Studies and Reports
Taxonomical Series 10 (2): 237-248, 2014

New species of the genus *Arhytinus* Bates. 4th supplement to the "Revision of the genus *Arhytinus* Bates" (Coleoptera: Carabidae: Platynini)

Martin BAEHR

Zoologische Staatssammlung, Münchhausenstr. 21,
D-81247 München, Germany
e-mail: martin.baehr@zsm.mwn.de

Taxonomy, new species, descriptions, Coleoptera, Carabidae, Platynini, *Arhytinus*, Malaysia

Abstract. Three new species of the platynine genus *Arhytinus* Bates, 1889 are described from Malaysia and their male genitalia are figured if available: *A. bastai* sp. nov., *A. cechovskyi* sp. nov., and *A. bulirschi* sp. nov. The species are introduced into the most recent key to species of the genus *Arhytinus*.

INTRODUCTION

By courtesy of J. Bašta (Brno) and through mediation of P. Bulirsch (Prague) I received a couple of specimens from the Oriental Region for determination which includes *inter alia* a few specimens of the platynine genus *Arhytinus* Bates, 1889 that appeared to represent three new species. These are described in the present paper and their male genitalia are figured if available. The paper is regarded the 4th supplement to the revision of this genus (Baehr 2010).

The genus *Arhytinus* presently includes 47 described species that are distributed from southern India through Nepal, Burma, Thailand, Malaysia, Vietnam, southern and central China, Taiwan, the Philippine and Indonesian Archipelagos including the Moluccas, to New Guinea and surrounding Islands of the Bismarck Archipelago, but the genus has not yet been recorded from Australia (Baehr 2010, 2012, Baehr & Schmidt 2010).

Apart from very few species, specimens of *Arhytinus* are extremely rare in collections, and in many 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 may be rather due to inadequate sampling methods and efforts than to the rarity of specimens in nature. Accordingly, the three new species were sampled at a single locality and in two species, only single specimens are at hand. Fortunately males are available in two of the new species, which gives the opportunity to describe them properly. The male aedeagus in most species of *Arhytinus* is very characteristic due to the presence of varied numbers, and different positions of teeth or spines in the internal sac, and to the variously denticulate apex of the aedeagus. Unfortunately, in contrast to this, the female gonocoxites are extremely similar in shape and structure throughout the genus, so that they are of little use for the differentiation of species.

The third new species, even when only the female is available, is also reasonably easily introduced into the key, because it is well differentiated by certain character states of its external morphology from all similarly sized and shaped species.

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 was 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 at the basal angles at the position of the posterior lateral seta.

Data of examined material are given in full length and the exact labeling was used. A / with a blank before and after denotes a new line on the label.

The types are stored in the working collection of the author in Zoologische Staatssammlung, München (CBM), and the private collection of J. Bašta, Brno, Czech Republic (CBB).

Genus *Arhytinus* Bates, 1889

Arhytinus Bates, 1889: 278. - For additional references see the paper of Baehr (2012).

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

Diagnosis. Genus of the tribe Platynini. Medium-sized to very small species (in tribe), characterized by usually short and wide body, absence of the mental tooth, rather cordiform prothorax, more or less short, usually rather oval-shaped, posteriad widened, and dorsally convex 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 quite similar throughout the genus, the male aedeagi are very differently shaped and structured: the apex commonly is uni- or bidenticulate in various ways, and they usually bear one or several strongly sclerotized teeth, or spines, or spinose plates of different size, shape, and location in the apical part of the (inverted) internal sac. Contrastingly, the female gonocoxites are very uniformly shaped and structured throughout the genus.

The relationships of this peculiar genus are not yet settled, as Baehr (2010, 2012) and Baehr & Schmidt (2010) stated, because 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; scutellar stria elongate, situated in 1st interval, scutellar 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 on each side close to the suture; metathoracic wings present; metepisternum elongate, c. 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 biseriately squamose.

Arhytinus bastai sp. nov.

(Figs 1, 3, 6)

Type material. Holotype (♂): "MALAYSIA W., Perak / 40 km SE of Ipoh, 900 m / Banjaran Titi Vangsa Ringlet, / 29.iii.-29.iv.2004 / Petr Čechovský leg.", (CBM). Paratypes (1 ♂, 1 ♀): same data, (CBB).

