

New seed beetles from Thailand belonging to the *Bruchidius mendosus* (Gyllenhal, 1839) species-group, and a key to Southeast Asian species (Coleoptera, Chrysomelidae: Bruchinae)

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Abstract – *Bruchidius aereomaculatus* sp. n. and *B. oculosus* sp. n. are described from the forests of North-Eastern Thailand. Both belong to the *Bruchidius mendosus* species-group, according to criteria based on adult morphology. A key to Southeast Asian seed beetles belonging to *B. mendosus* species-group is provided. With 8 figures.

Key words – New species, description, male genitalia.

INTRODUCTION

A number of seed beetles closely related with the paleotropical species *Bruchidius mendosus* (Gyllenhal, 1839) were described from India (ARORA 1977, 1980), Sri Lanka (DECELLE 1975) and Vietnam (DELOBEL 2010*a*, *b*, 2014). They are small to very small beetles, often measuring less than 1.5 mm in length, and all those with known host plant feed in the seeds of Fabaceae Desmodieae. The number of species presently known to share this common larval diet in Asia is estimated to be about twenty, of which sixteen were recorded in Vietnam (DELOBEL 2014). Several more Indian species, estimated to be at least ten (DELOBEL 2010*b*) show similar morphological features, and possibly belong to the same group of species. Apart from their small size, males of the group are best characterized by internal sac ornamentation, with variously arranged sclerotised teeth, and a small number (two to four) of usually dented plates. The ventral valve is usually an acute triangle, but it may be short and blunt, or produced into a long point. The dorsal valve is often wide and strongly sclerotised. In the following, we shall refer to these closely related species as the *Bruchidius mendosus* (Gyllenhal, 1839) species-group.

Here we report on a small but interesting series of seed beetles that were collected as adults by M. Földvári, A. Orosz and L. Papp, entomologists of the Hungarian Natural History Museum (HNHM), Budapest, in October and November 2004, and preserved in the Coleoptera Collection of the HNHM. The series includes three species described from India (*B. anderssoni* Decelle, 1975, *B. compositus* Arora, 1977, and *B. mendosus*) and two species that are new to science and are described here. The larval food plant(s) of these specimens is (are) unfortunately unknown, and their affiliation with the *B. mendosus* species-group is based on purely morphological grounds.

METHODS

Dissection and mounting of genitalia were performed according to standard techniques, with slight modifications: after rehydration of the specimen, genital parts were removed by gently lifting the last visible abdominal tergite, their clearing was carried out in a saturated solution of sodium hydroxide placed for 50 to 70 seconds in a microwave oven set at low power, i.e. about 150 watts. After microscopic examination (Leitz Laborlux K), pieces were glued on a rectangular card in a drop of water-soluble resin (dimethyl hydantoin formaldehyde). Digital photographs of the genitalia were transferred to a vector drawing program, where they served as models for the different figures. Length and width figures should be understood as the maximum values observed on a given specimen; figures for antennomeres 1 to 11 correspond to the ratio length of each antennomere / length of second antennomere, scape being considered as measurable with the highest level of accuracy. Terminology follows KINGSOLVER (1970) and NILSSON & JOHNSON (1993).

