | Ex-Musaeo VAN LANSBERGE | Museum Paris ex Coll. R. Oberthur” (MNHN). 1♂ “Amboine | Suyckerbuyk | 9910 | *luctuosa* Lansb. 79 [Lansberge’s handwriting]” (IRSN). 1♂ “Mollucc. Ceram. | A *Luctuosa* Lansb [Lansberge’s handwriting] | Collection E. CANDEZE | *Luctuosa* Lsb. Ceram. Lsb. | Type | *luctuosa* Lsb. Révision G.J.Arrow 1913” (IRSN).

**Additional material examined.** 2♂ “Amboina” (DEIM). 1♂ “Key” (DEIM). 1♀ “Amboina Dec. & Febr. Dohety” (MNHB). 1♀ “Amboina” (MNHB). 1♀ “Ceram Stdgr.” (MNHB). 1♀ “Ceram Illo C.Ribbe 1884” (MNHB). 2♂, 2♀ “Key-Inseln Tual C.Ribbe 1884.” (MNHB). 1♂ “Kei Toeal, I.-III.95 H.C.Webster” (MNHB). 1♀ “Ceram | Museum Paris ex Coll. R. Oberthur” (MNHN). 2♀ “Hoedt. Ambon” (RMNH). 1♀ “Mus.Leiden Snellius Exp. Ambon 15 Sept 1930” (RMNH). 1♀ “Boeroe | 2737 | coll. Dr S. LEEFMANS | *Anomala*” (ZMAN).

### 3.26. *Anomala aruensis* sp.n.

**Description and Diagnosis.** *Anomala aruensis* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: large body size (length: 14.6–15.9 mm; width: 8.1–8.5 mm) (in contrast to *A. sulana* and *A. tahunensis*); color variability reaching from brownish black with faint coppery shine to castaneous with black patterns as described in *A. aeruginosa*; parameres ventrally with a pointed tooth which is shorter than in *A. luctuosa* and more distinct than in *A. aeruginosa* (Fig. 88); main sacculus of the endophallus with a relatively broad and short tongue-shaped sclerite (Fig. 99); without sclerotized knob at the base of the internal sac.

**Distribution.** Southern Mollucas: Aru Islands.

**Etymology.** This species is named after the type locality, the Aru Islands.

**Material.** Holotype: ♂ “ARU Ins. Schneider | *Anomala ternatana* Lansb.” (MNHB). – Paratypes: 1♀ same data as holotype (CCZ). 1♂ “ARU Ins. Schneider | *Anomala aeruginosa* Boisd. [Ohaus’ handwriting]” (CCZ). 1♀ “Aru-inseln Ureiuning C.Ribbe 1884 | 87683 | ♀” (MNHB). 1♂ “Aru-inseln Ureiuning C.Ribbe 1884” (MNHB).



### 3.27. *Anomala sulana* sp.n.

**Description and Diagnosis.** *Anomala sulana* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: smaller body size (length 12.5–13.1 mm; width: 6.8–7.3 mm) (shared with *A. tahunensis*); parameres ventrally widely rounded (Fig. 89); apical hook of ventral plate very small; endophallus with a sclerotized knob at the base of the internal sac (similar to that of *A. toliensis*) (Figs. 98, 125).

**Distribution.** Mangole Island (Sula Archipelago).

**Etymology.** This species is named after the type locality, the Sula Archipelago.

**Material.** Holotype: ♂ “Sula Mangoli Oct.-Novbr.Doherty” (MNHB). – Paratypes: 2♂, 2♀ same data as holotype (MNHB, CCZ).

### 3.28. *Anomala tahunensis* sp.n.

**Description and Diagnosis.** *Anomala tahunensis* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: medium body size (length: 12.2–14.3 mm; width: 6.7–7.6 mm) (shared with *A. sulana*); color uniformly dark reddish brown with a weak metallic green shine (no known variation); parameres ventrally with a rounded, almost square angle (Fig. 91); endophallus with a tongue-shaped sclerite on the main sacculus and without a knob at the base of the internal sac (Fig. 102).

**Distribution.** Northern Sulawesi: Sangihe Island

**Etymology.** The species epithet is derived from Tahuna, the largest town on Sangihe Island.

**Material.** Holotype: ♂ “Iles Sangir Coll.Bruijn 1877” (MNHN). – Paratypes: 4♂, 3♀ same data as holotype (MNHN, CCZ).

### 3.29. *Anomala toliensis* Ohaus, 1916

· *Anomala toliensis* Ohaus, 1916: 60, fig. 11

**Description and Diagnosis.** *Anomala toliensis* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: smaller body size (length: 11.1–13.4 mm; width: 5.9–7.6 mm); color uniformly dark reddish brown, rarely blackish; parameres with a very wide ventro-apical opening, ventrally not dentate or angulate (Fig. 90); endophallus very similar to that of *A. aeruginosa* but with a very small setose diverticle at the base of the internal sac; sclerotized plate of main

sacculus slender and pointed; accessory sacculus with an apical horn-shaped sclerite (Figs. 100, 126).

**Distribution.** Northern Sulawesi: Toli Toli; southern Sulawesi: Bira [?]; no records from the middle and southeastern parts of Sulawesi.

**Remarks.** The specimen from southern Sulawesi (Bira) differs in endophallus characters, the sclerite of the main sacculus is larger and not pointed as in specimens from Toli Toli in northern Sulawesi (Fig. 101). This fact can not be evaluated before more material from southern Sulawesi is available. Moreover, there are female specimens from Muna Island and the Tukang Besi Islands which are similar to *A. toliensis* but can not be assigned to any species with certainty at present.

**Type material.** Syntypes: 1♂: “Nord-Celebes Toli-Toli Nov.-Dez. 1895 H.Fruhstorfer | Type | *Anomala toliensis* Ohs.” (MNHB). 5♀ “Nord-Celebes Toli-Toli Nov.-Dez. 1895 H.Fruhstorfer | ♀ | Cotype | *Anomala toliensis* Ohs.” (MNHB). 2♂ “Nord-Celebes Toli-Toli Nov.-Dez. 1895 H.Fruhstorfer | ♂ | Cotype | *Anomala toliensis* Ohs.” (MNHB). 1♂ “Nord-Celebes Toli-Toli Nov.-Dez. 1895 H.Fruhstorfer | Cotype | *Anomala toliensis* Ohs.” (MNHB).

**Additional material examined.** 1♂, 3♀ “Nord-Celebes Toli-Toli Nov.-Dez. 1895” (BMNH). 1♂ “INDONESIA 1.2.1998 SULAWESI Isl. mer. BIRA vill. M.NIKODYM lgt.” (CCZ). 1♀ “Eil. Calla bij Moena” (RMNH).

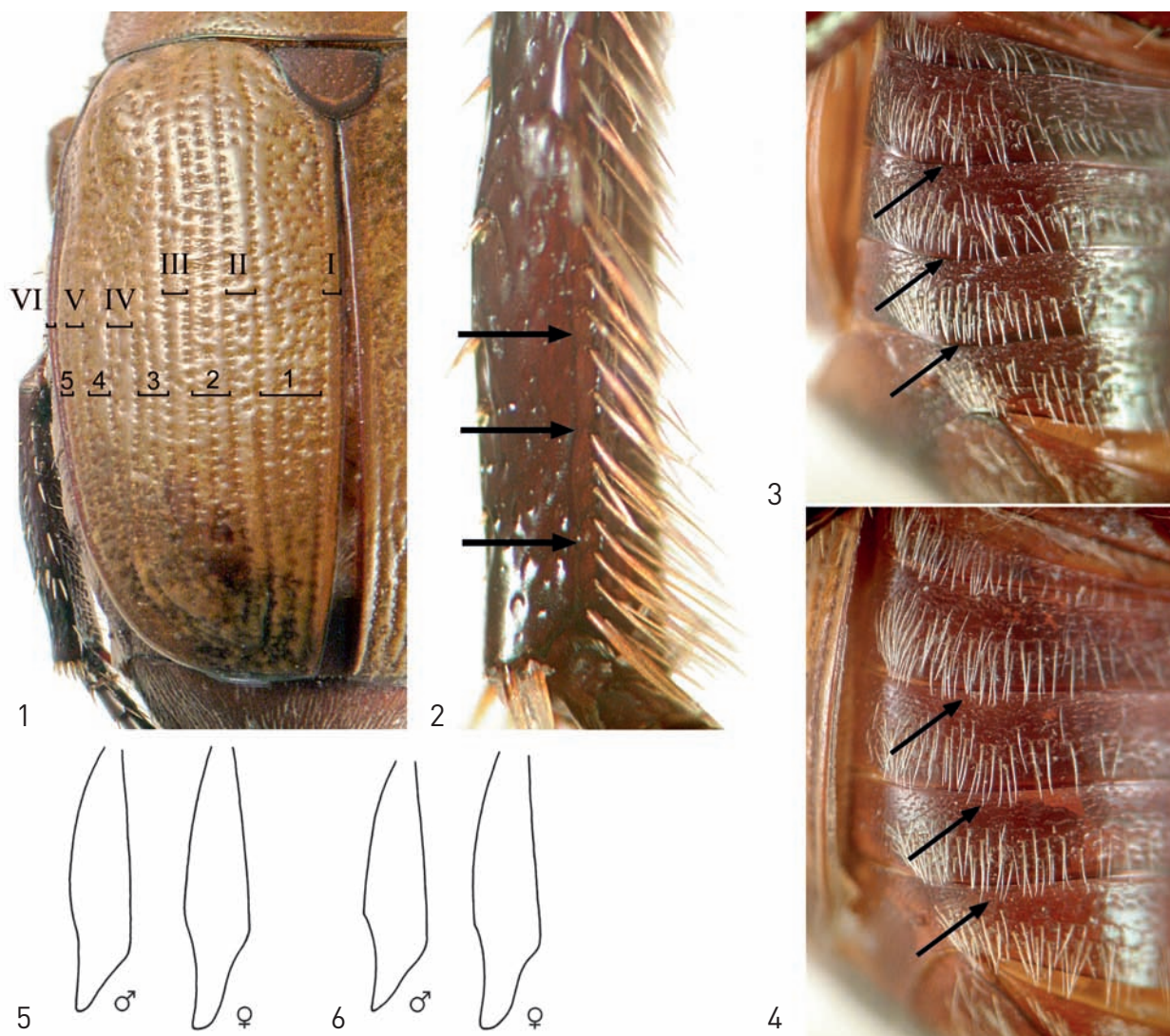
### [3.30. *Anomala cassiana* Ohaus, 1923]

· *Anomala cassiana* Ohaus, 1923: 587, fig. 8

**Description and Diagnosis.** *Anomala cassiana* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: Length: 11.3–14.1 mm; width: 6.5–7.5 mm; color uniformly dark reddish brown to orange brown dorsally; head black except anterior part of clypeus and a transversely elliptical patch between the eyes brown; pronotum, scutellum and elytra with blackened margins; lateral black margin of pronotum enlarged before the middle; elytra with broadly blackened humeral area and suture; ventral surface dark reddish brown to black with the distal parts of the abdominal sternites and fore coxae a little lighter; parameres ventrally widely rounded, with a very wide opening (Figs. 82–83); sclerotized plate of the main sacculus of the endophallus very large, broadly spoon-shaped; accessory sacculus with the typical apical horn-shaped sclerite as in *A. aeruginosa* but with two additional simple basal sclerites (Figs. 103, 127).

**Distribution.** Philippines: Samar; Bohol (Ubay); Mindanao (Dapitan, Pandag, Taganito, Zamboanga)

**Type material.** Lectotype (**here designated**): ♂ “Dapitan Mindanao Baker | Type | *cassiana* Ohs. [red, Ohaus’ hand-



**Figs. 1–6.** Explanation of morphological features. **1:** *A. maculicollis*, left elytron, dorso-lateral view; I–VI: numbered primary costae, 2nd costa with additional row of punctures; 1–5: numbered interstices, subsutural interstice irregularly punctate, 2nd interstice with almost complete secondary stria, 3rd interstice with abbreviated secondary stria, 4th interstice with very short secondary stria. **2:** *A. toliensis*, left mesotibia, dorsal view. **3:** *A. madangensis*, abdominal sternites, ventro-lateral view. **4:** *A. durvillei*, abdominal sternites, ventro-lateral view. **5, 6:** Shape of protibia in *A. pygidialis* (Fig. 5) and *A. bruggei* (Fig. 6).

writing]" (MNHB). Note: The original description was based on an unknown number of specimens from two localities but only one syntype was present at the MNHB. To avoid nomenclatorial instability a lectotype was designated.

**Additional material examined.** 1♂ "Island Samar Baker | Cotype | *Anomala cassiana* Ohs. [red, Ohaus' handwriting]" (MNHB) (invalid type designation). 1♂ "Taganito Mai 64. | Philippines Ch.Semper | Museum Paris ex Coll. R.Oberthur" (MNHN). 1♀ "Ubay Juli 63 | Philippines Ch.Semper | Museum Paris ex Coll. R.Oberthur" (MNHN). 1♀ "Ubay Oct. 63. | Philippines Ch.Semper | Museum Paris ex Coll. R.Oberthur" (MNHN). 1♂ "Pandag Juni 66. | Philippines Ch.Semper | Museum Paris ex Coll. R.Oberthur" (MNHN).

### [3.31. *Anomala calpurnia* Ohaus, 1923]

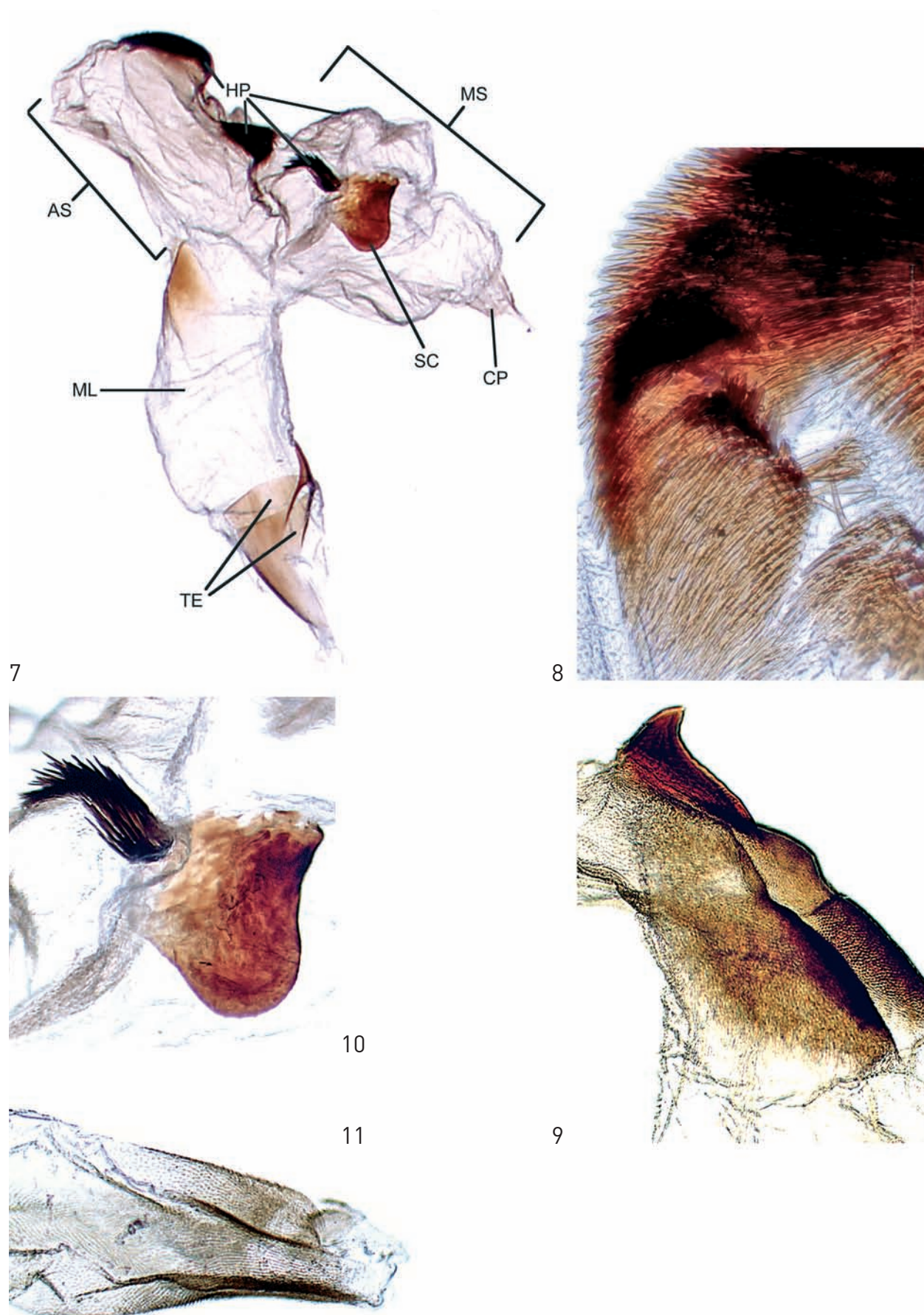
• *Anomala calpurnia* Ohaus, 1923: 587, fig. 7

**Description and Diagnosis.** *Anomala calpurnia* belongs to the *A. aeruginosa*-species complex (see diagnosis and remarks at *A. aeruginosa*). It is separated from the other species by the combination of the following characters: small body size (length 10.6 mm; width 6.0 mm); color dark reddish brown; pronotum lighter castaneous; elytra yellowish brown; pronotum and elytra with black margins; elytra with regular striae; without small rugae in the lateral area; aedeagus more elongated than in the other species of this complex (comp. fig. 7 in OHAUS 1923), somewhat resembling that of *A. bousqueti*; endophallus similar to that of *A. cassiana* but accessory sacculus without basal sclerites, sclerite of the main sacculus broad.