Description. Measurements. Length: 5.5-5.6 mm; width: 2.55-2.6 mm. Ratios. Width/length of pronotum: 1.62-1.63; width of widest diameter/base of pronotum: 1.27-1.29; width base/apex of pronotum: 1.06-1.07; width pronotum/head: 1.30-1.32; length/width of elytra: 1.39-1.40.

Colour (Fig. 3) black, elytra slightly iridescent. Pronotum and elytra without distinct pale lateral margins. Labrum and mandibles dark reddish, palpi dirty yellow, antenna completely piceous. Legs dirty yellow, tarsomeres of middle and hind tarsi apically slightly darker.

Head (Fig. 6) comparatively large. Eye large, laterally well projected, orbit very short, oblique. Frontal furrows very shallow, slightly oblique, developed only immediately behind clypeal suture. Antenna moderately elongate, surpassing base of pronotum by almost two antennomeres, 6th antennomere slightly < 2 x as long as wide. Surface with distinct, moderately fine, isodiametric microreticulation, moderately dull.

Pronotum (Fig. 6) wide, cordiform, widest at or slightly behind apical third, dorsal surface rather depressed. Apex with shallow excision, apical angles slightly projected but widely rounded. Lateral border in anterior three fourths convex, in basal fourth slightly concave. Base rather narrow in comparison to widest diameter, slightly convex. Basal angles faintly, obtusely dentate, laterally not projected, c. 100°. Lateral margin rather narrow in apical two thirds, in basal third widened and deplanate. Apex finely margined, base in middle not or very indistinctly margined. Median line shallow but distinct, not attaining apex or base. Both transverse impressions indistinct. Basal grooves wide, rather shallow. Anterior lateral seta inserted slightly in front of apical third and of widest diameter, and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base with coarse, rather sparse, irregularly spaced punctures which are sparser in middle. Surface with traces of extremely fine and superficial, transverse lines which are only perceptible at very high magnification and very bright illumination, surface glossy and slightly iridescent.

Elytra (Fig. 3) of average shape, rather short, oviform, widened apicad, dorsal surface convex. Humeral area comparatively wide, lateral margins in basal half slightly oblique and very slightly convex, then evenly convex. Striae deeply impressed, rather finely crenulate at least in basal half, intervals distinctly raised, convex but slightly depressed. 3rd interval impunctate. Only very fine and extremely superficial traces of transverse lines recognizable at very high magnification and very bright illumination, surface glossy, with slightly iridescent lustre.

Male genitalia (Fig. 1). Genital ring large but fairly narrow, rather asymmetric, triangular, with wide, rounded apex. Aedeagus rather short and moderately wide, little curved in basal

part, lower surface slightly concave throughout, carinate in middle, but not striolate. Apex large, 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 side in middle and far removed from apex, and with several moderately sclerotized folds, the posterior one several times folded with sclerotized margins. Both parameres large and apicad convex, the left one markedly triangular.

Female gonocoxites (much as in fig. 25 in Baehr 2010). Gonocoxite 1 with a few rather elongate and stout setae on the ventral rim. Gonocoxite 2 rather short, curved, with acute apex. Ventrolateral margin with three rather stout ensiform setae, dorsomedian margin with a single stout ensiform seta in middle, apex with a short nematiform seta originating from a groove.

Variation. Very little variability noted.

Diagnosis. A medium sized, convex species, characterized by combination of absence of distinct pale lateral borders of pronotum and elytra, wide, cordiform pronotum with angulate basal angles, large, laterad well protruding eyes, well impressed but only finely crenulate elytral striae, a horizontally directed, bidentate apex of the aedeagus, and presence of a single spine at the bottom of the left side in the internal sac. Shape and structure of the aedeagus are very similar to those of *Arhytinus javanus* Baehr, 2012 from Java and *A. crenulipennis* Baehr, 2010 from Borneo, but the species is distinguished from both of them by indistinct pale margins of pronotum and elytra, completely dark antennae, much finer crenulation of the elytral striae, and far less curved aedeagus.