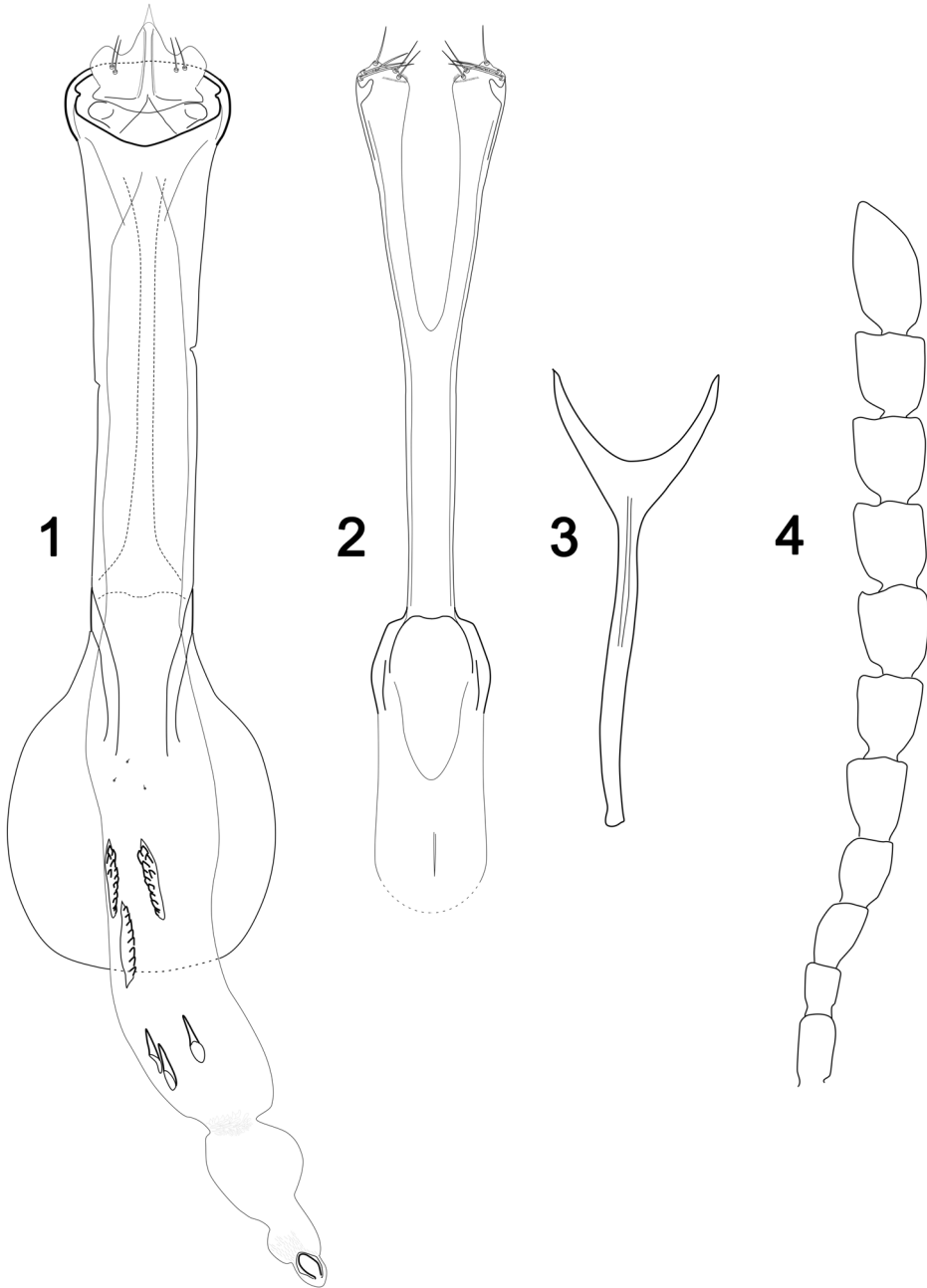
TAXONOMY

***Bruchidius aereomaculatus* sp. n.**

(Figs 1–4)

Type material – Thailand: Nan Province, Phu Phiang District. Holotype (male): “Thailand, Prov. Nan, Nan-Mae Charim Road, 20th km” “secondary bamboo forest, 6.XI.2004, M. Földvári, A. Orosz, L. Papp”, HNHM. Paratype: 1 male, same data as holotype, HNHM.