**Distribution.** Philippines: Parillo Island.

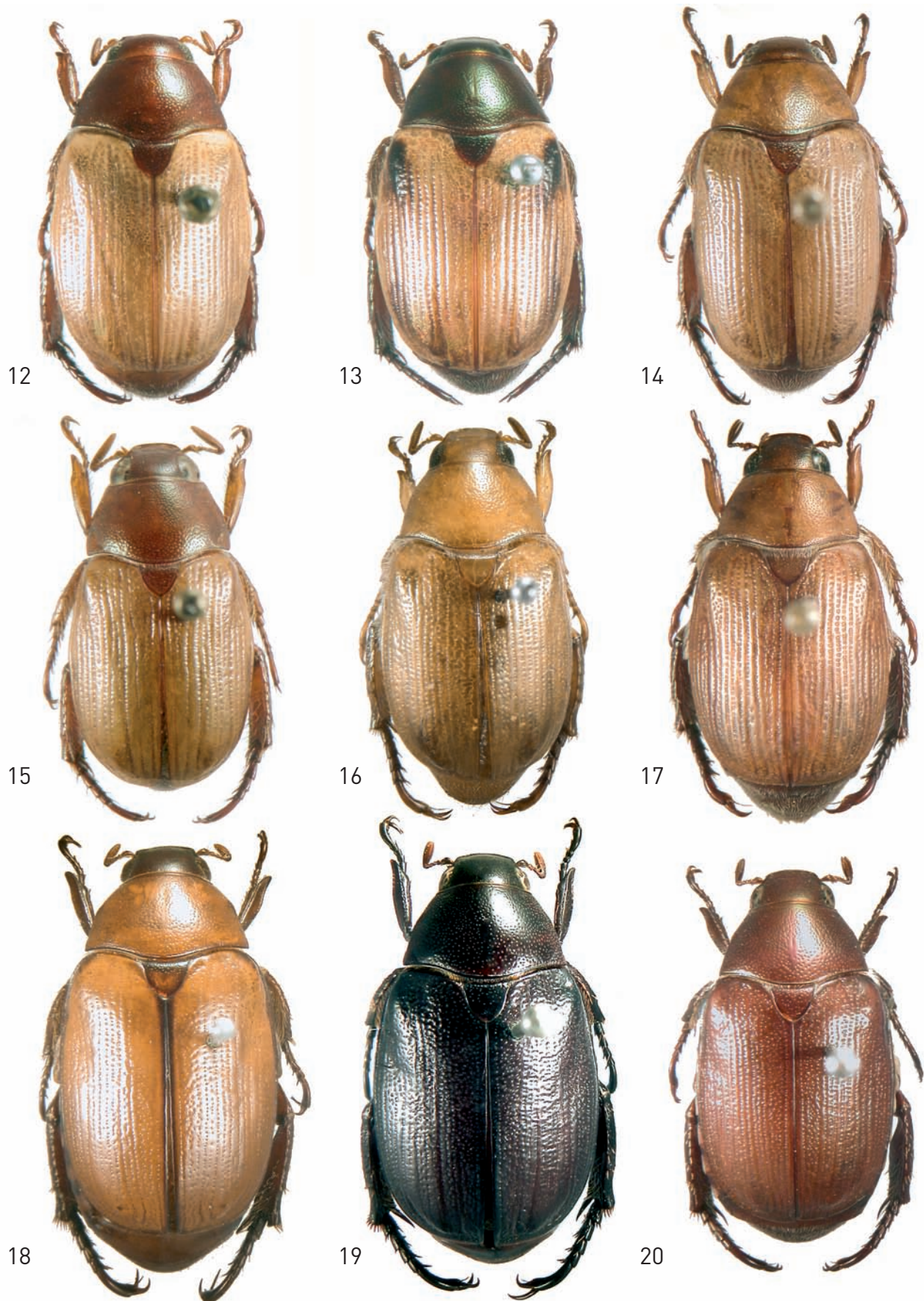
**Type material.** Syntype: 1♂ "Island Polilo Baker | Type | *Anomala calpurnia* Ohs." (MNHB).



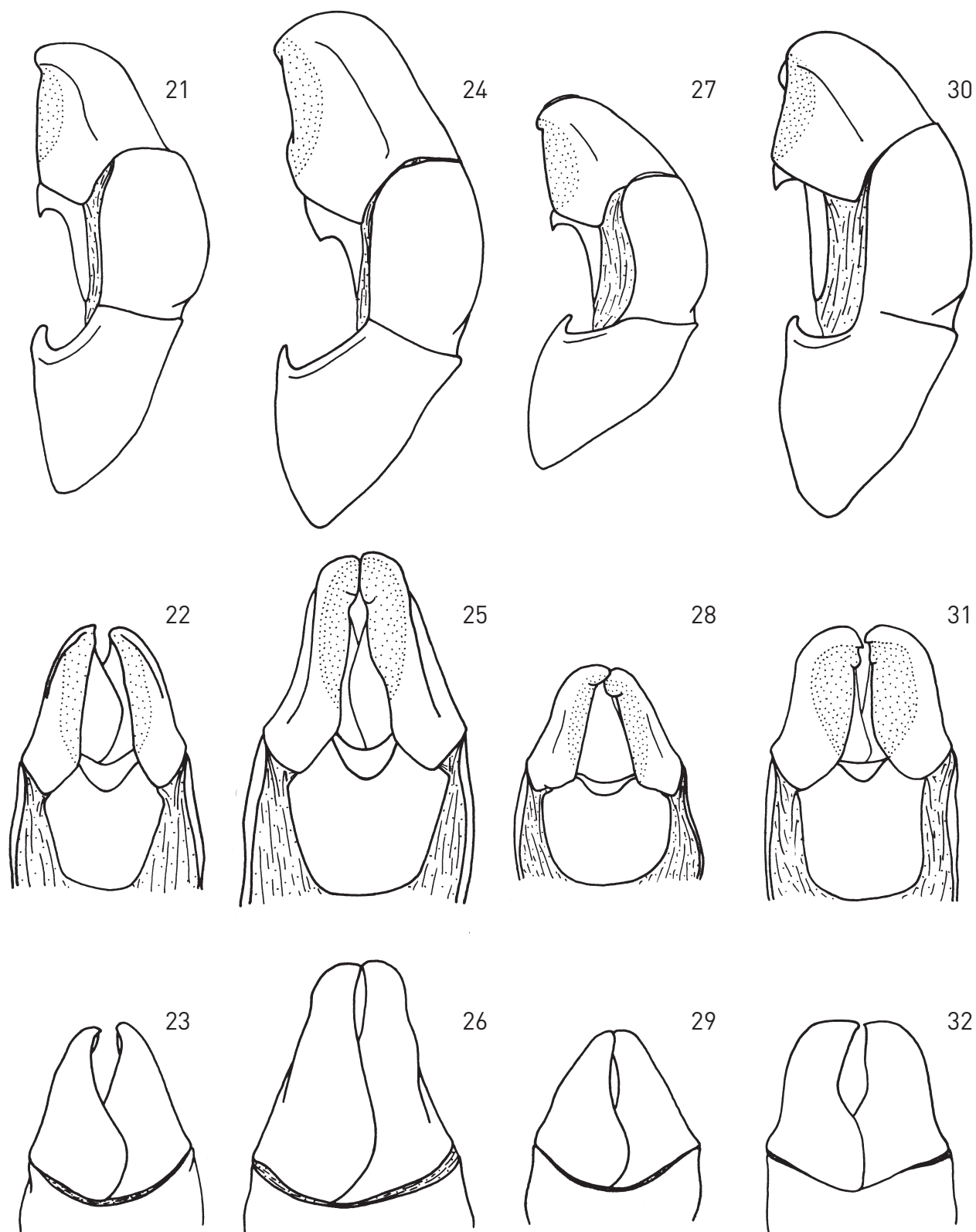


**Figs. 7–11.** Endophallus and its structural details. **7:** Endophallus of *A. aeneiventris*, ventro-lateral view; AS: accessory sacculus; CP: copulatory piece; HP: hair patch; ML: median lobe; MS: main sacculus; SC: sclerite; TE: temones. **8:** *A. denticulata*, hair patch. **9:** *A. aruensis*, hair patch combined with hook-shaped sclerite. **10:** *A. aeneiventris*, sclerotized plate combined with hair patch (thickened spine-like setae). **11:** *A. durvillei*, copulatory piece with microscopic setation.

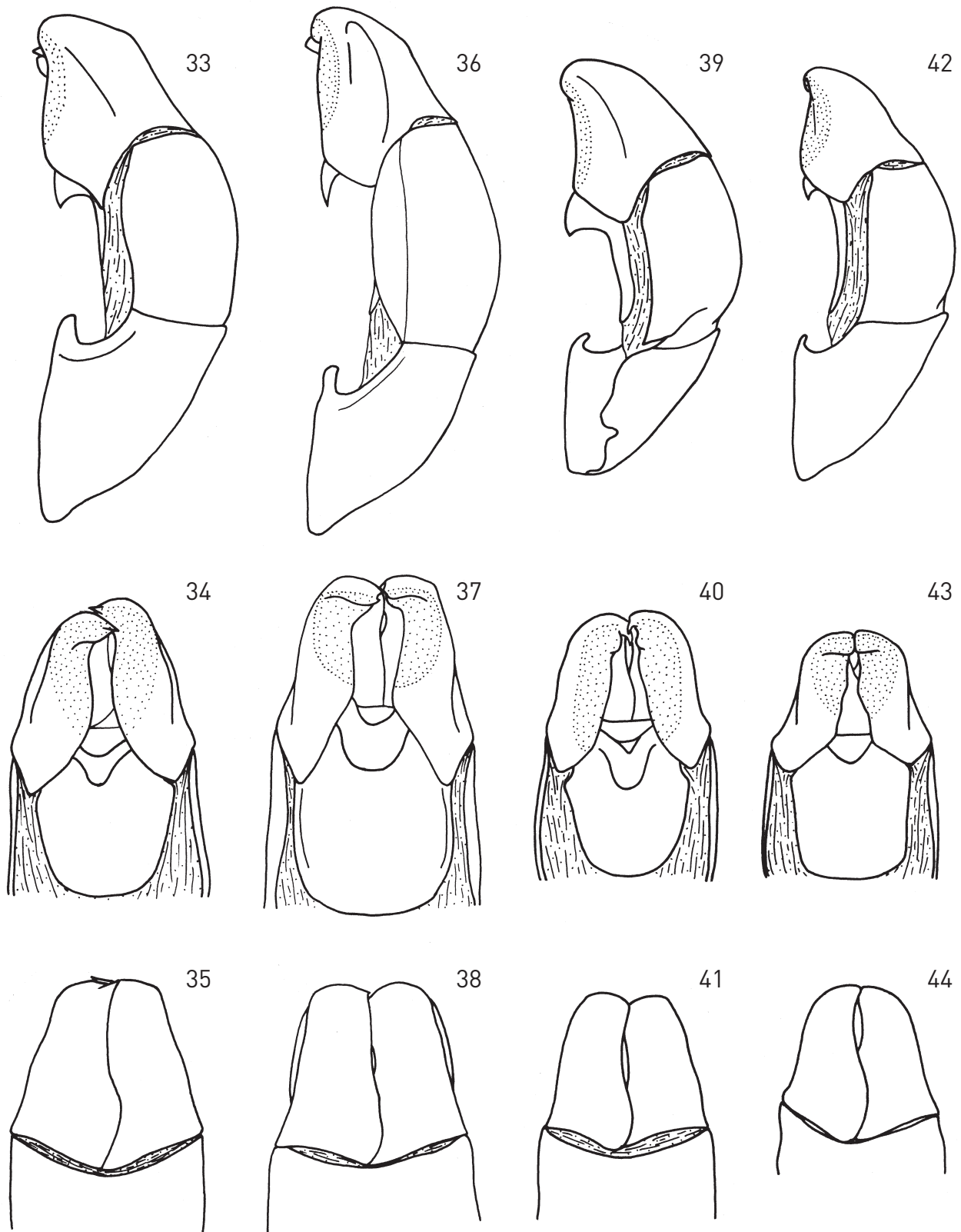




**Figs. 12–20.** Habitus images. 12: *A. irianensis* (male paratype, Ifar). 13: *A. denticulata* (male paratype, Aitape). 14: *A. pygidialis* (male, Sorong). 15: *A. sarmiensis* (male paratype, Yamna Island). 16: *A. chlorotica* (male, Ambon). 17: *A. bousqueti* (male, Bunaken Island, Sulawesi). 18: *A. aeruginosa* (female paralectotype of *A. ternatana*, Ternate, light brown color variety). 19: *A. luctuosa* (male, Ambon, black color variety). 20: *A. sulana* (holotype male, Mangole).