Etymology. The name is a patronym in honour of J. Bašta, owner of the collection.

Distribution. Malaysia. Known only from the type locality.

Collecting circumstances. Little recorded. Sampled at median altitude.

Relationships. According to shape and structure of the aedeagus, most similar and perhaps most closely related to *Arhytinus crenulipennis* Baehr, 2010 from Borneo and *A. javanus* Baehr, 2012 from Java, but in several characters of the external morphology quite different from both species.

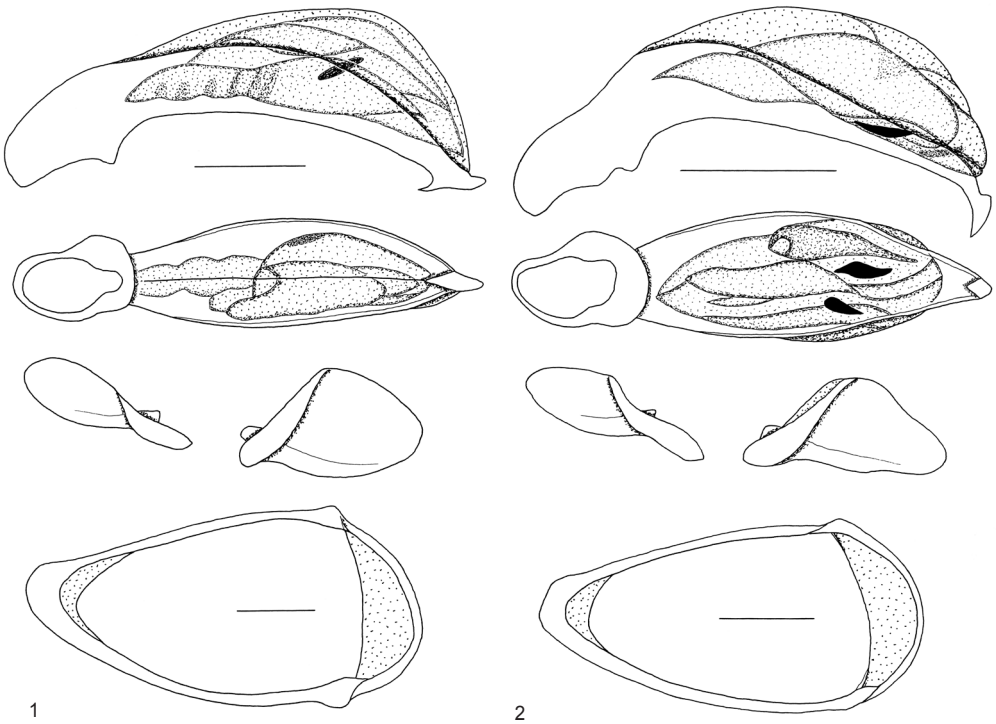
Arhytinus cechovskyi sp. nov.

(Figs 2, 4, 7)

Type material. Holotype (♂): "MALAYSIA W., Perak / 40 km SE of Ipoh, 900 m / Banjaran Titi Vangsa Ringlet, / 29.iii.-29.iv.2004 / Petr Čechovský leg.", (CBM).

Description. Measurements. Length: 4.4 mm; width: 2.05 mm. Ratios. Width/length of pronotum: 1.61; width of widest diameter/base of pronotum: 1.28; width base/apex of pronotum: 1.01; width pronotum/head: 1.25; length/width of elytra: 1.39.

Colour (Fig. 4) black, elytra slightly iridescent. Pronotum and elytra without distinct pale lateral margins. Labrum and mandibles dark reddish, palpi dirty yellow, antenna pale reddish throughout. Legs pale yellow, tarsomeres not darker.



Figs 1-2. Male aedeagus, left side, lower surface, left and right parameres, genital ring, 1- *Arhytinus bastai* sp. nov. 2- *A. cechovskyi* sp. nov. Scale bars: 0.25 m.

Head (Fig. 7) comparatively large. Eye large, laterally well projected, orbit very short, oblique. Frontal furrows very shallow, slightly oblique, developed only immediately behind clypeal suture. Antenna moderately elongate, surpassing base of pronotum by less than two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with distinct, moderately fine, isodiametric microreticulation, moderately dull.

