

**New species and new records of the genus *Arhytinus* BATES
2nd supplement to the
“Revision of the genus *Arhytinus* BATES”
(Coleoptera: Carabidae: Platynini)**

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Abstract

Six new species of the platynine genus *Arhytinus* BATES, 1889 (Coleoptera: Carabidae: Platynini) are described: *A. atripennis* and *A. javanus*, both from Java, *A. yunnanus* from south-western China, *A. darlingtoni* from the Philippines, *A. ludewigi* from New Britain, and *A. baliensis* from Bali. The male genitalia of *A. taiwanensis* BAEHR, 2010 are described and figured for the first time. Additional records of two described but very rare species are provided. A key and a checklist with information about distribution are provided for the genus.

Key words: Coleoptera, Carabidae, Platynini, *Arhytinus*, Oriental and Papuan Regions, taxonomy.

Introduction

Since the revision of the genus *Arhytinus* BATES, 1889 (BAEHR 2010) and the description of additional species (BAEHR & SCHMIDT 2010) again some new species of this genus were detected in collections, or were sent for identification, including the hitherto unknown male of the recently described *A. taiwanensis* BAEHR, 2010. These are described in the present paper and their male genitalia are figured as far as available.

The little known genus *Arhytinus* presently includes 37 described species which are distributed from southern India through Nepal, Burma, Thailand, Vietnam, southern central China, Taiwan, the Philippine and Indonesian Archipelagos, to New Guinea and the Bismarck Archipelago, but the genus is not yet known from Australia. In the present paper six new species are added.

Apart from very few species, specimens of *Arhytinus* are extremely rare in collections, and of several species only the holotype is known, or the species are only recorded from a single locality. The reasons for this apparent rarity are unknown, although they may be rather due to inadequate sampling methods and efforts than to their rarity in nature. Accordingly, of the six species newly described in the present paper only the holotypes are known. Fortunately five of these are males, which provides the opportunity to describe these properly, because the male aedeagus in *Arhytinus* is very characteristic in most species due to the common presence of varied numbers and positions of teeth or spines in the internal sac and the variously denticulate apex of the aedeagus. The holotype of the species from the island of Bali is a female, but in certain characters of its external morphology it is sufficiently different from related species to allow a proper description and differentiation.

Material and Methods

The genitalia were removed from specimens relaxed for a night in a jar under moist 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 X4.

Measurements were taken using a stereo microscope with an ocular micrometer. Body length has been measured from the apex of the labrum to the apex of the elytra. 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.

Data of examined material are given in full length and the exact labeling was used, including all ciphers, notes of determinators and curators, and printed labels. Also original spelling of the date of collecting is used. A slash "/" with a blank before and after it denotes a new label.

Types and material are stored in the Australian National Insect Collection, Canberra (ANIC), the working collection M. Baehr in the Zoologische Staatssammlung, München (CBM), the private collection of D. Wrase, Berlin (CWB), the Museum of Zoology, Buitenzorg, Cibinong (MZB), Naturhistorisches Museum, Wien (NMW), Netherlands Centre for Biodiversity Naturalis, Leiden (RMNH), and Staatliches Museum für Naturkunde, Karlsruhe (SMNK).

Genus *Arhytinus* BATES, 1889

Arhytinus BATES, 1889: 278. – CSIKI 1931: 821; ANDREWES 1931: 473; DARLINGTON 1952: 116; STORK 1986: 12; LORENZ 1998: 391; 2005: 413; BOUSQUET 2003: 456; BAEHR 2010: 7; BAEHR & SCHMIDT 2010: 43.

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 or crenulate 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 quite differently shaped and structured and may or may not bear a bidentulate apex, and commonly it bears one or several strongly sclerotized teeth, or spines, or spinose plates of different size, shape, and position in the apical part of the (inverted) internal sac.

The relationships of this peculiar genus are not yet settled, as BAEHR (2010) and BAEHR & SCHMIDT (2010) stated, and explanation of their relations would require a much better knowledge of the relations within the numerous Oriental-Papuan platynine genera.

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 which are slightly interrupted in middle; apex of elytra with two setiferous punctures at each side close to the suture; metathoracic wings present; metepisternum elongate, ca. twice as long as wide at anterior margin; terminal abdominal sternum in the male bisetose, in the female quadrisetose; legs slender and 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 biserially squamose.

***Arhytinus taiwanensis* BAEHR, 2010**

Arhytinus taiwanensis BAEHR, 2010: 34.

Through courtesy of D. Wrase, Berlin, now a male is available of this species, of which hitherto only females were known. The genitalia are herein described and figured.

MATERIAL EXAMINED:

TAIWAN: 1 ♂, "08.IV.2007 leg. S. Vit Rd. no. 20 km. 188. bfr. Wulu, Taitung Co. TAIWAN merid. / mount. frst. litter (alt. ± 750 m.)" (CWB).

MALE GENITALIA (Fig. 1): Genital ring large but narrow, almost symmetric, laterally slightly convex, with moderately wide, rounded apex. Aedeagus rather short and moderately wide, lower surface almost straight in apical two thirds, carinate in middle, but not striolate. Apex short, triangular, very acute and hook-shaped at tip, unidentate, directed horizontally backwards. Internal sac with four large dentiform sclerites that arise from large, circular bases: two on the left side, two on the right side. Both parameres large, the left one markedly triangular, the right one elongate and sinuate on the upper side.

***Arhytinus lieftincki* LOUWERENS, 1951**

Arhytinus lieftincki LOUWERENS, 1951: 125. – BAEHR 2010: 26.

ADDITIONAL MATERIAL EXAMINED:

W-JAVA: 1 ♂, 1 ♀, "Gn. Tikukur S07°07.816 E107°24.298 1784 m I.XII.11 leg. A. Riedel" (CBM, SMNK).

NOTE: This species hitherto was only recorded from the holotype in RMNH which lacks the head. The species identity was confirmed by dissection of the male genitalia which in the newly sampled male exactly match those of the holotype.

***Arhytinus nr. celebensis* BAEHR, 2010**

Arhytinus celebensis BAEHR, 2010: 25.

ADDITIONAL MATERIAL EXAMINED:

CERAM: 1 ♀, "16.2. Hatuolo – Manusela 600 – 700 m / INDONESIA 1989 leg. Jäch 15" (NMW).

NOTE: The identity of the female specimen with *A. celebensis* is doubtful and could be only verified by comparison of the male genitalia of specimens from Seram. However, in body size, shape, and surface structure the specimen is very similar to the male holotype of *A. celebensis*. For the present therefore the assignation to *A. celebensis* is preliminary. The specimen is very different from the single species recorded from the Moluccas, *A. moluccensis* BAEHR, 2010 which is known from the island of Batjan.

***Arhytinus atripennis* sp.n.**

TYPE MATERIAL: **Holotype** ♂: "W-Java, Gn. Honje, Ujung Kulon NP, S 06°46.141' E 105°31.649' 395m. 24.iv.2010, A. Riedel" (MZB).

DIAGNOSIS: A large, rather depressed species, distinguished from similarly sized species by combination of absence of pale lateral borders on pronotum and elytra, wide, not cordiform pronotum, large, laterad far protruded eyes, well impressed and distinctly crenulate elytral striae, presence of a discal puncture on the elytra, absence of any spines or teeth in the internal sac of the aedeagus, and the wide, abruptly bent down apex of the aedeagus.

DESCRIPTION: Measurements. Length: 8.3 mm; width: 3.5 mm. Ratios. Width/length of pronotum: 1.55; width of widest diameter/base of pronotum: 1.27; width base/apex of pronotum: 1.15; width pronotum/head: 1.39; length/width of elytra: 1.47.

Colour (Figs. 8, 14). Black, elytra slightly iridescent. Lateral margin of pronotum indistinctly and very narrowly dark reddish, lateral margin of elytra black. Labrum and mandibles dark reddish, palpi and antenna dirty yellow, though, 2nd and 3rd antennomeres slightly darker. Femora dark yellow, tibiae and tarsi slightly darker.

Head (Fig. 8). Comparatively large. Eye very large, laterally markedly projected, orbit extremely short, oblique. Frontal furrows small and shallow, circular, developed only immediately behind clypeal suture. Antenna moderately elongate, surpassing base of pronotum by about two and a half antennomeres, 6th antennomere 2 × as long as wide. Surface with fine, very slightly superficial, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 8). Rather wide, not cordiform, widest almost at middle, dorsal surface rather depressed. Apex fairly deeply excised, apical angles projected but widely rounded. Lateral border evenly convex throughout. Base rather wide in comparison with diameter, slightly convex. Basal angles obtusely dentate, laterally very faintly projected, ca. 120°. Lateral margin anteriorly narrow, in basal third widened and deplanate. Apex finely margined, base not margined. Median line shallow but distinct, not attaining apex but almost attaining base. Both transverse impressions barely perceptible. Basal grooves wide, shallow. Anterior lateral seta inserted at apical third, slightly in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Basal grooves and posterior third of lateral margin with fairly coarse, moderately dense, irregularly spaced punctures, middle of base with finer punctures. Surface with extremely fine and rather superficial, very transverse microsculpture which is composed of dense transverse meshes and lines, surface moderately glossy and slightly iridescent.

