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A revision of the genus *Arhytinus* BATES (Coleoptera: Carabidae: Platynini)

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Abstract

The species of the platynine genus *Arhytinus* BATES which occur in southern and south-eastern Asia and on New Guinea are revised and 22 additional new species are described: *A. frater*, *A. minor*, *A. missai*, and *A. unispinus* from New Guinea; *A. novaeirlandiae* from New Ireland; *A. celebensis* from Sulawesi; *A. moluccensis* from Batjan Island (Moluccas); *A. angustimargo*, *A. borcherdingi*, *A. cordicollis*, *A. crenulipennis*, *A. harpago*, *A. multispinosus*, and *A. nitidipennis,* all from Borneo; *A. inarmatus* and *A. riedeli* from Java; *A. sumatrensis* from Sumatra; *A. nitescens* and *A. taiwanensis* from Taiwan; *A. circumcinctus* from Thailand, and *A. indicus* and *A. lorenzi* from southern India. The male genitalia of these species, when available, as well as of the New Guinean species *A. major* DARLINGTON, *A. medius* DARLINGTON, and *A. granum* DARLINGTON, the Philippine species *A. piceus* JEDLICKA and *A. minimus* JEDLICKA, the Javan species *A. lieftincki* LOUWERENS, and of the widespread species *A. bembidioides* BATES are figured. A key to all species is provided. All species share a similar convex body shape, iridescent elytra, and wide, somewhat cordiform pronotum, and generally are very similar in their external morphology. The male aedeagus, however, in most species is conspicuous through its variously denticulate apex and very differently shaped and situated spinose sclerites in the internal sac.

Some large species possess a more simply structured aedeagus with edentate apex and they lack any internal spines or teeth. These species also are less convex and exhibit a more "normal" platynine body shape. They may occupy a rather basal systematic status within the genus.

At present the genus is recorded from India, Sikkim, Burma, northern Thailand, Vietnam, Taiwan, the Philippines, the large Sunda Islands, Sulawesi, Batjan in the Moluccas, New Guinea, and New Ireland. Surprisingly many species presently are recorded from Borneo (Brunei and Sabah) and New Guinea, but this may be caused by better exploration of these islands due to certain recent canopy fogging projects.

Key words. Coleoptera, Carabidae, Platynini, *Arhytinus*, new species, South-east Asia, Papuan Region, key

Introduction

The platynine genus *Arhytinus* BATES, 1889 at present comprises 9 species (LORENZ 1998, 2005) of medium sized to small (in tribe), wide, laterally and dorsally convex, usually markedly iridescent beetles of generally very similar shape and structure, which, apart from their characteristic body shape and surface structure, are characterized by edentate mentum, cordiform pronotum, and short, rather deeply striate elytra which usually bear distinctly crenulate striae, and commonly by presence of a various number of strongly sclerotized, variously shaped, and often quite large spines in the internal sac of the male aedeagus.

At the present state of knowledge the genus is distributed from Sikkim through Burma, Thailand, Vietnam, the Philippines, Indonesia, to New Guinea. In mainland Asia no species were recorded to exist on almost the whole Indian subcontinent and further east than Vietnam, and the genus has not reached Australia. Four species were described from the Philippine Islands (JEDLICKA 1936), one from mainland South Asia (BATES 1889) that likewise was reported to occur on Sumatra and Borneo (STORK 1986), and one from Java (LOUWERENS 1951). From New Guinea so far three species were known, all described by P. J. DARLINGTON (1952) in his monumental monograph about the Carabidae of New Guinea. All species of the genus are very similar in shape and appearance, and the New Guinean ones were mainly distinguished by their different body size.

Unfortunately, no one of the mentioned authors used the male genitalia for species differentiation, and moreover, all descriptions are based on only one or two specimens. It seems, thus, that specimens of *Arhytinus* either are rare beetles, or they are rarely collected, on whatever reasons. The present paper, however, demonstrates that application of adequate sampling methods, e.g. light collecting or fogging in rain forest, can yield fairly large numbers of specimens. However, it is worth noting that large areas within the genus' range apparently have not yet been adequately collected, therefore it is only the eastern part of New Guinea, and

here only two localities, Brunei in Borneo, and a locality in southern India, from where more numerous material (in terms of specimens) presently is available.

Very little has been reported about habits and life history of any species of the genus, and the unsatisfactory knowledge of their taxonomy may be also due to this deficiency.

I became interested in this group when working the very large amount of carabid beetles that OLIVIER MISSA collected in 1993-1996 during his extensive sampling activities in the rain forest canopy at Baiteta in the Madang Province of Papua New Guinea. The thousands of carabids sampled include a quite large number of specimens of *Arhytinus*, but their identification raised some problems, because the specimens are very similar in their external morphology and also the rather clear differences of body size that DARLINGTON postulated, could not been verified in the material. Hence, in view of the high grade of similarity in their external morphological characters, examination of the male genitalia seemed most promising, and indeed, the aedeagi are quite different in size, shape, and structure. Unfortunately, although sketching the aedeagus of one species, DARLINGTON did not use the structure of the aedeagus for species differentiation.

The examination of the male genitalia also demonstrated that some species apparently include specimens of quite different size. Therefore DARLINGTON's (1952) key to the species from New Guinea which mainly relies on body size, is no longer practicable, and for identification of New Guinean *Arhytinus*, as for all other species, dissection of the male genitalia is mandatory.

The bulk of the material mentioned in this paper therefore is from the sampling activities of O. MISSA at Baiteta in Papua New Guinea, stored in Institute Royal des Sciences Naturelles de Belgique, Bruxelles (IRSNB). Additional material from New Guinea is from samples that R. KITCHING and co-workers, of Griffith University, Brisbane, collected at Oomsis in the Morobe Province, also Papua New Guinea, during a comparative light trapping project. This project revealed also some specimens from Brunei in northern Borneo. The material of both programs is partly stored in Queensland Museum, Brisbane (QM), partly in the working collection of the author at Zoologische Staatssammlung, München (CBM). Additional specimens are from a fogging project carried out by M. BORCHERDING, likewise in Brunei (CBM), from a light sampling project carried out in the early 90ties of last Century by H. Malicky and co-workers in northern Thailand (CBM), from a locality in southern India, collected by W. LORENZ and stored in his collection (CLT), and from Java, sampled recently by A. RIEDEL (Karlsruhe). Holotypes from the latter sample will be stored in Museum Zoologicum Bogoriense (MZB), paratypes in Staatliches Museum für Naturkunde, Karlsruhe (SMNK) and in CBM. Types and a few additional specimens were borrowed from The Natural History Museum, London (NMH) through courtesy of M. BARCLAY and partly through arrangement of A. SCHMIDT (Rostock, CSR), from National Museum of Natural History Naturalis, Leiden (NHNL), and from Museum de l'Histoire Naturelle, Génève (MHNG) through courtesy of G. CUCCODORO; and a few specimens from Taiwan were sent by D. WRASE (Berlin, CWB) and WENBE (formerly Freiburg, CBM). Some of the latter specimens were from a pitfall trapping survey in southern Taiwan.

Methods

In the taxonomic section standard methods are used. The male and female genitalia were removed from specimens weakened for a night in a jar under wet atmosphere, then cleaned for a short while in hot 10% KOH. The habitus photographs were obtained by a digital camera using ProgRes CapturePro 2.6 and AutoMontage and subsequently were worked with Corel Photo Paint 11.

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those taken by other authors. Length of pronotum was measured along midline, width of base of pronotum was measured at the basal angles or in the case these are rounded, at the position of the posterior lateral seta. At least 6 specimens of each taxon were measured when available, otherwise all specimens were measured. Attention was paid to choose specimens of both sexes and of different size and shape. In strikingly variable species or in species with wide range, even more specimens were measured to get an impression of the complete range of size and shape of the respective taxon. Ratios are somewhat variable in most species, but generally offer rather good measures of relative shape.

Material

Altogether 279 specimens were examined, 223 of which, however, belong to the three New Guinean species *A. granum* DARLINGTON, *A. medius* DARLINGTON, and *A. missai* sp. nov. In most species the material is very

scarce and commonly only the holotype is available. In view of the very inadequate knowledge about any species, for all recorded specimens the exact labelling is noted, with all ciphers and abbreviations and any identification labels of previous authors. / with a blank before and after denotes another label, a new line on a label is marked by two blanks.

Systematic account

Genus *Arhytinus* Bates, 1889

Bates, 1889: 278. – Csiki 1931: 821; Andrewes 1931: 473; Darlington 1952: 116; Stork 1986: 12; Lorenz 1998: 391.

Type species: *Arhytinus bembidioides* Bates, 1889, by monotypy.

Diagnosis: Genus of Platynini. Medium-sized to very small species (in tribe), characterized by short and wide body shape, absence of the mental tooth, cordiform prothorax, short and wide, oval-shaped and posteriad widened elytra with well impressed and commonly distinctly punctate striae and usually rather iridescent surface due to superficial microreticulation of very fine, transverse lines. Commonly the 3rd interval is asetose, rarely unisetose. Even when the external characters are remarkably similar throughout the genus, the male aedeagus is rather differently shaped and structured and may or may not bear a bidenticulate apex, and commonly it bears one or several strongly scerotized teeth, or spines, or spinose plates of different size and shape in the apical part of the (inverted) internal sac.

In the descriptions the following character states common to all species are not further mentioned: clypeus bisetose; labrum 6-setose; palpi sparsely pilose; mentum edentate; mandibles elongate, evenly curved; scutellary stria elongate, situated in 1st interval, scutellary pore and seta present; elytral striae complete and usually well impressed; apical margin of the elytra evenly rounded, not sinuate; series of marginal punctures consisting of 16-19 punctures and setae, slightly interrupted in middle; apex of elytra with two setiferous punctures at each side close to suture; metathoracic wings present; metepisternum elongate, c. twice as long as wide at anterior margin; terminal abdominal sternum in male bisetose, in female quadrisetose; legs elongate; basal tarsomeres of meso- and metatarsi canaliculate on both sides; 5th tarsomeres with or without 1-2 very short and inconspicuous setae on the lower surface which are very difficult to detect; 1st - 3rd tarsomeres of male protarsus biseriately squamose.

Distribution according to the present paper: Southern mainland Asia from Southern India and Sikkim to Vietnam, Taiwan, the Philippine Islands, the Greater Sunda Islands, Sulawesi, Batjan Island in the Moluccas, New Guinea, and New Ireland. It is to be suspected that in future species will be discovered also in northern India, Nepal, southern mainland China, the Lesser Sunda Islands, other islands of the Moluccas except Batjan, and New Britain, as well as in areas from where species already were recorded.

Relationships: In the structure of a couple of external and genitalic character states (edentate mentum, complete set of fixed setae, complete striation of elytra, simple structure of tarsi, shape of the female gonocoxites) the genus *Arhytinus* most probably is rather plesiomorphic, not only within the New Guinean Platynini, but also generally within the tribe. Some apomorphic character states, however, e.g. small body size, the convex elytra and, in many species, the structure of the aedeagus (apex denticulate or bidenticulate, presence of spinose sclerites inside the internal sac), however, would contradict a basal position of the genus within Platynini. Hence, a thorough phylogenetic survey of the Oriental-Papuan Platynini would be needed to fix the position of the genus within this group.

Arhytinus bembidioides Bates, 1889
(Figs 1, 26, 48)

Bates, 1889: 279. – Csiki 1931: 821; Andrewes 1931: 473; Darlington, 1952: 119; Stork 1986: 12; Lorenz 1998: 391.

Type material examined: Not seen.

Diagnosis: A medium sized species, distinguished from all similarly sized species by narrower pronotum with relatively wide base and the structure of the aedeagus which bears four attached spines on the left, and a single spine on the right side of the internal sac.

This is the single species that was recorded so far from mainland Asia. For better comparison with the other species I give a supplementary description of measurements and some other characters of the available specimens.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 5.4-6.1 mm; width: 2.45-2.75 mm. Ratios. Width/length of pronotum: 1.53-1.58; width of widest diameter/base of pronotum: 1.21-1.24; width base/apex of pronotum: 1.10-1.14; width pronotum/head: 1.26-1.33; length/width of elytra: 1.41-1.45.

Colour (Figs 26, 48). Iridescent black, pronotum very slightly paler, very dark piceous. Lateral margins of pronotum and elytra with narrow though distinct yellow border, also suture of elytra indistinctly paler. Labrum and mandibles reddish-piceous, palpi, antenna, and legs yellow.

Head (Fig. 26). Of average size. Eyes large, though laterally only moderately projected, orbits short though perceptible, regularly oblique. Frontal furrows small, circular, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with fairly distinct, isodiametric microreticulation.

Pronotum (Fig. 26). Wide, slightly cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, only immediately in front of basal angles very shortly excised. Base rather wide in comparasion to widest diameter, in middle straight, lateral parts markedly oblique-convex. Basal angles very slightly projected, obtusely denticulate. Lateral margin in anterior part rather narrow, widened posteriad. Both apex and base not margined. Median line shallow, not attaining apex nor base. Both transverse impressions very shallow. Anterior lateral seta inserted at apical third, slightly in front of widest diameter. Posterior lateral seta inserted at basal angle. The whole base and the posterior half of lateral margin coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 48). Of average shape, but comparatively short, oviform, dorsal surface very convex. Striae finely crenulate, intervals very slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia. (Fig. 1). Genital ring large, laterally gently convex, almost symmetrical, with narrow, rounded apex. Aedeagus short and in middle very wide, lower surface very gently concave, triangular but median carina blunt. Apex triangular, more or less acute at tip, with large, acute apical hook at lower surface and a small one on upper surface. Internal sac on left side with four attached, small tooth-like sclerites, and with a single spine on right side. Spines small, acute, raising from a disk-shaped base. Both parameres large, wide, and short, with wide, slightly convex apex.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Little variation noted in external characters, also aedeagus in shape and structure similar, but apex more or less acute in specimens from Sumatra and Malaysia, respectively.

ADDITIONAL EXAMINED SPECIMENS: 1 ♀, Thailand Doi Inthanon 22.-29.7.1990 leg. Malicky (CBM); 1 ♂, Fort de Kock (Sumatra), 920 M. 1925 leg. E. Jacobson / *Arhytinus bembidioides* Bates H. E. Andrewes det. (NHM); 1 ♀, Fort de Kock. W. Sumatra. E. Jacobson. B.M. 1927-48. / *Arhytinus bembidioides* Bates H. E. Andrewes det. (NHM); 1 ♂, Malay Penin. B.M. 1931-326. / Perak F.M.S. Jor camp Aug. 21Sep1922 E. (unreadable) / *Arhytinus bembidioides* Bates H. E. Andrewes det. (NHM); 1 ♀, Ngoenoet. Res. Kediri Oost Java / Es Coll. R. J. Louwerens (NHM).

DISTRIBUTION: According to the examined material and literature records this species is now recorded from Sikkim, Burma, Thailand, Vietnam, Sumatra, Java, and, according to STORK (1986) also in Borneo. The latter record, however, is doubtful, because *A. cordicollis* sp. nov. is very similar and easily could have been taken previously for *A. bembidioides*.

COLLECTING CIRCUMSTANCES: The mentioned specimen from Thailand was collected in a light trap in or near rain forest.

***Arhytinus cordicollis* sp. nov.**

(Figs 27, 49)

TYPE MATERIAL EXAMINED: Holotype: ♀, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM).

ETYMOLOGY: The name refers to the conspicuously cordiform pronotum of this species.

DIAGNOSIS: A medium sized species, distinguished from all similarly sized species by very wide, markedly cordiform pronotum with narrow base, and from most similar *A. nitescens* sp. nov. also by larger and laterally more protruded eyes.

DESCRIPTION:

Measurements. Length: 6.0 mm; width: 2.7 mm. Ratios. Width/length of pronotum: 1.60; width of widest diameter/base of pronotum: 1.32; width base/apex of pronotum: 1.10; width pronotum/head: 1.31; length/width of elytra: 1.42.

Colour (Figs 27, 49). Iridescent black, pronotum barely paler. Lateral margins of pronotum and elytra with narrow though distinct yellow border, also suture of elytra indistinctly paler. Labrum and mandibles reddish-piceous, palpi, antenna, and legs yellow.

Head (Fig. 27). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows rather large but very shallow, circular, situated immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with fairly distinct, isodiametric microreticulation.

Pronotum (Fig. 27). Very wide, cordiform, widest about at middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, in basal sixth gently concave. Base rather narrow in comparison with diameter, in middle straight, lateral parts slightly oblique-convex. Basal angles not projected, less angulate than rectangular, obtuse at tip. Lateral margin comparatively wide and deplanate, even widened posteriad. Both apex and base not margined. Median line rather distinct, well impressed, not attaining apex nor base. Both transverse impressions very shallow. Anterior lateral seta inserted at apical third, well in front of widest diameter. Posterior lateral seta inserted slightly in front of basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, very transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 49). Of average shape, but comparatively short, oviform, dorsal surface very convex. Striae rather coarsely crenulate, intervals very slightly raised but depressed. 3rd interval asetose. Microreticulation etremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia. Not recorded.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Unknown.

DISTRIBUTION: Brunei, Borneo, known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype fogged from the canopy of low rain forest trees.

Arhytinus indicus sp. n.

(Figs 2, 28, 50)

TYPE MATERIAL EXAMINED: Holotype: ♂, S-India: Karnataka Puttur, ca. 200 m 12.46 N 45.13 E W. LORENZ, 18.x.84 (CLT). – Paratypes: 5 ♂♂, 8 ♀♀, same data (CBM, CLT).

ETYMOLOGY: The name refers to the occurrence of this species in southern India.

DIAGNOSIS: A medium sized species, distinguished from most similarly sized species, except *A. lorenzi* sp. nov., *A. harpago* sp. nov. and *A. sumatrensis* sp. nov. which have a very similar aedeagus, by the short and wide aedeagus which bears a very large lower tooth at the bidentate apex and two series of large, attached spinose sclerites on the left and right sides of the internal sac. Further distinguished from *A. harpago* and *A. sumatrensis* by larger size and wider and far less cordiform pronotum, and from *A. lorenzi* by much less distinct yellow margins of pronotum and elytra, absence of the pale sutural stripe, less distinct upper tooth of the apex of the aedeagus, and less numerous spines on the right side of the internal sac.

DESCRIPTION:

Measurements. Length: 5.3-6.0 mm; width: 2.35-2.65 mm. Ratios. Width/length of pronotum: 1.55-1.60; width of widest diameter/base of pronotum: 1.19-1.24; width base/apex of pronotum: 1.15-1.18; width pronotum/head: 1.26-1.30; length/width of elytra: 1.40-1.44.

Colour (Figs 28, 50). Dark piceous to black, slightly iridescent, pronotum barely paler. Lateral margins of pronotum and elytra very narrowly pale. Labrum, mandibles, palpi, antenna, and legs light reddish.

Head (Fig. 28). Of average size. Eyes very large, laterally markedly projected, orbits very short, barely recognizable, almost transversal. Frontal furrows very shallow, barely recognizable. Antenna moderately short, surpassing base of pronotum by almost two antennomeres, 6th antennomere c. 1.6 x as long as wide. Surface with distinct, isodiametric microreticulation, rather dull.

Pronotum (Fig. 28). Wide, barely cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex moderately excised, apical angles

projected but widely rounded. Lateral border evenly convex, very slightly concave immediately in front of base. Base rather wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles obtuse, barely produced laterad, c. 120°. Lateral margin narrow, widened and deplanate posteriad. Apex completely margined, but margin in middle weak. Base not margined. Median line shallow though distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted about at apical third, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with fairly coarse, moderately dense punctures and some short, longitudinal strioles. Surface with very fine and dense, very superficial, transverse microreticulation which is only visible at high magnification, glossy but barely iridescent.

Elytra (Fig. 50). Of average shape, comparatively elongate, gently oviform, dorsal surface rather convex. Lateral margins slightly oblique and convex in basal half, then evenly convex. Striae deep, very finely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation very fine, extremely superficial, recognizable only at very high magnification, consisting of finest transverse lines. Surface glossy, slightly iridescent.

Male genitalia (Fig. 2). Genital ring large and fairly wide, laterally slightly convex, almost symmetrical, with rather wide, slightly asymmetrical apex. Aedegus short and very wide, lower surface straight, in middle markedly carinate. Apex moderately wide, triagonal but laterally slightly convex, obtuse at tip, apical hook large, vertical, bidentate, lower tooth large. Internal sac with 3-5 attached spines on the left side and one to two (attached) spines on the right side. Both parameres large, rather triagonal.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Some variation noted in the number of spines at the dentate sclerites in the internal sac.

DISTRIBUTION: Southern India, known only from type locality.

COLLECTING CIRCUMSTANCES: Series collected between leaf litter under trees.