Diagnosis – Body moderately stout, 1.9 times longer than deep, pygidium almost vertical. Colour pattern of elytra is of a rather common type among Desmodieae-feeding *Bruchidius* in Southern and Southeastern Asia, particularly in *B. desmodei* Arora, 1980, *B. christiae* Delobel, 2010, *B. meibomiaca* Arora, 1980, or *B. phuanensis* Delobel, 2010. External morphology is quite similar to *B. mei-*



Figs 1–4. *Bruchidius aereomaculatus* sp. n., 1 = median lobe, 2 = lateral lobes, 3 = spiculum gastrale, 4 = male antenna

bomiaca (antennae and four anterior legs testaceous, elytra black except extreme apex, with whitish ground vestiture and copper-coloured markings). Posterior legs are, however, usually darker in *B. meibomiaca*, and the ventral valve of *B. aereomaculatus* aedeagus has no known counterpart in the genus.

Description – Male. Length (pronotum to pygidium): 1.6 mm; width: 1.1 mm. Integument black, antennae and legs testaceous, except extreme base of posterior legs darkened, elytra black with extreme apex testaceous; apex of last metatarsomeres briefly darkened; abdomen entirely black. Dorsal vestiture made of dense whitish (light grey) setae, with a few rather obscure copper-coloured (light brownish) markings. Dark setae very diffuse on pronotum, whereas on elytra forming three transverse stripes of unequal importance: diffuse stripe at basal fourth, larger and better defined one at and beyond middle, and preapical area with a few squarish spots. Dark markings of second stripe forming moderately strong, well defined lateral spot on interstriae 3 and 5–8. Last visible tergite almost uniformly whitish. Head: eyes moderately bulging, maximum head width about 1.5 times width behind eyes; eyes separated by 0.24 times head width including eyes; face moderately narrow, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 3.1; eye deeply cleft, width at bottom of sinus composed of 7 ommatidia; carina on frons well defined, shining. Punctuation of face strong. Antennae (Fig. 4) long, measuring 1.1 mm, that is 70% body length; antennomeres 1–4 submoniliform, 5 slightly widened apically, 6–10 slightly longer than wide, subrectangular, 11 oval ($L/W = 2.1$). Length of antennomeres: 1.4; 1; 1.4; 1.4; 1.6; 1.6; 1.8; 1.6; 1.7; 1.6; 2.8. Pronotum: longer than wide at base ($L/W = 1.4$), conical, its sides strait; apex briefly and feebly margined laterally, no oblique impression on sides of basal lobe. Dense punctuation on disc obscured by setation. Elytra a little wider than pronotal base, 1.1 times longer than combined width, their sides convex, maximum width at middle; two minute teeth at base of striae 3 and 4, much closer to each other than to elytral base; humeral callus shagreened; striae wide and deep at base, with strong isolated punctures, becoming narrower on disc. Legs: hind femora moderately incrassated, maximum width 1.8 times that of mesofemur; meso- and lateroventral margins carinate, mesoventral carina with well developed, acute preapical denticle; hind tibia apically strongly widened (2.2 times wider than at base), with dorsomesal and ventral carinae complete, lateral rather strong but apparently not reaching base; apex of tibia with mucro 2.6 times shorter than maximum tibia width, lateral denticle wide, less than half as long as mucro, dorsal denticles about one fourth of mucro. First metatarsomere without ventro-apical denticle. Abdomen: ventrite 5 strongly emarginate, its length medially about 2/5 of maximum ventrite length; ventrite 1 measuring almost 3/4 total abdomen length, without particular arrangement of setae or patch of short setae. Last visible ab-

dominal tergite shield-shaped, 1.1 times longer than wide at base, with apex not strongly turned under. Genitalia: Median lobe (Fig. 1) of moderate length, slender but strongly widened apically (maximum width excluding basal hood / total length = 0.17); basal hood short oval, not emarginate proximally; ventral valve transverse, strongly modified, transparent (feebly sclerotized), acutely triangular medially, with two lateral lobes bearing each a pair of long setae; dorsal valve braced by wide, strongly sclerotised ring; internal sac strongly wrinkled transversally in basal half, then smooth, with very small number of small sensilla; saccus with three moderately elongate dented sclerites and three strong spines; distal bulb separated from saccus by series of short hyaline spines, gonopore oval, surrounded by minute needles. Basal strut (Fig. 2) with feeble transparent keel; lateral lobes cleft to almost half their length; apex of parameres with six long setae. Spiculum gastrale (Fig. 3) strongly sclerotized, its distal part U-shaped.