Elytra (Fig. 14). Of average shape, comparatively elongate, slightly oviform, dorsal surface moderately convex and slightly depressed on disk. Humeral area comparatively wide, lateral margins in basal half barely convex, then evenly convex. Striae deeply impressed, distinctly crenulate, even in apical half still perceptibly crenulate, intervals distinctly raised, convex throughout. 3rd interval unipunctate, puncture located in middle and adjacent to 2nd stria. Only extremely fine and extremely superficial traces of microreticulation recognizable at very high magnification, composed of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 2). Genital ring large but rather narrow, almost symmetric, triangular, with moderately wide, rounded apex. Aedeagus rather narrow and elongate, lower surface almost straight in apical two thirds, not carinate in middle, not striolate. Apex short, obtusely quadrangular at tip, abruptly bent down. Internal sac without any distinctly sclerotized parts. Both parameres large, the left one obtusely triangular, the right one elongate, convex on upper rim.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: West Java. Known only from the type locality.

COLLECTING CIRCUMSTANCES: Little recorded. Holotype collected at median altitude.

RELATIONSHIPS: The species belongs to a group of relatively large species most of which lack any spines or teeth in the internal sac, and which are believed to represent the most plesiotypic species of the genus (BAEHR 2010).

ETYMOLOGY: The name refers to the completely black elytra of this species.

Arhytinus javanus sp.n.

TYPE MATERIAL: **Holotype** ♂: “Banjoewangi Mc Gillavry Java / coll. Dr. D. MacGillavry” (RMNH).

DIAGNOSIS: A medium sized species, distinguished from similarly sized species by combination of presence of distinct pale lateral margins on pronotum and elytra, markedly crenulate striae, moderately wide aedeagus with horizontal, bidentate apex, and presence of only a single, small dentiform sclerite in the middle of the left side of the internal sac. In structure of elytra and in shape and structure of the aedeagus very similar to *A. crenulipennis* BAEHR, 2010 from Borneo, but distinguished from that species by much wider pronotum with narrower base, more curved aedeagus, and more central position of the single dentiform sclerite in the internal sac.

DESCRIPTION: Measurements. Length: 5.6 mm; width: 2.5 mm. Ratios. Width/length of pronotum: 1.68; width of widest diameter/base of pronotum: 1.31; width base/apex of pronotum: 1.07; width pronotum/head: 1.38; length/width of elytra: 1.40.

Colour (Figs. 9, 15). Pale brown, head very slightly darker, surface rather iridescent. Lateral margins of pronotum and elytra conspicuously dirty yellow, also sutural interval of the elytra very slightly paler. Labrum and mandibles reddish, palpi and antenna pale reddish, three basal antennomeres slightly paler. Femora bright yellow, tibiae and tarsi very slightly darker.

Head (Fig. 9). Of average size. Eye large, laterally markedly projected, orbit very short, oblique. Frontal furrows small and shallow, circular, developed only immediately behind clypeal suture. Antenna comparatively elongate, surpassing base of pronotum by about two antennomeres, 6th antennomere almost 2 × as long as wide. Surface with fine, distinct, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 9). Wide, slightly cordiform, widest slightly behind apical third, dorsal surface rather depressed. Apex fairly deeply excised, apical angles projected but widely rounded. Lateral border evenly and convex in anterior half, straight and oblique in basal half, very slightly concave near base. Base narrow in comparison with diameter, slightly convex. Basal angles obtusely angulate, laterally not projected, about 110°. Lateral margin anteriorly fairly narrow, in basal third widened and deplanate. Apex finely margined, base not margined. Median line shallow but distinct, not attaining apex nor base. Both transverse impressions barely perceptible. Basal grooves shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with fairly coarse, rather sparse, irregularly spaced punctures which are confluent near the lateral margins. Surface with extremely fine and very superficial, very transverse microsculpture which is composed of dense transverse lines, visible only at very high magnification, surface glossy and slightly iridescent.

Elytra (Fig. 15). Of average shape, moderately elongate, gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins slightly convex in basal half, then evenly convex. Striae well impressed, in basal half distinctly and rather coarsely crenulate, in apical half barely crenulate, intervals in basal half distinctly raised, then depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, composed of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 3). Genital ring large but narrow, slightly asymmetric, laterally slightly convex, with rather narrow, rounded apex. Aedeagus rather short and moderately wide, remarkably curved, lower surface almost straight in apical two thirds, carinate in middle, but not striolate. Apex short, triangular, obtusely acute at tip, bidentate, directed horizontally backwards, the anterior tooth slightly curved upwards. Internal sac with a single, small dentate sclerite on the left in middle and far removed from apex. Both parameres large and apicad convex, the left one markedly triangular.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Java. Known only from the type locality.

COLLECTING CIRCUMSTANCES: Not recorded.

RELATIONSHIPS: With respect to the high grade of similarity of the structure of the elytra and of the aedeagus probably closely related to *A. crenulipennis* from Borneo which seems to represent the sister species.

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

Arhytinus yunnanus sp.n.

TYPE MATERIAL: **Holotype** ♂: "CHINA: S-YUNNAN (Xishuangbanna) 37 km NW Jinghong / Guo Men Shan (NNNR) N 22 17.91, E 100 38.85 1080m, 26.V.2008 leg. A. Weigel LF" (CBM).

DIAGNOSIS: A fairly small species, distinguished from similarly sized species by combination of presence of distinctly pale translucent lateral margins of pronotum and elytra, obtuse basal angles of the not cordiform pronotum, a comparatively narrow aedeagus with not dentate, slightly upturned apex, and presence of two small dentiform sclerites at the bottom of the left side, and a small dentiform sclerite in middle of the right side of the internal sac.

DESCRIPTION: Measurements. Length: 4.9 mm; width: 2.15 mm. Ratios. Width/length of pronotum: 1.58; width of widest diameter/base of pronotum: 1.27; width base/apex of pronotum: 1.05; width pronotum/head: 1.24; length/width of elytra: 1.39.

Colour (Figs. 10, 16). Black, slightly iridescent. Lateral margins of pronotum and elytra pale reddish translucent. Labrum, mandibles, and palpi reddish-piceous, antenna piceous, but 1st antennomere slightly paler. Femora pale yellow, tibiae and tarsi slightly darker.

Head (Fig. 10). Of average size. Eye very large, laterally projected, orbit extremely short, oblique. Frontal furrows small and shallow, circular, developed only immediately behind clypeal suture. Antenna short, surpassing base of pronotum by about a single antennomere, 6th antennomere about 1.5 × as long as wide. Surface with fine, very slightly superficial, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 10). Rather wide, not cordiform, widest slightly behind apical third, dorsal surface moderately convex. Apex slightly excised, apical angles very slightly projected but widely rounded. Lateral border evenly convex in anterior half, very slightly convex also in basal half, barely concave near base. Base rather wide in comparison with diameter, in middle straight, laterally convex. Basal angles obtuse, laterally not projected, slightly >110°. Lateral margin anteriorly narrow, in basal third widened and deplanate. Apex finely margined, base not margined. Median line shallow but distinct, not attaining apex nor base. Both transverse impressions barely perceptible. Basal grooves shallow. Anterior lateral seta inserted at apical quarter, well in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with fairly coarse, moderately dense, irregularly spaced punctures which are rather confluent. Surface with extremely fine and very superficial, very transverse microsculpture which is composed of dense transverse lines, visible only at high magnification, surface glossy and slightly iridescent.

Elytra (Fig. 16). Of average shape, moderately elongate, gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins slightly convex in basal half, then evenly convex. Striae well impressed, in basal half very finely crenulate, in apical half barely crenulate,

intervals distinctly raised, depressed only near apex. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, composed of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 4). Genital ring large but narrow, almost symmetric, laterally slightly convex, with moderately wide, rounded apex. Aedeagus narrow and elongate, lower surface almost straight in apical two thirds, carinate in middle, but not striolate. Apex short, triangular, rather acute at tip, not dentate, but slightly upturned. Internal sac with two small dentiform sclerites on the left side near bottom and near apex, and with a single small tooth on the right side in middle and rather removed from apex. Both parameres large, the left one obtusely rectangular, the right one slightly sinuate on the upper rim.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Southern Yunnan, south-western China. Known only from the type locality.

COLLECTING CIRCUMSTANCES: Little recorded. Holotype collected at median altitude.

RELATIONSHIPS: With respect to the unarmed apex of the aedeagus this species does not seem to possess very close relatives.

ETYMOLOGY: The name refers to the range of this species in Yunnan.

Arhytinus darlingtoni sp.n.

TYPE MATERIAL: **Holotype** ♂: PHILIPPINES: "Batangas & vic. Luzon Is., P.I. May 1945 Darlington / *Arhytinus bembidioides* Bts. det. Darlington 61" (ANIC).

DIAGNOSIS: A medium sized species, distinguished from similarly sized species by combination of presence of distinct pale lateral margins of pronotum and elytra, a pale sutural stripe on the elytra, very obtuse basal angles of the pronotum, moderately wide aedeagus with perpendicular, unidentate apex, and presence of three spiniform sclerites at the bottom of the left side and a single dentate sclerite at the right side of the internal sac.

DESCRIPTION: Measurements. Length: 5.25 mm; width: 2.25 mm. Ratios. Width/length of pronotum: 1.58; width of widest diameter/base of pronotum: 1.18; width base/apex of pronotum: 1.20; width pronotum/head: 1.30; length/width of elytra: 1.40.

Colour (Figs. 11, 17). Head black, pronotum dark piceous, elytra almost black, surface slightly iridescent. Lateral margins of pronotum and elytra distinctly pale reddish, also sutural interval of the elytra reddish. Labrum and mandibles reddish-brown, palpi, antenna, and legs yellow, femora even slightly paler than tibiae and tarsi.