Arhytinus lorenzi sp. nov.
(Figs 3, 29, 51)

TYPE MATERIAL EXAMINED: Holotype: ♂, S-India: Karnataka Kushalnagar, 800 m 12.28 N 75.58 E W. LORENZ, ix-x 1984 (CLT). – Paratypes: 1 ♂, same data (CBM).

ETYMOLOGY: The name is a patronym in honour of the collector, W. Lorenz.

DIAGNOSIS: A medium sized species, distinguished from most similarly sized species, except *A. indicus* sp. nov., *A. harpago* sp. nov. and *A. sumatrensis* sp. nov. which have a very similar aedeagus, by the short and wide aedeagus which bears large teeth at the bidentate apex and two series of large, attached spinose sclerites on the left and right sides of the internal sac. Further distinguished from *A. harpago* and *A. sumatrensis* by larger size, wider and far less cordiform pronotum, and more vivid colouration; and from *A. indicus* by very distinct yellow margins of pronotum and elytra, presence of a distinct pale sutural stripe, larger upper tooth on the apex of the aedeagus, and a larger number of spines on the right side of the internal sac.

DESCRIPTION:

Measurements. Length: 5.3-5.35 mm; width: 2.35-2.4 mm. Ratios. Width/length of pronotum: 1.52-1.56; width of widest diameter/base of pronotum: 1.20; width base/apex of pronotum: 1.16; width pronotum/head: 1.29-1.32; length/width of elytra: 1.44-1.45.

Colour (Figs 29, 51). Dark piceous to black, rather iridescent, pronotum barely paler. Lateral margins of pronotum and elytra very distinctly pale, elytra also with a distinct pale sutural stripe. Labrum, mandibles, palpi, antenna, and legs yellow to pale reddish.

Head (Fig. 29). Of average size. Eyes very large, laterally markedly projected, orbits very short, barely recognizable, almost transversal. Frontal furrows very shallow, barely recognizable, punctiform. Antenna moderately short, surpassing base of pronotum slightly more than two antennomeres, 6th antennomere c. 1.6 x as long as wide. Surface with distinct, isodiametric microreticulation, rather dull.

Pronotum (Fig. 29). Wide, not cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but widely rounded. Lateral border evenly convex, not perceptibly concave near base. Base rather wide in comparison with diameter, almost completely convex. Basal angles very obtuse, almost rounded off.

Lateral margin fairly wide, widened and deplanate posteriad. Apex completely margined, but margin in middle weak. Base not margined. Median line shallow though distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted about at apical third, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with fairly coarse, moderately dense punctures and some short, longitudinal strioles. Surface with very fine and dense, very superficial, transverse microreticulation which is only visible at high magnification, glossy but barely iridescent.

Elytra (Fig. 51). Of average shape, comparatively elongate, gently oviform, dorsal surface rather convex. Lateral margins slightly oblique and convex in basal half, then evenly convex. Striae deep, very finely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation very fine, extremely superficial, recognizable only at very high magnification, consisting of finest transverse lines. Surface glossy, rather iridescent.

Male genitalia (Fig. 3). Genital ring large and comparatively narrow, laterally little convex, almost symmetrical, with rather wide, slightly asymmetrical apex. Aedegus short and wide, lower surface straight, in middle markedly carinate. Apex moderately wide, triagonal, slightly asymmetrical, quite acute at tip, apical hook fairly large, slightly oblique, bidentate, upper tooth almost as large as the lower one. Internal sac with six large, attached spines on the left side and four attached spines on the right side of which the apical one is markedly elongate and curved. All spines raising from a basal plate. Both parameres large, rather triagonal.

Female genitalia. Unknown.

VARIATION: Very little variation noted.

DISTRIBUTION: Southern India, known only from type locality.

COLLECTING CIRCUMSTANCES: Not recorded, both specimens collected at median altitude.

Arhytinus philippinus JEDLICKA, 1936
(Figs 30, 52)

JEDLICKA, 1936: 54. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Holotype: ♀, Type / Philippine Is. Coll. Bottcher. B.M. 1929-201 / *Arhytinus philippinus* s. n. type DET. ING. JEDLICKA (NHM).

DIAGNOSIS: A medium sized species, distinguished from all similarly sized species, except *A. angustimargo* sp. nov., by combination of large and laterally well protruded eyes, narrow and indistinctly pale borders of pronotum and elytra, wide pronotum, and yellow legs. From *A. angustimargo* it is distinguished by wider lateral margins of pronotum, sparsely punctate base, less produced eyes which posteriorly are still oblique, and less distinct sericeous lustre of the elytra.

For better comparison with the other species I give a short supplementary description of measurements and some other characters of the holotype.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 6.25 mm; width: 2.85 mm. Ratios. Width/length of pronotum: 1.61; width of widest diameter/base of pronotum: 1.24; width base/apex of pronotum: 1.12; width pronotum/head: 1.28; length/width of elytra: 1.40.

Colour (Figs 30, 52). Head dark piceous, pronotum and elytra brown, lateral margins of pronotum and elytra with indistinct and narrow paler border. Labrum, mandibles, and palpi pale reddish, antenna apparently rather brown or piceous, but most of both antennae broken. Legs reddish, tibiae and tarsi not paler than femora.

Head (Fig. 30). Of average size. Eyes large, laterally rather projected, orbits short and oblique. Frontal furrows barely perceptible, but frons in middle with two shallow, circular impressions. Antennae broken from 2nd and 5th antennomere, respectively. Surface with fairly distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 30). Very wide, slightly cordiform, widest at anterior third, dorsal surface moderately depressed. Apex with moderate excision, apical angles slightly projected but rounded. Lateral border evenly convex, near base very slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts oblique-convex. Basal angles not projected, obtuse, c. 110°. Lateral margin in anterior half rather narrow, posteriad widened and deplanate. Apex and base in middle not margined, base laterally with faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions very shallow, barely recognizable. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base with sparse, irregular punctures and some strioles. Surface with very fine and

dense, very superficial, transverse lines which are only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 52). Of average shape, comparatively short, distinctly oviform and markedly widened towards apical third, dorsal surface convex but depressed on disk. Lateral margins oblique and slightly convex in basal two thirds, then evenly convex. Striae distinctly but finely punctate, intervals very slightly raised. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, consisting of finest transverse lines. Surface glossy, with slight iridescent lustre.

Male genitalia. Unknown.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Unknown.

DISTRIBUTION: Philippines, without exact locality.

COLLECTING CIRCUMSTANCES: Not recorded.

RELATIONSHIPS: Probably related to both foregoing species, but without knowledge of the male genitalia relationships remain uncertain.

Arhytinus angustimargo sp. nov.
(Figs 31, 53)

TYPE MATERIAL EXAMINED: Holotype: ♀, MALAYSIA, Sabah Kinabalu NP, Lighttrap Poring Hot Springs Staff Quarters 500m 30.8.-6.9.95 Leg. Brühl / *Arhytinus bembidioides* (CLT).

DIAGNOSIS: A medium sized species, distinguished from all similarly sized species, except *A. philippinus* JEDLICKA, by combination of large and laterally well protruded eyes, narrow and indistinctly pale borders of pronotum and elytra, wide pronotum, and yellow legs. From *A. philippinus* it is distinguished by even narrower lateral margins of pronotum, densely punctate base, markedly produced eyes which posteriorly are almost perpendicular, and very distinct sericeous lustre of the elytra.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 6.1 mm; width: 2.75 mm. Ratios. Width/length of pronotum: 1.59; width of widest diameter/base of pronotum: 1.22; width base/apex of pronotum: 1.12; width pronotum/head: 1.27; length/width of elytra: 1.40.

Colour (Figs 31,53). Almost black, lateral margins of pronotum with narrow and very indistinct, of elytra with more distinct paler border. Labrum, mandibles, and palpi pale reddish, antenna reddish. Legs pale reddish, tibiae and tarsi not paler than femora.

Head (Fig. 31). Of average size. Eyes large, laterally remarkably projected, orbits transverse and barely perceptible. Frontal furrows shallow and short. Antenna rather short, surpassing base of pronotum by less than two antennomeres, 6th antennomere c. 1.5 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 31). Very wide, slightly cordiform, widest at anterior third, dorsal surface moderately depressed. Apex with moderate excision, apical angles slightly projected but rounded. Lateral border evenly convex, near base very slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts oblique-convex. Basal angles not projected, obtuse, c. 110°. Lateral margin in anterior half very narrow, posteriad widened and deplanate. Apex very faintly margined, base in middle not margined, laterally with faint remnants of a margin. Median line shallow though distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base with rather dense, coarse punctures, without longitudinal strioles. Surface with very fine and dense, very superficial, transverse lines which are only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 53). Of average shape, comparatively short, distinctly oviform and markedly widened towards apical third, dorsal surface convex but depressed on disk. Lateral margins oblique and slightly convex in basal two thirds, then evenly convex. Striae distinctly but finely punctuate in basal two thirds, intervals very slightly raised. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, consisting of finest transverse lines. Surface glossy, with distinct iridescent lustre.

Male genitalia. Unknown.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Unknown.

DISTRIBUTION: Sabah, Borneo. Known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype collected in light trap at rather low altitude.

RELATIONSHIPS: Probably related to the foregoing species, but without knowledge of the male genitalia relationships remain uncertain.

Arhytinus nitescens, sp. nov.
(Figs 4, 32, 54)

TYPE MATERIAL EXAMINED: Holotype: ♂, S-Taiwan FO 34 May 2001 leg. Wenbe (CBM).

ETYMOLOGY: The name refers to the remarkably glossy surface of the the elytra.

DIAGNOSIS: A medium sized species, distinguished from all similarly sized species by combination of smaller and laterally less protruded eyes, distinct yellow borders of pronotum and elytra, yellow legs, and four dispersed spiniform sclerites in the internal sac of the aedeagus.

DESCRIPTION:

Measurements. Length: 5.9 mm; width: 2.6 mm. Ratios. Width/length of pronotum: 1.53; width of widest diameter/base of pronotum: 1.26; width base/apex of pronotum: 1.18; width pronotum/head: 1.45; length/width of elytra: 1.42.

Colour (Figs 32, 54). Iridescent black, pronotum barely paler. Lateral margins of pronotum and elytra with fairly wide, distinct yellow border, also suture of elytra very indistinctly paler. Labrum and mandibles reddish-piceous, palpi, antenna, and legs yellow.

Head (Fig. 32). Of average size. Eyes moderately large, laterally fairly projected, orbits short but distinct, oblique. Frontal furrows barely indicated, very shallow, situated immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with fairly distinct, isodiametric microreticulation, rather glossy.

Pronotum (Fig. 32). Wide, slightly cordiform, widest slightly in front of middle, dorsal surface moderately depressed, much wider than head. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base barely concave. Base rather narrow in comparison with diameter, in middle straight, lateral parts slightly oblique-convex. Basal angles not projected, far less angulate than rectangular, obtuse at tip. Lateral margin in anterior half rather narrow, posteriad widened and deplanate. Both apex and base not margined. Median line distinct, well impressed, not attaining apex nor base. Both transverse impressions very shallow. Anterior lateral seta inserted at apical third, well in front of widest diameter. Posterior lateral seta inserted slightly in front of basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 54). Of average shape, but comparatively short, oviform, dorsal surface rather convex. Striae extremely finely crenulate, intervals raised and moderately convex. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy and with distinct iridescent lustre. Striae with a row of extremely short, erect setae which are only recognizable at very high magnification and when seen from from base.

Male genitalia (Fig. 4). Genital ring large, laterally gently convex, almost symmetrical, with narrow, rounded apex. Aedegus short and in middle very wide, lower surface straight, very triangular but median carina blunt. Apex regularly triangular, acute at tip, without apical hook, but very slightly knobbed. Internal sac with four rather large spiniform sclerites dispersed over the whole sac. Spines rather large, acute, raising from a disk-shaped base. Both parameres large, wide, and short, with wide, slightly convex apex.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Southern Taiwan, known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype apparently sampled in pitfall trap in closed forest.

Arhytinus piceus JEDLICKA, 1936
(Figs 5, 33, 55

JEDLICKA, 1936: 55. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Paratype: ♂, Philippine Is. Coll. Bottcher. B.M. 1929-201. / Cotype / Mus. Nat. Pragae 25099 Inv. / *Arhytinus piceus* sp. n. DET. ING. JEDLICKA (NMNHP).

DIAGNOSIS: A moderately small species, distinguished from similarly sized species by the the wide and short aedeagus which bears a very elongate, horizontal apical hook. Further distinguished from *A. crenulipennis* sp. nov. which has a very similar aedeagus by wider

pronotum without sinuosity near base, simple, not crenulate elytral striae, and shorter, more curved aedeagus without any spine in the internal sac.

DESCRIPTION:

Measurements. Length: 5.7 mm; width: 2.55 mm. Ratios. Width/length of pronotum: 1.71; width of widest diameter/base of pronotum: 1.25; width base/apex of pronotum: 1.14; width pronotum/head: 1.38; length/width of elytra: 1.40.

Colour (Figs 33, 55). Dark piceous to almost black, slightly iridescent, pronotum not paler. Lateral margins of pronotum and elytra dark. Labrum and mandibles reddish-piceous, palpi in parts, antenna, and legs infuscate.

Head (Fig. 33). Of average size. Eyes large, laterally moderately projected, orbits short, but distinct, oblique. Frontal furrows small, shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by almost two antennomeres, 6th antennomere c. 1.6 x as long as wide. Surface with very fine, slightly superficial, isodiametric microreticulation, comparatively glossy.

Pronotum (Fig. 33). Very wide, cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex fairly deeply excised, apical angles projected but rounded. Lateral border evenly convex, even near basal angles not concave. Base rather wide in comparison with diameter, in middle almost straight, lateral parts markedly oblique-convex. Basal angles obtuse and very wide, almost rounded off, laterally not projected. Lateral margin narrow, widened and deplanate posteriad. Apex finely margined, margin in middle inconspicuous. Base not margined. Median line shallow, not attaining apex nor base. Both transverse impressions perceptible, but shallow. Basal grooves comparatively shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior fourth of lateral margin with coarse, even slightly rugose punctures. Surface with very fine and dense, highly superficial, very transverse microreticulation which is only visible at high magnification, glossy and slightly iridescent.

Elytra (Fig. 55). Of average shape, comparatively short, gently oviform, dorsal surface convex though depressed on disk. Lateral margins very slightly oblique and convex in basal half, then evenly convex. Striae fairly deep, not perceptibly crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 5). Genital ring large and wide, laterally convex, almost symmetrical, with rather narrow, slightly asymmetrical apex. Aedegus wide and short, lower surface very concave, markedly carinate in middle. Apex rather narrow, regularly triangular, acute at tip, apical hook transversal, very elongate, bidentate, upper tooth larger than the lower one. Internal sac without any spiniform sclerites. Both parameres large and wide, the left one apically rather transverse.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Philippines, without exact locality.

COLLECTING CIRCUMSTANCES: Not recorded.

RELATIONSHIPS: According to shape and structure of the aedeagus related to *A. crenulipennis* sp. nov.

Arhytinus irideus JEDLICKA, 1936
(Figs 34, 56)

JEDLICKA, 1936: 54. – DARLINGTON 1952: 119; STORK 1986: 12; LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Holotype: ♀, Type / *Arhytinus irideus* sp. n. type DET. ING. JEDLICKA (NHM).

DIAGNOSIS: A large species, distinguished from similarly large species by combination of pale margin of pronotum but dark margin of the elytra, and completely yellow antenna. From the most similar species *A. nitidipennis* sp. nov. also distinguished by the obtuse basal angles and the barely punctate basis of the pronotum. The aedeagus is so far unknown.

For better comparison with the other species I give a short supplementary description of measurements and some other characters of the holotype.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 7.5 mm; width: 3.15 mm. Ratios. Width/length of pronotum: 1.59; width of widest diameter/base of pronotum: 1.22; width base/apex of pronotum: 1.18; width pronotum/head: 1.47; length/width of elytra: 1.44.

Colour (Figs 34, 56). Iridescent piceous, pronotum barely paler. Lateral margin of pronotum with ill defined pale reddish lateral border which widens towards base, elytra with dark border. Labrum piceous, mandibles, palpi, antenna, and legs dirty yellow.

Head (Fig. 34). Of average size. Eyes large, laterally well projected, orbits rather short, oblique. Frontal furrows barely indicated, but area behind clypeal suture on both sides widely depressed. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.65 x as long as wide. Surface with very fine, superficial, irregularly isodiametric microreticulation, rather glossy.

Pronotum (Fig. 34). Very wide, cordiform but lateral margins not excised, widest about at middle, dorsal surface moderately depressed. Apex rather excised, apical angles well projected but rounded. Lateral border evenly convex, near base not perceptibly concave. Base moderately wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, obtusely rounded, c. 120°. Lateral margin in anterior half narrow, posteriad widened and deplanate. Apex and base in middle not margined, base laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted slightly behind apical third, in front of widest diameter. Posterior lateral seta inserted at basal angle. Base with sparse and rather fine punctures. Surface with finest traces of very fine and dense, extremely superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 56). Of average shape, moderately short, slightly oviform, dorsal surface convex but depressed on disk. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae shallow, finely punctate-crenulate, intervals absolutely depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of very transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia. Unknown.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Unknown.

DISTRIBUTION: Philippines, without exact locality.

COLLECTING CIRCUMSTANCES: Not recorded.

RELATIONSHIPS: In body shape rather similar to *A. nitidipennis* sp. nov., but in view of the unknown male genitalia the relationships are yet obscure.

Arhytinus nitidipennis sp. nov.
(Figs 6, 35, 57)

TYPE MATERIAL EXAMINED: Holotype: ♂, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM).

DIAGNOSIS: A large species, distinguished from all similarly large species by the distinct pale margins of pronotum and elytra, completely yellow antenna, and the bidenticulate apex of the aedeagus. From the most similar species *A. irideus* JEDLICKA also distinguished by the angulate basal angles and the coarsely punctate basis of the pronotum.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 7.6 mm; width: 3.3 mm. Ratios. Width/length of pronotum: 1.49; width of widest diameter/base of pronotum: 1.26; width base/apex of pronotum: 1.15; width pronotum/head: 1.36; length/width of elytra: 1.45.

Colour (Figs 35, 57). Iridescent black, pronotum barely paler. Lateral margins of pronotum and elytra with distinct pale reddish lateral border, pronotum also with slightly less distinct, reddish apex and base. Labrum, mandibles, palpi, antenna, and legs yellow.

Head (Fig. 35). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows small, circular, comparatively deep, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.6 x as long as wide. Surface with moderately distinct, about isodiametric microreticulation, rather glossy.

Pronotum (Fig. 35). Wide, slightly cordiform, widest about at middle, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but rounded. Lateral border evenly convex, near base not perceptibly concave. Base fairly narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles barely projected, obtuse, c. 120°. Lateral margin in anterior half narrow, widened and deplanate only posteriad. Apex and base in middle not margined, base laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions very shallow, barely recognizable. Anterior lateral seta inserted at apical third, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface here and there

with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 57). Of average shape, comparatively short, slightly oviform, dorsal surface convex but depressed on disk. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae not perceptibly crenulate, intervals slightly raised but rather depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of very transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 6). Genital ring not recorded. Aedegus short and wide, lower surface slightly convex in central part, markedly carinate in middle. Apex rather narrow, triangular, quite acute at tip, apical hook oblique, rather small, bidentate, upper tooth slightly larger than the lower one. Internal sac with a large, tridentate sclerite on left side. Both parameres large, the left one markedly triangular.

Female genitalia. Not recorded.

Variation. Unknown.

DISTRIBUTION: Brunei, Borneo. Known only from type locality.

COLLECTING CIRCUMSTANCES: The single specimen was fogged from the canopy of low rain forest trees.

Arhytinus circumcinctus sp. nov.
(Fig. 58)

TYPE MATERIAL EXAMINED: Holotype: ♀, Thailand Doi Inthanon 17.-18.5.1990 leg. Malicky (CBM).

ETYMOLOGY: The name refers to the remarkably distinct yellow borders of pronotum and elytra, of this species.

DIAGNOSIS: A large species, distinguished from the similarly sized species *A. irideus* JEDLICKA by wider pronotum with even deeper apical excision and much denser and coarser punctation of the base, and shorter and more oviform elytra with wider yellow margin and deeper and more distinctly crenulate striae; and from *A. bembidioides* BATES that occurs in the same area, by larger size, much wider pronotum with wider and more deplanate lateral margins, longer and narrower antennomeres, and wider yellow margin of pronotum and elytra.

DESCRIPTION

Measurements. Length: 7.7 mm; width: 3.5 mm. Ratios. Width/length of pronotum: 1.66; width of widest diameter/base of pronotum: 1.23 width base/apex of pronotum: 1.12; width pronotum/head: 1.47; length/width of elytra: 1.37.