Pronotum (Fig. 7) wide, cordiform, widest slightly behind apical third, dorsal surface rather depressed. Apex with shallow excision, apical angles slightly projected but widely rounded. Lateral border in anterior three fourths convex, in basal fourth slightly concave. Base narrow in comparison to widest diameter, slightly convex. Basal angles faintly, obtusely dentate, laterally not projected, almost rectangular. Lateral margin narrow in apical two thirds, in basal third slightly widened and deplanate. Apex finely margined, base in middle not margined. Median line very shallow, not attaining apex or base. Both transverse impressions indistinct. Basal grooves wide, rather shallow. Anterior lateral seta inserted about at apical fourth and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base with very coarse, rather sparse, irregularly spaced punctures which are even sparser in middle. Surface with very fine and superficial, very transverse meshes and lines which are only perceptible at high magnification, surface rather glossy and slightly iridescent.

Elytra (Fig. 4) of average shape, rather short, oviform, widened apicad, dorsal surface convex. Humeral area comparatively wide, lateral margins in basal half slightly oblique and very slightly convex, then evenly convex. Striae fairly deeply impressed, very finely crenulate at least in basal half, intervals distinctly raised, convex but slightly depressed. 3rd interval impunctate. Only very fine and extremely superficial traces of transverse lines recognizable at very high magnification and very bright illumination. Surface glossy, with slightly iridescent lustre.

Male genitalia (Fig. 2). Genital ring large and moderately wide, slightly asymmetric, triangular, with wide, obliquely rounded apex. Aedeagus wide and short, moderately curved in basal part, lower surface straight but remarkably curved down towards apex, not carinate nor striolate. Apex large, suddenly bent down in an almost right angle, bidentate, very acute at lower tip, obtuse at upper tip. Internal sac with two strongly sclerotized teeth, one near bottom at the left side, the other in middle at the right side, both far removed from apex. Internal sac also with several rather sclerotized, partly coiled folds. Both parameres large, the left one obtusely convex at apex, the right triangular at apex.

Female gonocoxites. Unknown.

Variation. Unknown.

Diagnosis. A rather small, convex species, characterized by combination of absence of distinct pale lateral borders on pronotum and elytra, wide, cordiform pronotum with angulate basal angles, large, laterad well protruded eyes, well impressed but only finely crenulate elytral striae, very large, vertically directed, bidentate apex of the aedeagus, and presence of two spines at the bottom of the internal sac. Shape and structure of the aedeagus are very similar to those of *Arhytinus sumatrensis* Baehr, 2010 from Sumatra and *A. gerdi* Baehr et Schmidt, 2010 from China, but the species is distinguished from both species by wider pronotum with narrower base, shorter elytra, and number, size, and location of the spines in the internal sac.

Etymology. The name is a patronym in honour of the collector, Petr Čechovský.

Distribution. Malaysia. Known only from the type locality.

Collecting circumstances. Little recorded. Sampled at median altitude.