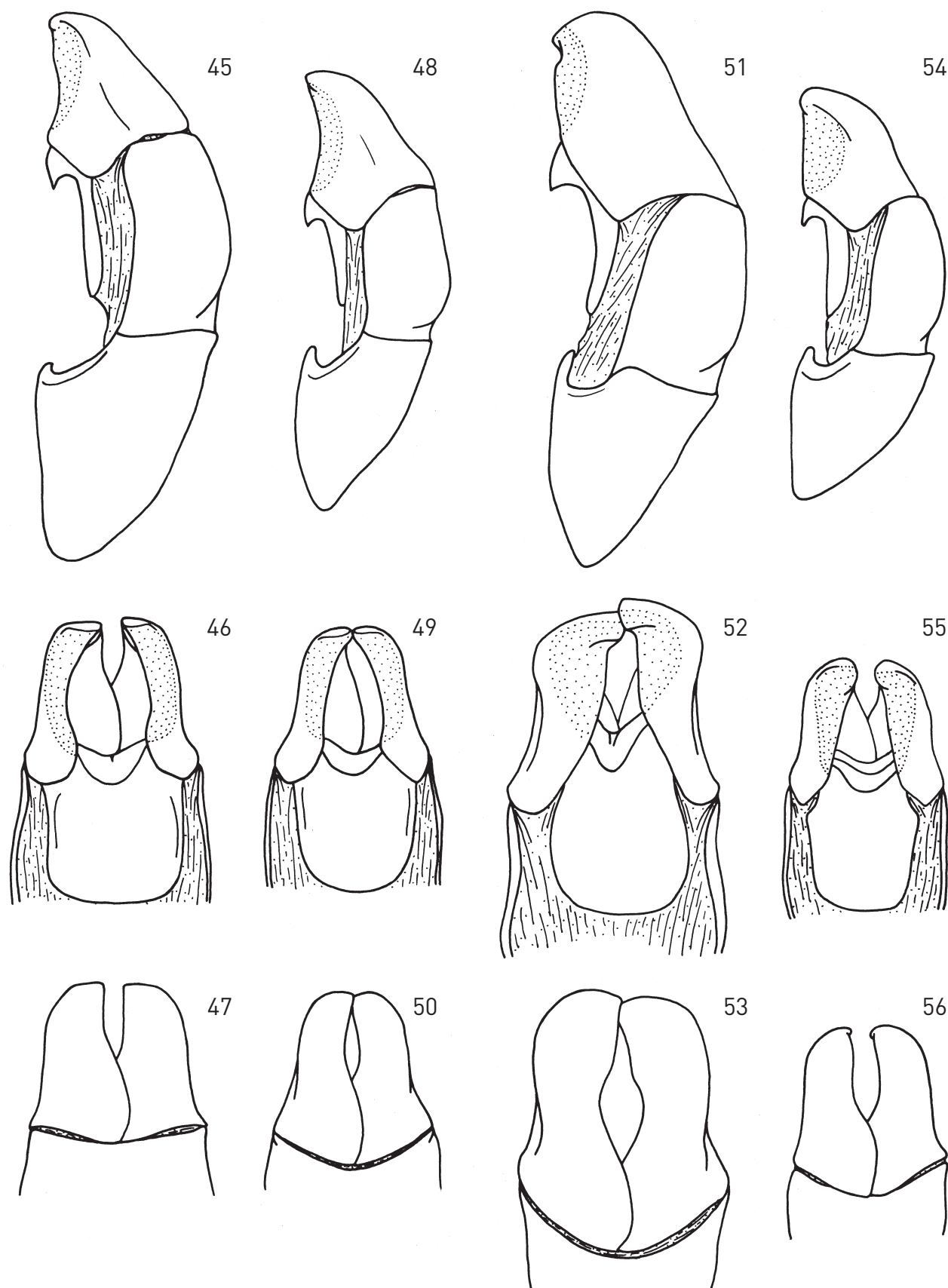


**Figs. 21–23.** Aedeagus of *A. aeneiventris* (Gazelle Peninsula, New Britain). **21:** Lateral aspect. **22:** Ventral aspect. **23:** Dorsal aspect. **Figs. 24–26.** Aedeagus of *A. madangensis* (paratype, Lae). **24:** Lateral aspect. **25:** Ventral aspect. **26:** Dorsal aspect. **Figs. 27–29.** Aedeagus of *A. kuekenthali* (paratype, Ternate). **27:** Lateral aspect. **28:** Ventral aspect. **29:** Dorsal aspect. **Figs. 30–32.** Aedeagus of *A. irianensis* (Jayapura). **30:** Lateral aspect. **31:** Ventral aspect. **32:** Dorsal aspect. (scale = 1 mm)

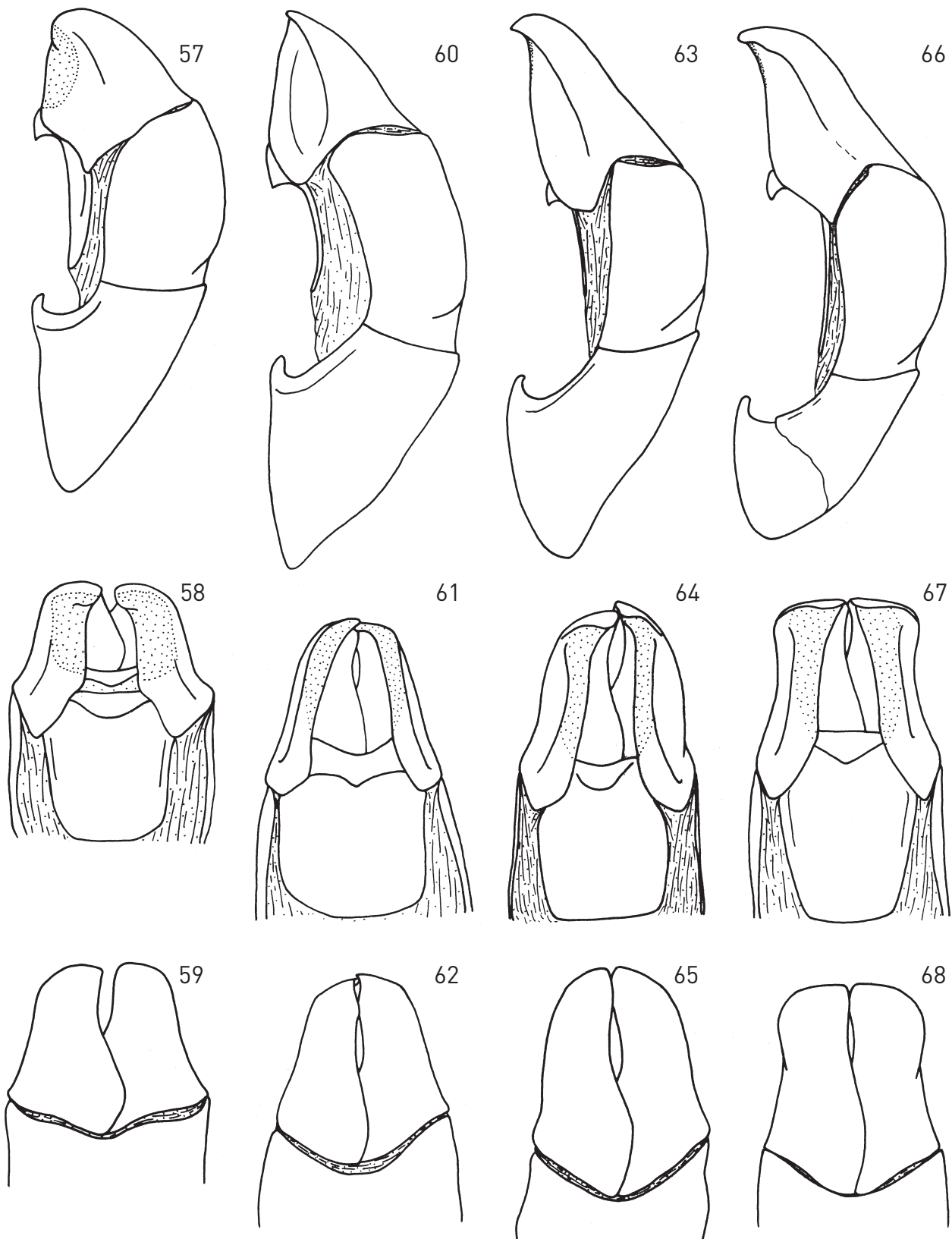


**Figs. 33–35.** Aedeagus of *A. durvillei* (paratype, Finschhafen). **33:** Lateral aspect. **34:** Ventral aspect. **35:** Dorsal aspect. **Figs. 36–38.** Aedeagus of *A. fergussonensis* (Fergusson Island). **36:** Lateral aspect. **37:** Ventral aspect. **38:** Dorsal aspect. **Figs. 39–41.** Aedeagus of *A. denticulata* (paratype, Aitape). **39:** Lateral aspect. **40:** Ventral aspect. **41:** Dorsal aspect. **Figs. 42–44.** Aedeagus of *A. malukana* (holotype, Aru). **42:** Lateral aspect. **43:** Ventral aspect. **44:** Dorsal aspect. (scale = 1 mm)

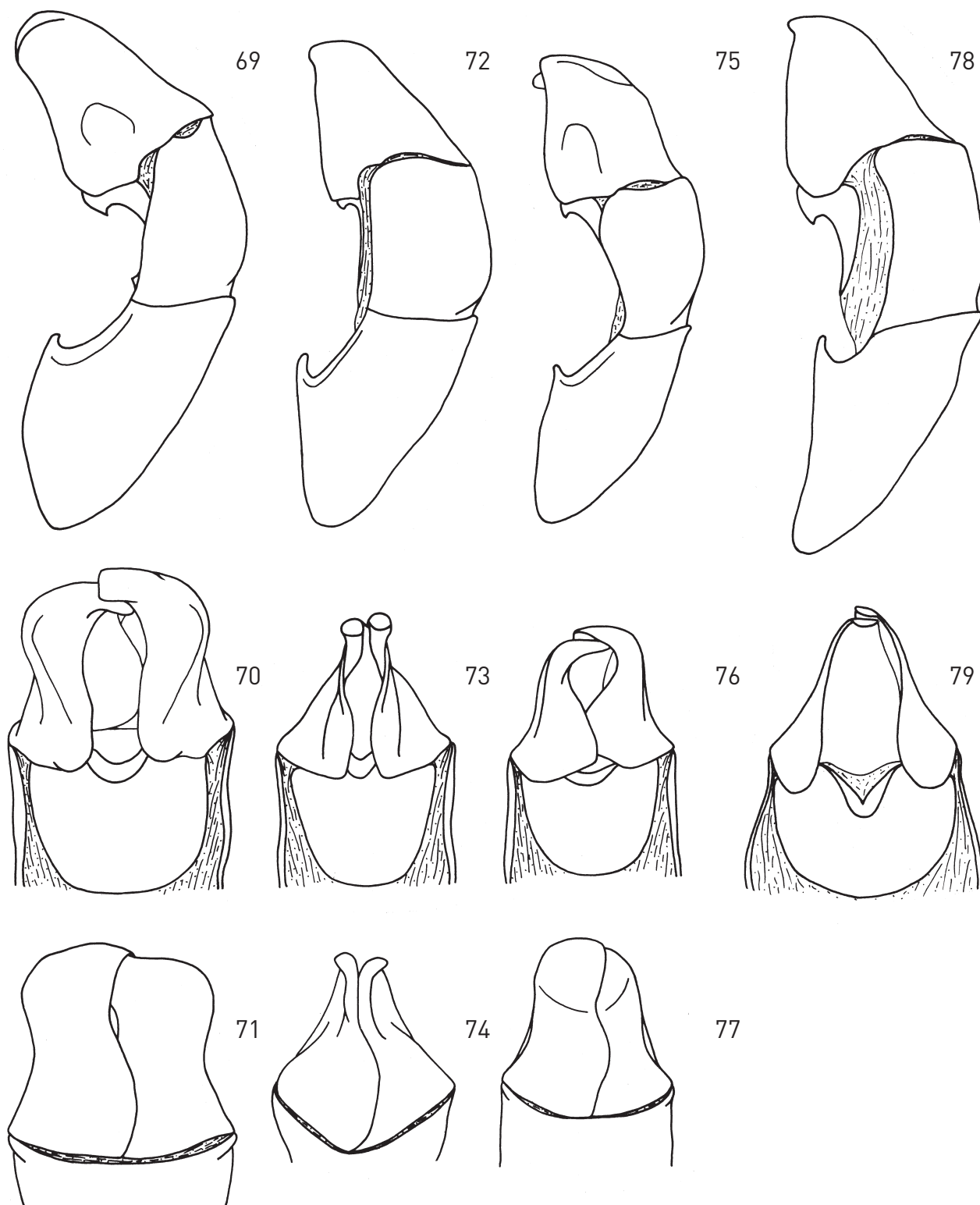




**Figs. 45–47.** Aedeagus of *A. pygidialis* (Nabire). **45:** Lateral aspect. **46:** Ventral aspect. **47:** Dorsal aspect. **Figs. 48–50.** Aedeagus of *A. pygidialis* (Misool). **48:** Lateral aspect. **49:** Ventral aspect. **50:** Dorsal aspect. **Figs. 51–53.** Aedeagus of *A. bruggei* (paratype, Roon Island). **51:** Lateral aspect. **52:** Ventral aspect. **53:** Dorsal aspect. **Figs. 54–56.** Aedeagus of *A. merkli* (paratype, Jayapura). **54:** Lateral aspect. **55:** Ventral aspect. **56:** Dorsal aspect. (scale = 1 mm)

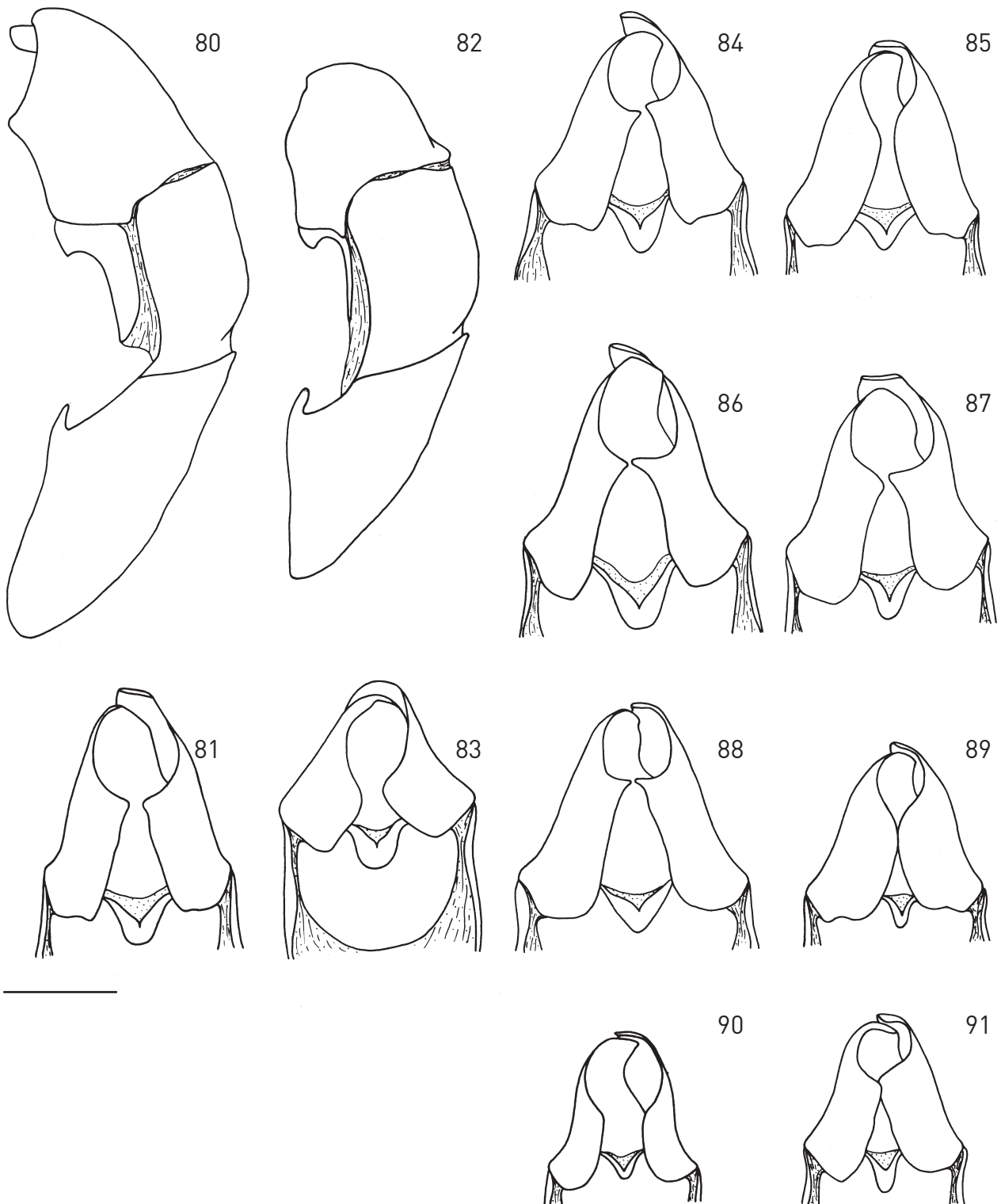


**Figs. 57–59.** Aedeagus of *A. biakensis* (holotype, Biak). **57:** Lateral aspect. **58:** Ventral aspect. **59:** Dorsal aspect. **Figs. 60–62.** Aedeagus of *A. butensis* (paratype, But). **60:** Lateral aspect. **61:** Ventral aspect. **62:** Dorsal aspect. **Figs. 63–65.** Aedeagus of *A. ophthalmica* (paratype, Sisimangum). **63:** Lateral aspect. **64:** ventral aspect. **65:** Dorsal aspect. **Figs. 66–68.** Aedeagus of *A. sarmiensis* (holotype, Sarmi). **66:** Lateral aspect. **67:** Ventral aspect. **68:** Dorsal aspect. (scale = 1 mm)