Female. Unknown.

Etymology – The specific epithet (masculine adjective) is from latin adjectives *aereus*, brass or copper colour and *maculatus*, dotted.

Biology – No identified host plant.

Comments – In the absence of biological or molecular data, the inclusion of new species in the *B. mendosus* species-group may seem audacious. However, purely morphological arguments in favour of this hypothesis are very strong: small size of the adult, which fits the usually very small size of Desmodieae seeds; elytral pattern similar to that found in several other species, particularly in *B. meibomiaca*, a species that feeds in *Dendrolobium umbellatum* seeds in India (ARORA 1980) and Vietnam (DELOBEL 2010b); ornamentation of saccus consisting in a small number of dented sclerites and spines (usually 2 to 4 in Asian Desmodieae-feeding bruchines). However, the peculiar shape of the ventral valve in *B. aereomaculatus* sheds a doubt on its inclusion in the Desmodieae-feeding group of species.

Bruchidius oculosus sp. n.

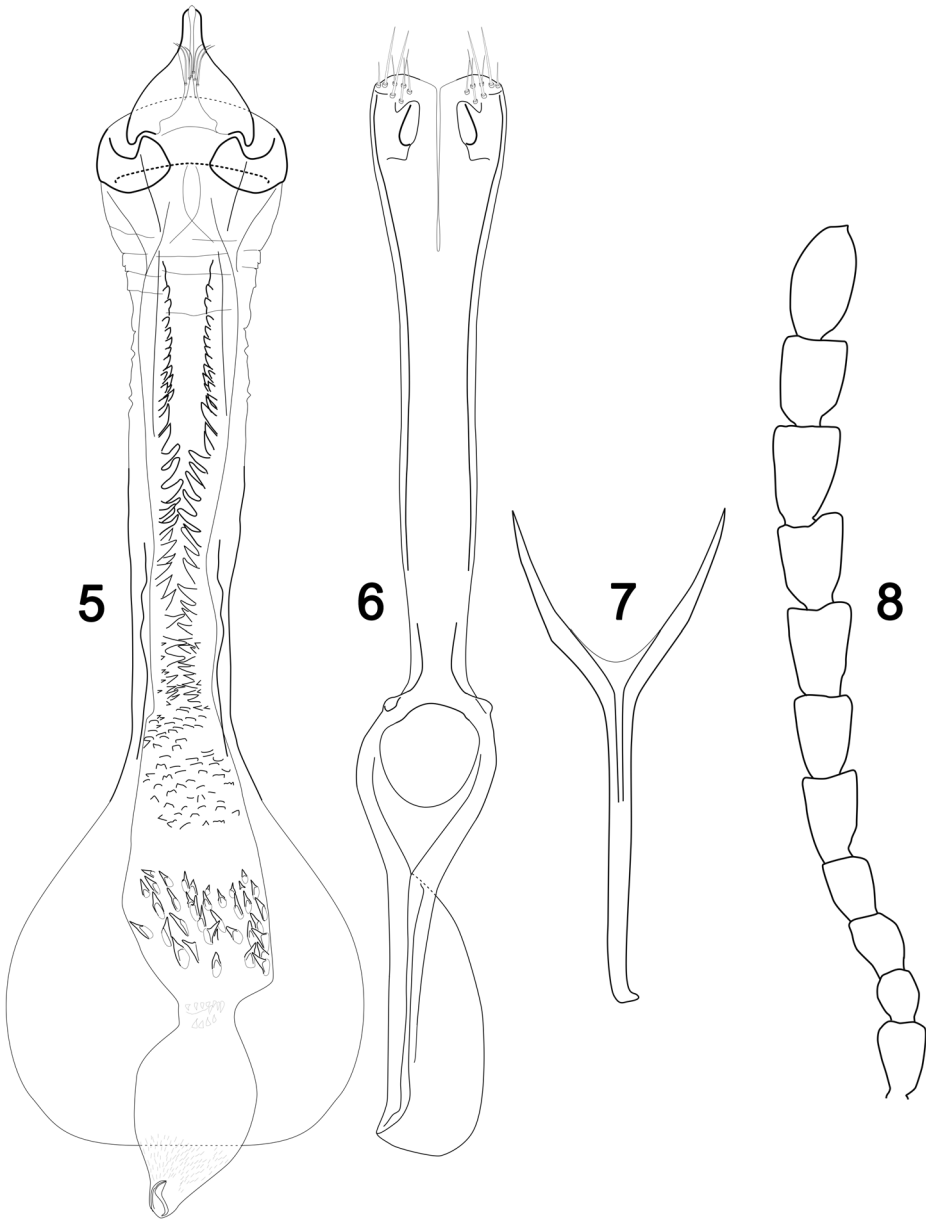
(Figs 5–8)