Head (Fig. 11). Of average size. Eye large, laterally projected, orbit very short, oblique. Frontal furrows barely perceptible, small and shallow, circular, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about a single antennomere, 6th antennomere about 1.5 × as long as wide. Surface with fine, very slightly superficial, isodiametric microreticulation, comparatively glossy.

Pronotum (Fig. 11). Fairly wide, not cordiform, widest far behind apical third, dorsal surface moderately convex. Apex moderately excised, apical angles slightly projected but widely rounded. Lateral border evenly and convex in anterior half, straight and oblique in basal half, barely concave near base. Base wide in comparison with diameter, markedly convex. Basal angles obtuse, laterally not projected, about 120°. Lateral margin anteriorly narrow, in basal third widened and deplanate. Apex finely margined, base not margined. Median line shallow but distinct, not

attaining apex nor base. Anterior transverse impression barely perceptible, posterior transverse impression shallow. Basal grooves shallow, barely perceptible. Anterior lateral seta inserted at apical quarter, well in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with coarse, fairly dense, irregularly spaced punctures which are confluent laterally. Surface with extremely fine and quite superficial, very transverse microsculpture which is composed of dense transverse meshes and lines, visible only at high magnification, surface glossy and slightly iridescent.

Elytra (Fig. 17). Of average shape, moderately elongate, gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins slightly convex in basal half, then evenly convex. Striae well impressed, in basal half very finely crenulate, in apical half not crenulate, intervals in basal half slightly raised, then depressed. 3rd interval asetose. Microreticulation extremely fine and highly superficial, barely recognizable even at very high magnification, composed of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 5). Genital ring large but narrow, almost symmetric, laterally convex, with moderately wide, rounded apex. Aedeagus rather short and moderately wide, lower surface almost straight, strongly carinate in middle, but not striolate. Apex short, triangular, acute at tip, markedly curved down, directed perpendicular, the upper tooth very small and rather obtuse. Internal sac with three dentiform sclerites on the left side near bottom of which the lowest is bidentate, and with a single tooth on the right side. Both parameres large and apicad convex, the left one markedly triangular.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: Luzon, Philippine Islands. Known only from the type locality.

Collecting circumstances: Not recorded.

RELATIONSHIPS: The relations of this species are obscure, because it does not seem to be related to anyone of the other species recorded from the Philippines.

ETYMOLOGY: The name is a patronym in honour of the late Philip Darlington, collector of the holotype and inestimable authority of Oriental and Papuan Carabidae.

Arhytinus ludewigi sp.n.

TYPE MATERIAL: **Holotype** ♂: "New Britain Keravat, L.A.E.S. 4.2004, light leg. H.Ludewig" (CBM).

DIAGNOSIS: A medium sized species, distinguished from *A. minor* BAEHR, 2010 by wider pronotum with more accentuated basal angles, depressed elytral intervals, and presence and different shape of two instead of three short spines in the internal sac of the aedeagus.

DESCRIPTION: Measurements. Length: 5.3 mm; width: 2.4 mm. Ratios. Width/length of pronotum: 1.62; width of widest diameter/base of pronotum: 1.35; width base/apex of pronotum: 1.04; width pronotum/head: 1.35; length/width of elytra: 1.40.

Colour (Figs. 12, 18). Dark piceous, head very slightly darker, surface moderately iridescent. Lateral margins of pronotum and elytra and sutural interval of the elytra inconspicuously paler. Labrum and mandibles reddish-piceous, palpi and antenna dark reddish, three basal antennomeres very slightly paler. Legs dirty yellow.

Head (Fig. 12). Of average size. Eye large, laterally markedly projected, orbit very short, oblique. Frontal furrows shallow and rather short, slightly oblique, Antenna comparatively elongate, surpassing base of pronotum by about two antennomeres, 6th antennomere ca. $2\frac{1}{4} \times$ as

long as wide. Surface with fine, distinct though slightly superficial, isodiametric microreticulation, moderately glossy.

Pronotum (Fig. 12). Wide, slightly cordiform, widest slightly behind apical third, dorsal surface moderately convex. Apex fairly deeply excised, apical angles projected but widely rounded. Lateral border evenly convex throughout, very slightly concave immediately near base. Base rather narrow in comparison with diameter, fairly convex. Basal angles obtusely angulate, laterally extremely slightly projected, about 120°. Lateral margin fairly narrow throughout, even towards base not much widened and deplanate. Apex finely margined but margin interrupted in middle, base not margined. Median line shallow but distinct, not attaining apex nor base. Both transverse impressions barely perceptible. Basal grooves shallow. Anterior lateral seta inserted at apical quarter, slightly in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base in middle with coarse, fairly dense punctures which become indistinct laterad. Disk impunctate, with extremely fine and rather superficial, very transverse microreticulation which is composed of dense transverse lines, visible only at high magnification, surface glossy and slightly iridescent.

Elytra (Fig. 18). Of average shape, moderately elongate, gently oviform, dorsal surface convex though slightly depressed on disk. Lateral margins straight and oblique in basal half, then evenly convex towards apex. Striae impressed, in basal half distinctly but finely crenulate, in apical half barely crenulate, intervals depressed. 3rd interval asetose. Microreticulation extremely fine and superficial, barely recognizable even at very high magnification, composed of finest transverse lines. Surface very glossy, with distinct iridescent lustre.

Male genitalia (Fig. 6). Genital ring large, moderately wide, rather asymmetric, laterally slightly convex, with fairly wide, asymmetrically rounded apex. Aedeagus moderately elongate, rather narrow, lower surface almost straight in apical two thirds, carinate in middle and slightly striolate. Apex fairly elongate, triangular, obtusely acute at tip, faintly bidentulate. Internal sac with two attached, short spines in the middle and directed to the left side. Both parameres large, the left one at apex transverse and little convex, the right one with convex apex.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION: New Britain. Known only from the type locality.

COLLECTING CIRCUMSTANCES: The holotype was collected at light.

RELATIONSHIPS: With respect to the high grade of similarity of body size and shape and to the structure of the aedeagus probably closely related to *A. minor* BAEHR, 2010 from New Guinea which seems to represent the sister species.

ETYMOLOGY: The name is a patronym in honour of the collector, H. Ludewig, who collected a number of interesting carabid species during his stay in New Britain.

Arhytinus baliensis sp.n.

TYPE MATERIAL: **Holotype** ♀: "Indonesien, Bali Danau, Tamblingan Gubug, 1000m, 17. 12.2007, R.Grimm" (CBM).

DIAGNOSIS: A small, short species, distinguished from species of similar body size by combination of short and wide elytra, barely crenulate elytral striae, moderately produced eyes, and dark antenna. Further distinguished from the most similar species *A. riedeli* BAEHR, 2010 by less angulate basal angles of the pronotum, depressed elytral intervals, and, in particular, laterally less evenly convex elytra which are straight and even very slightly concave in the basal half.

DESCRIPTION: Measurements. Length: 4.5 mm; width: 2.1 mm. Ratios. Width/length of pronotum: 1.57; width of widest diameter/base of pronotum: 1.25; width base/apex of pronotum: 1.06; width pronotum/head: 1.26; length/width of elytra: 1.38.

Colour (Figs. 13, 19). Black, surface of elytra slightly iridescent. Lateral margins of pronotum and elytra very inconspicuously paler, sutural interval of the elytra black. Labrum and mandibles reddish-brown, palpi dirty yellow, antenna dark, but 1st–3rd antennomeres paler, reddish. Legs yellow, tibiae and tarsi very slightly darker than femora.

Head (Fig. 13). Of average size. Eye large, laterally but moderately projected, orbit very short, oblique. Frontal furrows barely perceptible, small and shallow, circular, developed only immediately behind clypeal suture. Antenna rather short, surpassing base of pronotum by about two antennomeres, 6th antennomere about 1.5 × as long as wide. Surface with fine but distinct, isodiametric microreticulation, comparatively dull.

Pronotum (Fig. 13). Rather wide, very slightly cordiform, widest about at apical third, dorsal surface moderately convex. Apex slightly excised, apical angles slightly projected but widely rounded. Lateral border evenly convex in anterior three fourths, very slightly concave near base. Base narrow in comparison with diameter, laterally oblique. Basal angles obtusely angulate, laterally not projected, about 120°. Lateral margin anteriorly narrow, in basal third widened and deplanate. Apex finely margined, base not margined. Median line shallow but distinct, not attaining apex nor base. Anterior transverse impression barely perceptible, posterior transverse impression shallow. Basal grooves shallow, wide. Anterior lateral seta inserted slightly behind the apical fourth, in front of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base and posterior third of lateral margin with coarse, fairly dense, irregularly spaced punctures which are confluent laterally. Surface with extremely fine and quite superficial, very transverse microsculpture which is composed of dense transverse meshes and lines, visible only at high magnification, surface glossy and slightly iridescent.

Elytra (Fig. 19). Of average shape, rather short and wide, irregularly oviform, dorsal surface convex though slightly depressed on disk. Lateral margins in basal half oblique and almost straight, even very slightly concave at basal third, in apical half markedly convex. Therefore elytra remarkably widened behind middle. Striae impressed though rather shallow, extremely finely crenulate, intervals almost depressed. 3rd interval asetose. Microreticulation extremely fine and very superficial, barely recognizable even at very high magnification, composed of very transverse lines. Surface very glossy, with slight iridescent lustre.

Male genitalia. Unknown.

Female genitalia (Fig. 7). Gonocoxite 1 with 4–5 stout, at apex acute ensiform setae at the apical rim of the ventral surface; gonocoxite 2 curved, with rather acute apex, with one elongate dorso-median ensiform seta at middle, three elongate, stout ventro-lateral ensiform setae, and a single preapical nematiform seta originating from a pit.