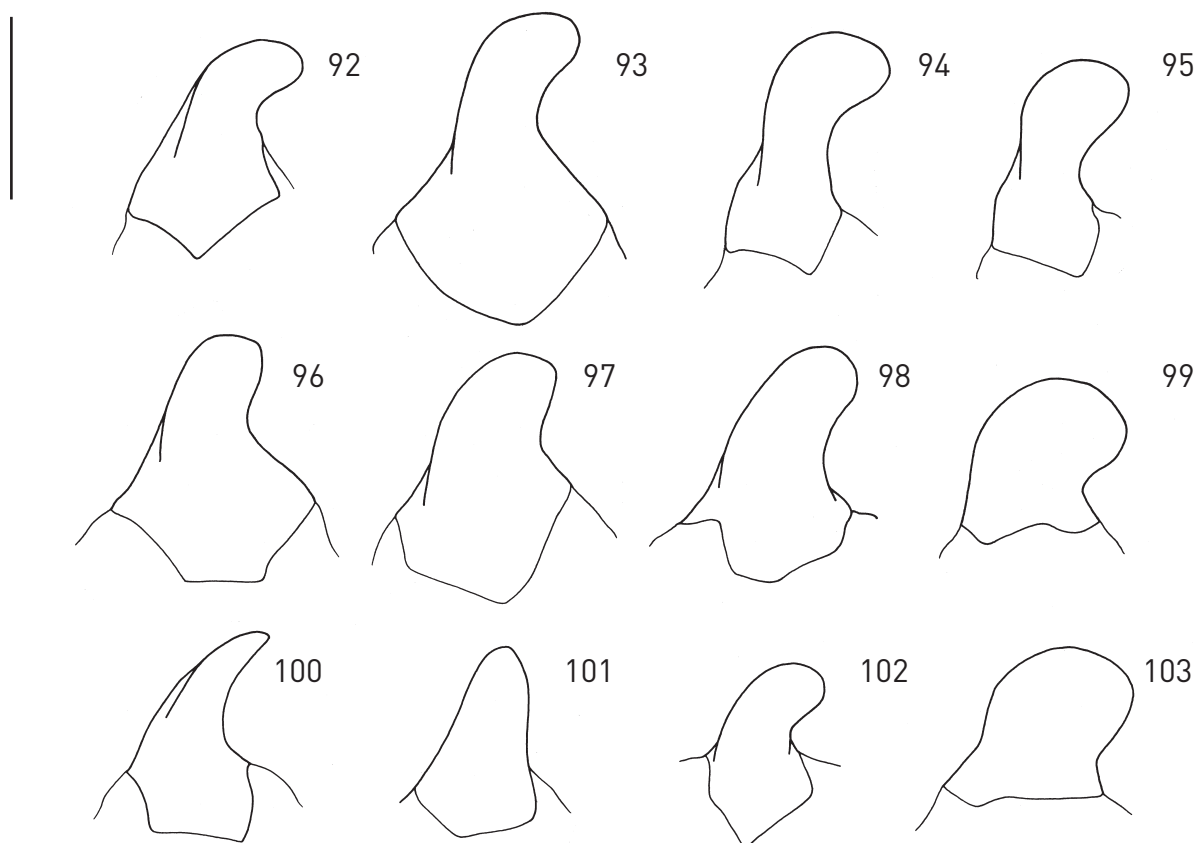
**Figs. 69–71.** Aedeagus of *A. chlorotica* (lectotype, Ambon). **69:** Lateral aspect. **70:** Ventral aspect. **71:** Dorsal aspect. **Figs. 72–74.** Aedeagus of *A. toxopei* (holotype, Buru). **72:** Lateral aspect. **73:** Ventral aspect. **74:** Dorsal aspect. **Figs. 75–77.** Aedeagus of *A. maculicollis* (lectotype, Seram). **75:** Lateral aspect. **76:** Ventral aspect. **77:** Dorsal aspect. **Figs. 78–79.** Aedeagus of *A. bousqueti* (NT, Bantaeng, S. Sulawesi). **78:** Lateral aspect. **79:** Ventral aspect. (scale = 1 mm)



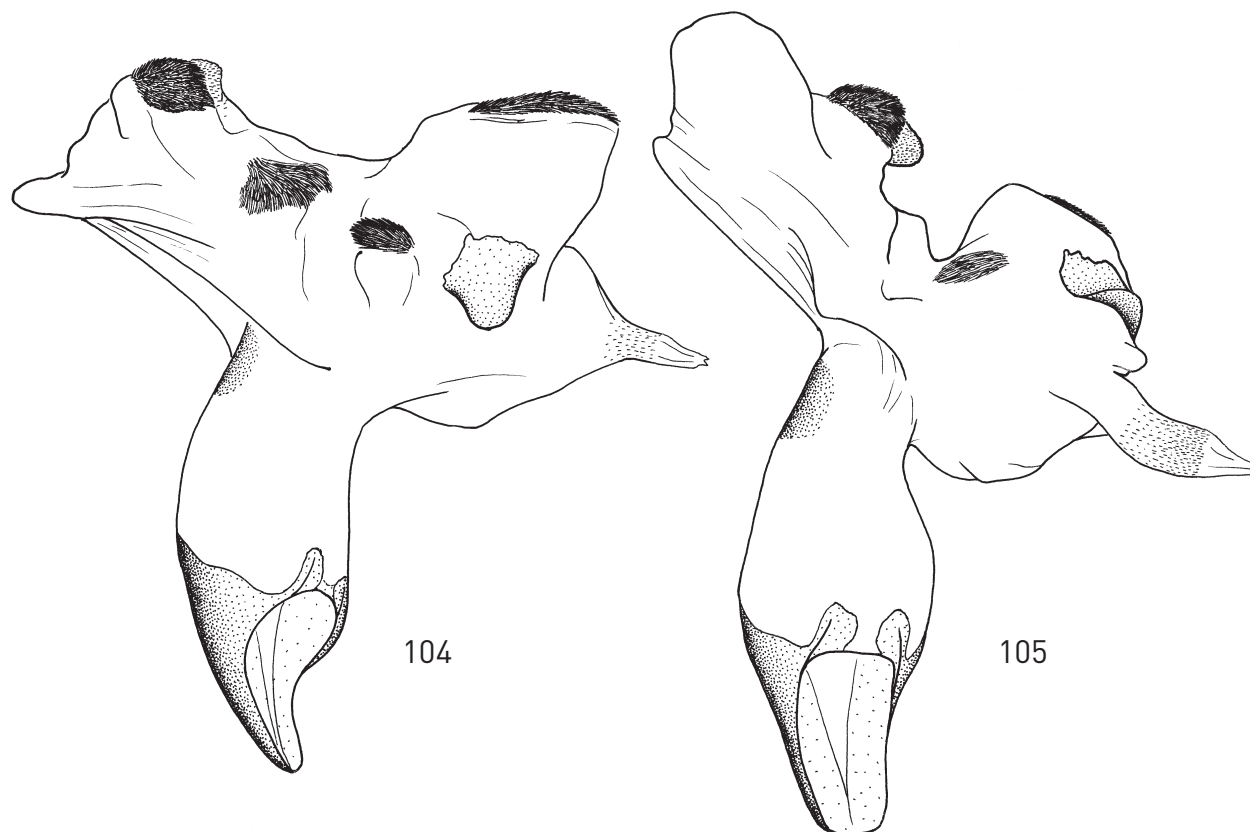


**Figs. 80–81.** Aedeagus of *A. aeruginosa* (NT, Waigeo). **80:** Lateral aspect. **81:** Ventral aspect. **Figs. 82–83.** Aedeagus of *A. cassiana* (paralectotype, Dapitan). **82:** Lateral aspect. **83:** Ventral aspect. (scale = 1 mm)

**Figs. 84–91.** Ventral aspect of aedeagi. **84:** *A. aeruginosa* (lectotype of *A. ternatana*, Ternate). **85:** *A. papuensis* (paratype, New Britain). **86:** *A. luctuosa* (lectotype, Ambon). **87:** *A. luctuosa* (Kei). **88:** *A. aruensis* (holotype, Aru). **89:** *A. sulana* (holotype, Mangole). **90:** *A. toliensis* (Toli Toli). **91:** *A. tahunensis* (holotype, Sangihe). (scale = 1 mm)



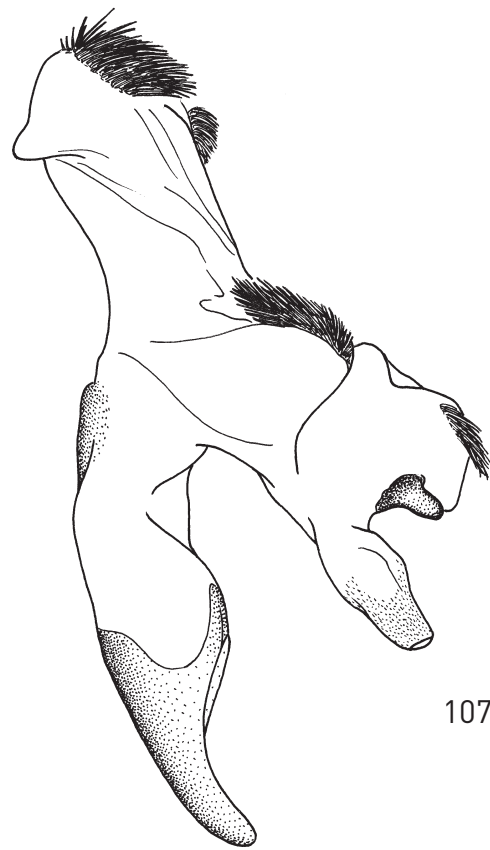
**Figs. 92–103.** Large sclerite of main sacculus of endophallus. **92:** *A. aeruginosa* (neotype, Waigeo). **93:** *A. aeruginosa* (lectotype of *A. ternatana*, Ternate). **94:** *A. papuensis* (paratype, Bogadjim). **95:** *A. papuensis* (paratype, New Britain). **96:** *A. luctuosa* (Ambon). **97:** *A. luctuosa* (Kei). **98:** *A. sulana* (paratype, Sula Mangoli). **99:** *A. aruensis* (paratype, Aru). **100:** *A. toliensis* (Toli Toli). **101:** *A. ?tolienensis* (Bira). **102:** *A. tahunensis* (paratype, Sangihe). **103:** *A. cassiana* (Pandag, Mindanao). (scale = 1 mm)



**Figs. 104–105.** Endophallus. **104:** *A. aeneiventris* (Kinigunang, New Britain). **105:** *A. madangensis* (paratype, Laing Island).



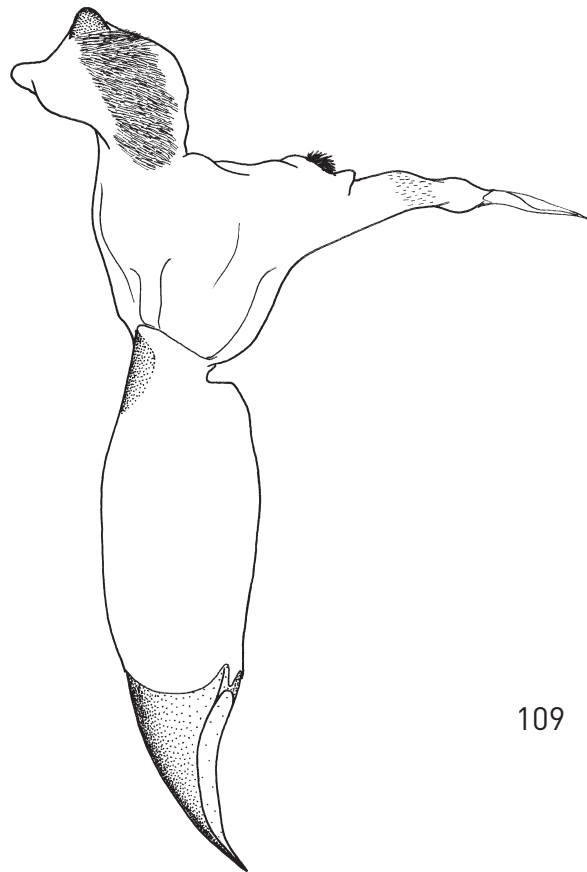
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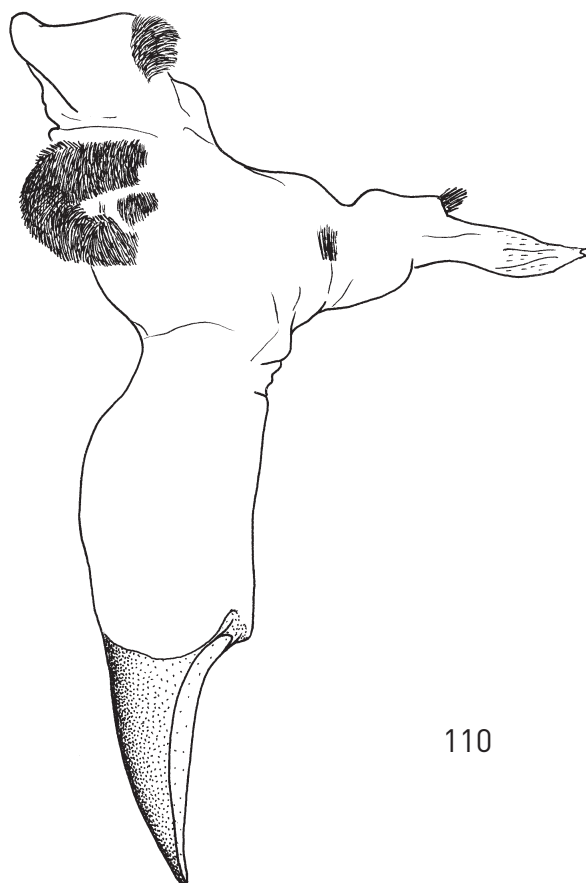
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**Figs. 106–109.** Endophallus. **106:** *A. kuekenthali* (paratype, Bacan). **107:** *A. irianensis* (paratype, Jayapura). **108:** *A. durvillei* (paratype, Finschhafen). **109:** *A. fergussonensis* (paratype, Woodlark).