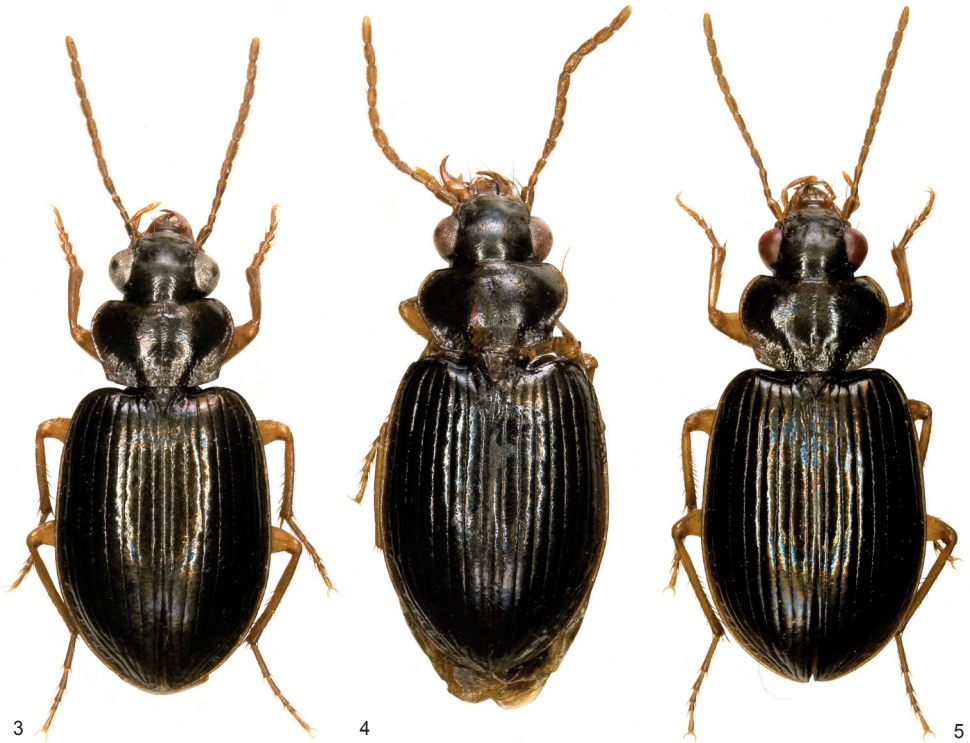
Relationships. According to shape and structure of the aedeagus most similar and perhaps most closely related to *Arhytinus sumatrensis* Baehr, 2010 from Sumatra and *A. gerdi* Baehr et Schmidt, 2010 from China, but in some characters of the external morphology rather different from both species.

Arhytinus bulirschi sp. nov.

(Figs 5, 8)

Type material. Holotype (♂): "MALAYSIA W., Perak / 40 km SE of Ipoh, 900 m / Banjaran Titi Vangsa Ringlet, / 29.iii.-29.iv.2004 / Petr Čechovský leg.", (CBM).

Description. Measurements. Length: 6.9 mm; width: 3.15 mm. Ratios. Width/length of pronotum: 1.56; width of widest diameter/base of pronotum: 1.28; width base/apex of



Figs 3-5. Habitus (body lengths in brackets). 3- *Arhytinus bastai* sp. nov. (5.6 mm). 4- *A. cechovskyi* sp. nov. (4.4 mm). 5- *A. bulirschi* sp. nov. (6.9 mm).

pronotum: 1.10; width pronotum/head: 1.38; length/width of elytra: 1.40.

Colour (Fig. 5) black, elytra slightly iridescent. Pronotum and elytra with narrow pale lateral margins. Labrum and mandibles dark reddish, palpi dirty yellow, antenna completely brown. Legs pale yellow, apical parts of tibiae and tarsi slightly darker.

Head (Fig. 8) comparatively large. Eye large, laterally well projected, orbit short, oblique. Frontal furrows very shallow, slightly oblique, developed only immediately behind clypeal suture. Antenna moderately elongate, surpassing base of pronotum by less than two antennomeres, 6th antennomere c. 1.75 x as long as wide. Surface with distinct, moderately fine, isodiametric microreticulation, moderately dull.

Pronotum (Fig. 8) wide, moderately cordiform, widest almost at middle, dorsal surface rather depressed. Apex with fairly deep excision, apical angles projected but widely rounded. Lateral border in anterior three fourths convex, in basal fourth almost straight, but very slightly sinuate just in front of the basal angles. Base rather wide in comparison to widest diameter, rather convex. Basal angles obtuse, laterally not projected. Lateral margin narrow in apical two thirds, in basal third widened and deplanate. Apex finely margined, base in middle not margined. Median line very shallow, not attaining apex or base. Both transverse impressions indistinct. Basal grooves wide, rather shallow. Anterior lateral seta inserted about at apical third and slightly removed from margin. Posterior lateral seta inserted at basal angle. Base

with moderately coarse, fairly dense punctures which are slightly sparser in middle. Surface with extremely fine and superficial traces of transverse lines which are only perceptible at very high magnification and bright illumination, glossy and slightly iridescent.