Colour (Fig. 58). Dark piceous to black, slightly iridescent, pronotum barely paler. Lateral margins of pronotum and elytra with distinct, rather wide, light reddish border, also suture of elytra indistinctly paler. Labrum and mandibles reddish-piceous, palpi, antenna, and legs yellow.

Head (Fig. 58). Of average size. Eyes moderately large, though laterally markedly projected, orbits short but distinct, oblique and slightly enclosing the posterior margin of the eye. Frontal furrows very shallow, barely recognizable, circular, situated immediately behind clypeal suture. Antenna comparatively elongate, surpassing base of pronotum by more than two antennomeres, 6th antennomere almost 2 x as long as wide. Surface with fairly distinct, isodiametric to slightly transverse microreticulation, rather glossy.

Pronotum (Fig. 58). Very wide, slightly cordiform, widest about at middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex thorughout, not concave near base. Base rather wide in comparison with diameter, in middle straight, lateral parts slightly oblique-convex. Basal angles very slightly projected, but obtuse. Lateral margin comparatively wide and deplanate, posteriad even widened. Apex in middle not margined, whole base not margined. Median line rather distinct, well impressed, not attaining apex nor base. Both transverse impressions very shallow, barely recognizable. Anterior lateral seta inserted slightly behind apical third, in front of widest diameter. Posterior lateral seta inserted slightly in front of basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 58). Of average shape, but comparatively short, slightly oviform, dorsal surface convex but depressed on disk. Striae finely but distinctly crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation etremely fine and superficial, barely recognizable even at high magnification, consisting of very transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia. Not recorded.

Female genitalia. Similar to those of *A. major*

DARLINGTON.

Variation. Unknown. A second female from Burma is tentatively alluded to this species: it is rather similarly sized and shaped, but has less angulate pronotal basal angles and much narrower yellow margins on elytra and pronotum. Additional specimens would be needed to fix its taxonomic position. The label reads: "N BURMA leg. Reuter ca 40 km NW Puao 2200mNN. 10.8.2006 (CSR).

DISTRIBUTION: Northern Thailand, known only from type locality; ? Burma.

COLLECTING CIRCUMSTANCES: The holotype was collected in a light trap in or near rain forest.

Arhytinus major DARLINGTON, 1952
(Figs 7, 25, 59)

DARLINGTON, 1952: 118. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Holotype: ♂, Dobodura Papua N.G. Mar-July, 1944 Darlington / *Arhytinus major* Darl. / ~~det.~~ Darlington at B.M. 1947-48 Notes p./6 (M.C.Z. Type 28587).

DIAGNOSIS: A large species, distinguished from all similarly large species by dark colour of antenna and legs. Further distinguished from the other New Guinean species by large size, darker colour, less angulate basal angles of the pronotum, and the large number of spinose sclerites at the apex of the internal sac of the aedeagus.

For better comparison with the other species a supplementary description is given.

SUPPLEMENTARY DESCRIPTION:

Measurements (According to Darlington 1952: p. 119 length of holotype is 8.0 mm, but this measurement includes the mandibles). Length: 7.4-7.5 m; width: 3.15-3.2 mm. Ratios. Width/length of pronotum: 1.53-1.54; width of widest diameter/base of pronotum: 1.22-1.28; width base/apex of pronotum: 1.11-1.15; width pronotum/head: 1.39-1.42; length/width of elytra: 1.48-1.51.

Colour (Fig. 59). Whole surface, including mouth parts, antenna, and legs black, barely iridescent. Lateral margins of pronotum and elytra with dark border.

Head (Fig. 59). Of average size. Eyes large, laterally moderately projected, orbits short but well perceptible, oblique. Frontal furrows small, circular, and very shallow, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere almost twice as long as wide. Surface with very fine though distinct, isodiametric microreticulation, fairly glossy.

Pronotum (Fig. 59). Very wide, slightly cordiform, widest in front of middle, dorsal surface moderately depressed. Apex deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base not concave. Base comparatively wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles very wide, almost rounded off. Lateral margin narrow, widened and deplanate only posteriad. Apex completely margined, base not margined. Median line very shallow though rather distinct, not attaining apex nor base. Anterior transverse impression very shallow, linear, posterior transverse sulcus not perceptible. Anterior lateral seta inserted slightly behind apical quarter, in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin moderately coarsely and in middle rather densely punctate. Surface with extremely fine, dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 59). Of average shape, comparatively elongate, moderately oviform, dorsal surface convex but slightly depressed on disk. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae finely crenulate, intervals very slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, barely iridescent.

Male genitalia (Fig. 7). The male aedeagus has been roughly sketched by DARLINGTON (1952, fig. 20). This figure fails to sketch the denticulate apex, and it depicts only four spines in two groups without explaining on which side of the aedeagus they are located.

Genital ring of the holotype not recorded. Aedeagus short and stout, lower surface in basal half concave, in apical half almost straight, just in front of apex slightly bisinuate, carinate in middle. Lower and lateral surfaces markedly striped longitudinally. Apex moderately narrow, almost symmetrically triangular but obtuse at tip, very oblique, bidentate, with a very small hook on the lower surface and a larger, more obtuse one on the upper surface that is slightly curved upwards. Internal sac with two elongate spines at bottom of internal sac and four shorter spines at roof, all situated at right side, and with two very small, short spines further inside at the left side. Both parameres large and rather triangular.

Female genitalia (Fig. 25). Apical margin of gonocoxite 1 with 5 fairly elongate ensiform setae in median two thirds of ventral surface. Gonocoxite 2 of moderate length, with curved, acute apex, with a large dorso-median ensiform seta orginiating about at middle, three rather elongate ventro-lateral ensiform setae of decreasing size, and a short ventro-median nematiform seta originating from an oval-shaped pit at apical third.

Variation. In the holotype the apex of the elytra is slightly lobed and depressed, but in the specimens that I allude to this species the apex is normal shaped.

ADDITIONAL EXAMINED SPECIMENS: 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 52 27-VII-1996 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 60 03-VII-1996 Leg. Olivier Missa (CBM).

DISTRIBUTION: Papua New Guinea, so far known only from the holotype and the two specimens recorded in present paper.

COLLECTING CIRCUMSTANCES: The specimens from Baiteta collected at light in rain forest.

Arhytinus borcherdingi sp. nov.
(Figs 8, 60)

TYPE MATERIAL EXAMINED: Holotype: ♂, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM). – Paratypes: 1 ♂, same data (CBM); 1 ♀, MALAYSIA, Sabah Kinabalu NP, Lighttrap Poring Hot Springs Staff Quarters 500m 30.8.-6.9.95 Leg. Brühl / *Arhytinus irideus* (CLT); 1 ♀, Brunei Borneo (Waterstradt) (NMH).

ETYMOLOGY: The name is a patronym in honour of the collector, A. BORCHERDING.

DIAGNOSIS: A large species, distinguished from the similarly large *A. major* DARLINGTON by yellow legs and partly yellow antenna and the absence of sclerites in the internal sac; from *A. irideus* JEDLICKA by partly dark antenna and the not bidenticulate apex of the aedeagus; and from *A. inarmatus* sp. nov. by deep basal grooves of the pronotum and distinctly hooked apex of the aedeagus.

DESCRIPTION:

Measurements (♂ holotype and 1 ♂, 1 ♀ paratypes). Length: 8.0-9.2 mm; width: 3.4-3.85 mm. Ratios. Width/length of pronotum: 1.42-1.50; width of widest diameter/base of pronotum: 1.27-1.28; width base/apex of pronotum: 1.12-1.22; width pronotum/head: 1.38-1.39; length/width of elytra: 1.50-1.53.

Measurements (♀ paratype from NMH). Length: 7.9 mm; width: 3.4 mm. Ratios. Width/length of pronotum: 1.60; width of widest diameter/base of pronotum: 1.25; width base/apex of pronotum: 1.16; width pronotum/head: 1.42; length/width of elytra: 1.43.

Colour (Fig. 60). Black, pronotum with indistinct, dark reddish margin. Labrum and mandibles reddish-piceous, palpi pale reddish, antenna reddish except for the three basal antennomeres which are piceous, legs brown.

Head (Fig. 60). Of average size. Eyes large, laterally markedly projected, orbits very short, almost transverse. Frontal furrows very shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by c. two antennomeres, 6th antennomere c. 1.6-1.7 x as long as wide. Surface with distinct, isodiametric microreticulation, rather glossy.

Pronotum (Fig. 60). Moderately to very wide (see measurements and variation), slightly cordiform, widest about at middle, dorsal surface moderately depressed. Apex little excised, apical angles slightly projected, rounded. Lateral border evenly convex, near base not concave. Base moderately wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not or very slightly projected, obtuse or but slightly angulate, c. 120°. Lateral margin in anterior half narrow, posteriad widened and deplanate. Apex even in middle margined, base not margined. Median line shallow though rather distinct, almost complete. Anterior transverse impression barely recognizable, posterior transverse sulcus very shallow. Anterior lateral seta inserted behind anterior third, slightly in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface with some very fine wrinkles and with traces of very fine, dense, highly superficial, transverse microreticulation which is only visible at very high magnification, moderately glossy.

Elytra (Fig. 60). Of average shape, comparatively elongate but different (see measurements), moderately oviform, dorsal surface convex. Lateral margins oblique and slightly convex in basal half, then evenly convex. Striae very finely to rather distinctly crenulate, intervals very slightly raised but depressed. 3rd interval asetose.

Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of very transverse lines. Surface glossy, with distinct iridescent lustre.

Male genitalia (Fig. 8). Genital ring large, laterally almost straight, almost symmetrical, with rather narrow, rounded apex. Aedeagus narrow and elongate, lower surface in basal half markedly concave, in apical half almost straight, not carinate. Apex rather narrow, asymmetrically triangular, slightly obtuse at tip, unidentate, with a small apical hook only on the lower surface. Internal sac without any sclerites. Both parameres moderately large and triangular.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. In the male types some minor variation is noted in body size and proportions, in particular in those of the pronotum, but the male aedeagus in both males is similar. One of the female specimens differs markedly in the proportions of prothorax and elytra, and the elytral striae also are more distinctly crenulate. In view of the few specimens available, these differences are supposed to represent intraspecific variation and thus, the female is tentatively included in the type series. Future examination of additional males perhaps will clarify the actual amount of variation within this species.

DISTRIBUTION: Brunei and Sabah, Borneo.

COLLECTING CIRCUMSTANCES: Both male specimens fogged from the canopy of low rain forest trees, one female sampled in light trap at rather low altitude.

Arhytinus inarmatus sp. nov.
(Figs 9, 61)

TYPE MATERIAL EXAMINED: Holotype: ♂, W-Java. Gn. Halimun N.P. Citalahab, 1200m, leg. A.Riedel / 12.IX.2005 - sample 2; sifted S06°44'30.2" E106°31'33.0" (MZB).

ETYMOLOGY: The name refers to the absence in this species of any apical hook on the aedagus.

DIAGNOSIS: A large species, distinguished from the similarly large *A. major* DARLINGTON by yellow legs and partly yellow antenna and the absence of sclerites in the internal sac; from *A. irideus* JEDLICKA by partly dark antenna and the not bidenticulate apex of the aedeagus; and from *A. borcherdingi* sp. nov. by shallow basal grooves of the pronotum and barely hooked apex of the aedeagus.

DESCRIPTION:

Measurements. Length: 8.3 mm; width: 3.65 mm. Ratios. Width/length of pronotum: 1.45; width of widest diameter/base of pronotum: 1.21; width base/apex of pronotum: 1.26; width pronotum/head: 1.50; length/ width of elytra: 1.47.

Colour (Fig. 61). Black, elytra slightly iridescent, lateral margins of pronotum and elytra with dark border. Labrum and mandibles piceous, palpi pale reddish except for the three basal palpomeres which are dark, antenna, and legs pale reddish.

Head (Fig. 61). Of average size, but comparatively small in comparison with pronotum. Eyes moderately large, laterally comparatively little projected, orbits fairly elongate, oblique. Frontal furrows small, shallow, circular, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum almost two antennomeres, 6th antennomere c. 1.6 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 61). Very wide, not cordiform, widest at middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly and markedly convex throughout, near base not concave. Base wide in comparison with diameter and in particular in comparsion with apex, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, very obtuse, >120°. Lateral margin in anterior half very narrow, posteriad suddenly widened and markedly deplanate. Apex laterally margined, margin in middle absent. Base not margined. Median line shallow though rather distinct, not attaining apex nor base. Anterior transverse impression shallow, posterior transverse sulcus barely recognizable. Anterior lateral seta inserted at apical third, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin moderately coarsely and rather densely punctate. Surface with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, rather glossy.

Elytra (Fig. 61). Of average shape, comparatively short, slightly oviform, dorsal surface convex but slightly depressed on disk. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae finely crenulate, intervals slightly raised but depressed. 3rd interval unisetose, seta located in middle in 3rd interval, but attached to 2nd stria. Microreticulation

extremely fine and superficial, barely recognizable even at high magnification, consisting of very transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 9). Genital ring large, laterally gently convex, almost symmetrical, with moderately wide, slightly oblique apex. Aedeagus rather narrow and elongate, lower surface in basal half markedly concave, in apical half almost straight, in basal half markedly carinate in middle. Apex moderately narrow, triangular, quite acute at tip, without a distinct apical hook, but apex very slightly bent down. Internal sac without any distinct sclerites. Both parameres large and rather triangular.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Western Java. Known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype sifted, probably from logs or litter near the ground in rain forest.

Arhytinus medius DARLINGTON, 1952
(Figs 10, 62)

DARLINGTON, 1952: 117. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Holotype: ♂, Dobodura Papua N.G. Mar-July, 1944 Darlington / *Arhytinus medius* Darl. / *medius* ♂ descr. (M.C.Z. Type 28586).

DIAGNOSIS: A medium sized species, distinguished from all similarly sized species by dark legs and dark margins of pronotum and elytra. Further distinguished from other New Guinean species by body size and by the aedeagus which bears one or two spiniform sclerites on the right side.

For better comparison with the other species I give a short supplementary description of measurements and some other characters.

SUPPLEMENTARY DESCRIPTION:

Measurements. Length: 6.0-6.3 mm; width: 2.6-2.75 mm. Ratios. Width/length of pronotum: 1.52-1.57; width of widest diameter/base of pronotum: 1.26-1.27; width base/apex of pronotum: 1.11-1.14; width pronotum/head: 1.37-1.40; length/width of elytra: 1.44-1.46.

Colour (Fig. 62). Dark piceous to almost black, slightly iridescent, pronotum barely paler. Lateral margins of pronotum and elytra with dark border. Labrum, mandibles, palpi, and antenna reddish, femora brown, tibiae and tarsi paler.

Head (Fig. 62). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows small, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 62). Wide, slightly cordiform, widest well in front of middle, dorsal surface moderately depressed. Apex with rather shallow excision, apical angles slightly projected but rounded. Lateral border evenly convex, near base not concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts oblique-convex. Basal angles not projected, very obtuse, c. 120°. Lateral margin in anterior half rather narrow, posteriad widened and deplanate. Apex and base in middle not margined, base laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions very shallow, barely recognizable. Anterior lateral seta inserted at apical third, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface here and there with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 62). Of average shape, comparatively short, slightly oviform, dorsal surface convex but depressed on disk. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae distinctly but finely crenulate, intervals slightly raised and gently convex. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 10). Genital ring large, laterally gently convex, slightly asymmetrical, with wide, slightly oblique apex. Aedeagus moderately wide and compact, lower surface straight, not markedly carinate but with several longitudinal stripes. Apex short and rather narrow, slightly spoon-shaped, obtuse at tip, apical hook oblique, small, bidentate, upper tooth larger than the lower one but both teeth small. Internal sac with one or two small, spiniform sclerites on right side. Both parameres large and elongate.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Apart from some differences in colour

which may be due to different age of specimens, very little variation noted.

ADDITIONAL EXAMINED SPECIMENS (all: "Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light"): 4 ♂♂, T2, 09-IV-1993 (CBM, IRSNB); 2 ♀♀, T 2, 6-V-1993 (IRSNB); 1 ♂, 3 ♀♀, T 2, 06-IX-1993 (IRSNB); 2 ♂♂, Baiteta forest 27.VI.1996 Light trap AR42 (IRSNB); 1 ♀, XG, 24-IV-1996 (IRSNB); 1 ♂, 1 ♀, M 1, 21-III-1993 (IRSNB); 1 ♀, M1, 18-III-1993 (IRSNB); 1 ♀, T 2, 24-III-1993 (IRSNB); 2 ♀♀, T 2, 26-III-1993 (IRSNB); 1 ♀, T 2, 22-IV-1993 (CBM); 1 ♀, T 2, 19-V-1993 (IRSNB); 1 ♀, T 2, 31-V-1993 (IRSNB); 1 ♀, 16.V.1996, FogAR10 (IRSNB); 1 ♂, M 1, 18-V-1993 (CBM); 1 ♂, 1 ♀, T 2, 20-IV-1993 (IRSNB); 1 ♂, AR 66, 24-VII-1996 (IRSNB); 2 ♀♀, T 2, 26-III-1993 (CBM, IRSNB); 1 ♀, T 2, 24-VI-1996 (IRSNB); 1 ♀, M 1, 31-III-1993 (CBM).

DISTRIBUTION: New Guinea, according to DARLINGTON (1971) recorded from several localities throughout the island.

COLLECTING CIRCUMSTANCES: All specimens reported in present paper collected at light in rain forest.

Arhytinus missai sp. nov.
(Figs 11, 36, 63)

TYPE MATERIAL EXAMINED: Holotype: ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light trap XE 16.V.1996 Leg. Olivier Missa (IRSNB). – Paratypes: 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 16 04-VI-1996 Leg. Olivier Missa (IRSNB); 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 60 4-VII-1996 Leg. Olivier Missa (CBM); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 41 25-VII-1996 Leg. Olivier Missa (IRSNB); 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 42 24-VI-1996 Leg. Olivier Missa (CBM); 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 52 27-VII-1996 Leg. Olivier Missa (IRSNB); 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light 03-VI-1996 Leg. Olivier Missa (IRSNB); 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 7 04-IV-1996 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T2 21-IV-1993 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T 2 01-VI-1996 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light M 8 16-IV-1995 Leg. Olivier Missa (CBM); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light M 1 18-V-1993 Leg. Olivier Missa (IRSNB); 1♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T 2 23-III-1993 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T 2 26-III-1993 Leg. Olivier Missa (CBM); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light A R 22 17-VI-1996 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 66 24-VII-1996 Leg. Olivier Missa (IRSNB); 1 ♂, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Canopy 2 28 July 2000 R L Kitching (QMB); 1 ♀, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Ground 3 30 July 2000 R L Kitching (CBM); Papua Nlle Guinée Morobe I. 81 wnv. de Gurakor W. G. Ullrich (MNHG).

ETYMOLOGY: The name is a patronym in honour of the collector of a multitude of interesting and new New Guinean carabid beetles, Olivier Missa.

DIAGNOSIS: A moderately small species, distinguished from the similarly shaped New Guinean species *A. minor* sp. nov. and *A. granum* DARLINGTON by slightly major size and the aedeagus which bears a very large, elongate spiniform sclerite on either side; further distinguished from the very similar *A. minor* by narrower pronotum. Distinguished from the most similar *A. frater* sp. nov. mainly by the differently shaped aedeagus which has much longer spiniform sclerites, a wider apex which is directed less horizontally, and the quadrangular left paramere; also different by its narrower pronotum and the coarsely punctate base.

DESCRIPTION:

Measurements. Length: 4.9-5.1 mm; width: 2.1-2.2 mm. Ratios. Width/length of pronotum: 1.49-1.52; width of widest diameter/base of pronotum: 1.24-1.30; width

base/apex of pronotum: 1.06-1.10; width pronotum/head: 1.26-1.27; length/width of elytra: 1.37-1.42.

Colour (Figs 36, 63). Iridescent black, pronotum barely paler. Lateral margins of pronotum and elytra with dark border. Labrum and mandibles reddish-piceous, palpi in parts, antenna, and femora infuscate, tibiae and tarsi yellow.

Head (Fig. 36). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows small, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere c. 1.5 x as long as wide. Surface with distinct, though somewhat superficial, isodiametric microreticulation, rather glossy.

Pronotum (Fig. 36). Very wide, cordiform, widest in front of middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base not or but very slightly concave. Base narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, obtuse or but slightly angulate, c. 120°. Lateral margin narrow, widened and deplanate only posteriad. Apex at least laterally margined, margin in middle indistinct or absent. Base not margined, sometimes laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Anterior transverse impression shallow, posterior transverse sulcus not recognizable. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface here and there with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 63). Of average shape, comparatively elongate, moderately oviform, dorsal surface convex but slightly depressed. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae finely or even barely crenulate, intervals very slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 11). Genital ring large, laterally convex, almost symmetrical, with very wide, rounded apex. Aedeagus wide, rather short, slightly sinuate, lower surface almost straight, longitudinally striolate and in middle carinate. Apex rather wide, asymmetrically triangular, obtuse at tip, apical hook oblique, rather large, bidentate, teeth of about similar size. Internal sac with a very large, elongate spiniform sclerite on either side and with one or two small, triangular sclerites on right side near the top. Both parameres large, the left one short and rather quadrangular, with wide apex.