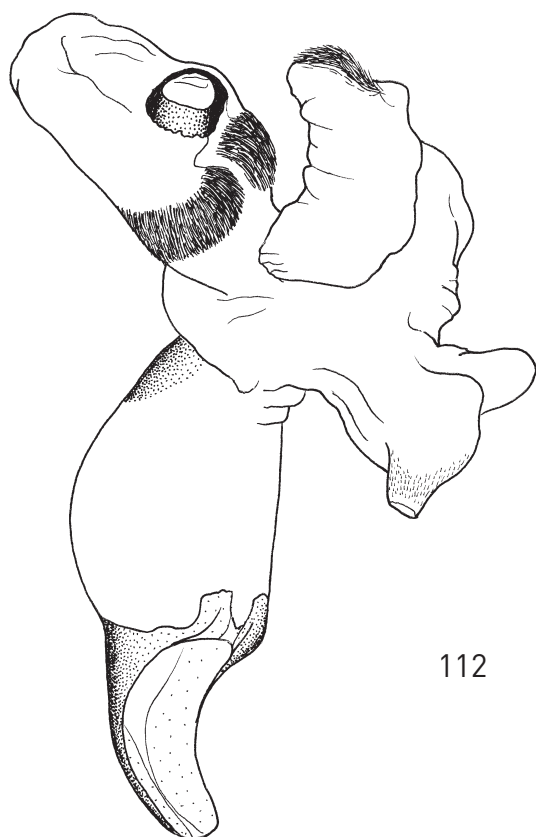




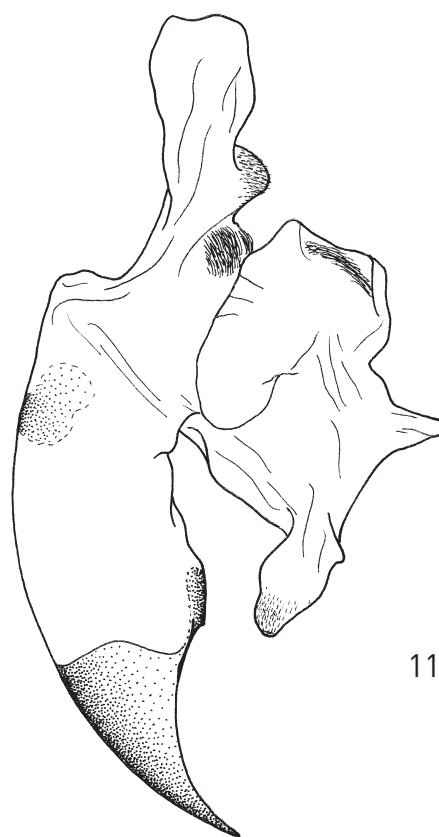
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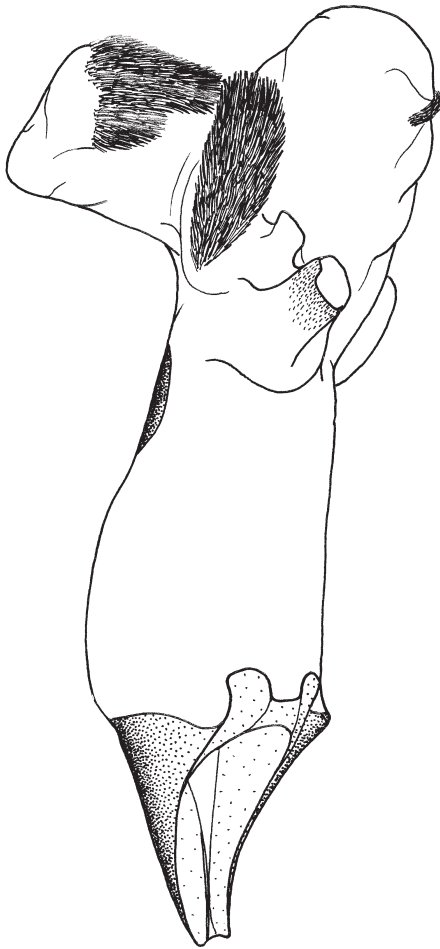


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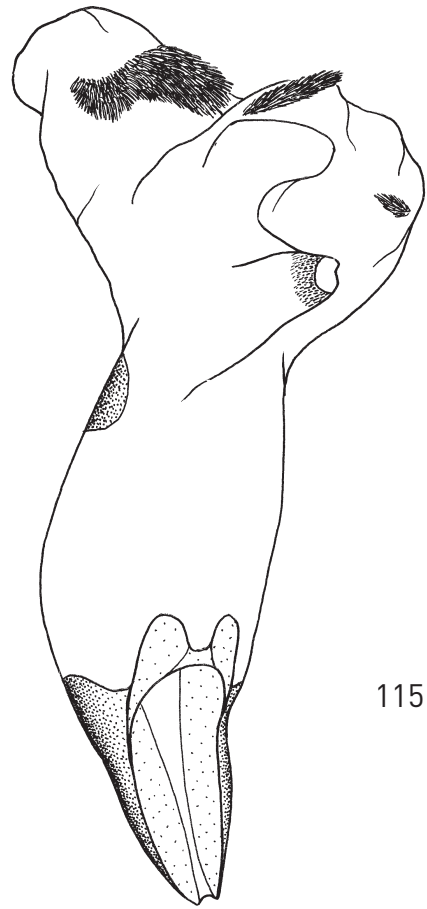


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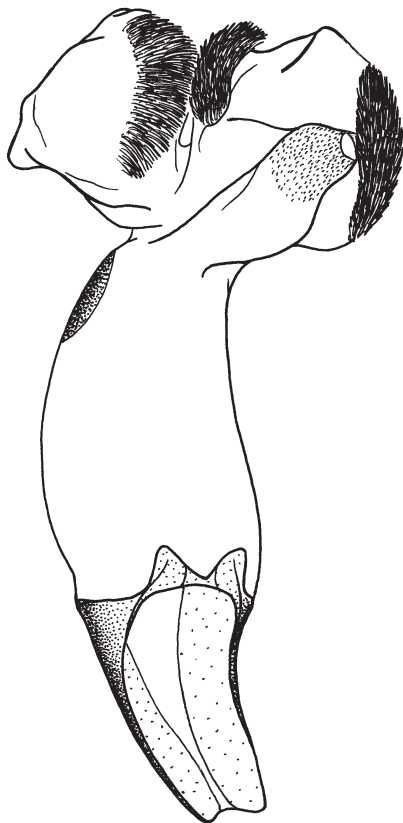
**Figs. 110–113.** Endophallus. **110:** *A. denticulata* (paratype, Aitape). **111:** *A. malukana* (paratype, Aru). **112:** *A. pygidialis* (Sorong). **113:** *A. pygidialis* (Misool).



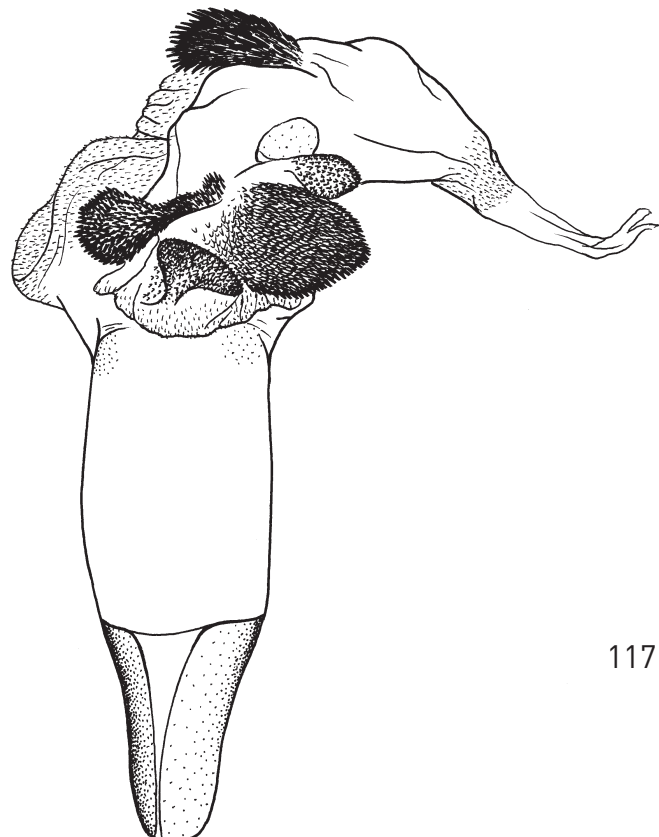
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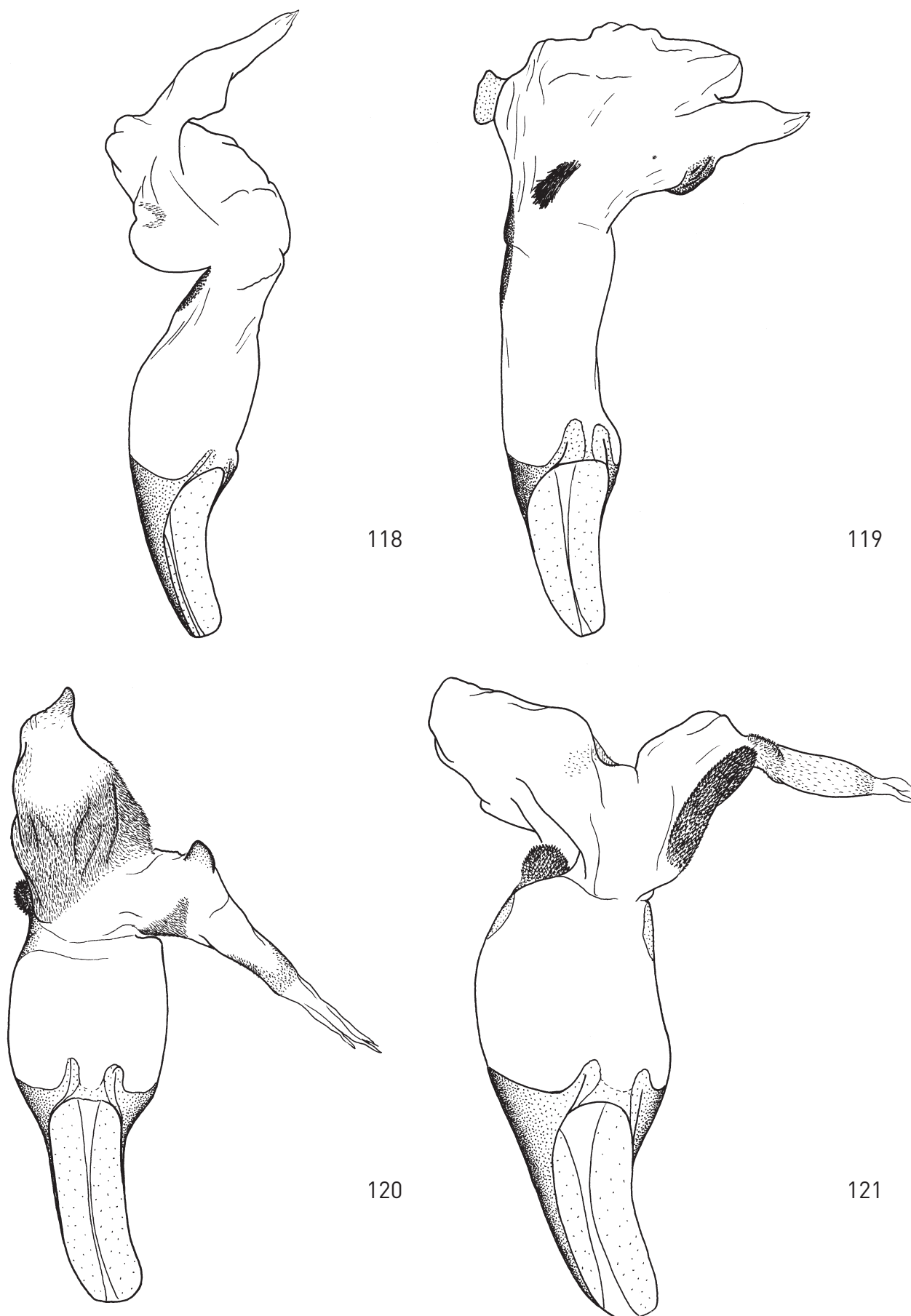


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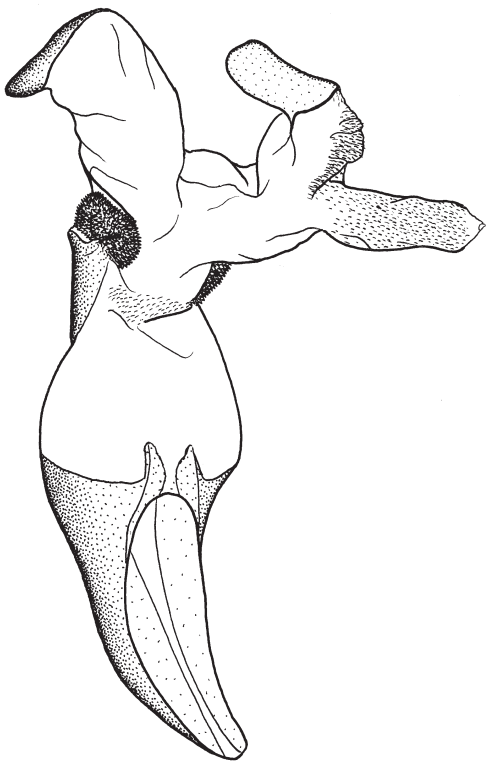
117

**Figs. 114–117.** Endophallus. **114:** *A. bruggei* (paratype, Jobi). **115:** *A. merkli* (holotype, But). **116:** *A. biakensis* (paratype, Biak). **117:** *A. butensis* (paratype, Aitape).

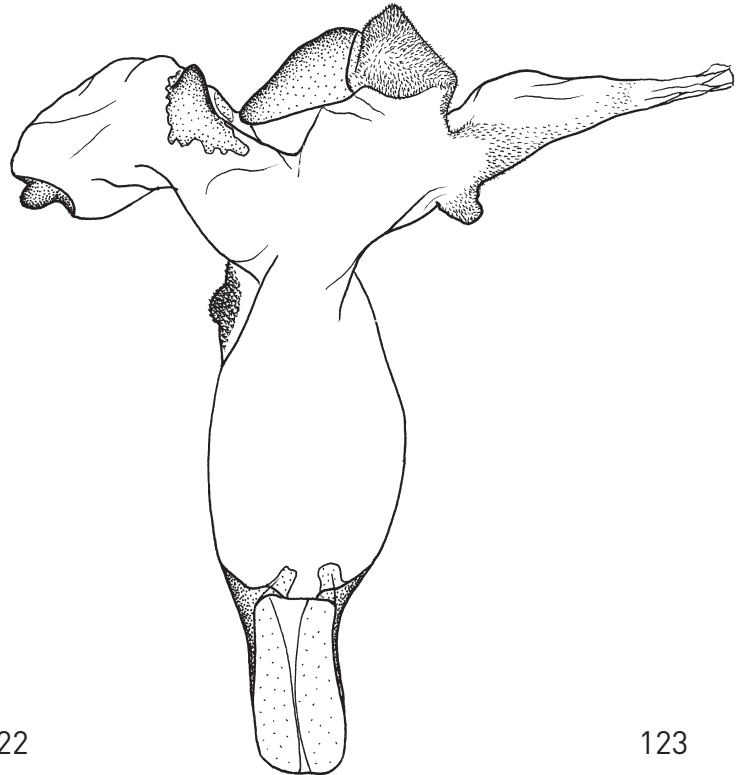


**Figs. 118–121.** Endophallus. **118:** *A. ophthalmica* (paratype, Way, Morobe prov.). **119:** *A. sarmiensis* (paratype, Yamna Island). **120:** *A. chlorotica* (Ambon). **121:** *A. toxopei* (holotype, Buru).