Variation. Unknown.

DISTRIBUTION: Bali. Known only from the type locality.

Collecting circumstances: Not recorded.

RELATIONSHIPS: This species belongs to a group of small, convex species which includes mainly species from the Greater Sunda Islands. It is apparently most similar to *A. riedeli* from Java. For discussing the actual relationships knowledge of the male genitalia would be needed.

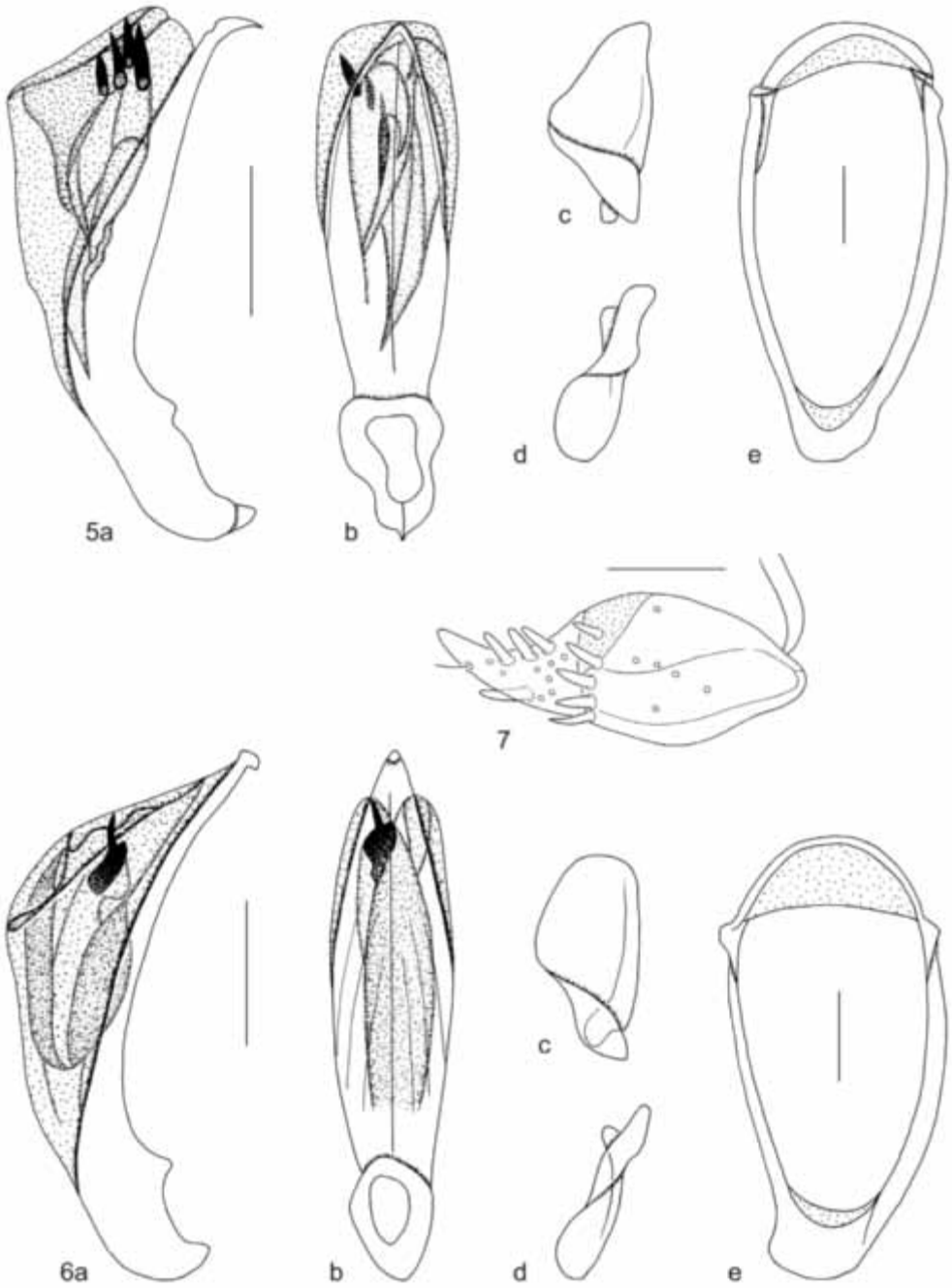
ETYMOLOGY: The name refers to the range of this species on the island of Bali.



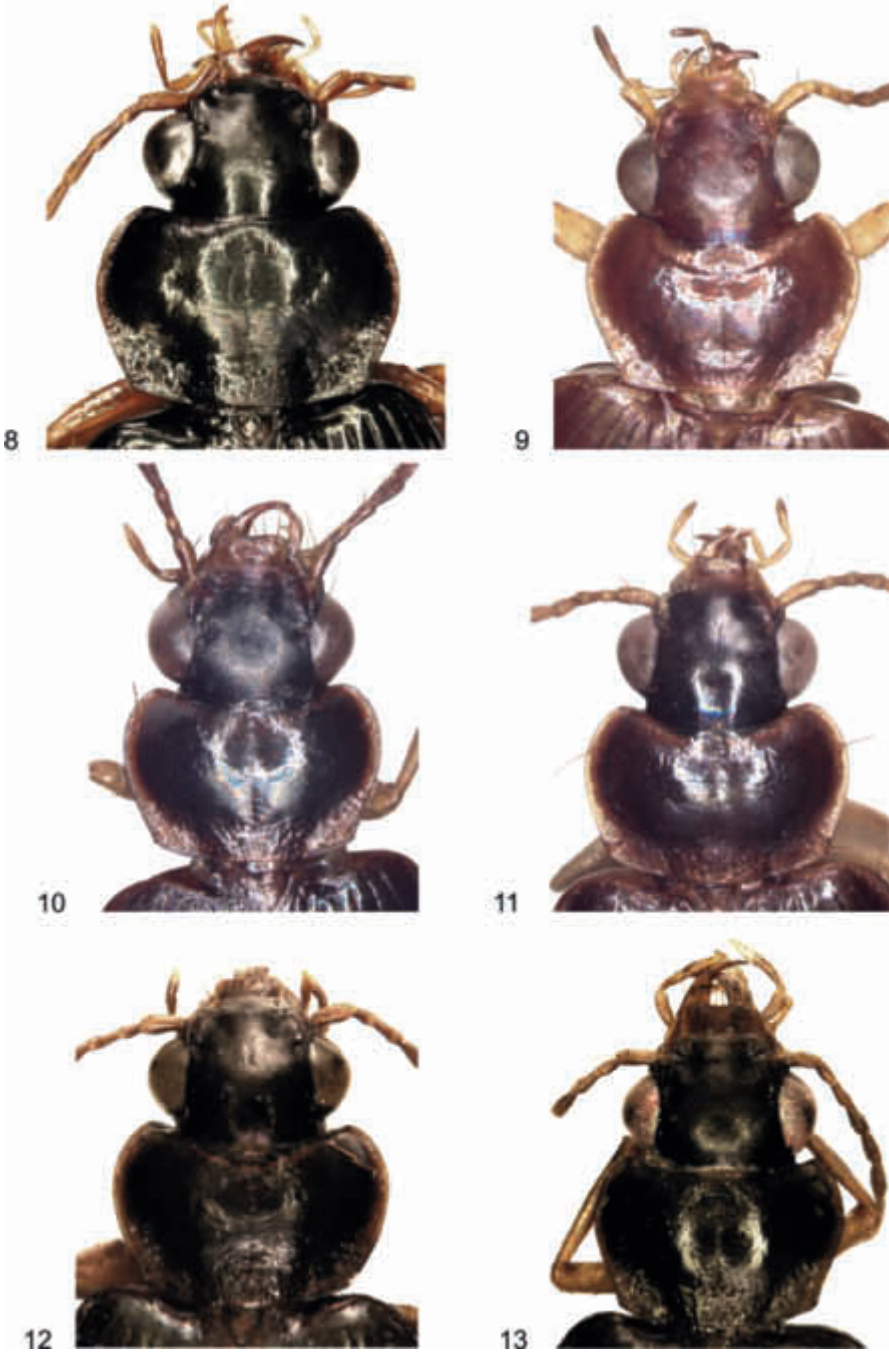
Figs. 1–2: 1) *Arhytinus taiwanensis*, 2) *A. atripennis*. Aedeagus left side (a) and lower surface (b), left (c) and right (d) parameres, genital ring (e). Scale bars: 0.25 mm.