Female genitalia. Similar to those of *A. major* DARLINGTON

Variation. Very little variation noted.

DISTRIBUTION: Eastern central Papua New Guinea in the Madang and Morobe Provinces. Known so far only from three localities.

COLLECTING CIRCUMSTANCES: Almost all specimens collected at light in rain forest.

Arhytinus frater sp. nov.

(Figs 12, 37, 64)

TYPE MATERIAL EXAMINED: Holotype: ♂, Bime 1600-2000 m 19.IX.1993 / IRIAN JAYA, Jayawijaya-Prov. leg. A. Riedel, 1993 (CBM).

ETYMOLOGY: The latin word "*frater*" means "brother" and refers to the very similar structure of the male aedeagus as compared with that of *A. missai* sp. nov.

DIAGNOSIS: A moderately small species, very similar in external and genitalic characters to *A. missai* sp. nov., distinguished by wider pronotum with almost impunctate base and narrower aedeagus with much shorter and slenderer spiniform sclerites in the internal sac, narrower apex which is directed more horizontally, and irregularly triangular left paramere.

DESCRIPTION:

Measurements. Length: 5.4 mm; width: 2.45 mm. Ratios. Width/length of pronotum: 1.62; width of widest diameter/base of pronotum: 1.24; width base/apex of pronotum: 1.15; width pronotum/head: 1.43; length/width of elytra: 1.41.

Colour (Figs 37, 64). Iridescent black, pronotum not paler. Lateral margins of pronotum with very narrow and inconspicuous light border, elytra with dark border. Labrum piceous, mandibles reddish-piceous, palpi infuscate apart from tip, three basal antennomeres piceous, from 4th antennomere rather contrastingly paler. Legs dark reddish.

Head (Fig. 37). Of average size. Eyes large, laterally well projected, orbits short, oblique. Frontal furrows rather small, about circular, fairly deep, developed

only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with distinct, isodiametric to slightly transverse microreticulation, rather glossy.

Pronotum (Fig. 37). Wide, not cordiform, widest well in front of middle, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but widely rounded. Lateral border evenly convex, even near base not concave. Base rather wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, very obtuse, c. 130°. Lateral margin narrow, widened and deplanate only posteriad. Apex completely margined, but margin in middle weakly developed. Base not margined, only laterally with faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior part of lateral margin almost impunctate. Surface with some irregular, very fine wrinkles and with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, rather glossy and iridescent.

Elytra (Fig. 64). Of average shape, moderately elongate, moderately oviform, dorsal surface convex but slightly depressed. Lateral margins oblique but almost straight in basal half, then evenly convex. Striae barely crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 12). Genital ring large, quite asymmetric, with fairly wide, rounded apex. Aedeagus rather wide and short, slightly sinuate, lower surface very gently concave, longitudinally striolate and in middle carinate. Apex narrow, obtuse at tip, apical hook very oblique, almost horizontally directed, rather large, bidentate, teeth of about similar size. Apical half of internal sac with a large, elongate spiniform sclerite on either side which both bear a large basal plate, and with one fairly large, spiniform sclerite on the right side near the top. Both parameres large, the left one rather odd shaped and somewhat triangular, with narrow apex.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Central Papua Indonesia (former Irian Jaya). Known so far only from the type locality.

COLLECTING CIRCUMSTANCES: The holotype probably collected by sifting debris from or under logs in rain forest, at rather elevated altitude.

Arhytinus minor sp. nov.

(Figs 13, 65)

TYPE MATERIAL EXAMINED: Holotype: ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light M 2 30-IV-1996 Leg. Olivier Missa (IRSNB). – Paratypes: 1 ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T2 24-III-1993 Leg. Olivier Missa (CBM); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light T 2 06-IV-1993 Leg. Olivier Missa (IRSNB); 1 ♀, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light AR 42 26-VI-1996 Leg. Olivier Missa (IRSNB).

ETYMOLOGY: The name refers to the slightly lesser size in comparison with *A. missai* sp. nov.

DIAGNOSIS: A moderately small species, distinguished from the similarly sized New Guinean species *A. missai* sp. nov. and *A. granum* DARLINGTON by the wide pronotum and the narrow, elongate aedeagus which bears a three small, attached spines in middle at bottom.

DESCRIPTION:

Measurements. Length: 4.6-4.8 mm; width: 2.1-2.15 mm. Ratios. Width/length of pronotum: 1.48-1.52; width of widest diameter/base of pronotum: 1.27-1.28; width base/apex of pronotum: 1.08-1.12; width pronotum/head: 1.31-1.33; length/width of elytra: 1.38-1.41.

Colour (Fig. 65). Black, slightly iridescent, pronotum barely paler. Lateral margins of pronotum and elytra dark, only posterior margins of pronotum indistinctly paler. Labrum and mandibles reddish-piceous, palpi in parts infucate, antenna reddish, femora infuscate, tibiae and tarsi yellow.

Head (Fig. 65). Of average size. Eyes large, though laterally only moderately projected, orbits very short but distinct, oblique. Frontal furrows shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere c. 1.5 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 65). Very wide, cordiform, widest in front of middle, dorsal surface moderately depressed.

Wider in comparison to the head than in similar species. Apex deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base not or but very slightly concave. Base narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, obtuse or even shortly rounded, >120°. Lateral margin narrow, widened and deplanate only posteriad. Apex at least laterally margined, margin in middle indistinct or absent. Base not margined. Median line fairly deeply impressed, not attaining apex nor base. Both transverse impressions distinct though shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely but rather sparsely punctate. Surface here and there with traces of very fine and dense, highly superficial, transverse microreticulation which is only visible at high magnification, glossy and slightly iridescent.

Elytra (Fig. 65). Of average shape, comparatively elongate, very little oviform, dorsal surface convex but slightly depressed. Lateral margins almost straight in basal half, then evenly convex. Striae relatively deep, finely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 13). Genital ring large, laterally gently convex, slightly asymmetrical, with very wide, apically oblique apex. Aedeagus rather narrow and elongate, lower slightly concave, not markedly carinate. Apex rather narrow, triangular, slightly obtuse at tip, apical hook oblique, small, bidentate, upper and lower teeth of almost similar size. Internal sac with 1-3 small, attached spiniform sclerites in middle. Both parameres large and elongate.

Female genitalia. Similar to those of *A. major* Darlington

Variation. Very little variation noted.

Distribution: Baiteta, Papua New Guinea. Known only from type locality.

Collecting circumstances: All specimens collected at light in rain forest.

Arhytinus granum Darlington, 1952
(Figs 14, 38, 66)

Darlington, 1952: 119. – Lorenz 1998: 391.

Type material examined: Holotype:♀, Dobodura Papua N.G. Mar-July, 1944 Darlington / *Arhytinus granum* Darl: / ♀ / ~~det.~~ Darlington at B.M. 1947-48 Notes p. (M.C.Z. Type 28588).

Diagnosis: A small species, distinguished from similarly small species by dark legs and dark margins of pronotum and elytra. Further distinguished from the similar New Guinean species *A. missai* sp. nov., *A. frater* sp. nov, and *A. minor* sp. nov. by lesser size and the short and wide aedeagus with has a very large tridentate sclerite on the left side of the internal sac; distinguished from the similarly sized *A. unispinum* sp. nov. by shorter and wider aedeagus, presence of a large tridentate sclerite in the internal sac, narrower pronotum, and distinctly angulate basal pronotal angles.

For better comparison with the other species I give a supplementary description of measurements and some other characters.

Supplementary description:

Measurements. Length: 3.4-4.5 mm; width: 1.5-2.15 mm. Ratios. Width/length of pronotum: 1.46-1.53; width of widest diameter/base of pronotum: 1.24-1.27; width base/apex of pronotum: 1.06-1.10; width pronotum/head: 1.21-1.26; length/width of elytra: 1.35-1.38.

Colour (Figs 38, 66). Very dark piceous to black, slightly iridescent, pronotum barely paler. Lateral margins of pronotum and elytra dark. Labrum and mandibles reddish-piceous, palpi in parts, antenna, and femora infuscate, tibiae and tarsi dirty yellow.

Head (Fig. 38). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows rather small, circular or slightly oblique, fairly deep, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by c. 1.5 antennomeres, 6th antennomere c. 1.5 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 38). Wide, cordiform, widest about at anterior thrid, dorsal surface moderately depressed. Apex moderately excised, apical angles slightly projected but widely rounded. Lateral border evenly convex, near base very slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles very slightly projected, slightly angulate, c. 120°. Lateral margin narrow, widened and deplanate only posteriad. Apex margined, margin in middle inconspicuous. Base not margined, sometimes laterally with very faint remnants of a margin. Median line

shallow though rather distinct, not attaining apex nor base. Both transverse impressions very shallow, barely recognizable. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface here and there with traces of very fine and dense, transverse, very superficial microreticulation which is only visible at very high magnification, glossy and rather iridescent.

Elytra (Fig. 66). Of average shape, comparatively short, moderately oviform, dorsal surface convex but slightly depressed on disk. Lateral margins very slightly convex or oblique but almost straight in basal half, then evenly convex. Striae very finely crenulate, intervals moderately raised. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 14). Genital ring large, laterally convex, almost symmetrical, with rather wide, rounded apex. Aedeagus short and wide, slightly asymmetric, lower surface bisinuate, not markedly carinate but with several longitudinal stripes. Apex rather narrow, asymmetrically triangular, quite acute at tip, apical hook oblique, small, bidentate, upper tooth larger than the lower one. Internal sac with a very large tridentate sclerite on left side and with 0-2, but most commonly 1 small spiniform sclerite(s) on the right side. Both parameres large but short, the left one markedly triangular.

Female genitalia. Similar to those of *A. major* DARLINGTON

Variation. In this species the variation of body size is remarkable, but shape and structure of the aedeagus is similar in both, very small and very large specimens. However, some variation in the structure of the internal sac is yet present, because the number of small spines near apex at the right side varies from 0-2, although most commonly a single spine is present.

ADDITIONAL EXAMINED SPECIMENS (those from IRSNB: "Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission Madang Province Baiteta Light Leg. Olivier Missa"): 1 ♂, T2, 06-IV-1993 (IRSNB); 1 ♂, 4 ♀♀, T2, 09-IV-1993 (IRSNB); 5 ♀♀, T2, 10-IV-1993 (CBM, IRSNB); 1 ♂, 4 ♀♀, Light T2, 24-III-1993 (CBM, IRSNB); 1 ♂, 1 ♀, Light T2, 26-III-1993 (CBM, IRSNB); 4 ♂♂, T 2, 20-VI-1996 (CBM, IRSNB); 1 ♀, T 2, 21-IV-1993 (IRSNB); 2 ♀♀, T 2, 22-IV-1993 (IRSNB); 1 ♀, T 2, 05-V-1993 (IRSNB); 3 ♀♀, T 2, 06-IX-1993 (IRSNB); 2 ♀♀, T 2, 20-VI-1996 (IRSNB); 2 ♂♂, 3 ♀♀, T 2, 24-VI-1996 (IRSNB); 1 ♀, T 8, 09-IV-1996 (IRSNB); 1 ♀, AR 3, 13-V-1996 (IRSNB); 3 ♀♀, AR 6, 11-IV-1996 (CBM, IRSNB); 2 ♀♀, AR 7, 05-VI-1996 (IRSNB); 2 ♂♂, 2 ♀♀, AR 8, 22-VI-1996 (IRSNB); 1 ♀, AR 8, 15-VII-1993 (IRSNB); 2 ♀♀, AR 10, 20-V-1996 (IRSNB); 1 ♀, AR 10, 23.V.1996 (IRSNB); 1 ♂, AR 10, 29.V.1996 (IRSNB); 1 ♂, 2 ♀♀, AR 14, 08-IV-1996 (IRSNB); 1 ♂, AR 15 13-IV-1996 (IRSNB); 2 ♂♂, 5 ♀♀, 14.V.1996 FogAR15 (CBM, IRSNB); 1 ♂, AR 16, 03-VI-1996 (IRSNB); 1 ♂, 2 ♀♀, AR 16, 04-VI-1996 (IRSNB); 1 ♂, AR 20, 16.IV.1996 (IRSNB); 1 ♂, AR 22, 17-VI-1996 (IRSNB); 1 ♀, AR 22, 18-VI-1996 (IRSNB); 1 ♀, AR 22, 12-VI-1996 (IRSNB); 1 ♂m, AR 27, 02/VII/1995 (IRSNB); 1 ♀, AR 34, 18.VI.1996 (IRSNB); 1 ♀, AR 41, 01-V-1996 (IRSNB); 1 ♀, AR 41, 25-VI-1996 (IRSNB); 9 ♂♂, 4 ♀♀, Light AR42, 24-VI-1996 (CBM, IRSNB); 1 ♀, Baiteta forest 27-VI-1996 Light trap AR42 (IRSNB); 1 ♀, AR 42, 24-VI-1996 (CBM); 1 ♀, AR 42, 25-VI-1996 (IRSNB); 1 ♂, 2 ♀♀, AR 42, 26-VI-1996 (IRSNB); 1 ♂, 2 ♀♀, Light AR52, 27-VII-1996 (CBM, IRSNB); 3 ♀♀, AR 52, 23.V.1996 (IRSNB); 1 ♂, AR 53, 30-V-1996 (IRSNB); 1 ♀, AR 53, 28.V.1996 (IRSNB); 1 ♀, AR 66, 23-VII-1996 (IRSNB); 1 ♂, 1 ♀, AR 66, 24-VII-1996 (IRSNB); 3 ♀♀, AR(XP), 14-VI-1996 (IRSNB); 1 ♂, 1 ♀, M1, 18-III-1993 (IRSNB); 1 ♀, M1, 21-III-1993 (IRSNB); 1 ♀, M 1, 31-III-1993 (IRSNB); 1 ♀, M 1, 17-V-1993 (IRSNB); 1 ♂, 1 ♀, M 1, 18-V-1993 (IRSNB); 1 ♂, 1 ♀, M 1, 2-VI-1993 (IRSNB); 1 ♂, 1 ♀, M 2, 30-IV-1996 (IRSNB); 1 ♂, M 7, 30-V-1996 (IRSNB); 1 ♂, 1 ♀, M 8, 27-IV-1996 (IRSNB); 1 ♂, 1 ♀, M9, 27.V.1996 (IRSNB); 3 ♂♂, 7 ♀♀, X P, 18-VI-1996 (CBM, IRSNB); 1 ♂, 4 ♀♀, K.O., 29-IV-1996 (CBM, IRSNB); 2 ♀♀, X J, IV-1996 (IRSNB); 1 ♂, 2 ♀♀, XE, 03-VI-1996 (IRSNB); 1 ♀, Light trap XE, 16-V-1996 (IRSNB); 2 ♀♀, A 11, 10-VI-1993 (IRSNB); 1 ♀, IV-1996 light RJ (IRSNB); 4 ♂♂, 2 ♀♀, light, Baiteta, 7.VI.1995 (CBM, IRSNB); 1 ♂, 2 ♀♀, light, Baiteta 11.IV.1996 (IRSNB); 2 ♂♂, 1 ♀, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Ground 2 26 July 2000 R L Kitching (CBM, QMB); 3 ♂♂, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Ground 2 28 July 2000 R L Kitching (CBM); 2 ♂♂, 3 ♀♀, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Ground 3 30 July 2000 R L Kitching (CBM, QMB); 1 ♂, 1 ♀, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Canopy 1 28 July 2000 R L Kitching (CBM, QMB); 1 ♀, 06°40.30S 146°48.00E Oomsis, Morobe, PNG Light Trap Ground 1 28 July 2000 R L Kitching (QMB); 1 ♀, Irian Jaya, Me- rauke-Pr., Senggo to Abau, 15.-17.6. 1994, leg. A. Riedel

(CBM); 1 ♂, Irian Jaya, Vogel- kop, Testega 1200m, 13.4.1999 leg. A. Riedel (CBM).

DISTRIBUTION: So far known only from Papua New Guinea.

COLLECTING CIRCUMSTANCES: All recorded specimens, except the two types and one specimen noted by DARLINGTON (1971) were collected at light in rain forest; according to DARLINGTON (1952) the types were sampled "under dead leaves on the ground in forest" and "in heavily flooded, forested or formerly forested country".

Arhytinus unispinus sp. nov.
(Figs 15, 39, 67)

TYPE MATERIAL EXAMINED: Holotype: ♂, Coll. I.R.Sc.N.B. PAPUA NEW GUINEA Canopy Mission, light Madang Prov. Baiteta 7.VI.1995 Leg. O. Missa (IRSNB).

ETYMOLOGY: The name refers to the single unispinose sclerite present in the internal sac of the aedeagus.

DIAGNOSIS: A small species, distinguished from similarly small species by dark legs and dark margins of pronotum and elytra. Further distinguished from the most similar New Guinean species *A. missai* sp. nov., *A. frater* sp. nov., and *A. minor* sp. nov. by slightly lesser size, furtheron from *A. missai* and *A. frater* by presence of just a single, smaller spine in the internal sac, and from *A. minor* by the shorter and wider aedeagus and the longer and more curved spine; distinguished from the similarly sized New Guinean species *A. granum* DARLINGTON by slightly longer and narrower aedeagus, presence of an unidentate spine in the internal sac, wider pronotum, and almost rounded basal pronotal angles.

DESCRIPTION:

Measurements. Length: 4.7 mm; width: 2.2 mm. Ratios. Width/length of pronotum: 1.62; width of widest diameter/base of pronotum: 1.22; width base/apex of pronotum: 1.14; width pronotum/head: 1.30; length/ width of elytra: 1.39.

Colour (Figs 39, 67). Almost black, slightly iridescent, pronotum not paler. Lateral margins of pronotum and elytra dark. Labrum and mandibles reddish-piceous, palpi in parts, antenna, and femora infuscate, tibiae and tarsi dirty yellow.

Head (Fig. 39). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows rather small, circular or slightly oblique, fairly deep, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere less than 1.5 x as long as wide. Surface with distinct, slightly transverse microreticulation, rather glossy.

Pronotum (Fig. 39). Very wide, moderately cordiform, widest about at anterior third, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but widely rounded. Lateral border evenly convex throughout, not even near base concave. Base rather wide in comparison with diameter, in middle almost straight, lateral parts oblique-convex. Basal angles very obtuse, almost rounded off. Lateral margin narrow, widened and deplanate only posteriad. Apex margined, margin in middle distinct. Base not margined, only laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Both transverse impressions barely recognizable. Anterior lateral seta inserted in front of apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Apical part in middle with a few short, longitudinal strioles. Surface here and there with very fine, dense, transverse, extremely superficial microreticulation which is only visible at very high magnification, and with sparse, very fine punctures, very glossy and rather iridescent.

Elytra (Fig. 67). Of average shape, comparatively short, moderately oviform, dorsal surface convex but slightly depressed on disk. Lateral margins very slightly convex or oblique but almost straight in basal half, then evenly convex. Striae finely crenulate, intervals moderately raised. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 15). Genital ring large, laterally almost straight and parallel-sided, asymmetric, with wide, rounded apex. Aedeagus moderately elongate, rather narrow, slightly asymmetric, lower surface straight, carinate in middle and with several longitudinal stripes. Apex moderately narrow, convexly triangular, obtuse at tip, apical hook oblique, fairly small, bidentate, upper tooth slightly larger than the lower one. Internal sac only with a single, fairly large, unidentate sclerite on the left side that arises from a large basal plate, without any other sclerites. Both parameres large, the left one ontusely triangular.

Female genitalia. Unknown.
Variation. Unknown.

DISTRIBUTION: Papua New Guinea. So far known only from the type locality.

COLLECTING CIRCUMSTANCES: Holotype collected at light.

Arhytinus celebensis sp. nov.
(Figs 16, 68)

TYPE MATERIAL EXAMINED: Holotype: ♂, Coll. I.R.Sc.N.B. Sulawesi Utara Dumega-Bone Nat. Park Toraut „Picnic" site X/-1985. Station: 043 (IRSNB).

ETYMOLOGY: The name refers to the range of this species on Sulawesi, former Celebes.

DIAGNOSIS: A moderately small species, distinguished from similarly sized species by the wide base of the pronotum and the narrow and elongate, at apex but indistinctly bidentate aedeagus which bears a small spiniform sclerite on either side.

DESCRIPTION:

Measurements. Length: 5.2 mm; width: 2.2 mm. Ratios. Width/length of pronotum: 1.50; width of widest diameter/base of pronotum: 1.20; width base/apex of pronotum: 1.11; width pronotum/head: 1.29; length/width of elytra: 1.39.