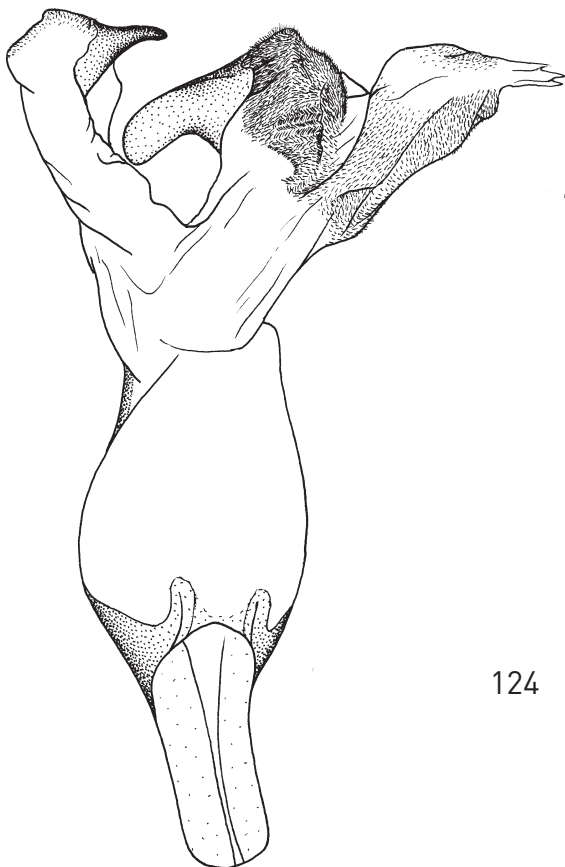




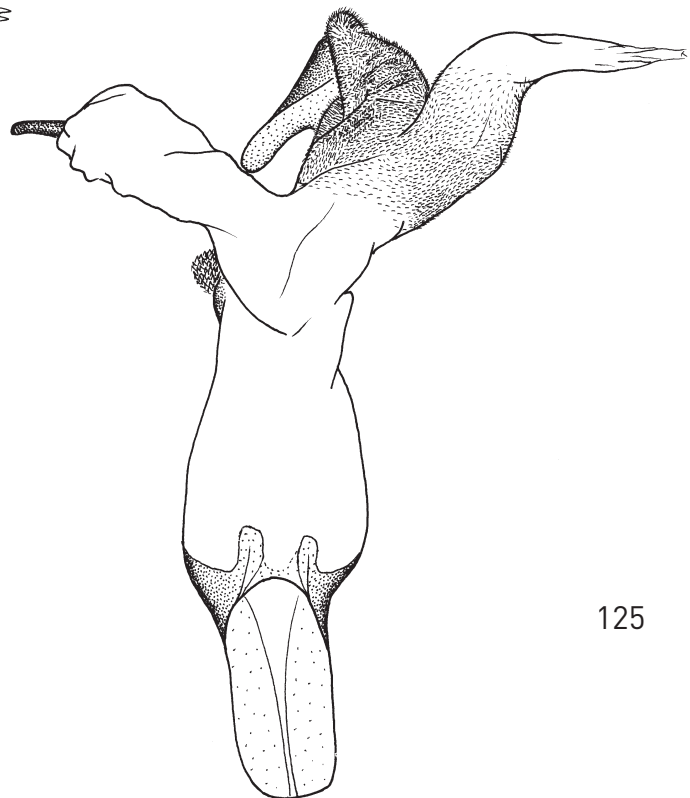
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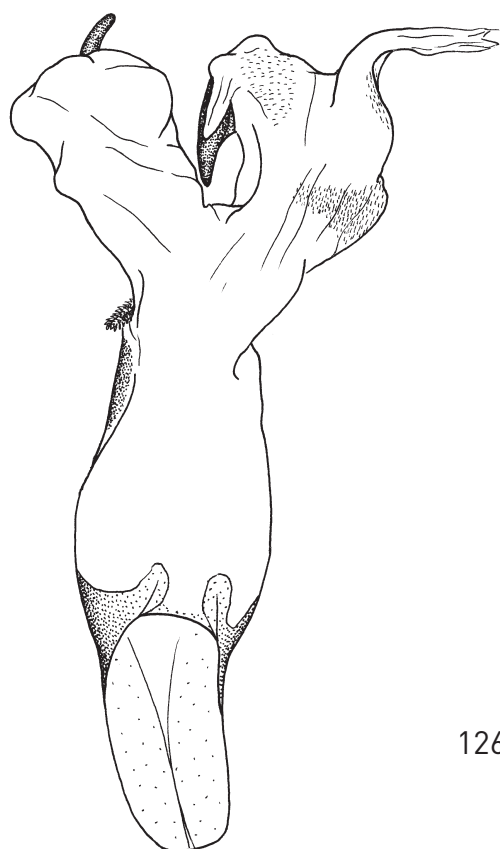


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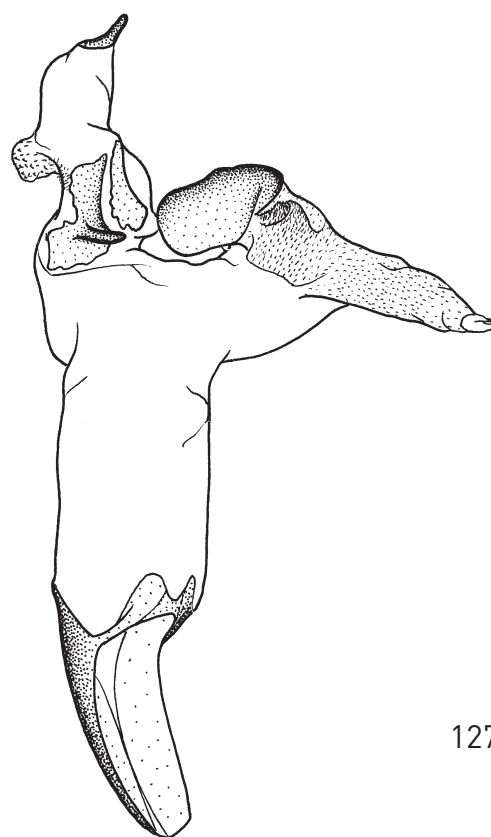


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**Figs. 122–125.** Endophallus. **122:** *A. maculicollis* (Tevor Island). **123:** *A. bousqueti* (Manado). **124:** *A. aeruginosa* (Halmahera). **125:** *A. sulana* (holotype, Mangole).

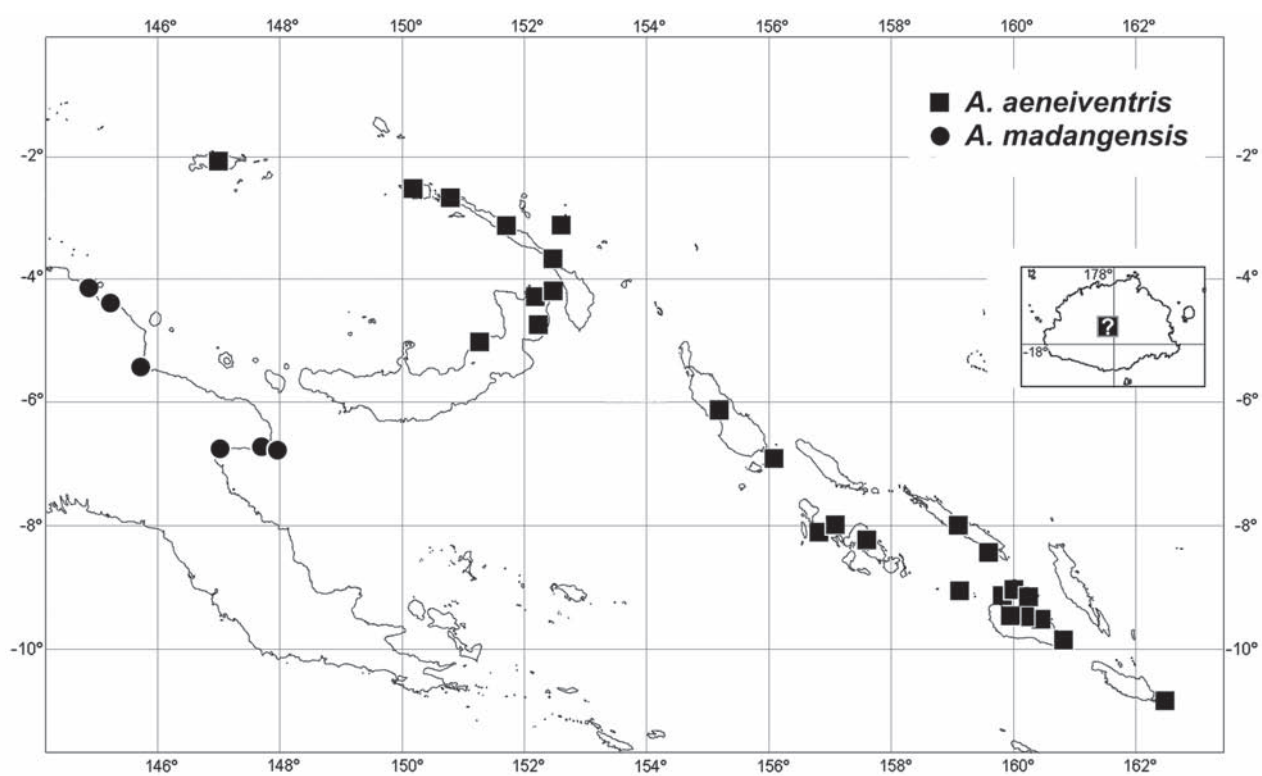


126



127

**Figs. 126–127.** Endophallus. **126:** *A. toliensis* (Toli Toli, Sulawesi). **127:** *A. cassiana* (Pandag, Mindanao).



**Fig. 128.** Distribution of *A. aeneiventris* and *A. madangensis*.

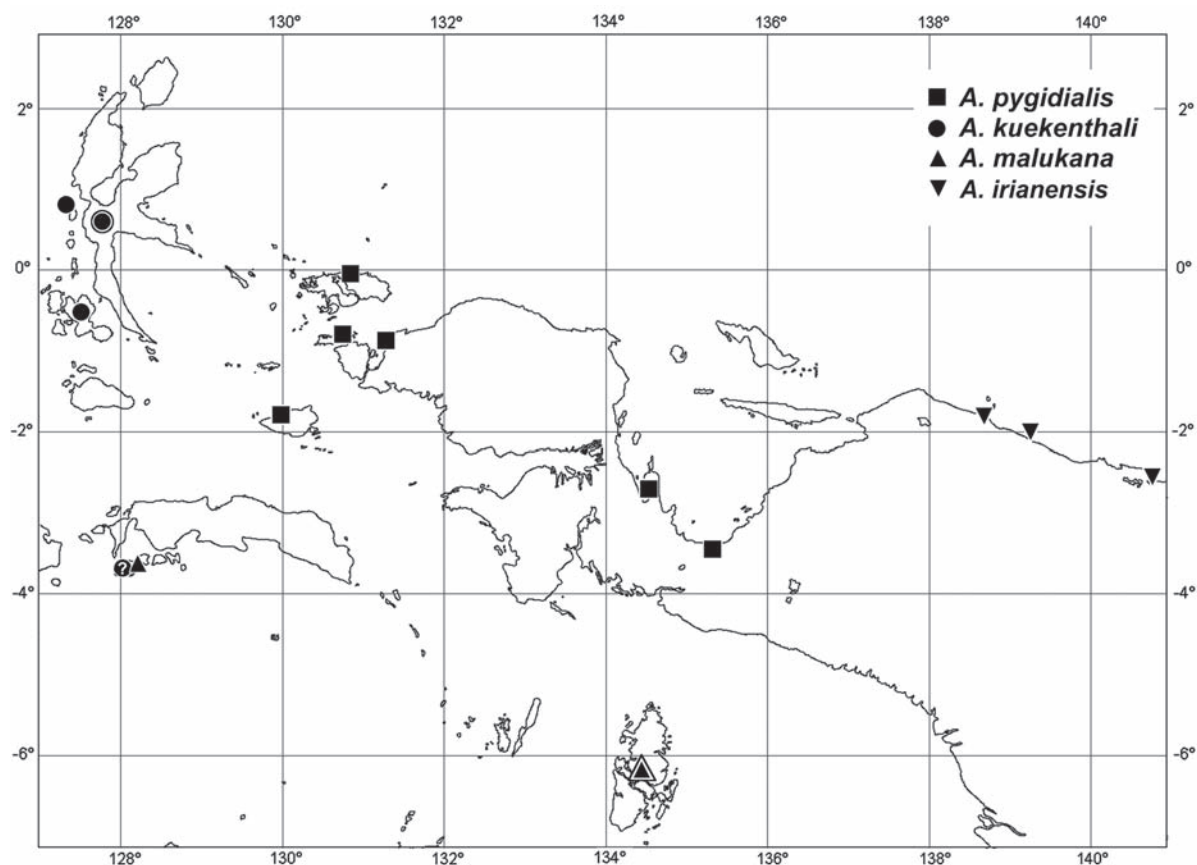


Fig. 129. Distribution of *A. pygidialis*, *A. kuekenthali*, *A. malukana* and *A. irianensis* (imprecise record with frame).

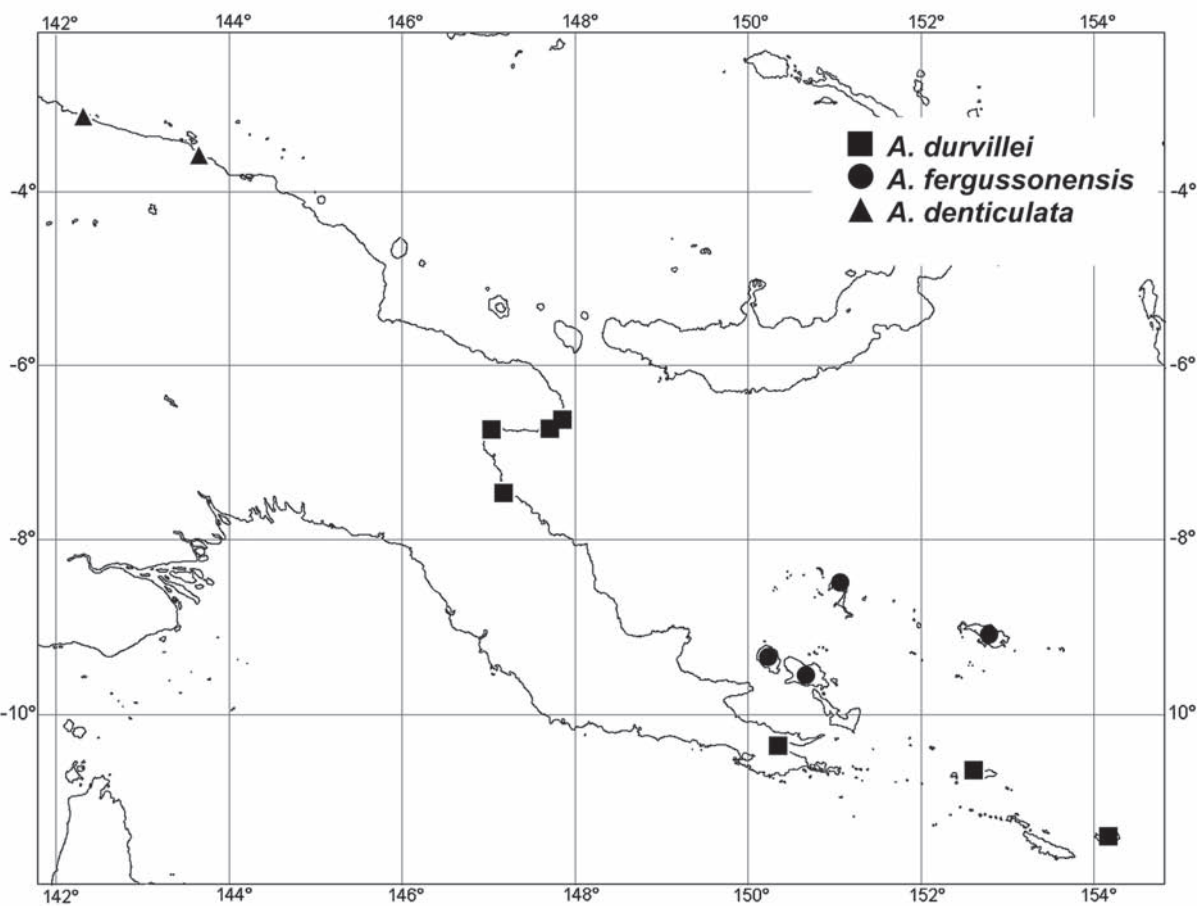


Fig. 130. Distribution of *A. durvillei*, *A. fergussonensis* and *A. denticulata*.