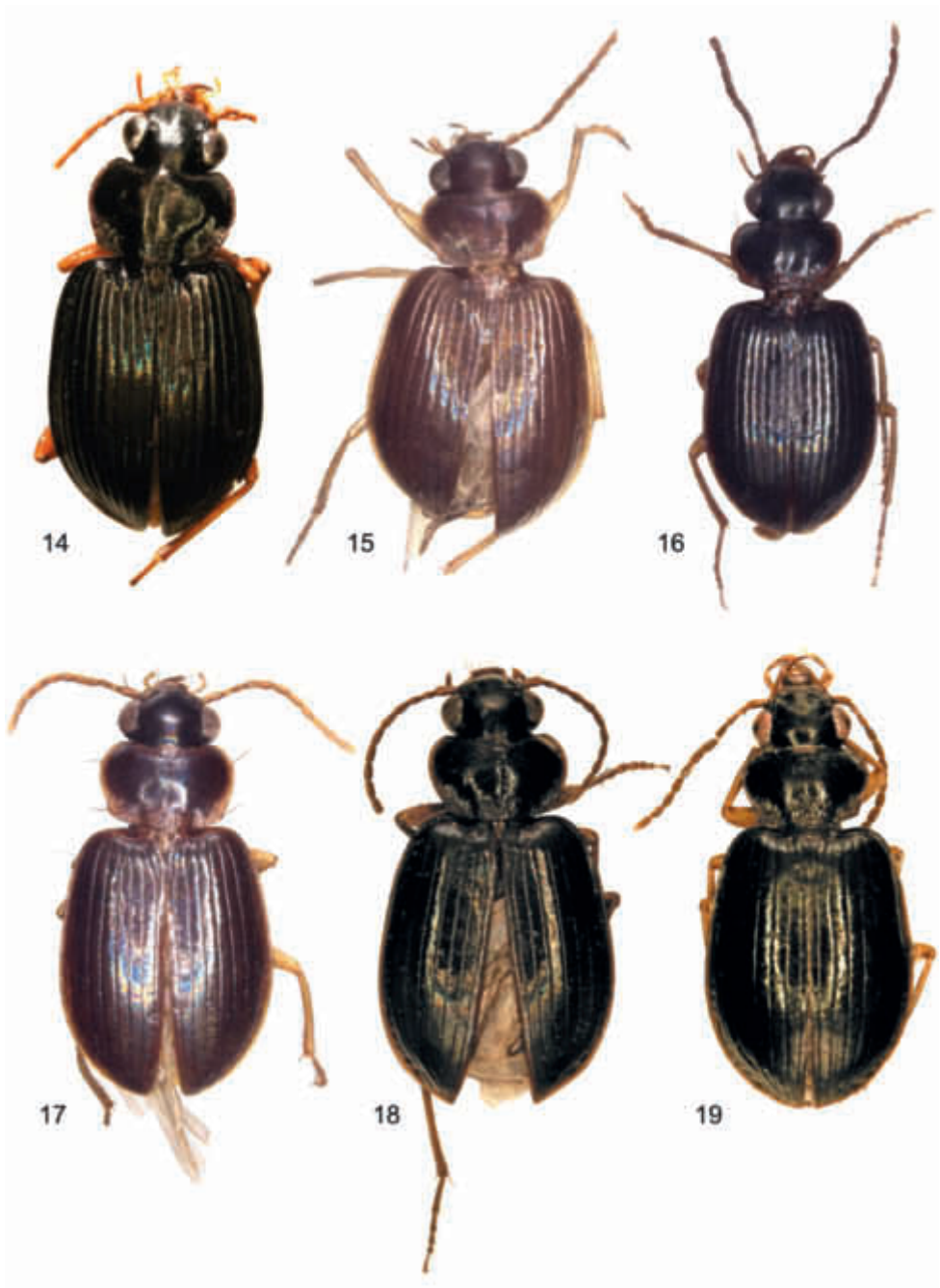
Figs. 3–4: 3) *Arhytinus javanus*, 4) *A. yunnanus*. Aedeagus left side (a) and lower surface (b), left (c) and right (d) parameres, genital ring (e). Scale bars: 0.25 mm.



Figs. 5–7: 5) *Arhytinus darlingtoni*, 6) *A. ludewigi*. Aedeagus left side (a) and lower surface (b), left (c) and right (d) parameres, genital ring (e); 7) *A. baliensis*, gonocoxites 1 and 2. Scale bars: 0.25 mm (5–6), 0.1 mm (7).



Figs. 8–13: Head and pronotum, 8) *Arhytinus atripennis*, 9) *A. javanus*, 10) *A. yunnanus*, 11) *A. darlingtoni*, 12) *A. ludewigi*, 13) *A. baliensis*.



Figs. 14–19: Habitus (body lengths in brackets), 14) *Arhytinus atripennis* (8.30 mm), 15) *A. javanus* (5.60 mm), 16) *A. yunnanus* (4.90 mm), 17) *A. darlingtoni* (5.25 mm), 18) *A. ludewigi* (5.30 mm), 19) *A. baliensis* (4.50 mm).

Revised key to the species of the genus *Arhytinus*

The key to all recorded species of the genus is completely revised, to include not only the new species described in the present paper, but also those that were recently described by BAEHR & SCHMIDT (2010). For better use numbers of figures in BAEHR (2010) are introduced as **Ba**, those in BAEHR & SCHMIDT (2010) as **B&S**, and the measurements and ratios for all species are presented in Tab. 1.

- 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 < 7.0 mm; apex of aedeagus usually denticulate, or unknown; if not denticulate (*A. yunnanus*, *A. nitescens*, *A. minimus*, *A. leytensis*), with some scattered short spines (Fig. 4, **Ba** figs. 4, 24), or with large, densely denticulate folds (**B&S** fig. 16) 9
- 2 Pale margins of pronotum and elytra conspicuous and wide (**Ba** fig. 58); base of pronotum with dense and coarse punctation; elytra short, ratio length/width 1.37; aedeagus unknown. Thailand *circumcinctus* BAEHR, 2010
- Pale margins of pronotum and elytra less conspicuous and wide (**Ba** figs. 56, 57, **B&S** fig. 7), or margins dark (Figs. 8, 14, **Ba** 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 Fig. 1, **Ba** figs. 6–9, **B&S** fig. 13. Nepal, Philippines, Java, Borneo, New Guinea 3
- 3 Margin of pronotum distinctly pale and antenna completely yellow (**Ba** figs. 56, 57, **B&S** fig. 7); aedeagus variously shaped (**Ba** fig. 4, **B&S** fig. 13) or unknown. Nepal, Philippines, Borneo 4
- Margin of pronotum not distinctly pale; at least 1st–3rd antennomeres perceptibly darker than the rest (Fig. 8, **Ba** figs. 59–61); aedeagus bidenticulate or not at apex; if bidenticulate, internal sac at the right side with 6 spines (**Ba** fig. 7). Java, Borneo, Papua New Guinea 6
- 4 Margins of pronotum and of elytra distinctly pale (**Ba** fig. 57); pronotum with angulate basal angles, base distinctly punctate (**Ba** fig. 35); intervals convex; aedeagus bidenticulate at apex, internal sac at left side with a large, tridentate sclerite (**Ba** fig. 6). Borneo..... *nitidipennis* BAEHR, 2010
- Margin of pronotum more or less distinctly pale, margin of elytra dark (**Ba** fig. 56); pronotum with obtuse basal angles, punctation of base various (**Ba** fig. 34); intervals depressed or little raised; aedeagus not bidenticulate, without any sclerotized parts (**B&S** fig. 13), or unknown. Nepal, Philippines 5
- 5 Body size slightly smaller, length 7.5 mm; pronotum narrower as compared to the head, ratio width or pronotum / width of head 1.47, margin more distinctly pale, base barely punctate (**Ba** fig. 34); body more iridescent (**Ba** fig. 56); aedeagus unknown. Philippines..... *irideus* JEDLICKA, 1936
- Body size slightly larger, length > 8.4 mm; pronotum wider as compared to the head, ratio width or pronotum / width of head 1.81, margin less distinctly pale, base distinctly punctate (**B&S** fig. 7); body far less iridescent (**B&S** fig. 1); aedeagus without any sclerotized parts, apex narrow, asymmetric, slightly bent down (**B&S** fig. 13). Nepal..... *nepalensis* BAEHR & SCHMIDT, 2010
- 6 Antenna and legs completely dark (**Ba** fig. 59); aedeagus bidenticulate at apex but lower tooth very small; internal sac at the right side with 6 spines, at the left side with two very small ones (**Ba** fig. 7). Papua New Guinea *major* DARLINGTON, 1952
- Legs yellow, only 1st–3rd antennomeres dark; apex of aedeagus not denticulate, internal sac without any teeth-like sclerites (Fig. 1, **Ba** figs. 8, 9). Borneo, Java 7
- 7 Pronotum laterally evenly rounded, basal grooves shallow (Fig. 8, **Ba** fig. 61); aedeagus either with barely hooked apex (**Ba** fig. 9) or with wide, transverse apex (Fig. 1). Java 8
- Pronotum in anterior half more rounded than in posterior half, basal grooves deep (**Ba** fig. 60); aedeagus with triangular, angulate, distinctly hooked apex (**Ba** fig. 8). Borneo..... *borcherdingi* BAEHR, 2010