Colour (Fig. 68). Iridescent black, pronotum brown. Lateral margins of pronotum and elytra with distinct pale border. Clypeus brown, labrum and mandibles dark yellow, palpi, antenna, and legs yellow.

Head (Fig. 68). Of average size. Eyes large, laterally markedly projected, orbits very short and barely perceptible, almost transverse. Frontal furrows moderately shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 68). Very wide, cordiform, with comparatively wide base, widest in front of middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base not or but very slightly concave. Base narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles not projected, obtuse or but slightly angulate, c. 120°. Lateral margin narrow, widened and deplanate only posteriad. Apex completely margined, base not margined. Median line rather deeply impressed, not attaining apex nor base. Both transverse impressions distinct though shallow. Anterior lateral seta inserted slightly in front of apical third, in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin moderately coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 68). Of average shape, comparatively short, rather oviform, dorsal surface convex. Lateral margins oblique and slightly convex in basal half, then evenly convex. Striae rather deep, very finely crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre. Striae with finest, extremely short, erect pilosity which is only recognizable at very high magnification and when seen from base.

Male genitalia (Fig. 16). Genital ring large, rather wide, laterally gently convex, almost symmetrical, with wide, rounded apex. Aedeagus rather narrow and elongate, lower surface very slightly concave, markedly carinate in middle. Apex rather narrow, triangular, slightly obtuse at tip, apical hook perpendicular, large, indistinctly bidentate, lower tooth large, upper tooth very indistinct. Internal sac with one spiniform sclerite on either side. Both parameres large and elongate, rounded at apex.

Female genitalia. Unknown.
Variation. Unknown.

DISTRIBUTION: Sulawesi. Known only from type locality.

COLLECTING CIRCUMSTANCES: Not recorded.

Arhytinus crenulipennis sp. nov.
(Figs 17, 69)

TYPE MATERIAL EXAMINED: Holotype: ♂, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM).

ETYMOLOGY: The name refers to the markedly crenulate elytral striae in this species.

DIAGNOSIS: A moderately small species, distinguished from similarly sized species by the the wide and short aedeagus which bears a very elongate, horizontal apical hook. Further distinguished from *A. piceus* JEDLICKA which has a very similar aedeagus by narrower pronotum with a distinct sinuosity near base, markedly crenulate elytral striae, and longer, less curved aedeagus with a spine on left side of the internal sac.

DESCRIPTION:

Measurements. Length: 5.2 mm; width: 2.3 mm. Ratios. Width/length of pronotum: 1.53; width of widest diameter/base of pronotum: 1.27; width base/apex of pronotum: 1.11; width pronotum/head: 1.24; length/width of elytra: 1.43.

Colour (Fig. 69). Black, slightly iridescent, pronotum slightly paler. Lateral margins of pronotum and elytra distinctly pale. Labrum and mandibles light reddish, palpi, antenna, and legs yellow, only basal antennomeres slightly infuscate.

Head (Fig. 69). Of average size. Eyes very large, laterally remarkably projected, orbits extremely short, almost transversal. Frontal furrows large, shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by almost two antennomeres, 6th antennomere almost 1.75 x as long as wide. Surface with very fine, slightly superficial, isodiametric microreticulation, comparatively glossy.

Pronotum (Fig. 69). Very wide, cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex slightly excised, apical angles projected but rounded. Lateral border anteriorly evenly convex, in basal quarter distinctly concave. Base rather wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles angulate, c. 110°. Lateral margin narrow, widened and deplanate posteriad. Apex laterally finely margined, margin in middle absent. Base not margined. Median line shallow, not attaining apex nor base. Both transverse impressions perceptible, but shallow. Basal grooves comparatively shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with very sparse, irregularly spaced punctures. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at high magnification, glossy and slightly iridescent.

Elytra (Fig. 69). Of average shape, comparatively elongate, very gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins very slightly oblique and convex in basal half, then evenly convex. Striae deep, in basal half very coarsely crenulate, in apical half far less distinctly crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 17). Genital ring not recorded. Aedegus wide and rather short, lower surface gently concave, markedly carinate in middle. Apex narrow, triangular, acute at tip, apical hook transversal, very elongate, bidentate, upper tooth much larger than the lower one. Internal sac with a single spiniform sclerite on left side. Both parameres large and apically convex.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Brunei, Borneo. Known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype fogged from the canopy of low rain forest trees.

Arhytinus lieftincki Louwerens
(Figs 18, 40, 70)

LOUWERENS, 1951: 125. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Holotype: ♂ (head missing), F. C. DRESCHER G. Tangkoenban Prahoe 4000-5000 Foet Preanger, Java 12-18.I.1933 / Museum Leiden ex collection C. J. Louwerens rec. 1979 / Typus *Arhytinus lieftincki* Louw. det. C. J. Louwerens / type (NHML).

DIAGNOSIS: A small species, distinguished from similarly sized species by the rather elongate elytra and the short and wide aedeagus which bears a moderately large, oblique, bidentate apex and a large tridentate sclerite on the left side of the internal sac.

DESCRIPTION:

Measurements. Length: c.4.9 mm; width: 2.15 mm. Ratios. Width/length of pronotum: 1.40; width of widest diameter/base of pronotum: 1.36; width base/apex of pronotum: 1.03; width pronotum/head: ?; length/width of elytra: 1.42.

Colour (Figs 40, 70). Iridescent brown, pronotum not paler than elytra. Lateral margins of pronotum and elytra with inconspicuous light border. Mouth parts and antenna unknown. Legs yellow, though tarsi very

slightly darker than femora and tibiae.

Head. In the holotype the head is lost.

Pronotum (Fig. 40). Rather wide, cordiform, widest shortly behind anterior third, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but obtuse. Lateral border evenly convex, near base extremely slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles obtuse, laterad barely projected, c. 120°. Lateral margin narrow, widened and deplanate only posteriad. Apex margined, though margin in middle less distinct. Base not margined, laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Anterior transverse impression not perceptible, posterior transverse sulcus shallow. Anterior lateral seta inserted at apical fifth, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with very few coarse but shallow punctures. Surface with very fine and dense, superficial, very transverse microreticulation which is only visible at high magnification, rather glossy and slightly iridescent.

Elytra (Fig. 70). Of average shape, comparatively elongate, moderately oviform, dorsal surface convex but slightly depressed on disk. Lateral margins in basal half oblique and almost straight, then evenly convex. Striae not crenulate, almost impunctate, intervals very slightly raised but depressed. 3rd interval asetose. Microreticulation very fine and superficial, recognizable only at high magnification, consisting of finest transverse lines. Surface glossy and rather iridescent.

Male genitalia (Fig. 18). Genital ring large, laterally gently convex, slightly asymmetrical, with moderately wide apex. Aedeagus moderately wide, slightly sinuate, lower surface very gently concave, markedly carinate in middle. Apex fairly wide, triangular, quite acute at tip, apical hook oblique, moderately large, bidentate, lower tooth not larger than upper tooth. Internal sac with a large tridentate sclerite on the left side. Both parameres large and triangular.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Western Java. Known only from type locality.

COLLECTING CIRCUMSTANCES: Little recorded, holotype collected at about 1.500 m.

***Arhytinus harpago* sp. nov.**

(Figs 19, 41, 71)

TYPE MATERIAL EXAMINED: Holotype: ♂, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM).

ETYMOLOGY: The name refers to the grappling-iron like apical hook on the aedeagus of this species.

DIAGNOSIS: A rather small species, distinguished from most similarly sized species, except *A. sumatrensis* sp. nov. and *A. indicus* sp. nov. which have a very similar aedeagus, by the short and wide aedeagus which bears a very large lower tooth at the bidentate apex and a large tridentate sclerite on left side and a large bidentate sclerite on right side of the internal sac. Further distinguished from *A. sumatrensis* sp. nov. by slightly larger size, more convex lateral margins of pronotum and deeper excision of its apex, and considerably larger aedeagus with relatively larger spinose sclerites; and from *A. indicus* sp. nov. by lesser size, narrower and much more cordiform pronotum, and relatively larger aedeagus.

DESCRIPTION:

Measurements. Length: 4.6 mm; width: 2.05 mm. Ratios. Width/length of pronotum: 1.47; width of widest diameter/base of pronotum: 1.33; width base/apex of pronotum: 1.04; width pronotum/head: 1.29; length/width of elytra: 1.44.

Colour (Figs 41, 71). Black, barely iridescent, pronotum very slightly paler. Lateral margins of pronotum and elytra inconspicuously pale. Labrum and mandibles light reddish, palpi, antenna, and legs yellow.

Head (Fig. 41). Of average size. Eyes large, laterally rather projected, orbits very short, almost transversal. Frontal furrows large, shallow, irregularly circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by almost two antennomeres, 6th antennomere almost 1.75 x as long as wide. Surface with distinct, isodiametric microreticulation, comparatively dull.

Pronotum (Fig. 41). Very wide, cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex deeply excised, apical angles projected but shortly rounded. Lateral border evenly convex, very shortly concave immediately in front of base. Base narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles angulate, even very faintly produced laterad, c.

110°. Lateral margin narrow, widened and deplanate posteriad. Apex laterally finely margined, margin in middle absent. Base not margined. Median line rather deeply impressed, not attaining apex nor base. Both transverse impressions comparatively deeply impressed. Basal grooves comparatively deep. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with sparse, rather irregular punctures and short, longitudinal strioles. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at high magnification, glossy but barely iridescent.

Elytra (Fig. 71). Of average shape, comparatively elongate, gently oviform, dorsal surface rather convex. Lateral margins slightly oblique and convex in basal half, then evenly convex. Striae deep, barely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation not recognizable even at high magnification. Surface very glossy, but barely iridescent.

Male genitalia (Fig. 19). Genital ring not recorded. Aedeagus short and very wide, lower surface straight, in middle markedly carinate. Apex moderately wide, asymmetrically triagonal, laterally slightly convex, obtuse at tip, apical hook large, vertical, bidentate, lower tooth large. Internal sac with a large tridentate sclerite on left side and a large bidentate sclerite on right side. Both parameres large, rather triagonal.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Brunei, Borneo, known only from type locality.

COLLECTING CIRCUMSTANCES: Holotype fogged from the canopy of low rain forest trees.

RELATIONSHIPS: According to shape and structure of the aedeagus very closely related to *A. sumatrensis* sp. nov.

Arhytinus sumatrensis sp. nov.
(Figs 20, 42, 72)

TYPE MATERIAL EXAMINED: Holotype: ♂, Fort de Kock (Sumatra) 920 M. 1925 leg. E. Jacobson (NMH).

ETYMOLOGY: The name refers to the occurrence of this species on Sumatra.

DIAGNOSIS: A rather small species, distinguished from most similarly sized species, except *A. harpago* sp. nov. and *A. indicus* sp. nov. which have a very similar aedeagus, by the short and wide aedeagus which bears a very large lower tooth at the bidentate apex and a large tridentate sclerite on left side and a large bidentate sclerite on right side of the internal sac. Further distinguished from *A. harpago* sp. nov. by slightly lesser size, less convex lateral margins of pronotum and less deep excision of its apex, and considerably smaller aedeagus; and from *A. indicus* sp. nov. by lesser size, narrower and much more cordiform pronotum, and relatively smaller spinose sclerites in the internal sac of the aedeagus.

DESCRIPTION:

Measurements. Length: 4.5 mm; width: 1.95 mm. Ratios. Width/length of pronotum: 1.56; width of widest diameter/base of pronotum: 1.26; width base/apex of pronotum: 1.06; width pronotum/head: 1.24; length/width of elytra: 1.44.

Colour (Figs 42, 72). Dark piceous, slightly iridescent, pronotum slightly paler. Lateral margins of pronotum and elytra inconspicuously paler. Labrum and mandibles light reddish, palpi, antenna, and legs yellow.

Head (Fig. 42). Of average size. Eyes large, laterally well projected, but orbits distinct, short, oblique. Frontal furrows fairly large, shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere <1.5 x as long as wide. Surface with distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 42). Moderately wide, cordiform, widest slightly in front of middle, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but rounded. Lateral border evenly convex, shortly concave in front of base. Base rather wide in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles angulate and almost rectangular, slightly produced laterad. Lateral margin narrow, widened and deplanate posteriad. Apex laterally finely margined, margin in middle very inconspicuous. Base not margined. Median line rather shallow though distinct, not attaining apex nor base. Anterior transverse impression very shallow, posterior impression comparatively deep. Basal grooves shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with sparse but coarse punctures. Surface

with very fine and dense, highly superficial, transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 72). Of average shape, comparatively elongate, gently oviform, dorsal surface rather convex but slightly depressed on disk. Lateral margins slightly oblique but almost straight in basal half, then evenly convex. Striae moderately deep, finely crenulate, intervals raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy and slightly iridescent.

Male genitalia (Fig. 20). Genital ring large, rather wide, laterally convex, almost symmetrical, apex moderately wide, regularly rounded. Aedeagus short and very wide, lower surface straight, in middle markedly carinate. Apex moderately wide, asymmetrically triagonal, laterally slightly convex, obtuse at tip, apical hook large, vertical, bidentate, lower tooth large. Internal sac with a moderately large tridentate sclerite on left side and a bidentate sclerite on right side. Both parameres large, rather triagonal.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Sumatra, known only from type locality.

COLLECTING CIRCUMSTANCES: Not recorded.

Arhytinus multispinosus sp. nov.
(Figs 21, 73)

TYPE MATERIAL EXAMINED: Holotype: ♂, Borneo, Brunei Temburong Kuala Bolalong 10.2.-20.7.95 leg. Borcherding (CBM). – Paratypes: 2 ♂♂, 2 ♀♀, Brunei KBFSC 4°32'.8N 115°09'4E Light Trap- canopy 12.Jul-1997 LC-3 R L Kitching H. Mitchell (CBM, QMB); 1 ♀, Brunei KBFSC 4°32'.8N 115°09'4E Light Trap- canopy 12.Jul-1997 LC-1 R L Kitching H. Mitchell (CBM); 1 ♀, MALAYSIA, Sabah Kinabalu NP, Lighttrap Poring Hot Springs Staff Quarters 500m 30.8.-6.9.95 Leg. Brühl / *Arhytinus minimus* (CLT).

ETYMOLOGY: The name refers to the many sclerotized spines in the internal sac of the aedeagus of this species.

DIAGNOSIS: A small species, distinguished from similarly sized species by the narrow and elongate aedeagus which bears a small, bidentate apex and 7-8 small, spiniform sclerites dispersed in the internal sac.

DESCRIPTION:

Measurements. Length: 4.0-4.45 mm; width: 1.75-1.9 mm. Ratios. Width/length of pronotum: 1.48-1.52; width of widest diameter/base of pronotum: 1.27-1.31; width base/apex of pronotum: 1.04-1.08; width pronotum/head: 1.26-1.28; length/width of elytra: 1.40-1.44.

Colour (Fig. 73). Black, iridescent, pronotum in some specimens slightly paler. Lateral margins of pronotum and elytra distinctly pale. Labrum and mandibles reddish, palpi in parts infucate, antenna reddish but with three basal antennomeres, femora infuscate, tibiae and tarsi yellow.

Head (Fig. 73). Of average size. Eyes large, laterally rather projected, orbits very short but distinct, oblique. Frontal furrows small, shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere c. 1.5 x as long as wide. Surface with very distinct, isodiametric microreticulation, comparatively dull.

Pronotum (Fig. 73). Very wide, cordiform, widest in front of middle, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, in basal fifth slightly concave. Base narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles angulate, even very faintly produced laterad, c. 100°. Lateral margin narrow, widened and deplanate posteriad. Apex laterally finely margined, margin in middle indistinct or absent. Base inconspicuously margined. Median line shallow, not attaining apex nor base. Anterior transverse impression barely recognizable, posterior transverse impression distinct though shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin coarsely, moderately densely punctate. Surface with very fine and dense, highly superficial, transverse microreticulation which is only visible at high magnification, glossy and fairly iridescent.

Elytra (Fig. 73). Of average shape, comparatively elongate, gently oviform, dorsal surface convex but slightly depressed. Lateral margins slightly oblique and convex in basal half, then evenly convex. Striae deep, coarsely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse

lines. Surface very glossy, rather iridescent.

Male genitalia (Fig. 21). Genital ring large, laterally gently convex, almost symmetrical, with rounded apex. Aedeagus narrow and elongate, lower surface straight, not markedly carinate, near apex in middle impressed. Apex rather narrow, triangular, quite acute at tip, apical hook very oblique, rather small, bidentate, upper tooth larger than the lower one. Internal sac with 7-8 spiniform sclerites dispersed over the apical half. Both parameres large.

Female genitalia. Similar to those of *A. major* DARLINGTON

Variation. Little variation noted.

DISTRIBUTION: Brunei and Sabah, Borneo.

COLLECTING CIRCUMSTANCES: Holotype fogged from the canopy of low rain forest trees, the other specimens sampled in light trap in the canopy of rain forest.

Arhytinus moluccensis sp. nov.

(Figs 22, 43, 74)

TYPE MATERIAL EXAMINED: Holotype: ♂, RMNH/HH 380 MOLUCCAS: BACAN Sibela Range alt. m 450 04-08.vii.1985 J. Huijbregts / multistr ever-gren forest 2 human excr. traps (NMHL).

ETYMOLOGY: The name refers to the occurrence of this species on the island of Batjan in the Moluccas.

DIAGNOSIS: A small species, distinguished from similarly sized species by the narrow pronotum with comparatively narrow base, short and markedly convex elytra, laterally but moderately protruded eyes, and the aedeagus whih bears on the left side 2 very large, sharply curved and very acute spiniform sclerites.

DESCRIPTION:

Measurements. Length: 3.7 mm; width: 1.6 mm. Ratios. Width/length of pronotum: 1.42; width of widest diameter/base of pronotum: 1.33; width base/apex of pronotum: 1.03; width pronotum/head: 1.27; length/width of elytra: 1.33.

Colour (Figs 43, 74). Black, slightly iridescent, pronotum not paler. Lateral margins of pronotum and elytra dark. Labrum and mandibles reddish, palpi, antenna, and legs dirty yellow.

Head (Fig. 43). Of average size. Eyes moderately large, laterally comparatively little projected, orbits fairly elongate, oblique. Frontal furrows rather large, shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere <1.5 x as long as wide. Surface with fairly distinct, isodiametric to slightly transverse microreticulation, fairly glossy.

Pronotum (Fig. 43). Comparatively narrow, cordiform, widest about at anterior third, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, even near basal angles not perceptibly concave. Base narrow in comparison with diameter, in middle almost straight, lateral parts distinctly oblique-convex. Basal angles obtuse, not produced laterad, >120°. Lateral margin narrow, widened and deplanate posteriad. Apex laterally finely margined, margin in middle absent. Base not margined. Median line shallow but distinct, not attaining apex nor base. Both transverse impressions shallow though distinct. Anterior lateral seta inserted at apical quarter, slightly in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior fourth of lateral margin with coarse but sparse punctures. Surface here and there with very fine and dense, highly superficial, transverse microreticulation which is only visible at high magnification, glossy and fairly iridescent.

Elytra (Fig. 74). Of average shape, comparatively short, distinctly oviform, dorsal surface convex. Lateral margins convex throughout. Striae rather deep, not perceptibly crenulate, intervals raised and convex. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at high magnification, consisting of finest transverse lines. Surface very glossy, rather iridescent.

Male genitalia (Fig. 22). Genital ring large and moderately wide, laterally gently convex, slightly asymmetrical, with wide, rounded apex. Aedeagus moderately wide, in apical third almost regularly triangular. Lower surface almost straight, inconspicuously carinate and with several inconspicuous longitudinal striae. Apex rather narrow, triangular, quite acute at tip, apical hook rather small, bidentate, almost horizontal, upper tooth very slightly larger than the lower one. Internal sac on left side with 2 very large, sharply curved and very acute spiniform sclerites which raise from oval-shaped bases. Both parameres large, the left one almost rectangular with convex apex, the right one with wide apex.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Island of Batjan, Moluccas; known only from type locality.

COLLECTING CIRCUMSTANCES: The holotype was collected in "multistratum ever-green forest" at "human excrement traps" which certainly are quite strange sampling circumstances.

Arhytinus riedeli sp. nov.
(Figs 23, 44, 75)

TYPE MATERIAL EXAMINED: Holotype: ♂, E-Java Banyuwangi Gn. Ijen, Licin, Leg. A. Riedel / 31.VIII.2006 sample5, sifted. 1000m, S08°07,539' E114°14,827' (MZB). – Paratypes: 2 ♀♀, same data (SMNK, CBM).

ETYMOLOGY: The name is a patronym and honours the collector of this and many other new species, A. RIEDEL.

DIAGNOSIS: A small species, distinguished from similarly sized species by the rather short and wide aedeagus which bears a large, horizontal, bidentate apex and two small spiniform sclerites on left side, and one small sclerite on right side at bottom of the internal sac.