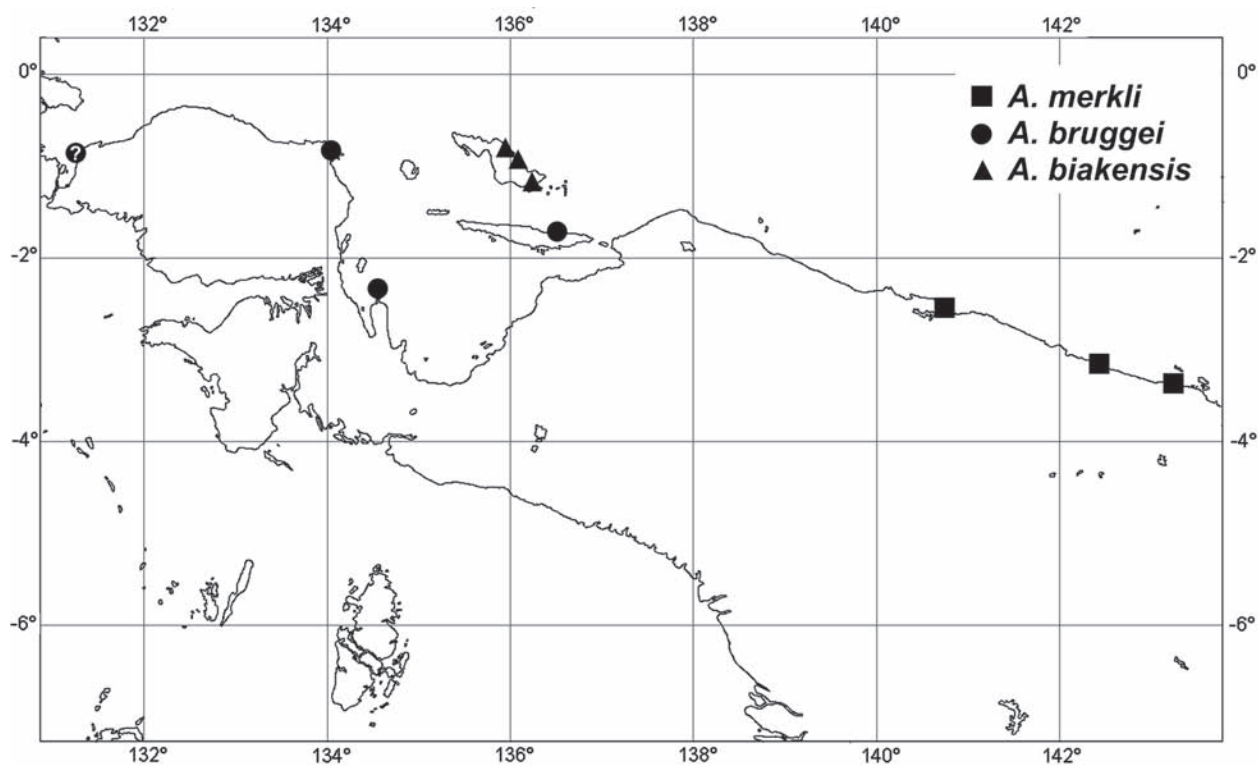


Fig. 131. Distribution of *A. merkli*, *A. bruggei* and *A. biakensis*.

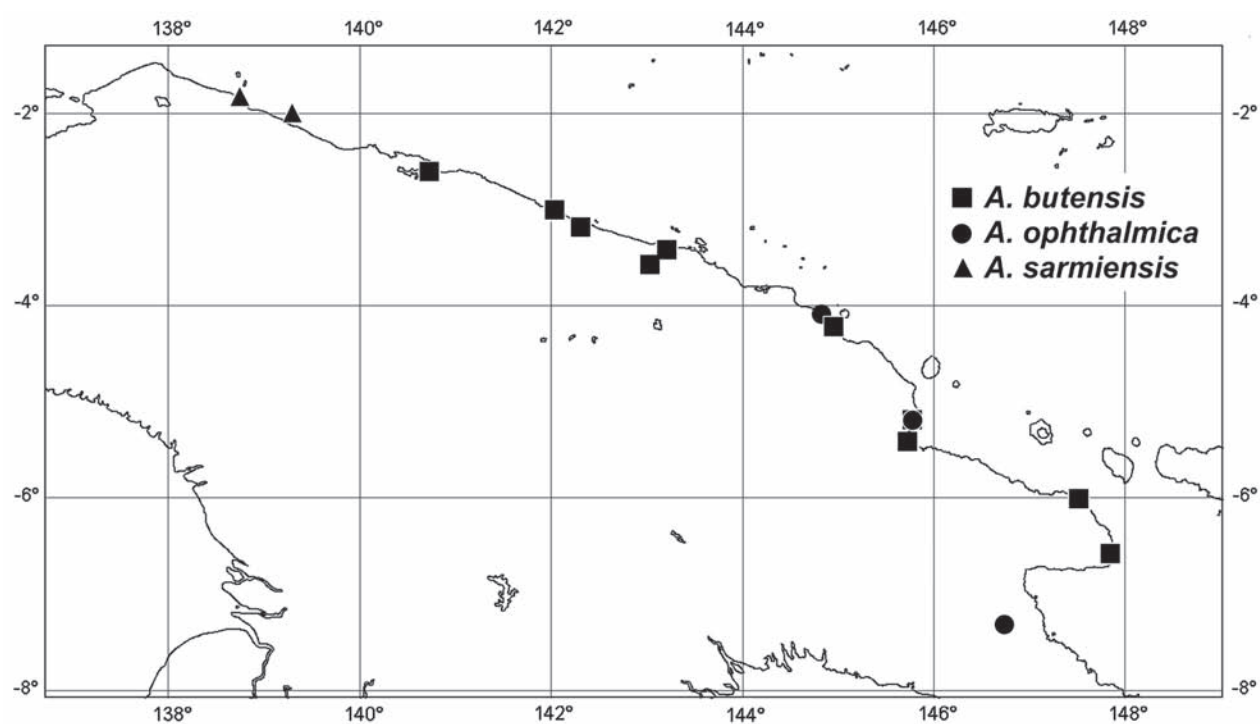


Fig. 132. Distribution of *A. butensis*, *A. ophthalmica* and *A. sarmiensis*.

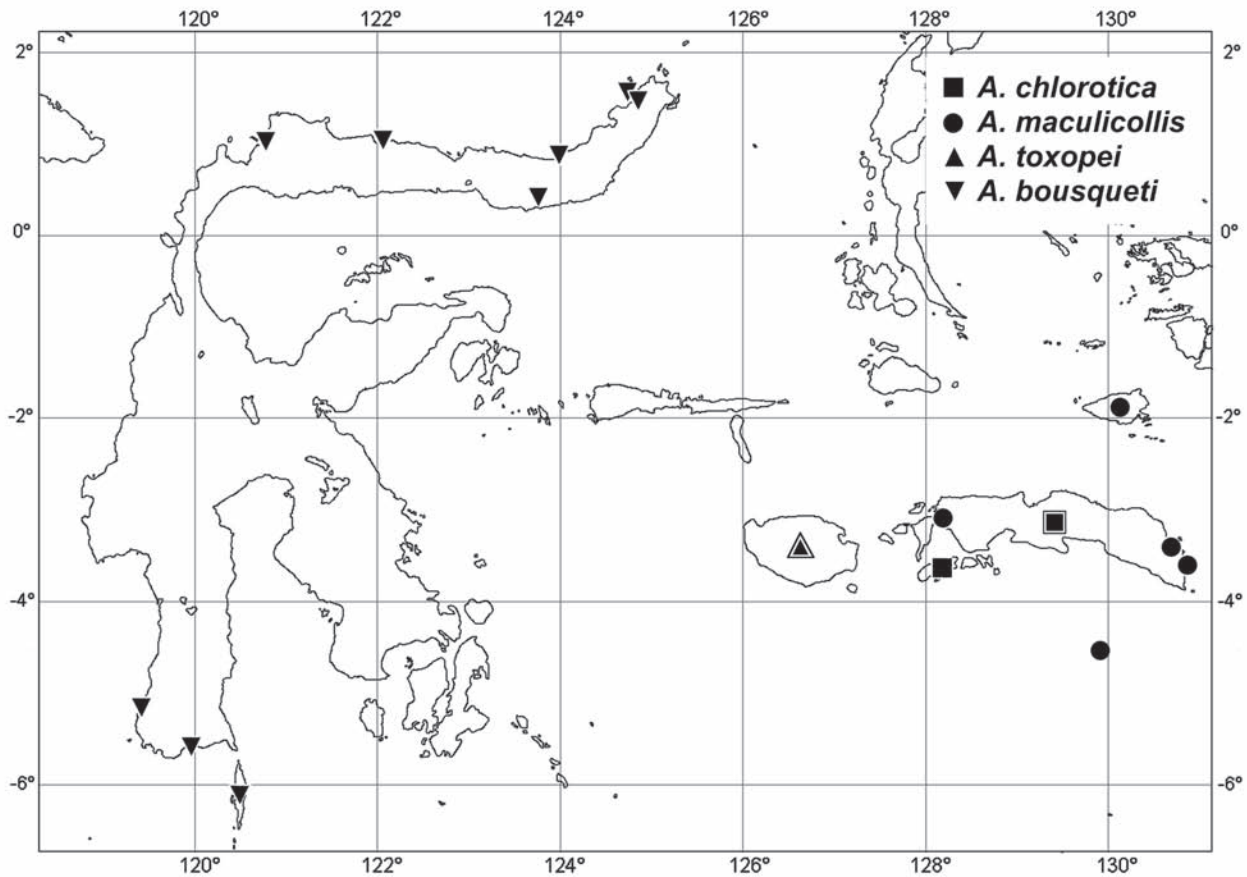


Fig. 133. Distribution of *A. chlorotica*, *A. maculicollis*, *A. toxopei* and *A. bousqueti* (imprecise records with frame).

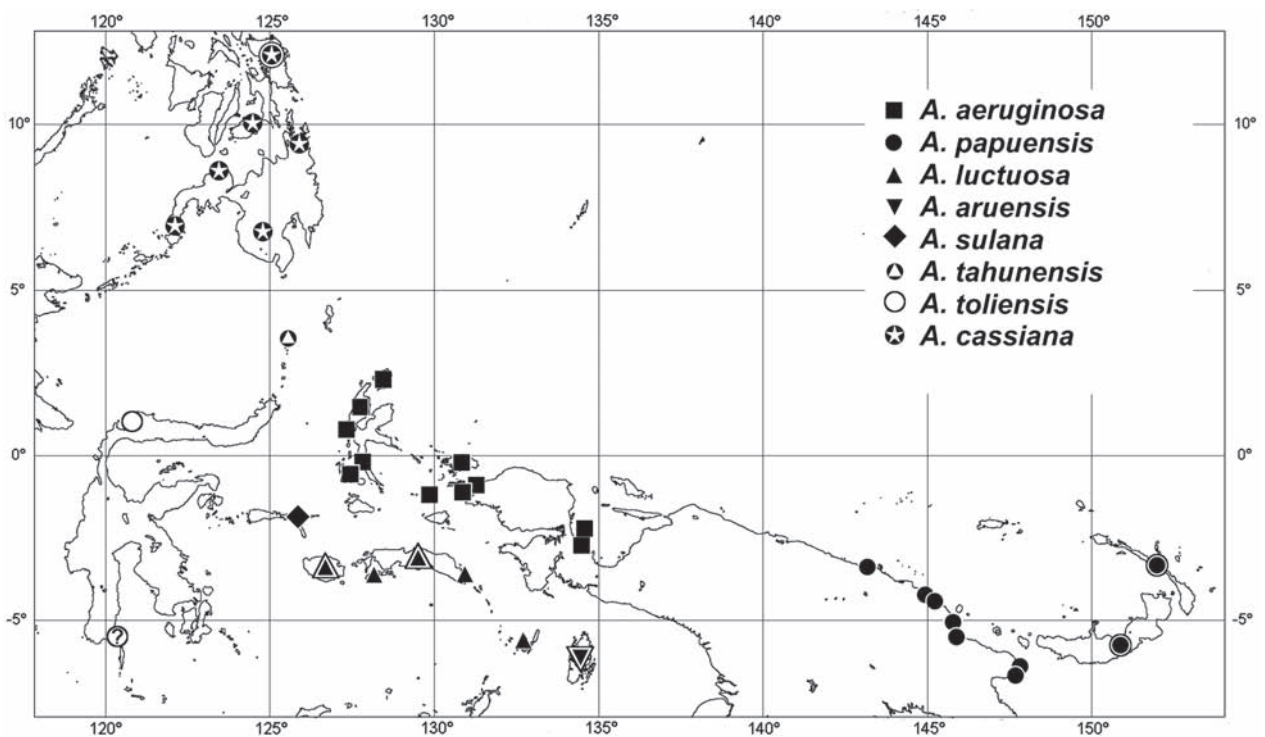


Fig. 134. Distribution of *A. aeruginosa*, *A. papuensis*, *A. luctuosa*, *A. aruensis*, *A. sulana*, *A. tahunensis*, *A. toliensis* and *A. cassiana* (imprecise records with frame).

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For the assistance while working in the collections of various institutions and for generously providing specimens for study I am deeply indebted to the following collection managers and curators: Manfred Uhlig, Johannes Frisch, Berndt Jäger, Hella Wendt and Joachim Schultze (MNH), Ben Brugge (ZMAN), Pol Limbourg (IRSN), Jan van Tol, Rienk de Jong and Fred van Assen (RMNH), Malcolm Kerley (BMNH), Lothar Zerche and Lutz Behne (DEIM), Otto Merkl (HNHM), Jean Menier, Thierry Deuve, Olivier Montreuil and Azadeh Tagavian (MNHN), Matthias Hartmann (NME), and Matthias Nuss and Olaf Jäger (MTD). I thank my friends Milan Nikodým (Prague) and Kaoru Wada (Tokyo) for providing specimens from their private collections.