Type material – Thailand: Nan Province, Mae Charim District. Holotype (male): “Thailand, Prov. Nan, above Mae Charim waterfall” “6.XI.2004, M. Földvári, A. Orosz & L. Papp”, HNHM. Paratype: 1 female, same data as holotype, but 7–8.XI.2004, HNHM.

Diagnosis – Body moderately stout, 1.7 times longer than deep, pygidium (last visible tergite) almost vertical. External morphology similar to *B. meibomiaca*. It differs mainly in eye size (widely separated in *B. meibomiaca*, almost contiguous in *B. oculosus*), length of antennae (in male slightly longer than half body length in *B. meibomiaca*, as long as body in *B. oculosus*), colour of posterior

legs (testaceous with base of femur or tibia darkened in *B. meibomiaca*, almost entirely black in *B. oculosus*).

Description – Male. Length (pronotum to pygidium): 1.5 mm; width: 1.0 mm. Integument black, antennae and four anterior legs testaceous, except extreme apex of last antennomere and base of femora, darkened; posterior legs black except extreme apex of femora and tibiae reddish, and brownish tarsi becoming testaceous towards apex; elytra and abdomen entirely black. Dorsal vestiture made of whitish (light grey) setae, with copper-coloured (light brownish) markings, arranged in a pattern similar to that seen in *B. aereomaculatus*, except for a more striking, whiter fringe surrounding the dark lateral spot, particularly on interstriae 6 to 8. Last visible tergite whitish, with basal triangle of denser white setation. Head: eyes large, maximum head width about 1.5 times width behind eyes; eyes separated at their closest by only 0.08 times head width including eyes; face triangular, with distance between posterior rim of eyes and apex of clypeus / minimum distance between eyes = 9.1; eye moderately cleft, width at bottom of sinus composed of 8 ommatidia; carina on frons well defined, shining. Antennae (Fig. 8) long, measuring 1.4 mm, almost as long as body length; antennomeres 1–4 submoniliform, 5 slightly widened apically, 5–10 about 1.4 times longer than wide, 11 oval ($L/W = 2.0$). Length of antennomeres: 1.5; 1; 1.3; 1.3; 1.6; 1.7; 1.9; 1.8; 2.0; 1.8; 2.5. Pronotum: wider at base than long ($W/L = 1,3$), slightly campaniform; apex briefly and feebly margined laterally, no oblique impression on sides of basal lobe. Punctuation on disc large, ocellate, intermixed with dense smaller punctures. Elytra slightly wider than pronotal base, 1.1 times longer than combined width, their sides convex, maximum width beyond middle; two minute teeth at base of striae 3 and 4, closer to each other than to elytral base; humeral callus shining; striae narrow, well defined, interstriae densely punctuate. Legs: hind femora moderately incrassate, maximum width twice that of mesofemur; meso- and lateroventral margins carinate, mesoventral carina with minute preapical denticle; hind tibia strongly widened apically (2.2 times wider than at base), with dorsomesal, ventral and lateral carinae rather strong, apparently reaching base; apex of tibia with mucro strong, about half as long as maximum tibia width, lateral and dorsal denticles minute. First metatarsomere with small acute ventro-apical denticle. Abdomen: ventrite 5 strongly emarginate; ventrite 1 measuring 70% of total abdomen length, without particular arrangement of setae or patch of short setae. Last visible abdominal tergite shield-shaped, 1.2 times longer than wide at base, its apex not strongly turned under. Genitalia: median lobe (Fig. 5) of moderate length, slender but strongly widened apically (maximum width excluding basal hood / total length = 0.16); basal hood short oval, not emarginated basally; ventral valve subtriangular, well sclerotised, with wide base, its apex obtuse and rounded; dorsal valve braced by wide, strong-