- 8 Intervals considerably raised (Fig. 14); pronotum with narrower base as compared with the apex (Fig. 8); apex of aedeagus wide, transverse at tip, distinctly bent down (Fig. 1)..... *atripennis* sp.n.
- Intervals only in basal half slightly raised (**Ba** fig. 61); pronotum with wider base as compared with the apex (**Ba** fig. 61); apex of aedeagus narrow, triangular, barely bent down (**Ba** fig. 9) *inarmatus* BAEHR, 2010
- 9 Pronotum exceptionally wide, ratio width / length >1.68 (Fig. 9, **Ba** fig. 33), body length 5.6–5.7 mm; aedeagus wide, markedly curved, with elongate, oblique, bidentate apex, internal sac with a single spine or without any spines (Fig. 3, **Ba** fig. 5). Philippines, Java 10
- Pronotum less wide, ratio width / length < 1.63; aedeagus varied, if rather similar to that of *A. piceus*, internal sac with one spine (**Ba** fig. 17) and elytral striae remarkably crenulate 11
- 10 Basal margin of pronotum laterally very oblique and basal angles very obtuse (**Ba** fig. 33); elytral striae not punctate or crenulate; aedeagus without any spines (**Ba** fig. 5). Philippines..... *piceus* JEDLIČKA, 1936
- Basal margin of pronotum laterally far less oblique and basal angles distinctly angulate (Fig. 9); elytral striae distinctly crenulate (Fig. 15); aedeagus with a single spine (Fig. 3). Java..... *javanus* sp.n.
- 11 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) 12
- Whole legs yellow or dark reddish. South Asia from India to China, Taiwan, Philippines, Sumatra, Java, Borneo, Sulawesi, Moluccas, New Britain, New Ireland 17
- 12 Body length > 6.0 mm; margins of pronotum and lateral margin of elytra inconspicuously but perceptibly paler (**Ba** fig. 62); internal sac of aedeagus with one or two small teeth at bottom (**Ba** fig. 10) *medius* DARLINGTON, 1952
- Body length < 5.4 mm; margins of pronotum and lateral margin of elytra not perceptibly paler (**Ba** figs. 36–39, 63–67); internal sac of aedeagus either with one or several large, acute spines (**Ba** figs. 11, 12, 14, 15), or with three attached small spines in middle of bottom (**Ba** fig. 13) 13
- 13 Eyes laterally less projected, pronotum wider in relation to head, ratio width pronotum / head > 1.31 (**Ba** fig. 65); aedeagus narrower and less curved on lower surface, internal sac with 3 small spines in middle of bottom (**Ba** fig. 13) *minor* BAEHR, 2010
- Eyes laterally more projected, pronotum narrower in relation to head, ratio width pronotum / head < 1.27 (**Ba** figs. 36–39); aedeagus wider and more curved on lower surface, internal sac with large spinose sclerites on both sides (**Ba** figs. 11, 12, 14, 15) 14
- 14 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 (**Ba** figs. 11, 12) 15
- 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 (**Ba** fig. 14), or only with a fairly large unidentate sclerite on the left side (**Ba** fig. 15) 16
- 15 Body size slightly smaller, length < 4.5 mm, commonly less; pronotum narrower, ratio width / length < 1.53, with distinctly angulate basal angle (**Ba** fig. 38); aedeagus shorter and wider, with a large tridentate sclerite on the left side and 1–2 smaller spines on the right side (**Ba** fig. 14) *granum* DARLINGTON, 1952
- Body size slightly larger, length 4.7 mm; pronotum wider, ratio width / length 1.62, with very obtuse, almost rounded basal angle (**Ba** fig. 39); aedeagus longer and narrower, only with an unidentate sclerite on the left side (**Ba** fig. 15) *unispinus* BAEHR, 2010
- 16 Pronotum narrower, ratio width / length < 1.52, with coarsely punctate base (**Ba** fig. 36); aedeagus wider, spinose sclerites in internal sac much larger (**Ba** fig. 11) *missai* BAEHR, 2010
- Pronotum wider, ratio width / length 1.62, with almost impunctate base (Fig. 37); aedeagus narrower, spinose sclerites in internal sac considerably smaller (**Ba** Fig. 12) *frater* BAEHR, 2010

- 17 Body length > 5.2 mm; commonly larger 18
- Body length < 4.9 mm, commonly smaller; when > 4.6 mm long, either aedeagus with 3 large, attached spines or a single spine on the left side, none on the right side (**Ba** fig. 18, **B&S** figs. 14, 15), or with a single spine on the right side but with unarmed apex (**B&S** fig. 15), or with two densely denticulate folds (**B&S** fig. 16), or basal angles of the pronotum almost rounded off (**Ba** fig. 47) 30
- 18 Body length 6.8 mm; pronotum with distinctly sinuate lateral margins and nearly rectangular basal angles, base in middle barely punctate (**B&S** fig. 8); elytra elongate, ratio length / width 1.52 (**B&S** fig. 2); aedeagus unknown. Malaysia *hammondi* BAEHR & SCHMIDT, 2010
- Body length < 6.3 mm; pronotum with less distinctly sinuate lateral margins and more obtuse basal angles, if lateral margins slightly sinuate, base rather coarsely punctate (**Ba** fig. 27); elytra shorter, ratio length / width < 1.45; aedeagus various or unknown. Distribution various 19
- 19 Eyes small and depressed, ratio width pronotum / head 1.45 (**Ba** fig. 32); aedeagus wide and compact, apex not denticulate, internal sac with four dispersed spiniform sclerites (**Ba** fig. 4). Taiwan *nitescens* BAEHR, 2010
- Eyes larger and more protruded, ratio width pronotum / head < 1.35; apex of aedeagus bidenticulate (Figs. 5, 6, **Ba** figs. 1–4, 16, 17, **B&S** fig. 14), or aedeagus unknown. Distribution different 20
- 20 Pronotum wide, markedly cordiform, with relatively narrow base, ratio widest diameter / width of base 1.32; eyes laterally more protruded (**Ba** fig. 27); elytral striae coarsely crenulate; body body length 6.0 mm; aedeagus unknown. Borneo *cordicollis* BAEHR, 2010
- Pronotum less cordiform, with relatively wider base, ratio widest diameter / width of base usually < 1.27, except *A. ludewigi* from New Britain which has evenly convex lateral angles; eyes commonly laterally less protruded; elytral striae less coarsely crenulate, except *A. crenulipennis* from Borneo which is only 5.2 mm long and has a narrower prothorax; apex of aedeagus bidenticulate or unknown. Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java, Borneo, Sulawesi, New Britain 21
- 21 Body length 5.2 mm and elytral striae coarsely crenulate (**Ba** fig. 69) and pronotum with slightly sinuate lateral margins and rather angulate basal angles (**Ba** fig. 69) and 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 (**Ba** fig. 17). Borneo *crenulipennis* BAEHR, 2010
- Body length either larger **or** elytral striae less coarsely crenulate **or** pronotum with not sinuate lateral margins and with rather obtuse basal angles **or** aedeagus differently shaped (Figs. 5, 6, **Ba** figs. 1–3, 16, **B&S** fig. 14). Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java, Borneo, Sulawesi, New Britain 22
- 22 Body length 5.2 mm and pronotum relatively narrow, ratio width / length 1.50 and lateral margins of pronotum and elytra with distinct pale margin (**Ba** fig. 68) and apex of aedeagus sharply denticulate only on the lower side, internal sac with a small spine on either side (**Ba** fig. 16). Sulawesi *celebensis* BAEHR, 2010
- Body length either larger **or** pronotum wider **or** lateral margins of pronotum and elytra with less distinct pale margin **or** aedeagus differently shaped (Figs. 5, 6, **Ba** figs. 1–3, **B&S** fig. 14). Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java, Borneo, New Britain 23
- 23 Body length > 6.0 mm and pronotum wide, ratio width / length > 1.58 and pronotum with rather narrow marginal channel, base variously punctate, but when coarsely punctate, marginal channel very narrow (**Ba** figs. 30, 31) and margins of pronotum and elytra barely pale (**Ba** figs. 52, 53); aedeagus unknown. Borneo, Philippines 24
- Body length various but when > 6.0 mm **either** pronotum narrower **or** pronotum with wide marginal channel **or** margins of pronotum and elytra distinctly pale; aedeagus variously shaped. Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java, New Britain 25

- 24 Pronotum with narrower lateral margin, more sinuate lateral borders near base, and coarsely punctate base (**Ba** fig. 31); eyes more produced, almost perpendicular at their posterior margin; elytra with distinct sericeous lustre. Borneo *angustumargo* BAEHR, 2010
- Pronotum with wider lateral margin, less sinuate lateral borders near base, and sparsely punctate base (**Ba** fig. 30); eyes less produced, still oblique at their posterior margin; elytra with faint sericeous lustre. Philippines *philippinus* JEDLICKA, 1936
- 25 Elytra with conspicuous pale margins and suture (**Ba** fig. 51); basal angles of pronotum very obtuse to almost rounded (**Ba** fig. 29); aedeagus with a large spine on the right side and 3, respectively 4 smaller spines on both sides (**Ba** fig. 3). Southern India *lorenzi* BAEHR, 2010
- Elytra without or with less conspicuous pale margins and suture (Figs. 17, 18, **Ba** figs. 48, 49, **B&S** fig. 3); basal angles of pronotum more accentuate (Figs. 11, 12, **Ba** figs. 26, 28, **B&S** fig. 9); aedeagus without the large spine on the right side, usually with less numerous additional spines (Figs. 5, 6, **Ba** figs. 1, 2, **B&S** fig. 14). Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java, New Britain 26
- 26 Pronotum very wide, with comparatively narrow base, ratio widest diameter / width of base 1.35 (Fig. 12); aedeagus bidenticulate, with small lower hook, internal sac with two attached spines on the left side (Fig. 6). New Britain *ludewigi* sp.n.
- Pronotum narrower, with wider base, ratio widest diameter / width of base < 1.25 (Fig. 11, **Ba** figs. 26, 28, **B&S** fig. 9); aedeagus bidenticulate, but with very large lower hook, internal sac with more than two spines (Fig. 5, **Ba** figs. 1, 2, **B&S** fig. 14). Southern India, Sikkim, Burma, Thailand, Vietnam, China, Philippines, Sumatra, Java (the following four species are very similar in shape and structure and are best distinguished by their aedeagi) 27
- 27 Internal sac with spines on both sides (**Ba** figs. 1, 2). Southern India, Sikkim, Burma, Thailand, Vietnam, Sumatra, Java 28
- Internal sac with spines only on the left side (Fig. 5, **B&S** fig. 14). China, Philippines 29
- 28 Pronotum with more accentuate basal angles (**Ba** fig. 26); aedeagus with acute apex, and with 4 attached spines on the left side and one at the right side (**Ba** fig. 1). Sikkim, Burma, Thailand, Vietnam, Sumatra, Java *bembidioides* BATES, 1889
- Pronotum with more obtuse basal angles (**Ba** fig. 28); aedeagus with more obtuse apex, and with 5 attached spines on the left side and two at the right side (**Ba** fig. 2). Southern India *indicus* BAEHR, 2010
- 29 Pronotum with slightly wider base, ratio width of base / width of apex 1.20, margins and base more widely pale (Fig. 11); aedeagus with upper hook very feeble, with four spines on the left side (Fig. 5). Philippines *darlingtoni* sp.n.
- Pronotum with slightly narrower base, ratio width of base / width of apex < 1.15, margins and base more narrowly pale (**B&S** fig. 9); aedeagus with upper hook more distinct, with three spines on the left side (**B&S** fig. 14). Central China *gerdi* BAEHR & SCHMIDT, 2010
- 30 Legs dark reddish to pale brown; basal angles of pronotum very obtuse, lateral margins dark and regularly convex towards the basal angle (**Ba** fig. 45); aedeagus narrow and elongate, apex not denticulate, only very slightly knobbed, with three small spiniform sclerites on the top of the right side and a small single spine at the base on the left side (**Ba** fig. 24). Philippines *minimus* JEDLICKA, 1936
- 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 and with different number and position of spines (Figs. 1, 4, **Ba** figs. 18–23, **B&S** figs. 14–16), or aedeagus unknown. China, Taiwan, Philippines, Sumatra, Java, Borneo, Bali, Sulawesi, Moluccas, New Ireland 31
- 31 Lateral margins of pronotum not sinuate, basal angles almost rounded off (**Ba** figs. 43, 47, **B&S** fig. 11); **either** aedeagus with two large, posteriad curved spines at the left side (**Ba** fig. 22), **or** with two large, densely denticulate folds (**B&S** fig. 16), **or** aedeagus unknown, in latter species either lateral margin of pronotum distinctly pale, of elytra dark (**Ba** fig. 78) or base barely wider than apex (**B&S** fig. 12). Philippines, Moluccas, New Ireland 32