## 5. References

- ANTOINE, PH., R.-P. DECHAMBRE & D. PALMA 2002. Les Types Schizorhini Conservés dans les Collections du Laboratoire d'Entomologie du Muséum National d'Histoire Naturelle (Coleoptera, Cetoniidae). – *Revue Française d'Entomologie (N.S.)* **24**: 79–96.
- ARROW, G.J. 1910. On a few new Bornean beetles of the rutelid genera *Mimela* and *Anomala*. – *The Annals and Magazin of Natural History including Zoology, Botany, and Geology (series 8)* **6**: 64–72.
- ARROW, G.J. 1917. The fauna of British India, including Ceylon and Burma. Coleoptera Lamellicornia part II (Rutelinae, Desmonycinae, and Euchirinae). – London: Taylor & Francis, 387 pp. + 5 pl.
- BLANCHARD, É. 1851. IVE Tribu.-Rutelinae. Anomalitae. Pp. 173–203 in: H. MILNE-EDWARDS (ed.), *Catalogue de la Collection Entomologique du Muséum d'Histoire Naturelle de Paris. Classe des Insectes. Ordre des Coléoptères. Tome 2.* – Paris: Gide et Baudry, pp. 129–240.
- BLANCHARD, É. 1853. Zoologie. Description des insectes. In: J.B. HOMBRON & CH.-H. JACQUINOT (eds.): *Voyage au Pole Sud et dans l'Océanie sur les Corvettes l'Astrolabe et la Zélée; Exécuté par Ordre du Roi Pendant les Années 1837-1838-1839-1840, sous le Commandement de M. Dumont-d'Urville, Capitaine de Vaisseau; Publié par Ordre du Gouvernement, sous la Direction Supérieure de M. Jacquinot, Capitaine de Vaisseau, Commandant de la Zélée. Zoologie, par MM. Hombron et Jacquinot. Tome Quatrième.* – Paris: Gide et J. Baudry, iv + 422 pp.
- BOISDUVAL, J. 1835. Voyage de la Corvette L'Astrolabe Exécuté par Ordre du Roi, Pendant les Années 1826-1827-1828-1829, sous le Commandement de M. Jules Dumont d'Urville, Capitaine de Vaisseau. Div. 4, Faune Entomologique de l'Océan Pacifique; Vol. 2, Coleopteres et autres ordres. – Paris: Tastu, vii + 716 pp. + 12 pl.
- BURMEISTER, H. 1844. Handbuch der Entomologie. 4(1), Coleoptera Lamellicornia Anthobia et Phyllophaga systelochela. – Berlin: Enslin, ii + 587 pp.
- CARNE, P.B. 1957. A revision of the ruteline genus *Anoplognathus* Leach (Coleoptera: Scarabaeidae). – *Australian Journal of Zoology* **5**: 88–143.
- CARNE, P.B. 1958. A review of the Australian Rutelinae (Coleoptera: Scarabaeidae). – *Australian Journal of Zoology* **6**: 162–240.
- CLARK, P.F. & A. CROSNIER 2000. The zoology of the Voyage au Pôle sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée exécuté par ordre du roi pendant les années 1837-1838-1839-1840 sous le commandement de M. Dumont-d'Urville (1842–1854): titles, volumes, plates, text, contents, proposed dates and anecdotal history of the publication. – *Archives of Natural History* **27**: 407–435.
- COX, C.B. & P.D. MOORE (eds.) 2005. Biogeography. An Ecological and Evolutionary Approach. 7th edn. – Malden: Blackwell Publishing, xi + 428 pp.
- D'HOTMAN, D. & C.H. SCHOLTZ 1990a. Comparative morphology of the male genitalia of derived groups of Scarabaeoidea (Coleoptera). – *Elytron* **4**: 3–39.
- D'HOTMAN, D. & C.H. SCHOLTZ 1990b. Phylogenetic significance of the structure of the external male genitalia in the Scarabaeoidea (Coleoptera). – *Entomology Memoir* **77**: iii + 51 pp.
- DEJEAN, P.F.M.A. 1821. Catalogue de la collection de Coléoptères de M. le Comte Dejean. – Paris: Crevot, viii + 136 + [2] pp.
- DUFFELS, J.P. 1983. Distribution patterns of Oriental Cicadoidea (Homoptera) east of Wallace's Line and Plate Tectonics. – *Geojournal* **7**: 491–498.
- FAIRMAIRE, L. 1883. Essai sur les Coléoptères de l'Archipel de la Nouvelle-Bretagne. – *Annales de la Société Entomologique de Belgique* **27**: 1–58.
- GRESSITT, J.L. 1982. General introduction. Pp. 3–13 in: J.L. GRESSITT (ed.), *Monographiae Biologicae* **42**, Biogeography and ecology of New Guinea. – The Hague: Dr W. Junk Publishers, vii + 983 pp.
- GUÉRIN-MÉNEVILLE, F.E. 1838. In: L.I. DUPERREY (ed.), *Voyage autour du monde execute par ordre du roi sur la corvette de Sa Majeste, La Coquille pendant les années 1822, -23, -24 et -25. Zoologie Pt. 2, T. 2.* – Paris: Bertrand, xii + 319 pp. + 155 pp.
- GYLLENHAL, L. 1817. In: C.J. SCHÖNHERR (ed.), *Synonymia Insectorum, oder Versuch einer Synonymie aller bisher bekannten Insecten; nach Fabricii Systema Eleutheratorum etc. geordnet. Erster Band. Eleutherata oder Käfer. Dritter Theil. Hispa-Molorchus.* – Upsala: Em. Brucelius, 506 pp + Appendix: Descriptiones novarum specierum, 266 pp.
- HALL, R. 1998. The plate tectonics of Cenozoic SE Asia and the distributions of land and sea. Pp. 99–131 in: R. HALL & J.D. HOLLOWAY (eds.), *Biogeography and Geological Evolution of SE Asia.* – Leiden: Backhuys Publishers. ii + 417 pp.
- HELLER, K.M. 1891. Die mit der Ruteliden-Gattung *Singhala* Burm. verwandten Gattungen und Arten. – *Deutsche Entomologische Zeitschrift* **1891**: 289–306.
- HOMBRON, J.B. & CH.-H. JACQUINOT 1846. Atlas d'Histoire Naturelle Zoologie par MM. Hombron et Jacquinot, chirurgiens de l'expédition, in *Voyage au Pole Sud et dans l'Océanie sur les Corvettes l'Astrolabe et la Zélée Exécuté par Ordre du Roi Pendant les Années 1837-1838-1839-1840 sous le Commandement de M. Dumont-d'Urville Capitaine de Vasseau Publié sous les Auspices de Département de la Marine et sous la*



- Direction Supérieure de M. Jacquinet, Capitaine de Vaisseau, Commandant de la Zélee. Vieng-unième Livraison. Oiseaux pl. 25 bis; Insectes coléoptères pls. 8, 10, 12, 15. – Paris: Gide et Cie.
- HOPE, F.W. 1839. A monograph on Mr. William Sharp MacLeay's coleopterous genus *Euchlora*. – Proceedings of the Scientific Meetings of the Zoological Society of London **7**: 65–75.
- JAMESON, M.L. 1997. Phylogenetic analysis of the subtribe Rutelina and revision of the *Rutela* generic groups. – Bulletin of the University of Nebraska State Museum **14**: 1–184.
- KIRSCH, TH. 1876. Beitrag zur Kenntniss der Coleopteren-Fauna von Neu Guinea. – Mittheilungen aus dem Königlich Zoologischen Museum zu Dresden **2**: 135–161.
- KRAATZ, G. 1892. Monographische Revision der Ruteliden-Gattung *Popillia* Serville. – Deutsche Entomologische Zeitschrift **1892**: 177–192, 225–306 + pl. iv.
- LANSBERGE, J.W. VAN 1879. Diagnoses de quelques espèces nouvelles de Buprestides et Scarabaeides de la Malaisie. – Bulletin de la Société Entomologique de Belgique **1879**: 147–155.
- LATREILLE, P.A. 1802. Histoire naturelle, générale et particulière des Crustacés et des Insectes. Ouvrage faisant suite aux œuvres de Leclerc de Buffon, et partie du cours complet d'Histoire naturelle rédigé par C.S. Sonnini, membre de plusieurs sociétés savantes. Familles naturelles des genres. Tome troisième. – Paris: F. Dufart, xii + 13–467 pp. + [1 p. Errata].
- LE GUILLOU, E.J.F. 1844. Description de vingt insectes Coléoptères recueillis pendant le voyage autour du monde de l'Astrolabe et la Zélee. – Revue Zoologique Société Cuvierienne **7**: 220–225.
- LIN, P. 1999. New species of the genus *Anomala* Samouelle (Coleoptera: Rutelidae) collected in Yunnan, China. – Entomotaxonomia **21**: 157–176. [in Chinese and English]
- MACHATSCHKE, J.W. 1955. Versuch einer Neugliederung der Arten des Genus *Adoretosoma* Blanchard (Coleoptera: Scarabaeidae, Rutelinae). – Beiträge zur Entomologie **5**: 349–396.
- MACHATSCHKE, J.W. 1957. Coleoptera Lamellicornia Fam. Scarabaeidae Subfam. Rutelinae 2. Pp. 1–219 + 6 pl. in: P.A.G. Wytsman (ed.), Genera Insectorum **199** (B). – Bruxelles: Desmet-Verteneuil.
- MICÓ, E. & E. GALANTE 2000. The internal ectodermic genitalia of Iberian Anisopliini (Coleoptera: Scarabaeoidea: Rutelidae). – Elytron **14**: 53–67.
- MIYAKE, Y. 1996. New or little known scarabaeid beetles from southeast Asia III (Coleoptera: Geotrupidae & Scarabaeidae). – Lamellicornia **11**: 33–54.
- MIYAKE, Y. 2000. New or little known scarabaeid beetles from southeast Asia IV (Insecta: Coleoptera: Scarabaeidae). – Science Report of the Research Institute of Evolutionary Biology **9**: 105–120.
- OHAUS, F. 1897. Beitrag zur Kenntniss der Ruteliden. – Entomologische Zeitung **58**: 341–440.
- OHAUS, F. 1902. Beiträge zur Kenntniss der Ruteliden. Anomaliden der neuen Welt. – Stettiner Entomologische Zeitung **63**: 3–57.
- OHAUS, F. 1910a. Beiträge zur Kenntniss der Ruteliden. VII. – Annales de la Société Entomologique de Belgique **54**: 213–227.
- OHAUS, F. 1910b. Die Ruteliden der Philippinischen Inseln. – The Philippine Journal of Science, D. General Biology, Ethnology and Anthropology **5**: 233–262.
- OHAUS, F. 1915. XVII. Beitrag zur Kenntniss der Ruteliden (Col. lamell.). – Stettiner Entomologische Zeitung **76**: 88–143.
- OHAUS, F. 1916. XIX. Beitrag zur Kenntniss der Ruteliden (Col. lamell.). – Deutsche Entomologische Zeitschrift **1916**: 345–346.
- OHAUS, F. 1923. V. Nachtrag zur Kenntniss der Philippinischen Ruteliden (Coleoptera, Lamellicornia). – The Philippine Journal of Science **22**: 581–590 + 1 plate.
- OHAUS, F. 1924. XXII. Beitrag zur Kenntniss der Ruteliden (Col. lamell.). – Stettiner Entomologische Zeitung **84**: 167–186.
- OHAUS, F. 1926a. XXIV. Beitrag zur Kenntniss der Rutelinen (Col. lamell.). – Deutsche Entomologische Zeitschrift **1926**: 225–239.
- OHAUS, F. 1926b. Fauna Buruana. Coleoptera, Fam. Scarabaeidae, Rutelinae. – Treubia **7**: 111–113.
- OHAUS, F. 1930. Zwei neue Rutelinen (Col. Lamell.) aus dem Basler Naturhistorischen Museum. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft **15**: 17–19.
- OHAUS, F. 1932. A collection of Rutelinae (Col: Scarabaeid:) from Mt. Kinabalu, British North Borneo. – Journal of the Federated Malay States Museums **17**: 122–127.
- OHAUS, F. 1934. Coleoptera Lamellicornia Fam. Scarabaeidae Subfam. Rutelinae 1. Pp. 1–172 + 6 pl. in: P.A.G. WYTSMAN (ed.), Genera Insectorum **199** (A). – Bruxelles: Desmet-Verteneuil.
- OHAUS, F. 1936a. Three new species of *Anomala* (Col. Scarab. Rutelinae) from New Guinea. – Proceedings of the Royal Entomological Society of London (B) **5**: 125–126.
- OHAUS, F. 1936b. XXIX. Beitrag zur Kenntniss der Rutelinae (Col. Scarab.). – Stettiner Entomologische Zeitung **97**: 141–153.
- PAUCAR-CABRERA, A. 2003. Systematics and phylogeny of the genus *Epectinaspis* Blanchard (Coleoptera: Scarabaeidae: Rutelinae) and description of a new genus of Anomalini from Mexico. – Coleopterists' Society Monographs **2**: 1–60.
- PILLERI, G. 1948. Studi morfologici e sistematici sul genere *Anisoplia* Serv. (Coleoptera Scarabaeidae). – Eos **24**: 57–81.
- PILLERI, G. 1951. Studi morfologici e sistematici sul genere *Anisoplia* Serv. (Col. Scarabaeidae). V. contributo. – Eos **27**: 235–336 + pl. iii–iv.
- PILLERI, G. 1954. Studi morfologici e sistematici sul genere *Anisoplia* Serv. (Coleoptera Scarabaeidae). VIII. contributo: Analisi strutturali degli organi genitali maschili in specie note e descrizione di due nuove Anisoplie. – Eos **30**: 391–414 + vi pl.
- POTTS, R.W.L. 1976. New species of North American *Anomala* (Scarabaeidae: Anomalinae). – The Pan-Pacific Entomologist **52**: 220–226.
- ROSS, H.H. 1956. Evolution and classification of the mountain caddisflies. – Urbana: University of Illinois Press. 211 pp.
- SABATINELLI, G. 1993. Studi morfologici e sistematici sul genere *Popillia*: le specie Indo-Himalayane con disco

- del pronoto pubescente (Coleoptera, Scarabaeoidea, Rutelidae). – *Fragmenta Entomologica* **24**: 201–214.
- SABATINELLI, G. 1994. Note tassonomiche su specie Orientali del genere *Popillia* con descrizione di otto nuove specie (Coleoptera, Scarabaeoidea, Rutelidae). – *Fragmenta Entomologica* **25**: 325–350.
- SABATINELLI, G. 1996. Descrizione di cinque nuove specie di *Popillia* della regione Orientale (Coleoptera, Rutelidae). – *Fragmenta Entomologica* **28**: 27–42.
- SAMOUELLE, G. 1819. The Entomologist's Useful Compendium; or an Introduction to the Knowledge of British Insects. – London: Th. Boys, 448 pp. + 12 pl.
- SHARP, D. & F. MUIR 1912. The comparative anatomy of the male genital tube in Coleoptera. – *Transactions of the Entomological Society of London* **3**: 477–462, 36 pls. (p. 523, pl. 60, figs. 107–109).
- SMITH, A.B.T. 2003. A monographic revision of the genus *Platycoelia* Dejean (Coleoptera: Scarabaeidae: Rutelinae: Anoplognathini). – *Bulletin of the University of Nebraska State Museum* **15**: vi + 202 pp.
- WADA, K. 1998. Four new species of the genus *Callistethus* Blanchard (Coleoptera: Scarabaeidae: Rutelinae) from Sulawesi and a redescription of *Callistethus riedeli* Lansberge. – *The Entomological Review of Japan* **52**: 93–101.
- WADA, K. 1999. Replacement of a preoccupied name of a *Callistethus* species (Coleoptera, Scarabaeidae, Rutelinae). – *Elytra* **27**: 175.
- WADA, K. 2000. Two new species and a new subspecies of the genus *Callistethus* (Coleoptera, Scarabaeidae, Rutelinae) from Sulawesi. – *Elytra* **28**: 349–354.
- WADA, K. 2002. Three new species of the genus *Callistethus* (Coleoptera, Scarabaeidae, Rutelinae) from Sulawesi and Mindanao. – *Elytra* **30**: 173–181.
- WALLACE, A.R. 1863. On the physical geography of the Malay archipelago. – *The Journal of the Royal Geographical Society* **33**: 217–234.
- WIEDEMANN, C.R.W. 1823. Zweihundert neue Käfer von Java, Bengalen und dem Vorgebirge der guten Hoffnung. – *Zoologisches Magazin* **2**(1): 3–132.
- ZORN, C. 1998. Neue Arten des Genus *Anomala* Samouelle, 1819 (Col.: Melolonthidae: Rutelinae) von Sumatra und der Malayischen Halbinsel sowie Bemerkungen zur Synonymie und Verbreitung einiger Arten. – *Beiträge zur Entomologie* **48**: 469–503.