Elytra (Fig. 5) of average shape, rather short, oviform, widened apicad, dorsal surface convex. Humeral area comparatively wide, lateral margins in basal half slightly oblique and very slightly convex, then evenly convex. Striae fairly deeply impressed, very finely crenulate at least in basal half, intervals distinctly raised, convex but slightly depressed. 3rd interval impunctate. Only very fine and extremely superficial traces of transverse lines recognizable at very high magnification and very bright illumination, Surface glossy, with slightly iridescent lustre.

Male genitalia. Unknown.

Female gonocoxites. Similar to those of *A. bastai* sp. nov. (see fig. 25 in Baehr 2010).

Variation**.** Unknown.

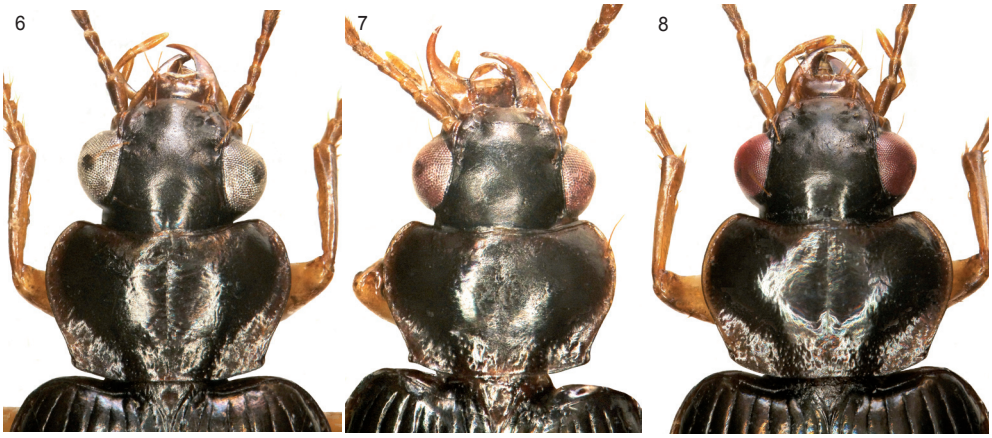
Diagnosis. A rather large, convex species, characterized by combination of presence of narrow pale lateral borders on pronotum and elytra, wide, rather cordiform pronotum with obtuse basal angles, large, laterad fairly well protruding eyes, and well impressed but only finely crenulate elytral striae. In body shape reasonably similar to *Arhytinus bembidioides* Bates, 1889 but larger, with less angulate basal angles of the pronotum, narrower pale margins of pronotum and elytra, and shorter elytra.

Etymology. The name is a patronym in honour of Petr Bulirsch who kindly transferred the specimen to me.

Distribution. Malaysia. Known only from the type locality.

Collecting circumstances. Little recorded. Sampled at median altitude.

Relationships. Doubtful due to the unknown male genitalia. In body shape, except for shape of pronotum, somewhat reminiscent of *Arhytinus bembidioides* Bates, 1889 and of both other species described in the present paper, but larger in size than all of them.



Figs 6-8. Head and prothorax. 6- *Arhytinus bastai* sp. nov. 7- *A. cechovskyi* sp. nov. 8- *A. bulirschi* sp. nov.

RECOGNITION

The new species are introduced in the most recent key to the genus (Baehr 2012). For better use numbers of figures in Baehr (2010) are introduced as B10, those in Baehr (2012) as B12, and those in Baehr & Schmidt (2010) as B&S.

A. bastai can be followed on in the key to couplet 9. that must be altered as follows, then to couplet 17., then to couplet 20. which has to be changed as follows:

9. Pronotum exceptionally wide, ratio width/length >1.68 (B10 fig. 33, B12 fig. 9), 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 (B10 fig. 5, B12 fig. 3). 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 (B10 fig. 17) and elytral striae distinctly crenulate; ..... 11.

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 (B10 fig. 18, B&S figs 14, 15), or with a single spine on the right side but with unarmed apex (B&S 15), or with two densely denticulate folds (B&S fig. 16), or basal angles of the pronotum almost rounded off (B10 fig. 47) ..... 30.