Figs 5–8. *Bruchidius oculosus* sp. n., 5 = median lobe, 6 = lateral lobes, 7 = spiculum gastrale, 8 = male antenna

ly sclerotized ring; internal sac with two strands of gradually stronger teeth, followed by small hyaline teeth and scales; saccus with 35 to 40 small to medium-sized spines; distal bulb separated from saccus by series of short hyaline spines, gonopore oval, surrounded by minute needles. Basal strut (Fig. 6) with wide and strong keel; lateral lobes cleft to 27% their length; their apices moderately wide, with dense fluff and seven long setae; spiculum gastrale (Fig. 7) slender, Y-shaped.

Female. Similar to male, but elytral dark markings more extensive, almost black. Antennae shorter, with antennomeres 6–10 almost square. Ventrite 5 not notched, last visible tergite flat, triangular.

Etymology – The specific epithet (adjective masculine) is a latin adjective meaning “with eyes”.

Biology – No identified host plant.

Comments – Clear-cut differences in genital morphology exist with *B. meibomiaca*: ventral valve is acutely triangular in the latter, widened basally and obtuse apically in *B. oculusus*; proximal part of internal sac with a much higher number of sclerotized teeth, and saccus lined with numerous acute spines in *B. oculusus*, absent in *B. meibomiaca*. Median lobe ornamentation shows closer relationship with *B. phuanensis*, but ventral valve shape is strikingly different. In two species showing only minor differences in external morphology with *B. oculusus*, namely *B. nebulatus* Delobel, 2010 and *B. vinhanensis* Delobel, 2010, the median lobe shows three large sclerites instead of being lined with small spines.

KEY TO MALES OF THE SOUTHEAST ASIAN *BRUCHIDIUS* *MENDOSUS* SPECIES-GROUP

Considering that most (if not all) species presently known to exist in Vietnam and India or Sri Lanka are probably also present in Thailand, we present a key that should enable the identification of a significant proportion of Thai species. It is mainly based on colour characteristics of both integument and setation, and provides a practical way of identifying male specimens, especially those bred from *Desmodieae* seeds. In some cases however, examination of genitalia will be found necessary. It is based on a key previously published for Vietnam (DELOBEL 2010*b*), to which are added species reported posteriorly. Our current knowledge of the geographic distribution of these 20 species is given in brackets.

- | | | |
|---|---|----|
| 1 | Antennae yellowish to light brown, sometimes darkened medially or with apex of terminal antennomeres darkened | 2 |
| – | Antennae black or dark brown, with base testaceous or reddish (including specimens with 3–5 basal antennomeres reddish ventrally); elytral integument black | 13 |