DESCRIPTION:

Measurements. Length: 4.0-4.4 mm; width: 1.85-2.0 mm. Ratios. Width/length of pronotum: 1.47-1.51; width of widest diameter/base of pronotum: 1.27-1.33; width base/apex of pronotum: 1.05-1.11; width pronotum/ head: 1.32-1.34; length/width of elytra: 1.34-1.38.

Colour (Figs 44, 75). Iridescent black, pronotum barely paler. Lateral margins of pronotum and elytra with dark border. Labrum and mandibles reddish-piceous, palpi in parts, antenna, and femora infuscate, tibiae and tarsi more or less dirty yellow.

Head (Fig. 44). Of average size. Eyes large, but laterally comparatively little projected, orbits short, oblique. Frontal furrows very small and shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by about two antennomeres, 6th antennomere c. 1.5x as long as wide. Surface with distinct, isodiametric microreticulation, rather glossy and fairly iridescent.

Pronotum (Fig. 44). Rather wide, cordiform, widest about at anterior third or slightly behind, dorsal surface moderately depressed. Apex rather deeply excised, apical angles projected but rounded. Lateral border evenly convex, near base very slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts slightly oblique-convex. Basal angles slightly angulate, laterad very slightly projected, c. 110°. Lateral margin narrow, widened and deplanate only posteriad. Apex laterally margined, margin in middle indistinct. Base not margined, laterally with very faint remnants of a margin. Median line shallow though rather distinct, not attaining apex nor base. Anterior transverse impression not perceptible, posterior transverse sulcus shallow. Anterior lateral seta inserted at apical fifth, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with coarse but sparse, irregular punctures. Surface with traces of very fine and dense, highly superficial, very transverse microreticulation which is only visible at very high magnification, markedly glossy and rather iridescent.

Elytra (Fig. 75). Of average shape, comparatively short, moderately oviform, dorsal surface convex but slightly depressed on disk. Lateral margins gently convex in basal half, then evenly convex. Striae finely crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation very fine and superficial, recognizable even at high magnification, slightly more distinct than in most other species, consisting of finest transverse lines. Surface very glossy and rather iridescent.

Male genitalia (Fig. 23). Genital ring large, laterally gently convex, slightly asymmetrical, with wide apex. Aedeagus moderately wide, lower surface very gently concave, markedly carinate in middle. Apex fairly wide, triangular, quite acute at tip, apical hook almost horizontal, large, bidentate, lower tooth very large. Internal sac with two small spiniform sclerites on the left side and a single small spiniform sclerite on the right side. Both parameres large and triangular.

Female genitalia. Similar to those of *A. major* DARLINGTON

Variation. Some variation noted only in relative shape of the pronotum.

DISTRIBUTION: Eastern Java. Known only from type locality.

COLLECTING CIRCUMSTANCES: All specimens sifted, probably from logs or litter near the ground in rain forest.

Arhytinus minimus Jedlicka, 1936
(Figs 24, 45, 76)

JEDLICKA, 1936: 55. – LORENZ 1998: 391.

TYPE MATERIAL EXAMINED: Paratype: ♂, Philippine Is.

Coll. Bottcher. B.M. 1929-201. / Cotype / Mus. Nat. Pragae 25100 Inv. / *Arhytinus minimus* sp. n. DET. ING. JEDLICKA (NMNHP).

DIAGNOSIS: A small species, distinguished from similarly sized species by the laterally markedly convex, not cordiform prothorax which has almost rounded basal angles, and the narrow and elongate aedeagus which lacks a distinct apical hook and bears three spiniform sclerites on the right side and a single at bottom of left side.

DESCRIPTION:

Measurements. Length: 4.5 mm; width: 2.05 mm. Ratios. Width/length of pronotum: 1.53; width of widest diameter/base of pronotum: 1.21; width base/apex of pronotum: 1.17; width pronotum/head: 1.29; length/width of elytra: 1.39.

Colour (Figs 45, 76). Dark piceous, slightly iridescent, pronotum very slightly paler. Lateral margin of pronotum very inconspicuously paler, lateral margin of elytra dark. Labrum and mandibles reddish-piceous, palpi in parts and basal antennomere infucate, other antennomeres reddish; femora dark, tibiae and tarsi reddish.

Head (Fig. 45). Of average size. Eyes large, but laterally only moderately projected, orbits short, oblique. Frontal furrows small and very shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by about a single antennomere, 6th antennomere <1.5 x as long as wide. Surface with fine, slightly superficial, isodiametric to slightly transverse microreticulation, comparatively glossy.

Pronotum (Fig. 45). Wide, barely cordiform, widest slightly in front of middle, dorsal surface moderately convex. Apex slightly excised, apical angles slightly projected but widely rounded. Lateral border evenly and comparatively strongly convex, not concave in front of base. Base wide in comparison with diameter, almost completely convex. Basal angles barely perceptible, very obtuse to almost rounded. Lateral margin anteriorly moderately narrow, widened and deplanate posteriad. Apex finely margined. Base not margined. Median line shallow, not attaining apex nor base. Both transverse impressions very shallow. Basal grooves comparatively shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with fairly coarse, rather sparse, irregularly spaced punctures. Surface here and there with finest traces of dense, extremely superficial, very transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 75). Of average shape, moderately elongate, gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins very slightly convex in basal half, then evenly convex. Striae rather deep, near base very finely crenulate, in apical half barely crenulate, intervals distinctly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, consisting of finest transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia (Fig. 24). Genital ring large but remarkably narrow, laterally slightly convex, with narrow, rounded apex. Aedeagus narrow and elongate, lower surface very gently concave, inconspicuously carinate in middle and with several longitudinal striae. Apex narrow and elongate, triangular, obtuse at tip, without apical hook, but very slightly knobbed. Internal sac with three spiniform sclerites on right side and a single at bottom of left side. Both parameres large and apically convex, the left one markedly triangular.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Philippines, without exact locality.

COLLECTING CIRCUMSTANCES: Not recorded.

RELATIONSHIPS: According to shape and structure of the male genitalia, at the present state of knowledge, this is a rather isolated species without close relationships

Arhytinus taiwanensis sp. nov.

(Figs 46, 77)

TYPE MATERIAL EXAMINED: Holotype: ♀, S-Taiwan FO. 3 Feb. 2001 leg. Wenbe (CBM). – Paratype: 1 ♀, 08.IV.2007 leg. S. Vit d.no.**20**. km.188. hfr. Wulu. Taitung Co. **TAIWAN merid.** (CDW); 1 ♀, TAIWAN Taipei Co. Tian Mu Gudao Hik. Trail (Taipei) Beitou Twnsh. / S Samau Mt. dead leaves 3.i.2009 leg. St. Vit (CDW).

ETYMOLOGY: The name refers to the occurrence of this species in Taiwan.

DIAGNOSIS: A small species, distinguished from similarly sized species by combination of: laterally little produced eyes, distinct, angulate basal angles of pronotum, and narrow pale margins of pronotum and elytra.

DESCRIPTION:

Measurements. Length: 4.4-4.5 mm; width: 2.05-2.1 mm. Ratios. Width/length of pronotum: 1.50-1.58; width of widest diameter/base of pronotum: 1.26-1.30; width base/apex of pronotum: 1.04-1.08; width pronotum/head: 1.34-1.36; length/width of elytra: 1.35.

Colour (Figs 46, 77). Dark piceous to black, pronotum in holotype and one paratype slightly paler, surface slightly iridescent. Lateral margins of pronotum and elytra with narrow though distinct yellow border, also suture of elytra indistinctly paler. Labrum and mandibles reddish-piceous, palpi, antenna, and legs more or less dirty yellow.

Head (Fig. 46). Of average size. Eyes fairly large, though laterally little projected, orbits fairly elongate, oblique. Frontal furrows small and very shallow, circular, situated immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere <1.5 x as long as wide. Surface with fairly distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 46). Wide, cordiform, widest at or slightly behind anterior third, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but shortly rounded. Lateral border evenly convex, immediately near base very slightly concave. Base rather narrow in comparison with diameter, in middle almost straight, lateral parts oblique-convex. Basal angles slightly angulate, laterally feebly projected, obtuse at tip, c. 120°. Lateral margin anteriorly narrow, posteriorly widened and deplanate. Apex inconspicuously margined, base not margined. Median line rather distinct, well impressed, not attaining apex nor base. Both transverse impressions very shallow. Anterior lateral seta inserted slightly in front of apical third, well in front of widest diameter. Posterior lateral seta inserted slightly in front of basal angle. Base and posterior third of lateral margin coarsely and rather densely punctate. Surface with very fine and dense, highly superficial, very transverse microreticulation which is only visible at high magnification, but slightly more distinct than in most other species, glossy and slightly iridescent.

Elytra (Fig. 77). Of average shape, but comparatively short, slightly oviform, dorsal surface convex, but slightly depressed on disk. Striae fairly deep, finely crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation very fine and superficial, recognizable only at very high magnification, consisting of finest transverse lines, but slightly more distinct than in most other species. Surface very glossy, with slight iridescent lustre.

Male genitalia. Not known.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Some variation noted in shape and relative size of the pronotum which is decidedly wider in the holotype. As long as the male genitalia of small Taiwanese *Arhytinus* are unknown, no further taxonomical decisions are possible.

DISTRIBUTION: Taiwan.

COLLECTING CIRCUMSTANCES: One specimen collected between "dead leaves".

RELATIONSHIPS: Difficult to track without knowledge of the male genitalia.

Arhytinus novaeirlandiae sp. nov.
(Figs 47, 78)

TYPE MATERIAL EXAMINED: Holotype: ♀, PNG: New Ireland prov. Schleinitz Range, 15 km SE Fissoa, 100m 03°02'58"S, 151°34'88"E 07.III.2000 leg. A. WEIGEL (CBM).

ETYMOLOGY: The name refers to the occurrence of this species on the island of New Ireland.

DIAGNOSIS: A small species, distinguished from similarly sized species by combination of: laterally little produced eyes, almost rounded basal angles of pronotum, barely crenulate elytral striae, and inconspicuously pale margin of pronotum, but not of elytra.

DESCRIPTION:

Measurements. Length: 4.7 mm; width: 2.2 mm. Ratios. Width/length of pronotum: 1.55; width of widest diameter/base of pronotum: 1.25; width base/apex of pronotum: 1.13; width pronotum/head: 1.37; length/width of elytra: 1.36.

Colour (Figs 47, 78). Dark piceous, pronotum not paler, surface slightly iridescent. Lateral margins of pronotum inconspicuously pale, lateral margins of elytra not perceptibly paler, but suture inconspicuously reddish. Labrum, mandibles, and palpi in parts reddish-piceous, antenna reddish, legs dirty yellow.

Head (Fig. 47). Of average size. Eyes fairly large, though laterally little projected, orbits moderately elongate, oblique. Frontal furrows small and shallow, circular, situated immediately behind clypeal suture. Antenna short, surpassing base of pronotum by a single antennomere, 6th antennomere <1.5 x as long as wide.

Surface with fairly distinct, isodiametric to slightly transverse microreticulation, moderately glossy.

Pronotum (Fig. 47). Moderately wide, not cordiform, widest slightly behind anterior third, dorsal surface moderately depressed. Apex moderately excised, apical angles projected but shortly rounded. Lateral border evenly convex, near base not concave. Base rather wide in comparison with diameter, almost regularly convex. Basal angles very obtuse, almost rounded off, laterally not projected. Lateral margin anteriorly narrow, posteriorly widened and deplanate. Apex laterally margined, in middle not perceptibly margined, base not margined. Median line rather distinct, but fine, not attaining apex nor base. Both transverse impressions very shallow. Anterior lateral seta inserted slightly in front of apical third, well in front of widest diameter. Posterior lateral seta inserted slightly in front of basal angle. Base and posterior fourth of lateral margin with sparse and markedly superficial punctures. Surface with very fine and dense, extremely superficial, very transverse microreticulation which is only visible at very high magnification, glossy and slightly iridescent.

Elytra (Fig. 78). Of average shape, but comparatively short, slightly oviform, dorsal surface convex, but slightly depressed on disk. Striae fairly deep, barely crenulate, intervals slightly raised but depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, consisting of finest transverse lines. Surface very glossy, rather iridescent.

Male genitalia. Not known.

Female genitalia. Similar to those of *A. major* DARLINGTON.

Variation. Unknown.

DISTRIBUTION: New Ireland. Known only from type locality.

COLLECTING CIRCUMSTANCES: Not recorded, the holotype was collected at low altitude, probably in rain forest.

RELATIONSHIPS: Difficult to track without knowledge of the male genitalia.

Key to the recorded species of *Arhytinus*

1. Body size major, length > 7.5 mm; apex of aedeagus denticulate or not, or unknown; if latter, yellow margins, at least on pronotum, conspicuous and wide, and elytra short .....2.

- Body size minor, length < 6.5 mm; apex of aedeagus usually denticulate, or unknown; if not denticulate (*A. nitescens, A. minimus*), see Figs 4, 24 .....7.

2. Pale margins of pronotum and elytra conspicuous and wide (Fig. 58); base of pronotum with dense and coarse punctation; elytra short, ratio length/width 1.37; aedeagus unknown. Thailand ....*circumcinctus* sp. nov.

- Pale margins of pronotum and elytra less conspicuous and wide (Figs 56, 57), or margins dark (Figs 59-61); if margins pale, base of pronotum with far less dense and coarse punctation; elytra longer, ratio length/width > 1.43; for aedeagus see figs 6-9. Philippines, Java, Borneo, New Guinea.....3.

3. Margin of pronotum distinctly pale; antenna completely yellow (Figs 54, 55); aedeagus bidenticulate at apex, internal sac at left side with a large, tridentate sclerite (Fig. 4), or unknown. Philippines, Borneo.....4.

- Margin of pronotum not distinctly pale; at least 1st - 3rd antennomeres dark (Figs 57-59); aedeagus bidenticulate or not at apex; if bidenticulate, internal sac at right side with 6 spines (Fig. 7). Java, Borneo, Papua New Guinea.....5.

4. Margin of pronotum **and** elytra distinctly pale (Fig. 57); pronotum with angulate basal angles, base distinctly punctate (Fig. 35); intervals convex; aedeagus bidenticulate at apex, internal sac at left side with a large, tridentate sclerite (Fig. 6). Borneo.....*nitidipennis* sp. nov.

- Margin of pronotum pale, of elytra dark (Fig. 56); pronotum with obtuse basal angles, base barely punctate (Fig. 34); intervals depressed; aedeagus unknown. Philippines.....*irideus* JEDLICKA

5. Antenna and legs completely dark (Fig. 59); aedeagus bidenticulate at apex but lower tooth very small; internal sac at right side with 6 spines, at left side with two very small ones (Fig. 7). Papua New Guinea.....*major* DARLINGTON

- Legs yellow, only 1st - 3rd antennomeres dark; apex of aedeagus not denticulate, internal sac without any teeth-like sclerites (Figs 8, 9). Borneo, Java....6.

6. Pronotum laterally evenly rounded, basal grooves shallow (Fig. 61); aedeagus with barely hooked apex (Fig. 9). Java.....*inarmatus* sp. nov.

- Pronotum in anterior half more rounded than in posterior half, basal grooves deep (Fig. 60); aedeagus with distinctly hooked apex (Fig. 8). Borneo.....*borcherdingi* sp. nov.

7. Pronotum exceptionally wide, ratio width/length >1.7 **and** basal margin laterally very oblique (Fig. 33) **and** elytral striae not punctate or crenulate **and** body length 5.7 mm; aedeagus very wide, with elongate, oblique, bidentate apex, internal sac without any spiniform sclerite (Fig. 5). Philippines.....*piceus* JEDLICKA

- Pronotum less wide, ratio width/length <1.65; aedeagus varied, if rather similar to that of *A. piceus*, internal sac with one spiniform sclerite (Fig. 17); if ratio width/length of pronotum c. 1.65 and aedeagus unknown, body length c. 6.25 mm **and** basal margin of pronotum laterally less oblique (Fig. 52) **and** elytral striae distinctly punctate or crenulate.....8.

8. Femora dark or at least darker than tibiae. New Guinea (the following six species are very similar in shape and structure and are best distinguished by their aedeagi).....9.

- Whole legs yellow or dark reddish. South Asia from India to Vietnam, Taiwan, Philippines, Sumatra, Java, Borneo, Sulawesi, Moluccas, New Ireland.....14.

9. Body length > 6.0 mm; margins of pronotum and lateral margin of elytra inconspicuously but perceptibly paler (Fig. 62); internal sac of aedeagus with one or two small teeth at bottom (Fig. 10).....*medius* DARLINGTON

- Body length < 5.4 mm; margins of pronotum and lateral margin of elytra not perceptibly paler (Figs 36-39, 63-67); internal sac of aedeagus either with one or several large, acute spines (Figs 11, 12, 14, 15), or with tree attached small spines in middle of bottom (Fig. 13).....10.

10. Eyes laterally less projected, pronotum wider in relation to head, ratio width pronotum/head >1.31 (Fig. 65); aedeagus narrower and less curved on lower surface, internal sac with 3 small spines in middle of bottom (Fig. 13).....*minor* sp. nov.

- Eyes laterally more projected, pronotum narrower in relation to head, ratio width pronotum/head <1.27 (Figs 36-39); aedeagus wider and more curved on lower surface, internal sac with large spinose sclerites on both sides (Figs 11, 12, 14, 15).....11.

11. Body size slightly larger, length >4.9 mm; aedeagus with a large and elongate, unidentate sclerite on either side and one additional small triangular spine on the right side (Figs 11, 12).....12.

- Body size slightly smaller, length <4.7 mm, commonly less; aedeagus either with a large tridentate sclerite on the left side and 1-2 smaller spines on the right side (Fig. 14), or only with a fairly large unidentate sclerite on the left side (Fig. 15).....13.

12. Body size slightly smaller, length <4.5 mm, commonly less; pronotum narrower, ratio width/length < 1.53, with distinctly angulate basal angle (Fig. 38); aedeagus shorter and wider, with a large tridentate sclerite on the left side and 1-2 smaller spines on the right side (Fig. 14).....*granum* DARLINGTON

- Body size slightly larger, length 4.7 mm; pronotum wider, ratio width/length 1.62, with very obtuse, almost rounded basal angle (Fig. 39); aedeagus longer and narrower, only with an unidentate sclerite on the left side (Fig. 15).....*unispinus* sp. nov.

13. Pronotum narrower, ratio width/length <1.52, with coarsely punctate base (Fig. 36); aedeagus wider, spinose sclerites in internal sac much larger (Fig. 11).....*missai* sp. nov.

- Pronotum wider, ratio width/length 1.62, with almost impunctate base (Fig. 37); aedeagus narrower, spinose sclerites in internal sac considerably smaller (Fig. 12).....*frater* sp. nov.

14. Body length > 5.2 mm; commonly larger.....15.

- Body length < 4.9 mm, commonly smaller; when >4.6 mm long, either aedeagus with 3 large, attached spines at left side, but none at right side

(Fig. 18), or lateral margins of pronotum not sinuate, basal angles almost rounded off (Fig. 47) .....23.

15. Eyes smaller and more depressed, ratio width pronotum/head >1.45 (Fig. 32); aedeagus wide and compact, apex not denticulate, internal sac with four dispersed spiniform sclerites (Fig. 4). Taiwan.....*nitescens* sp. nov.

- Eyes larger and more protruded, ratio width pronotum/head <1.32 (Figs 27-31); apex of aedeagus bidenticulate (Figs 1-3, 16-17), or aedeagus unknown. Distribution different.....16.

16. Pronotum markedly cordiform, with relatively narrower base, ratio widest diameter/width of base 1.32; eyes laterally more protruded (Fig. 27); elytral striae coarsely crenulate (Fig. 49); body length 6.0 mm; aedeagus unknown. Borneo.....*cordicollis* sp. nov.

- Pronotum less cordiform, with relatively wider base, ratio widest diameter, width of base <1.27; eyes usually laterally less protruded (Figs 28-31, 50-53, 68, 69); elytral striae less coarsely crenulate, except *A. crenulipennis* sp. nov. from Borneo which is only 5.2 mm long and has a narrower prothorax; apex of aedeagus bidenticulate (Figs 1-3, 16, 17), or unknown. Southern India, Sikkim, Burma, Thailand, Vietnam, Philippines, Sumatra, Borneo, Sulawesi.....17.

17. Body length 5.2 mm; aedeagus either rather narrow and with two spiniform sclerites (Fig. 16), or aedeagus wide with a single spine (Fig. 17). Borneo, Sulawesi.....18.

- Body length usually larger, 5.3-6.3 mm, when under 6.0 mm, aedeagus with 4 or more rather attached spines on left side, and 1-4 spines on right side (Figs 1-3). Southern India, Sikkim, Burma, Thailand, Vietnam, Philippines, Sumatra .....19.