20. Pronotum wide, markedly cordiform, with relatively narrow base, ratio widest diameter/width of base 1.32; eyes laterally more protruding (Fig. 3; B10 fig. 27); elytral striae distinctly crenulate; aedeagus either with apex horizontally bidenticulate (Fig. 1), or unknown. Malaysia, Borneo ..... 20a.
- 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 protruding; elytral striae rather finely 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.

20a. Larger species, body length 6.0 mm; lateral margin of pronotum distinctly pale, base slightly narrower, ratio diameter/base 1.32; elytra slightly longer, ratio length/width 1.42; aedeagus unknown. Borneo ..... *cordicollis* Baehr, 2010
- Smaller species, body length <5.6 mm; lateral margin of pronotum not distinctly pale, base slightly wider, ratio diameter/base <1.29 (Fig. 6); elytra slightly shorter, ratio length/width <1.40; aedeagus moderately compact, lower surface gently concave, apex horizontally bidenticulate, internal sac with a single small spine on the left side (Fig. 1). Malaysia ..... *bastai* sp. nov.

A. cechovskyi can be followed on in the key to couplet 30. that must be altered as follows, then to couplet 38. which has to be changed as follows:

30. Legs dark reddish to pale brown; basal angles of pronotum very obtuse, lateral margins dark and regularly convex towards the basal angle (B10 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 (B10 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 (Fig. 2, B10 figs 18-23, B12 figs 1, 4, B&S figs 14-16), or aedeagus unknown. China, Taiwan, Philippines, Malaysia, Sumatra, Java, Borneo, Bali, Sulawesi, Moluccas, New Ireland ..... 31.

31. Lateral margins of pronotum not sinuate, basal angles almost rounded off (B10 figs 43, 47, B&S fig. 11); either aedeagus with two large, posteriad curved spines at the left side (B10 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 (B10 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 (Fig. 4, B12 figs 10, 13, B10 figs 40-42, 44, 46, B12 figs 10, 13, B&S figs 9, 10, 12); either aedeagus with differently shaped and distributed spines (Fig. 2, B12 figs 1, 4, B10 figs 18-20, 23, B12 figs 1, 4, B&S figs 14, 15), or aedeagus unknown, in latter species antenna dark (B12 fig. 13) or base of pronotum barely wider than apex (B&S fig. 12). China, Taiwan, Malaysia, Sumatra, Java, Bali, Borneo, Sulawesi ..... 34.

34 Body length > 4.8 mm; aedeagus with spines only on the left side (B12 figs 4, B10 fig. 18, B&S figs 14, 15). China, Java, Sulawesi ..... 35.

- Body length < 4.6 mm; aedeagus with spines on both sides (Fig. 2, B12 fig. 1, B10 figs 19-21, 23). Taiwan, Malaysia, Sumatra, Java, Bali, Borneo ..... 38.

38. Eyes large, laterally markedly projected (Fig. 4, B10 figs 41, 42, 73, B&S fig. 12); elytra usually longer, ratio length/width > 1.38, commonly more; aedeagus either with large, vertical or oblique, bidenticulate apex and a various number of spines which are attached if more than two (Fig. 2, B10 figs 19, 20), or narrow, with small bidenticulate apex and 7-8 single spines (B10 fig. 21), or unknown. Malaysia, Sumatra, Borneo ..... 39.

- Eyes laterally far less projected (B12 fig. 13, Ba figs 44, 46); elytra shorter, ratio length/width < 1.38; aedeagus with small, horizontally denticulate apex, either with two very small spines on the left and a single small spine on the right side (B10 fig. 23), or with four large spines on the left and two smaller spines on the right side (B12 fig. 1), or 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 (B10 fig. 73); aedeagus narrow, with small apical teeth, with 7-8 dispersed single spines (B10 fig. 21). Borneo ..... *multispinosus* Baehr, 2010

- Elytral striae either finely punctate (Fig. 7, B10 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, internal sac either with three large attached spines on left side and two attached spines on right side (B10 figs 19, 20), or with one spine on either side (Fig. 2), or aedeagus unknown. Malaysia, 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 et Schmidt, 2010

- Elytra longer, ratio width/length > 1.36, striae in basal half at most finely punctate (Fig. 4, B10 figs 71, 72, B13 fig. 10); aedeagus with large lower apical tooth, internal sac either with three large attached spines on left side and two attached spines on right side (B10 figs 19, 20), or with one spine on either side (Fig. 2), or unknown. Vietnam, Malaysia, Sumatra, Borneo ..... 41.