- 2 Base of posterior femora black, rest reddish-brown 3
 – Posterior legs entirely black; sometimes a red tinge on mesal side and/or tarsi more or less reddish 8
 3 Integument of elytra entirely black, with two basal teeth 4
 – Integument of elytra partly testaceous or brown (sometimes at extreme apex only) 5
 4 Larger species (1.7 mm), antennae light testaceous; antennomeres 1–3 moniliform (India, Vietnam) *B. meibomiaca* Arora, 1980
 – Smaller species (1.4 mm), antennae light brown with apical half darkened; antennomeres 1–4 moniliform (Vietnam) *B. alacer* Delobel, 2010
 5 Integument of elytra mostly black, only extreme apex testaceous 6
 – Entire disc of elytra testaceous 7
 6 Basal half of metafemora black (India, Vietnam) *B. desmodei* Arora, 1980
 – Only extreme base of metafemora black (Thailand)
 ***B. aereomaculatus* sp. n.**
 7 Large species (2 mm), with pronotum partly brown; elytron with two basal teeth (Vietnam) *B. dendrolobii* Delobel, 2010
 – Smaller species (1.5 mm), with black pronotum; elytron with one very small basal tooth (Vietnam) *B. christiae* Delobel, 2010
 8 Antennae more or less darkened centrally, last antennomere lighter than preceding ones (Vietnam) *B. nebulatus* Delobel, 2010
 – Antennae testaceous, last antennomeres sometimes darkened 9
 9 Minimum distance between eyes less than 0.1 head width, antennae as long as body. Posterior femora black, tibiae and tarsi reddish (Thailand)
 ***B. oculusus* sp. n.**
 – Face wider (about 0.2 head width or more), antennae about 70% body length 10
 10 Small species (1.2–1.5 mm) 11
 – Larger species (1.6–2.4 mm). Elytra with well-defined copper-coloured dots 12
 11 Elytra whitish with three ill-defined, copper-coloured transverse bands. Apex of tarsi at least partly dark testaceous (Vietnam)
 B. vinhanensis Delobel, 2010
 – Elytra light grey with copper-coloured dots and whitish spots. Tarsi entirely black (Vietnam) *B. alysicarpi* Delobel, 2010
 12 Internal sac without any large sclerite (Vietnam)
 B. phuanensis Delobel, 2010
 – Internal sac with three large dented sclerites (Vietnam)
 B. hoangi Delobel, 2014
 13 Posterior legs entirely black 14

- Posterior legs partly reddish or brown 20
- 14 Elytral vestiture variegated, whitish with dark markings 15
- Elytral vestiture uniform 19
- 15 Antennae long, measuring about 90% body length 16
- Antennae short, measuring 70% body length or less 17
- 16 Antennomere 5 entirely black. Black area on side of elytra small, ill-defined (India, Nepal, Sri Lanka, Thailand, Vietnam)
- B. anderssoni* Decelle, 1975 (specimens with black posterior legs)
- Antennomere 5 partly yellowish. A large and well defined black area beyond middle of elytra (Vietnam) *B. madaguiensis* Delobel, 2014
- 17 Internal sac without odd roof- or gutter-like sclerite, but a pair of small dented sclerites (India, Thailand) *B. compositus* Arora, 1977
- Internal sac with a pair of small dented sclerites and one roof- or gutter-like sclerite 18
- 18 Roof-like sclerite of internal sac S- or boomerang-shaped (Sri Lanka, Vietnam) *B. brincki* Decelle, 1975
- Roof-like sclerite of internal sac proximally widened and dented (India, Vietnam) *B. minutissimus* (Motschulsky, 1858)
- 19 Elytral base with a small tooth; antennomeres 5–10 wider than long (India, Nepal, Vietnam) *B. mussooriensis* Arora, 1980
- Elytral base without noticeable tooth; antennomeres 5–10 longer than wide (Bhutan, India, Iran, Myanmar, Nepal, Thailand, Vietnam, Yemen)
- B. mendosus* (Gyllenhal, 1839)
- 20 Smaller species (1.2–1.3 mm), elytra elongate (1.2 times longer than wide together), with small basal tooth or blunt tubercle. Antennae almost as long as body (excluding head), apical antennomeres black; posterior tarsi black (India, Nepal, Sri Lanka, Thailand, Vietnam)
- B. anderssoni* Decelle, 1975 (specimens with posterior legs partly red)
- Larger species (1.7–1.8 mm), elytra short (1.05 times longer than wide together), with 2 distinct basal teeth. Antennae shorter, antennomeres dark brown; pronotum black with only a few yellow and whitish spots; posterior tarsi reddish (Vietnam) *B. urariae* Delobel, 2010

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