18. Base of pronotum comparatively wide, ratio width diameter/base 1.20 (Fig. 68); elytral striae not perceptibly crenulate; aedeagus narrower, apex sharply denticulate only on lower surface, internal sac with a small spine on either side (Fig. 16). Sulawesi.....*celebensis* sp. nov.

- Base of pronotum narrower, ratio width diameter/base 1.27 (Fig. 69); elytral striae coarsely crenulate; aedeagus compact, lower surface markedly concave, apex horizontally bidenticulate, the upper tooth much larger than the lower one, internal sac with a single small spine on the left side (Fig. 17). Borneo..... .....*crenulipennis* sp. nov.

19. Elytra with conspicuous pale margins and suture (Fig. 51); basal angles of pronotum obtuse (Fig. 29); body length < 5.4 mm; aedeagus with a large spine on right side and 3, respectively 4 smaller spines on right and left sides (Fig. 3). Southern India.....*lorenzi* sp. nov.

- Elytra without or with less conspicuous pale margins and suture (Figs 48, 49, 52, 53); basal angles of pronotum more accentuate (Figs 26, 28, 30, 31); when body length c. 5.4 mm, aedeagus without the large spine on right side and with less numerous additional spines (Figs 1, 2). Southern India, Sikkim, Burma, Thailand, Vietnam, Philippines, Sumatra.....20.

20. Pronotum with rather wide marginal channel, base coarsely punctate (Figs 26, 28); margins of pronotum and elytra more distinctly pale (Figs 48, 50); apex of aedeagus bidenticulate and internal sac with 4-5 attached spines at left side and 1-2 spines at right side (Figs 1, 2); body length usally smaller, 5.3-6.1 mm. Southern India, Sikkim, Burma, Thailand, Vietnam, Sumatra, Java.....21.

- Pronotum with narrower marginal channel, base variously punctate, but when coarsely punctate, marginal channel very narrow (Figs 30, 31); margins of pronotum and elytra barely pale (Figs 52, 53); aedeagus unknown; body length always >6.0 mm. Borneo, Philippines.....22.

21. Pronotum with more accentuate basal angles (Fig. 26); aedeagus with acute apex, and with 4 attached spines on left side and one at right side (Fig. 1). Sikkim, Burma, Thailand, Vietnam, Sumatra, Java.....*bembidioides* BATES

- Pronotum with more obtuse basal angles (Fig. 28); aedeagus with more obtuse apex, and with 5 attached spines on left side and two at right side (Fig. 2). Southern India.....*indicus* sp. nov.

22. Pronotum with narrower lateral margin, more sinuate lateral borders near base, and coarsely punctate base (Fig. 31); eyes more produced, almost perpendicular at their posterior margin; elytra with distinct sericeous lustre. Borneo..... .....*angustimargo* sp. nov.

- Pronotum with wider lateral margin, less sinuate lateral borders near base, and sparsely punctate base (Fig. 30); eyes less produced, still oblique at their posterior margin; elytra with faint sericeous lustre. Philippines.....*philippinus* JEDLICKA

23. Legs dark reddish to light brown; basal angle of pronotum very obtuse, lateral margins dark **and** regularly convex towards basal angle (Fig. 45); aedeagus narrow and elongate, apex not denticulate, only very slightly knobbed, with three small spiniform sclerites on top of right side and a small single spine at base on the left side (Fig. 24). Philippines.....*minimus* JEDLICKA

- Legs yellow; **either** basal angle of pronotum angulate and lateral margins at least slightly sinuate near angle, **or** basal angles very obtuse but pale; aedeagus variously shaped, but apex always denticulate (Figs 18-23), or aedeagus unknown. Taiwan, Sumatra, Java, Borneo, Moluccas, New Ireland.....24.

24. Lateral margins of pronotum not sinuate, basal angles almost rounded off (Figs 43, 47); either aedeagus with two large, posteriad curved spines at right side (Fig. 22), or aedeagus unknown, in latter species lateral margin of pronotum distinctly pale, of elytra dark (Fig. 78). Moluccas, New Ireland.....25.

- Lateral margins of pronotum slightly sinuate, basal angles distinct (Figs 40-42, 44, 46); either aedeagus with differently shaped and distributed spines (Figs 18-20, 23), or aedeagus unknown, in latter species lateral margin of elytra distinctly pale (Fig. 77). Taiwan, Sumatra, Java, Borneo.....26.

25. Body size larger, 4.7 mm; pronotum wider, ratio width/length 1.55, with wider base, ratio width of base/apex 1.13 (Fig. 47); elytra more depressed and less oviform (Fig. 78); aedeagus unknown. New Ireland.....*novaeirlandiae* sp. nov.

- Body size smaller, 3.7 mm; pronotum narrower, ratio width/length 1.42, with narrower base, ratio width of base/apex 1.03 (Fig. 43); elytra less depressed and more oviform (Fig. 74); aedeagus with two large, posteriad curved spines at right side (Fig. 22). Batjan, Moluccas..... .....*moluccensis* sp. nov.

26. Body length c. 4.9 mm; pronotum wide with comparatively narrow base, ratio width of diameter/base 1.36 (Fig. 40); elytral striae very shallow, virtually impunctate (Fig. 70); aedeagus slightly sinuate, apex with small lower tooth, with three large attached spines at left side, but none at right side (Fig. 18). Java.....*lieftincki* LOUWERENS

- Body length < 4.6 mm; pronotum with wider base, ratio width of diameter/base < 1.33 (Figs 41, 42, 44, 46); elytral striae deeper, punctation various, but always visible (Figs 71, 72, 73, 75, 77); either aedeagus not sinuate, apex with large lower tooth, and with three smaller attached spines at left side and two spines at right side (Figs 19-21, 23), or aedeagus unknown, but in this species elytra shorter and striae deeply impressed and perceptibly punctate (Fig. 77). Taiwan, Sumatra, Java, Borneo.....27.

27. Eyes laterally markedly projected (Figs 41, 42, 73); elytra longer, ratio length/width > 1.40; aedeagus either wide, with large, vertical or oblique, bidenticulate apex and three large attached spines on left side and two attached spines on right side (Figs 19, 20), or narrow, with small bidenticulate apex and 7-8 single spines (Fig. 21). Sumatra, Borneo.....28.

- Eyes laterally far less projected (Figs 44, 46); elytra shorter, ratio length/width < 1.38; aedeagus either with two very small spines on left and a single small spine on right side (Fig. 23), or aedeagus unknown. Java, Taiwan.....30.

28. Elytral striae coarsely punctate (Fig. 73); aedeagus narrow, with small apical teeth, with 7-8 dispersed single spines (Fig. 21). Borneo..... .....*multispinosus* sp. nov.

- Elytral striae finely punctate (Figs 71, 72); aedeagus wide, with large lower apical tooth, three large attached spines on left side and two attached spines on right side (Figs 19, 20). Sumatra, Borneo.....29.

29. Apex of pronotum deeply excised, apical angles far protruded and rather acute (Fig. 41); aedeagus considerably larger (c. 1.0 mm); dentate sclerites in internal sac much larger (Fig. 19). Borneo..... .....*harpago* sp. nov.

- Apex of pronotum less deeply excised, apical angles less protruded and rather obtuse (Fig. 42); aedeagus considerably smaller (c. 0.75 mm); dentate sclerites in internal sac much smaller (Fig. 20). Sumatra.....*sumatrensis* sp. nov.

30. Lateral margins of pronotum and elytra distincty pale (Fig. 46); pronotum generally slightly wider, ratio width/length 1.50-1.58; elytral striae more deeply impressed; aedeagus unknown. Taiwan.....*taiwanensis* sp. nov.

- Lateral margins of pronotum and elytra not perceptibly pale (Fig. 44); pronotum generally slightly narrower, ratio width/length 1.47-1.51; elytral striae less impressed; aedeagus with two very small spines on left and a single small spine on right side (Fig. 23). Java.....*riedeli* sp. nov.

Remarks

Identification and differentiation of the species of the genus *Arhytinus* are problematic in several respects:

Because body size may vary considerably within some species and, on the other hand, in a couple of species widely overlaps, this character state used by DARLINGTON (1952) in his key to the New Guinean species is not practicable. Hence few characters of external morphology can be used for the distinction of the species. Also shape of head, pronotum, and elytra are very similar in most species, as can be taken from Tab. 1. Minor differences useful for species differentiation are only found in colour of the margins of pronotum and elytra and colouration of the legs, in relative width of the pronotum and shape of its basal angle, and in distinctness and punctation of the elytral striae.

Hence it is rather the male aedeagus which bear well recognizable differences, mainly in its general shape, shape of the apex, and number, shape, and distribution of spinose sclerites in the internal sac. Because quite similar species, with respect to body size and external morphological characters, may inhabit the same area and actually can be captured in the same locality, identification of the females can be difficult and thus affiliation of females to males in some species is problematic.

The coexistence of apparently very similar species at the same locality raises the question, in which way interbreeding between similarly sized and structured species is prevented. Exemples are the occurrence of *A. granum*, *A. medius*, *A. minor*, *A. missai*, and *A. unispinus* at the same locality in Papua New Guinea, and of *A. crenulipennis*, *A. harpago*, and *A. multispinosus* in Brunei, Borneo. Due to lack of knowledge about any ethological or ecological factors which could prevent interbreeding, the different shapes and structures of the male aedeagi, in particular the characteristically shaped apices and the very different armatures with spine-shaped sclerites, of the internal sac, at present are the first choice for such mechanism.

Although in body shape and most external characteristics most species of *Arhytinus* are very similar, the male genitalia exhibit very different structures. Therefore detection of relationships between species, or groups of related species, is difficult. Only few pairs of certainly closely related species are evident, namely *A. piceus-A.crenulipennis* that occur in the Philippines, respectively on Borneo, *A. harpago-A. sumatrensis* which occur on Borneo, respectively on Sumatra, and *A. missai-A.frater* which occur in eastern, respectively western New Guinea. In all three pairs the aedeagi are very similarly shaped and the species certainly are related but geographically separated. This is not too surprising, because it is well known that the carabid fauna of Borneo bears close affinities as well to that of Sumatra as to that of the Philippines. Similar relations may also exist in *A. bembidioides* and *A. cordicollis*, although this is still uncertain due to the lack of knowledge about the male genitalia of the latter species; and some affinities may also exist between *A. riedeli* and *A. moluccensis*, according to shape and structure of the aedeagus. In the latter pair the ranges of the species are widely distant, but we always must bear in mind that nothing is known about a possible occurrence of *Arhytinus* species on the Lesser Sunda Islands, and whether additional species occur on Sulawesi or on other islands of the Moluccas, likewise is uncertain.

Even when grouping within the genus is difficult, it is evident that some of the large species possess far less complexly structured aedeagi than most of the small species, at least than those that occur in the southern part of the genus' range. If a denticulate apex and a complexly structured armature of the internal sac of the aedeagus are regarded apomorphic character states, it would be obvious that those of the large species which possess simply structured male genitalia should represent the plesiomorphic adelphotaxa of most of the small species, at least with respect to the characters

Table 1 – Measurements and ratios of the mentioned species of *Arhytinus* Bates. N – number of measured specimens; l – body length in mm; w/l pr – ratio width/length of pronotum; d/b pr – ratio width widest diameter/base of pronotum; b/a pr – ratio width base/apex pronotum; pr/h – ratio width pronotum/head; l/w el – ratio length/width of elytra. Only of few species more than a single specimen were available.

	N	l	w/l pr	d/b pr	b/a pr	pr/h	l/w el
bembidioides	5	5.4-6.1	1.53-1.58	1.21-1.24	1.10-1.14	1.26-1.33	1.41-1.45
cordicollis	1	6.0	1.60	1.32	1.10	1.31	1.42
indicus	6	5.3-6.0	1.55-1.60	1.19-1.24	1.15-1.18	1.26-1. 30	1.40-1.44
lorenzi	2	5.3-5.35	1.52-1.56	1.20	1.16	1.29-1.32	1.44-1.45
philippinus	1	6.25	1.61	1.24	1.12	1.28	1.40
angustimargo	1	6.1	1.59	1.22	1.12	1.27	1.40
nitescens	1	5.9	1.53	1.26	1.18	1.45	1.42
piceus	1	5.7	1.71	1.25	1.14	1.38	1.40
irideus	1	7.5	1.59	1.22	1.18	1.47	1.44
nitidipennis	1	7.6	1.49	1.26	1.15	1.36	1.45
circumcinctus	1	7.7	1.66	1.23	1.12	1.47	1.37
major	3	7.4-7.5	1.53-1.54	1.22-1.28	1.11-1.15	1.39-1.42	1.48-1.51
borcherdingi	3	8.0-9.2	1.42-1.50	1.27-1.28	1.12-1.22	1.38-1.39	1.50-1.53
? *borcherdingi* (#f)	1	7.9	1.60	1.25	1.16	1.42	1.43
inarmatus	1	8.3	1.45	1.21	1.26	1.50	1.47
medius	6	6.0-6.3	1.52-1.57	1.26-1.27	1. 11-1.14	1.37-1.40	1.44-1.46
missai	6	4.9-5.1	1.49-1.52	1.24-1.30	1.06-1.10	1.26-1.27	1.37-1.42
frater	1	5.4	1.62	1.24	1.15	1.43	1.41
minor	5	4.6-4.8	1.48-1.52	1.27-1.28	1.08-1.12	1.31-1.33	1.38-1.41
granum	10	3.4-4.5	1.46-1.53	1.24-1.27	1.06-1.10	1.21-1.26	1.35-1.38
unispinus	1	4.7	1.62	1.22	1.14	1.30	1.39
celebensis	1	5.2	1.50	1.20	1.11	1.29	1.39
crenulipennis	1	5.2	1.53	1.27	1.11	1.24	1.43
lieftincki	1	c.4.9	1.56	1.36	1.03	?	1.42
harpago	1	4.6	1.47	1.33	1.04	1.29	1.44
sumatrensis	1	4.5	1.56	1.26	1.06	1.24	1.44
multispinosus	6	4.0-4.45	1.48-1.52	1.27-1.31	1.04-1.08	1.26-1.28	1.40-1.44
moluccensis	1	3.7	1.42	1.33	1.03	1.27	1.33
riedeli	3	4.0-4.4	1.47-1.51	1.27-1.33	1.05-1.11	1.32-1.34	1.34-1.38
minimus	1	4.5	1.53	1.21	1.17	1.29	1.39
taiwanensis	3	4.4-4.5	1.50-1.58	1.26-1.30	1.04-1.08	1.34-1.36	1.35
novaeirlandiae	1	4.7	1.55	1.25	1.13	1.37	1.36

of the genitalia. Large body size and a less depressed body shape also may represent plesiomorphic character states, and indeed, those large, depressed species in their external stature are more similar to other platynine genera that the small, markedly convex species, most of which possess complexly structured male genitalia.

A more elaborate phylogenetic analysis certainly is premature, because the males of a couple of species are still unknown, but as a first hypothesis it could be suggested that the intrageneric evolution proceeded from large species (in genus) with simply shaped and structured male genitalia to small species with complexly structured aedeagi.

Unfortunately this phylogenetic hypothesis at present cannot be combined with a biogeographic view, because we do not know how many additional species actually exist and in which part of the genus' range they occur.

In spite of the quite numerous specimens of a few species sampled during some of the projects mentioned in the introduction, the actual ecology of the species still is little known and rather doubtful. Because the specimens on which the present paper is based, almost exclusively were collected by light trapping (at least those specimens with recorded collecting circumstances), which was partly employed in the canopy of rain forest, or by fogging either bark or foliage, it seems that the species rather live on trees, be it on the bark or on twigs or leaves in the canopy. The few species captured by P. J. Darlington, however, were found „among dead leaves on the ground in forest". Also both southern Indian species, *A. indicus* and *A. lorenzi*, according to the collector W. Lorenz, were found on rather dry

ground under Cashew trees among leaf litter. Hence, hand collecting on the ground and on trees or fogging of bark or of the canopy should be employed during future sampling activities to verify the actual mode of life which even may be different in different species. Very probably the inadequate sampling methods are responsible for the rarity of specimens and the very limited knowledge about this genus.

The multiplication of species on the basis of examination of the male genitalia suggests that in other parts of the putative range of the genus similar taxonomic methods should reveal similar results, i.e. a reasonable augmentation of the species inventory – provided that sampling activities have been intensified so that adequate material from other countries than Papua New Guinea and Brunei is available.

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Alphabetical checklist of the species of the genus *Arhytinus* Bates with information about their distribution

angustimargo sp. nov.....Sabah (Borneo)
bembidioides Bates, 1889.....
Sikkim, Burma, Thailand, Vietnam, Sumatra, ? Borneo
borcherdingi sp. nov.....Brunei, Sabah (Borneo)
celebensis sp. nov.....Sulawesi
circumcinctus sp. nov.....northern Thailand, ?Burma
cordicollis sp. nov.....Brunei (Borneo)
crenulipennis sp. nov.....Brunei (Borneo)
frater sp. nov.....Papua Indonesia
granum Darlington, 1952.....Papua New Guinea
harpago sp. nov.....Brunei (Borneo)
inarmatus sp. nov.....western Java
indicus sp. nov.....southern India
irideus Jedlicka, 1936.....Philippines
lieftincki Louwerens, 1951.....western Java
lorenzi sp. nov.....southern India
major Darlington, 1952.....Papua New Guinea
medius Darlington, 1952.....New Guinea
minimus Jedlicka, 1936.....Philippines
minor sp. nov.....Papua New Guinea
missai sp. nov.....Papua New Guinea
moluccensis sp. nov.....Batjan (Moluccas)
multispinosus sp. nov.....Brunei, Sabah (Borneo)
nitescens sp. nov.....Taiwan
nitidipennis sp. nov.....Brunei (Borneo)
novaeirlandiae sp. nov.....New Ireland
philippinus Jedlicka, 1936.....Philippines
piceus Jedlicka, 1936.....Philippines
riedeli sp. nov.....eastern Java
sumatrensis sp. nov.....Sumatra
taiwanensis sp. nov.....Taiwan
unispinus sp. nov.....Papua New Guinea