- Lateral margins of pronotum straight or slightly sinuate, basal angles distinct (Figs. 10, 13, **Ba** figs. 40–42, 44, 46, **B&S** figs. 9, 10, 12); **either** aedeagus with differently shaped and distributed spines (Figs. 1, 4, **Ba** figs. 18–20, 23, **B&S** figs. 14, 15), **or** aedeagus unknown, in latter species antenna dark (Fig. 13) or base of pronotum barely wider than apex (**B&S** fig. 12). China, Taiwan, Sumatra, Java, Bali, Borneo, Sulawesi 34
- 32 Body length 3.7 mm; pronotum narrower, ratio width / length 1.42, with narrower base, ratio width of base / width of apex 1.03 (**Ba** fig. 43); elytra less depressed and more oviform (**Ba** fig. 74); aedeagus with two large, posteriad curved spines at the left side (**Ba** fig. 22). Moluccas: Batjan *moluccensis* BAEHR, 2010
- Body length > 4.7 mm; pronotum wider, ratio width / length > 1.55, with wider base, ratio width of base / width of apex > 1.13 (**Ba** fig. 47, **B&S** fig. 11); elytra more depressed and less oviform (**Ba** fig. 78, **B&S** fig. 5); aedeagus at apex not denticulate, with two large, densely denticulate folds (**B&S** fig. 16), or aedeagus unknown. Philippines, New Ireland 33
- 33 Lateral margins of pronotum distinctly pale, base narrower as compared with apex; eyes laterad less produced (**Ba** fig. 47); aedeagus unknown. New Ireland .. *novaeirlandiae* BAEHR, 2010
- Lateral margins of pronotum inconspicuously pale, base wider as compared with apex; eyes laterad more produced (**B&S** fig. 11); aedeagus at apex not denticulate, with two large, densely denticulate folds (**B&S** fig. 16). Philippines: Leyte *leytensis* BAEHR & SCHMIDT, 2010
- 34 Body length > 4.8 mm; aedeagus with spines only on the left side (Figs. 4, **Ba** fig. 18, **B&S** figs. 14, 15). China, Java, Sulawesi 35
- Body length < 4.6 mm; aedeagus with spines on both sides (Fig. 1, **Ba** figs. 19–21, 23). Taiwan, Sumatra, Java, Bali, Borneo 38
- 35 Pronotum very wide, ratio width / length 1.63 (**B&S** fig. 11); elytra short, ratio length / width 1.32 (**B&S** fig. 4); aedeagus with a small, oblique hook at apex, internal sac with a single spine (**B&S** fig. 15). Sulawesi *brendelli* BAEHR & SCHMIDT, 2010
- Pronotum narrower, ratio width / length < 1.58 (Fig. 10, **Ba** fig. 40, **B&S** fig. 10); elytra longer, ratio length / width > 1.39 (Fig. 16, **Ba** fig. 40, **B&S** fig. 3); aedeagus **either** with a small, oblique hook at apex and internal sac with three large, attached spines (**Ba** fig. 18), **or** with a large, vertical lower hook at apex and internal with three large, attached spines (**B&S** fig. 14), **or** aedeagus with unarmed apex and internal sac with two small spines (Fig. 4). China, Java 36
- 36 Pronotum with narrower base (**Ba** fig. 40); elytral striae very shallow, virtually impunctate; aedeagus with a small, oblique hook at apex and internal sac with three large, attached spines (**Ba** fig. 18). Java *lieftincki* LOUWERENS, 1951
- Pronotum with wider base (Fig. 10, **B&S** fig. 10); elytral striae deeper, at least in basal half finely punctuate or crenulate; aedeagus **either** with a large, vertical lower hook at apex and internal sac with three large, attached spines (**B&S** fig. 14), **or** aedeagus with unarmed apex and internal sac with two small spines (Fig. 4). China 37
- 37 Pronotum with wider base as compared with apex, ratio width of base / width of apex > 1.12 (**B&S** fig. 10); aedeagus with a large, vertical lower hook at apex and internal sac with three large, attached spines (**B&S** fig. 14). Central China: Hubei *gerdi* BAEHR & SCHMIDT, 2010
- Pronotum with narrower base as compared with apex, ratio width of base / width of apex 1.05 (Fig. 10); aedeagus with unarmed apex and internal sac with two small spines (Fig. 4). South-western China: Yunnan *yunnanus* sp.n.
- 38 Eyes large, laterally markedly projected (**Ba** figs. 41, 42, 73, **B&S** fig. 12); elytra usually longer, ratio length / width > 1.38, commonly more; aedeagus **either** wide, with large, vertical or oblique, bidenticate apex and three larger attached spines on the left side and two attached smaller spines on the right side (**Ba** figs. 19, 20), **or** aedeagus narrow, with small bidenticate apex and 7–8 single spines (**Ba** fig. 21), **or** aedeagus unknown. Sumatra, Borneo 39
- Eyes laterally far less projected (Fig. 13, **Ba** figs. 44, 46); elytra shorter, ratio length / width < 1.38; aedeagus **either** with two very small spines on the left and a single small spine on the

- right side (**Ba** fig. 23), **or** aedeagus with four large spines on the left and two smaller spines on the right side (Fig. 1), **or** aedeagus unknown. Taiwan, Java, Bali 42
- 39 Elytral striae coarsely punctate and ratio length / width of elytra > 1.40 (**Ba** fig. 73) and basal angles of pronotum angulate (**Ba** fig. 73); aedeagus narrow, with small apical teeth, with 7–8 dispersed single spines (**Ba** fig. 21). Borneo *multispinosus* BAEHR, 2010
- Elytral striae **either** finely punctate (**Ba** figs. 71, 72), **or** striae coarsely punctate, but then ratio length / width 1.35 (**B&S** fig. 6) and basal angles of pronotum rather obtuse (**B&S** fig. 12); aedeagus wide, with large lower apical tooth and internal sac with three large attached spines on left side and two attached spines on right side (**Ba** figs. 19, 20), **or** aedeagus unknown. Sumatra, Borneo 40
- 40 Elytra short, ratio width / length 1.35, striae in basal half coarsely punctate (**B&S** fig. 6); aedeagus unknown. Borneo *angustibasis* BAEHR & SCHMIDT, 2010
- Elytra longer, ratio width / length 1.44, striae in basal half at most finely punctate (**Ba** figs. 71, 72); aedeagus wide, with large lower apical tooth and internal sac with three large attached spines on left side and two attached spines on right side (**Ba** figs. 19, 20). Sumatra, Borneo 41
- 41 Apex of pronotum deeply excised, apical angles far protruded and rather acute (**Ba** fig. 41); aedeagus considerably larger (ca. 1.0 mm); spines in the internal sac much larger (**Ba** fig. 19). Borneo *harpago* BAEHR, 2010
- Apex of pronotum less deeply excised, apical angles less protruded and rather obtuse (**Ba** fig. 42); aedeagus considerably smaller (ca. 0.75 mm); spines in the internal sac much smaller (**Ba** fig. 20). Sumatra *sumatrensis* BAEHR, 2010
- 42 Lateral margins of pronotum and elytra distinctly pale (**Ba** fig. 46); aedeagus with four large spines on the left and two smaller spines on the right side (Fig. 1). Taiwan..... *taiwanensis* BAEHR, 2010
- Lateral margins of pronotum and elytra not perceptibly pale (Fig. 19, **Ba** fig. 44); aedeagus with two very small spines on the left and a single small spine on the right side (**Ba** fig. 23), **or** aedeagus unknown. Java, Bali 43
- 43 Basal angles of the pronotum more angulate (**Ba** fig. 44); elytra in basal half laterally more convex, with slightly convex intervals (**Ba** fig. 75); aedeagus with two very small spines on the left and a single small spine on the right side (**Ba** fig. 23). Java *riedeli* BAEHR, 2010
- Basal angles of the pronotum less angulate (Fig. 13); elytra in basal half laterally less convex, almost straight, with depressed intervals (Fig. 19); aedeagus unknown. Bali *baliensis* sp.n.