41. Elytra shorter, ratio length/width < 1.40; aedeagus with 2 spines in the internal sac (Fig. 2), or unknown. Vietnam, Malaysia ..... 41a.

- Elytra longer, ratio length/width 1.44; aedeagus with 4-5 spines in the internal sac (B10 figs 19, 20). Sumatra, Borneo ..... 41b.

41a. Pronotum wider, ratio length/width 1.61, with indistinct pale margin (Fig. 7); aedeagus with 2 spines in the internal sac (Fig. 2), Malaysia ..... *cechovskyi* sp. n.

- Pronotum narrower, ratio length/width < 1.50, with distinct pale margin (B13 fig. 6); aedeagus unknown. Vietnam ..... *vietnamensis* Baehr, 2014

41b. = 41. in Baehr (2012)

A. bulirschi can be followed on in the key to couplet 18. that must be altered as follows:

18. 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); body length 6.8 mm; aedeagus unknown. Malaysia ..... *hammondi* Baehr et Schmidt, 2010

- Pronotum with less or not sinuate lateral margins and more obtuse basal angles (Fig. 8), if lateral margins slightly sinuate, base rather coarsely punctate (B10 fig. 27); elytra shorter, ratio length/width < 1.45; aedeagus various or unknown. Distribution various ..... 19.

19. Body length 6.9 mm and elytra short, ratio length/width 1.40 and ratio width of pronotum/width of head 1.38 and pronotum and elytra with narrow pale margin and antenna completely brown (Figs 5, 8); aedeagus unknown. Malaysia ..... *bulirschi* sp. nov.

- Body length < 6.3 mm; not all mentioned characters occurring together; aedeagus variously shaped. Distribution various, but not yet recorded from Malaysia ..... 19a.

19a. = 19. in Baehr (2012).

REMARKS

The species described as new in the present paper again demonstrate the high species diversity of the genus *Arhytinus*. 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 areas from where no species yet has been recorded. However, the apparent rarity of the majority of the described species at present renders any considerations about taxonomic diversity and distribution difficult. The present paper again demonstrates that collecting at not yet visited areas likely will bring to light additional species and thus will enlarge the species diversity as well as the knowledge about their distribution.

Although the species mentioned in the present paper bear little information about their collecting circumstances and habits, the occurrence of three species at the exactly similar locality merits attention, because they do not differ much in their external morphology except for body size. As in other parts of the genus' range (Baehr 2010), again the question arises how species of such extremely similar body shape and structure manage to occur not only sympatrically but probably also syntopically. Unfortunately, almost nothing has been recorded about the habits of almost all *Arhytinus* species, thus the question of probable competition of several species must be left untouched.

ACKNOWLEDGEMENTS. My sincere thanks are due to J. Bašta (Brno) and P. Bulirsch (Prague) for the kind loan or gift of the specimens.

REFERENCES

Baehr M. 2010: A revision of the genus *Arhytinus* Bates (Coleoptera: Carabidae: Platynini). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique* 80: 5-50.

Baehr M. 2012: New species and new records of the genus *Arhytinus* Bates. 2nd supplement to the "Revision of the genus *Arhytinus* Bates ". (Coleoptera: Carabidae: Platynini). *Koleopterologische Rundschau* 82: 41-64

Baehr M. 2014: "New species of the genus *Arhytinus* Bates. 3rd supplement to the "Revision of the genus *Arhytinus* Bates" (Insecta, Coleoptera, Carabidae, Platynini)" *Spixiana* 37 (in print).

Baehr M. & J. Schmidt 2010: New species of the genus *Arhytinus* Bates, 1889 (Coleoptera, Carabidae, Platynini). *Entomologische Blätter* 106: 41-56.

Bates H. W. 1889: Contributions a la faune Indo-Chinoise. 3e Mémoir. Carabidae. *Annales de la Société de France* (6) 9: 261-286.

Received: 27.4.2014
Accepted: 20.5.2014