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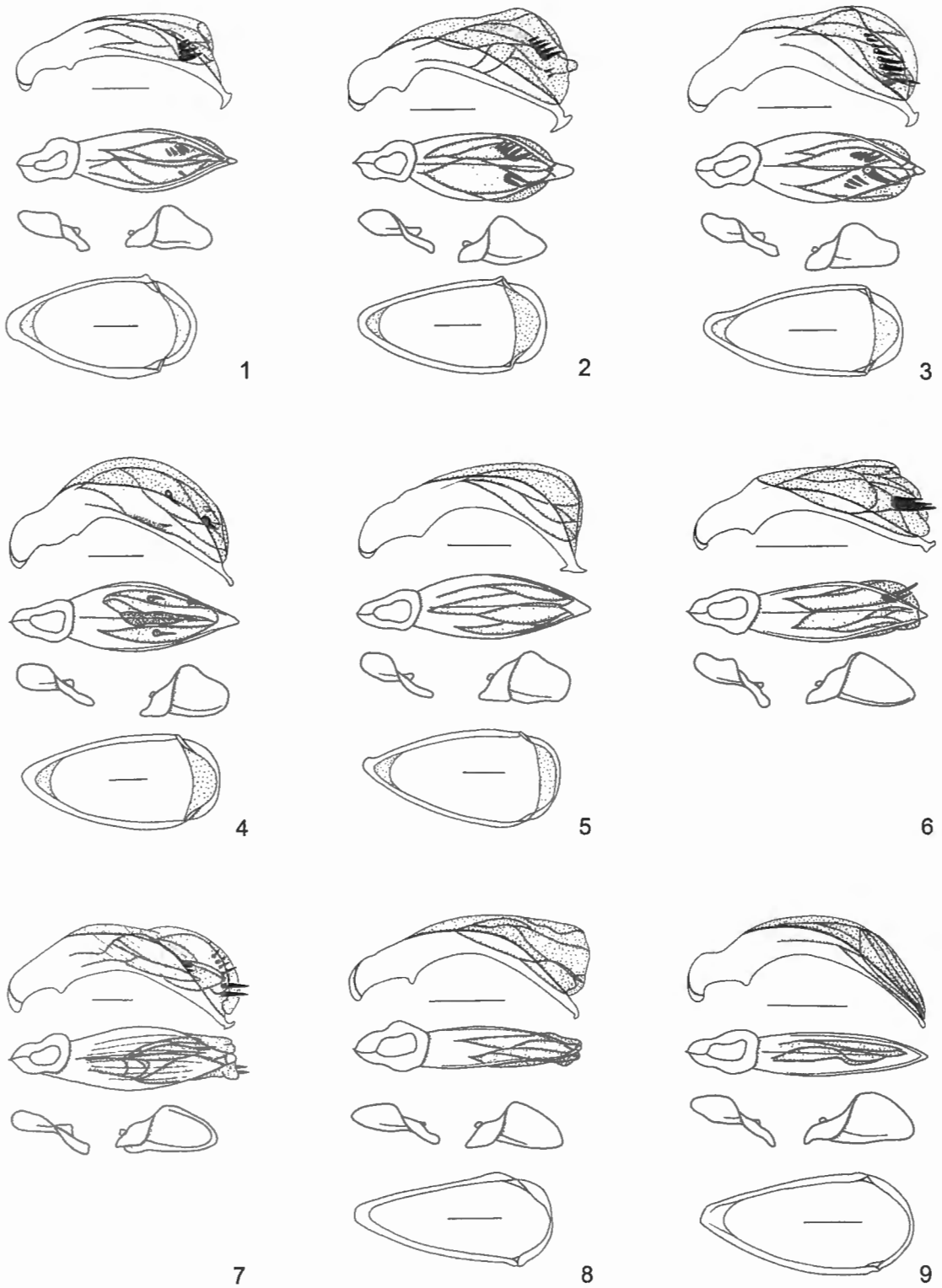
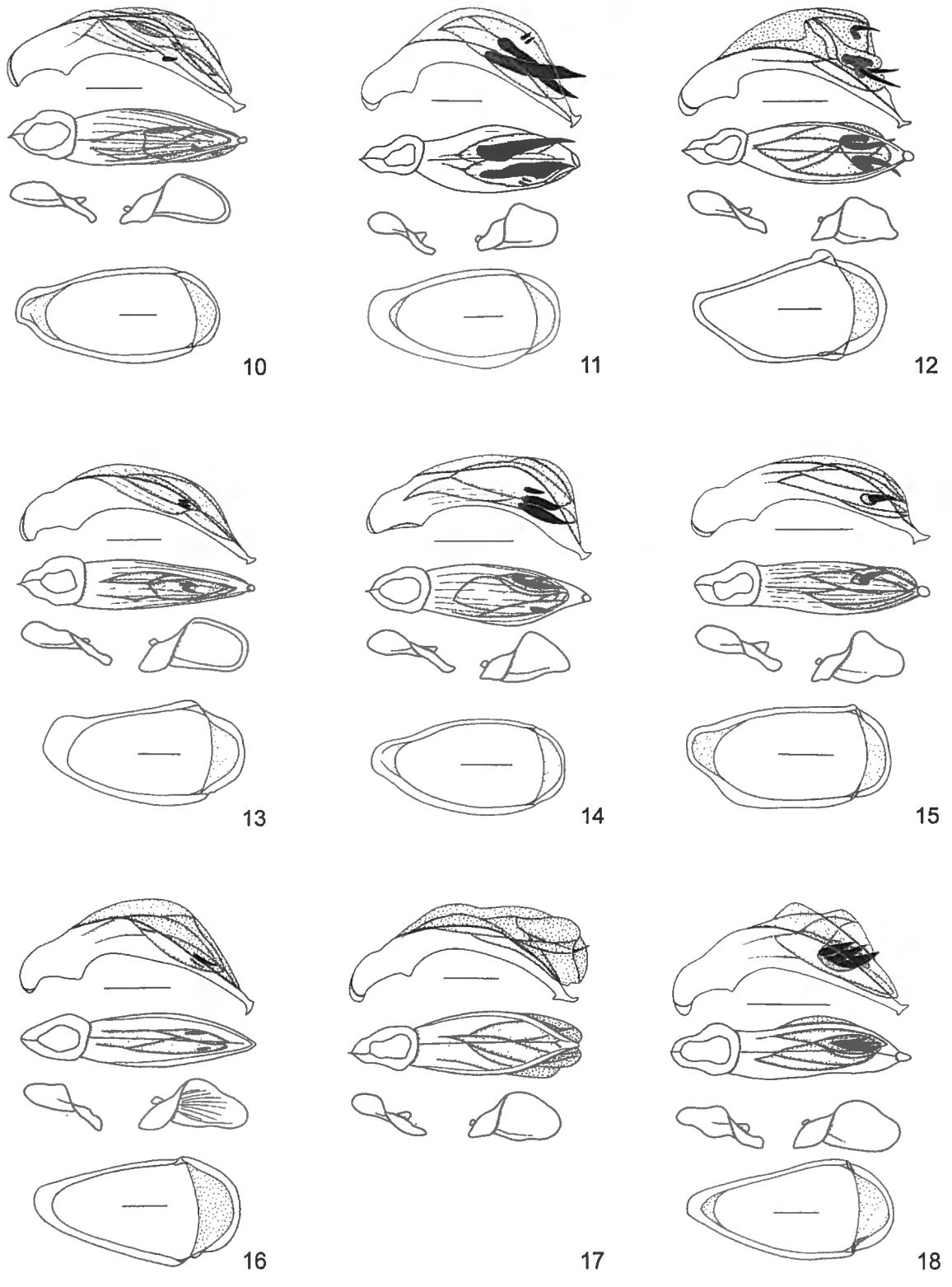
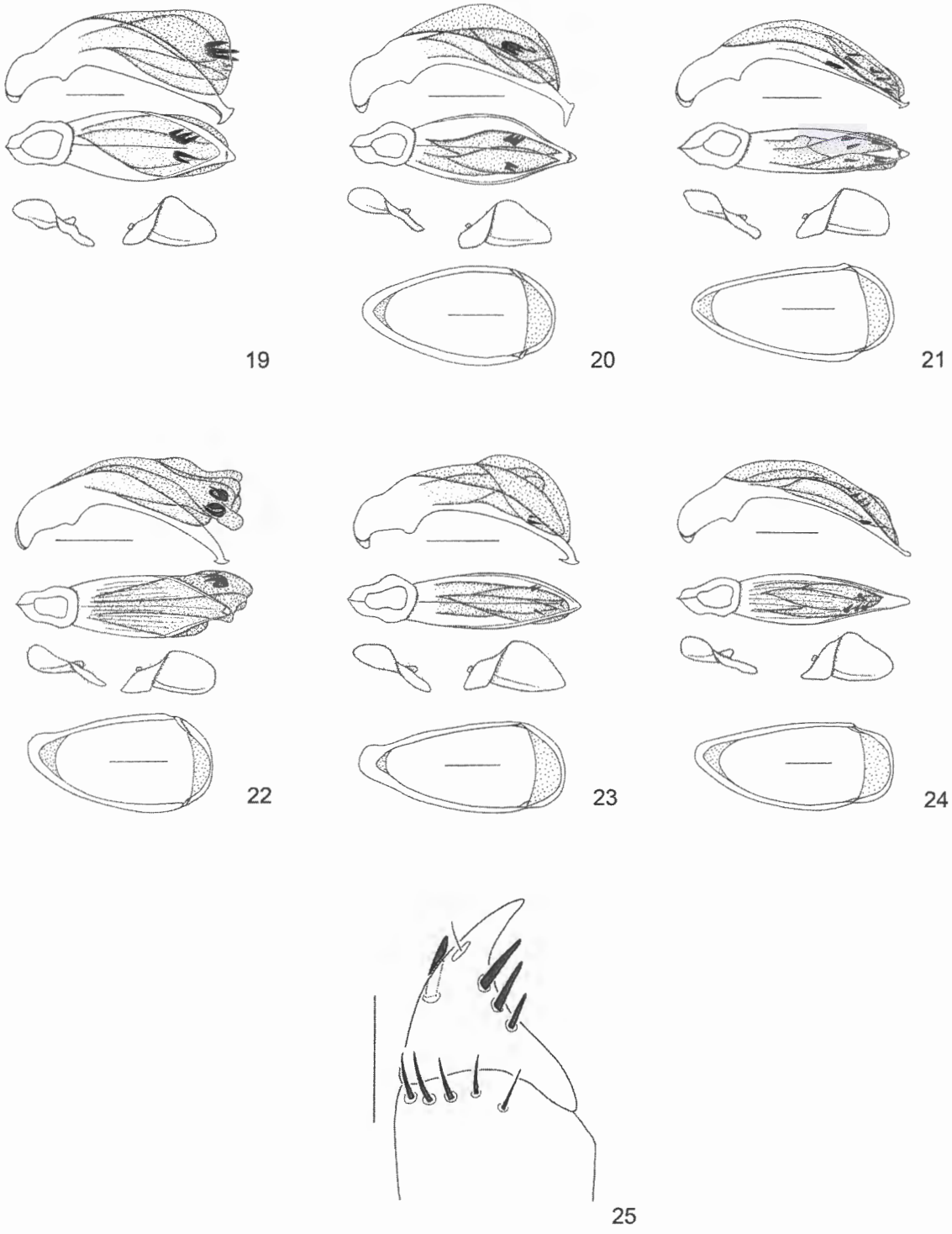


Figs 1-9. – Male aedeagus, left side, lower surface, left and right parameres, genital ring. 1. *Arhytinus bembidioides* BATES. 2. *A. indicus* sp. nov. 3. *A. lorenzi* sp. nov. 4. *A. nitescens* sp. nov. 5. *A. piceus* JEDLICKA. 6. *Arhytinus nitidipennis* sp. nov. 7. *A. major* DARLINGTON. 8. *A. borcherdingi* sp. nov. 9. *A. inarmatus* sp. nov. Scale bars: Figs 1-5: 0.25 mm; Figs 6-9: 0.5 mm.



Figs 10-18. – 10. *A. medius* DARLINGTON. 11. *A. missai* sp. nov. 12. *A. frater* sp. nov. 13. *A. minor* sp. nov. 14. *A. granum* DARLINGTON. 15. *A. unispinus* sp. nov. 16. *A. celebensis* sp. nov. 17. *A. crenulipennis* sp. nov. 18. *A. lieftincki* LOUWERENS. Scale bars: Figs 10-18: 0.25 mm.



Figs 19-25. – 19. *A. harpago* sp. nov. 20. *A. sumatrensis* sp. nov. 21. *A. multispinosus* sp. nov. 22. *A. moluccensis* sp. nov. 23. *A. riedeli* sp. nov. 24. *A. minimus* JEDLICKA. 25. *Arhytinus major* DARLINGTON. Female gonocoxites. Scale bars: Figs 19-24: 0.24 mm; Fig. 25: 0.1 mm.

Figs 26-37. – Head and pronotum. 26. *Arhytinus bembibioides* BATES. 27. *A. cordicollis* sp. nov. 28. *A. indicus* sp. nov. 29. *A. lorenzi* sp. nov. 30. *A. philippinus* JEDLICKA. 31. *A. angustimargo* sp. nov. 32. *A. nitescens* sp. nov. 33. *A. piceus* JEDLICKA. 34. *A. irideus* JEDLICKA. 35. *A. nitidipennis* sp. nov. 36. *A. missai* sp. nov. 37. *A. frater* sp. nov.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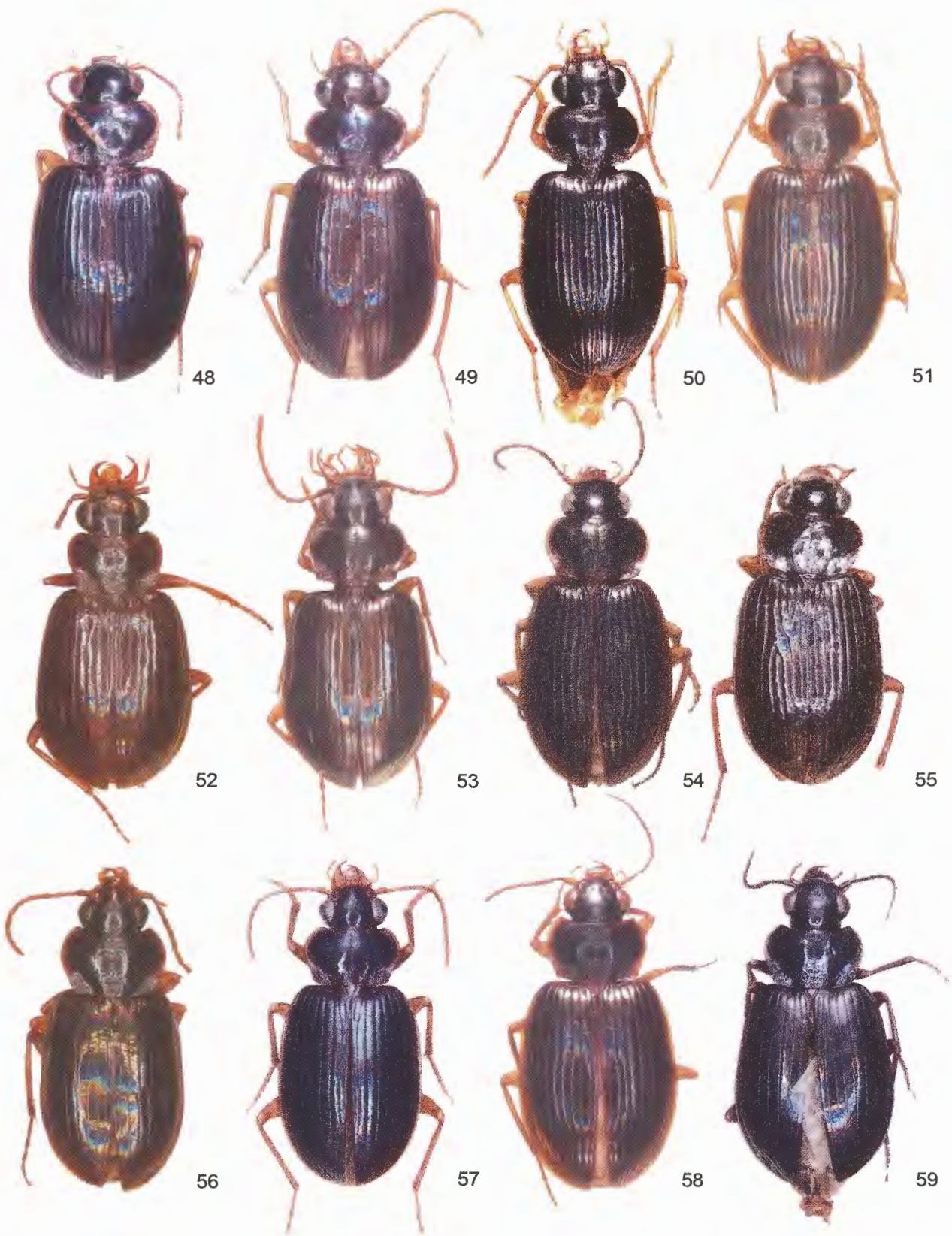
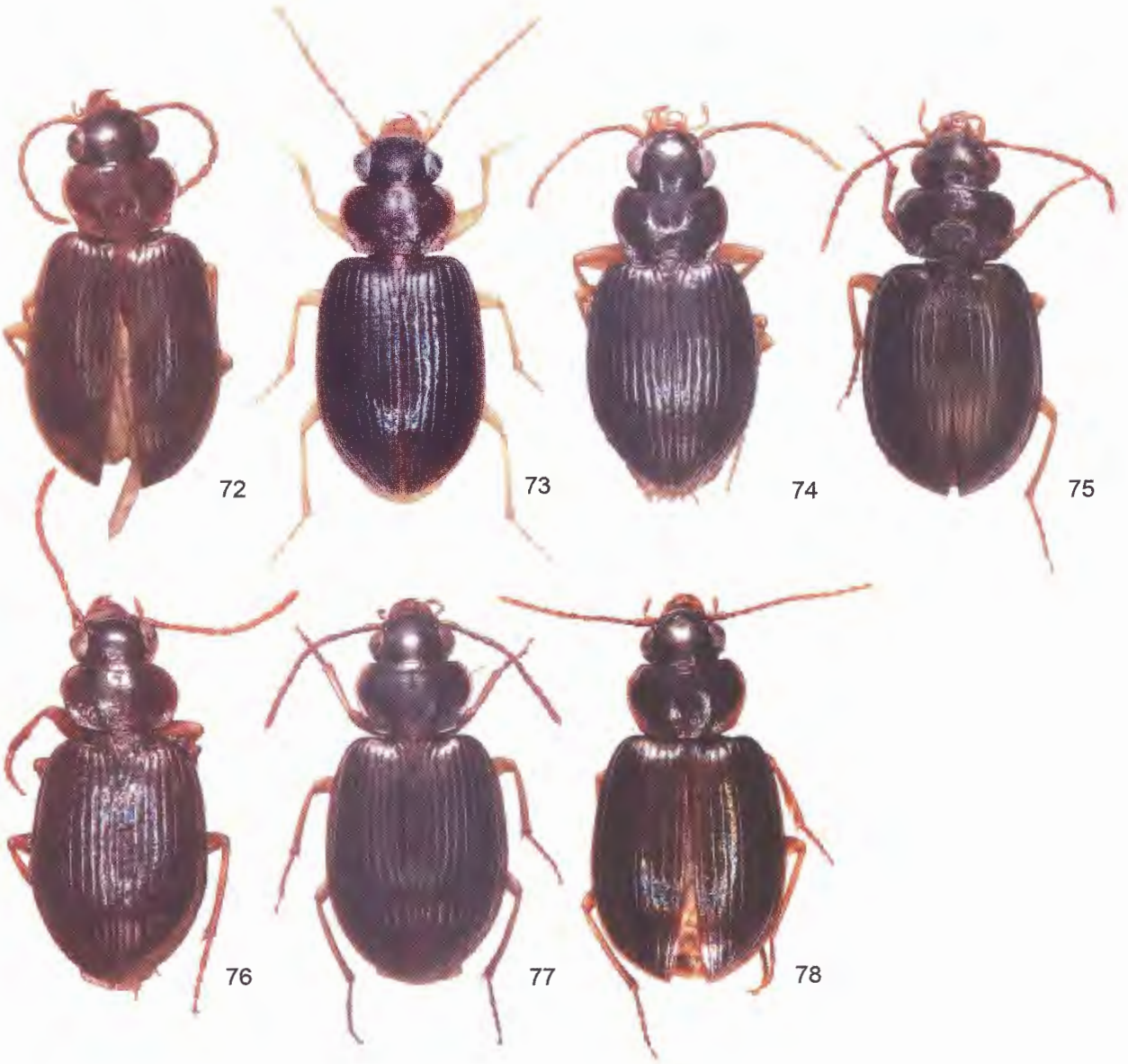
Figs 38-47. – Head and pronotum (in *A. lieftincki* only the pronotum due to loss of the head). 38. *A. granum* DARLINGTON. 39. *A. unispinus* sp. nov. 40. *A. lieftincki* LOUWERENS. 41. *A. harpago* sp. nov. 42. *A. sumatrensis* sp. nov. 43. *A. moluccensis* sp. nov. 44. *A. riedeli* sp. nov. 45. *A. minimus* sp. nov. 46. *A. taiwanensis* sp. nov. 47. *A. novaeirlandiae* sp. nov.



Figs 48-59. – Habitus (body lengths in brackets). 48. *Arhytinus bembibioides* BATES (6.1 mm). 49. *A. cordicollis* sp. nov. (6.0 mm). 50. *A. indicus* sp. nov. (5.3 mm). 51. *A. lorenzi* sp. nov (5.4 mm). 52. *A. philippinus* JEDLICKA (6.25 mm). 53. *A. angustimargo* sp. nov. (6.1 mm). 54. *A. nitescens* sp. nov. (5.9 mm). 55. *A. piceus* JEDLICKA (5.7 mm). 56. *A. irideus* JEDLICKA (7.5 mm). 57. *A. nitidipennis* sp. nov. (7.6 mm). 58. *A. circumcinctus* sp. nov. (7.7 mm). 59. *A. major* DARLINGTON (7.5 mm).

Figs 60-71. – Habitus (body lengths in brackets). 60. *A. borcherdingi* sp. nov. (8.0 mm). 61. *A. inarmatus* sp. nov. (8.3 mm). 62. *A. medius* DARLINGTON (6.0 mm). 63. *A. missai* sp. nov. (5.0 mm). 64. *A. frater* sp. nov. (5.4 mm). 65. *A. minor* sp. nov. (4.6 mm). 66. *A. granum* DARLINGTON (4.2 mm). 67. *A. unispinus* sp. nov. (4.7 mm). 68. *A. celebensis* sp. nov. (5.2 mm). 69. *A. crenulipennis* sp. nov. (5.2 mm). 70. *A. lieftincki* LOUWERENS (c. 4.9 mm). 71. *A. harpago* sp. nov. (4.6 mm).



Figs 72-78. – Habitus (body lenghts in brackets). 72. *A. sumatrensis* sp. nov. (4.5 mm). 73. *A. multispinosus* sp. nov. (4.0 mm). 74. *A. moluccensis* sp. nov. (3.7 mm). 75. *A. riedeli* sp. nov. (4.2 mm). 76. *A. minimus* sp. nov. (4.5 mm). 77. *A. taiwanensis* sp. nov. (4.5 mm). 78. *A. novaeirlandiae* sp. nov. (4.7 mm).