Tab. 1: Measurements and ratios of the species of *Arhytinus*

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 was available.

The main list is sorted according to the putative relationships, the two additional lists refer to the species described by BAEHR & SCHMIDT (2010) and to those described in the present paper.

	N	l	w/l pr	d/b pr	b/a pr	pr/h	l/w el
<i>bembidioides</i>	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
<i>cordicollis</i>	1	6.0	1.60	1.32	1.10	1.31	1.42
<i>indicus</i>	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
<i>lorenzi</i>	2	5.3–5.35	1.52–1.56	1.20	1.16	1.29–1.32	1.44–1.45
<i>philippinus</i>	1	6.25	1.61	1.24	1.12	1.28	1.40
<i>angustumargo</i>	1	6.1	1.59	1.22	1.12	1.27	1.40
<i>nitescens</i>	1	5.9	1.53	1.26	1.18	1.45	1.42
<i>piceus</i>	1	5.7	1.71	1.25	1.14	1.38	1.40
<i>irideus</i>	1	7.5	1.59	1.22	1.18	1.47	1.44
<i>nitidipennis</i>	1	7.6	1.49	1.26	1.15	1.36	1.45

	N	l	w/l pr	d/b pr	b/a pr	pr/h	l/w el
<i>circumcinctus</i>	1	7.7	1.66	1.23	1.12	1.47	1.37
<i>major</i>	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
<i>borcherdingi</i>	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
? <i>borcherdingi</i> (♀)	1	7.9	1.60	1.25	1.16	1.42	1.43
<i>inarmatus</i>	1	8.3	1.45	1.21	1.26	1.50	1.47
<i>medius</i>	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
<i>missai</i>	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
<i>frater</i>	1	5.4	1.62	1.24	1.15	1.43	1.41
<i>minor</i>	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
<i>granum</i>	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
<i>unispinus</i>	1	4.7	1.62	1.22	1.14	1.30	1.39
<i>celebensis</i>	1	5.2	1.50	1.20	1.11	1.29	1.39
<i>crenulipennis</i>	1	5.2	1.53	1.27	1.11	1.24	1.43
<i>lieftincki</i>	3	4.5–4.9	1.50–1.56	1.35–1.37	1.0–1.03	1.35–1.38	1.42–1.47
<i>harpago</i>	1	4.6	1.47	1.33	1.04	1.29	1.44
<i>sumatrensis</i>	1	4.5	1.56	1.26	1.06	1.24	1.44
<i>multispinosus</i>	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
<i>moluccensis</i>	1	3.7	1.42	1.33	1.03	1.27	1.33
<i>riedeli</i>	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
<i>baliensis</i>	1	4.5	1.57	1.25	1.06	1.26	1.38
<i>minimus</i>	1	4.5	1.53	1.21	1.17	1.29	1.39
<i>taiwanensis</i>	3	4.4–4.5	1.50–1.58	1.26–1.30	1.04–1.08	1.34–1.36	1.35
<i>novaeirlandiae</i>	1	4.7	1.55	1.25	1.13	1.37	1.36
<i>nepalensis</i>	2	8.4–8.6	1.54–1.63	1.22–1.28	1.22–1.24	1.61	1.51
<i>hammondi</i>	1	6.8	1.54	1.27	1.13	1.39	1.52
<i>gerdi</i>	2	4.8–5.25	1.55–1.56	1.22–1.25	1.12–1.15	1.30–1.31	1.42–1.43
<i>brendelli</i>	1	4.9	1.63	1.25	1.13	1.42	1.32
<i>leytensis</i>	1	4.8	1.60	1.22	1.19	1.39	1.39
<i>angustibasis</i>	1	4.3	1.54	1.31	1.02	1.24	1.35
<i>atripennis</i>	1	8.3	1.55	1.27	1.15	1.39	1.47
<i>javanus</i>	1	5.6	1.68	1.31	1.07	1.38	1.40
<i>yunnanus</i>	1	4.9	1.58	1.27	1.05	1.24	1.39
<i>darlingtoni</i>	1	5.25	1.58	1.18	1.20	1.30	1.40
<i>ludewigi</i>	1	5.3	1.62	1.35	1.04	1.35	1.40
<i>baliensis</i>	1	4.5	1.57	1.25	1.06	1.26	1.38

Remarks

The species described as new in the present paper again demonstrate the high species diversity of the genus *Arhytinus* and, in particular, the diversity of shape and structure of the male genitalia. Even with the new additions, the number of actually existing species certainly is not even approximately recorded and, moreover, it can be expected that additional species will be detected in countries and islands from where no species yet have been recorded. However, the apparent rarity of the majority of the described species at present renders any considerations about taxonomic diversity and distribution difficult. To receive a more adequate impression of diversity and distribution of this genus, therefore sampling has to be much intensified and more adequate sampling methods should be applied.

Unfortunately, of almost all specimens mentioned in the present paper very little or even no information is available of collecting circumstances and habits. As discussed in BAHR (2010),

the actual habits of species of the genus *Arhytinus* still are unsettled. Specimens have been as well collected on the ground in rain forest litter, as on tree trunks, but most specimens, in particular of those species of which a number of specimens were recorded, have been sampled at light. This sampling method, however, reveals no information about the actual ecology. Future collectors hence are requested to add information about the collecting method and the environment to their label data.

The systematic position of the genus *Arhytinus* still is obscure, because a phylogenetic survey of the Oriental-Papuan Platynini has not yet been undertaken. Some characters of *Arhytinus* seem to represent plesiomorphic states, others could be interpreted as apomorphic. But even the apparent plesiomorphic characters are not unequivocal. At any rate, in a future phylogenetic survey this genus probably will occupy a crucial position.

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

<i>angustibasis</i> BAEHR & SCHMIDT, 2010	Brunei (Borneo)
<i>angustimargo</i> BAEHR, 2010	Sabah (Borneo)
<i>atripennis</i> sp.n.	western Java
<i>baliensis</i> sp.n.	Bali
<i>bembidioides</i> BATES, 1889	Sikkim, Burma, Thailand, Vietnam, Sumatra, ? Borneo
<i>borcherdingi</i> BAEHR, 2010	Brunei, Sabah (Borneo)
<i>brendelli</i> BAEHR & SCHMIDT, 2010	Sulawesi
<i>celebensis</i> BAEHR, 2010	Sulawesi, ? Seram
<i>circumcinctus</i> BAEHR, 2010	northern Thailand, ?Burma
<i>cordicollis</i> BAEHR, 2010	Brunei (Borneo)
<i>crenulipennis</i> BAEHR, 2010	Brunei (Borneo)
<i>darlingtoni</i> sp.n.	Luzon (Philippines)
<i>frater</i> BAEHR, 2010	Papua Indonesia
<i>gerdi</i> BAEHR & SCHMIDT, 2010	central China
<i>granum</i> DARLINGTON, 1952	Papua New Guinea
<i>hammondi</i> BAEHR & SCHMIDT, 2010	Malaysia
<i>harpago</i> BAEHR, 2010	Brunei (Borneo)
<i>inarmatus</i> BAEHR, 2010	western Java
<i>indicus</i> BAEHR, 2010	southern India
<i>irideus</i> JEDLICKA, 1936	Philippines
<i>javanus</i> sp.n.	Java
<i>leytensis</i> BAEHR & SCHMIDT, 2010	Leyte (Philippines)
<i>lieftincki</i> LOUWERENS, 1951	western Java
<i>lorenzi</i> BAEHR, 2010	southern India
<i>ludewigi</i> sp.n.	New Britain
<i>major</i> DARLINGTON, 1952	Papua New Guinea
<i>medius</i> DARLINGTON, 1952	New Guinea
<i>minus</i> JEDLICKA, 1936	Philippines
<i>minor</i> BAEHR, 2010	Papua New Guinea
<i>missai</i> BAEHR, 2010	Papua New Guinea
<i>moluccensis</i> BAEHR, 2010	Batjan (Moluccas)
<i>multispinosus</i> BAEHR, 2010	Brunei, Sabah (Borneo)
<i>nepalensis</i> BAEHR & SCHMIDT, 2010	Nepal
<i>nitescens</i> BAEHR, 2010	Taiwan
<i>nitidipennis</i> BAEHR, 2010	Brunei (Borneo)
<i>novaeirlandiae</i> BAEHR, 2010	New Ireland
<i>philippinus</i> JEDLICKA, 1936	Philippines
<i>piceus</i> JEDLICKA, 1936	Philippines
<i>riedeli</i> BAEHR, 2010	eastern Java

<i>sumatrensis</i> BAEHR, 2010.....	Sumatra
<i>taiwanensis</i> BAEHR, 2010.....	Taiwan
<i>unispinus</i> BAEHR, 2010.....	Papua New Guinea
<i>yunnanus</i> sp.n.....	south-western China

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