

# Stuttgarter Beiträge zur Naturkunde

## Serie A (Biologie)

Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart

Stuttgarter Beitr. Naturk.	Serie A	Nr. 572	6 S.	Stuttgart, 15. 6. 1998
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### *Scytomaria*, a new genus of Cryptophagidae (Coleoptera) from the Nepal Himalayas<sup>\*)</sup>

By Georgy Lyubarsky, Moscow

With 6 figures

Summary

A new genus of Cryptophagidae, *Scytomaria* n.gen. (type species: *himalaica* n.sp.), is described from the Nepal Himalayas. This genus differs from other genera by the following features: 3-segmented antennal club with 3rd segment very elongated; median process and transverse ridge of the mentum present; gular sutures present; antennal grooves on head and prosternum absent; transverse line on the vertex of the head absent; pronotum with narrow marginal bead laterally and basally; prosternum without parallel lines, procoxal cavity closed internally and partially closed externally; metasubcoxal lines absent; tarsal formula 555; tarsomeres not lobed.

#### Zusammenfassung

Eine neue Gattung der Cryptophagidae, *Scytomaria* n.gen. (Typus-Art: *himalaica* n.sp.), wird aus dem Nepal Himalaya beschrieben. Diese Gattung unterscheidet sich von anderen Gattungen durch folgende Merkmale: 3gliedrige Antennenkeule, davon das 3. Glied sehr verlängert; Medianfortsatz und Querkiel auf dem Mentum vorhanden; Gularnähte vorhanden; Antennengruben auf Kopf und Prosternum fehlen; Querlinie auf dem Kopfscheitel fehlt; Pronotum mit engem Rand lateral und basal; Prosternum ohne Parallellinien; Procoxalhöhle innen geschlossen und außen teilweise geschlossen; Metasubcoxallinien fehlen; Tarsenformel 555; Tarsalglieder nicht gelappt.

#### 1. Introduction

In recent years some new genera of Cryptophagidae were described from Nepal by LESCHEN (1996) (*Asternodea*, *Striatocryptus*) and by SEN GUPTA & PAL (1980) (*Himascelis*). Additionally, some new species of the genus *Anitamaria* Leschen 1996

<sup>\*)</sup> Results of the Himalaya Expeditions of J. MARTENS, no. 218. – For no. 217 see: Bonner zool. Beitr. 47, 1997. – J. M. sponsored by Deutscher Akademischer Austauschdienst and Deutsche Forschungsgemeinschaft.

are prepared for description by the author from the same country. Thus, Nepal possesses a quite diverse, autochthonous fauna of Cryptophagidae (besides the synanthropic species).

The present paper is based on the material lent to me by Dr. W. SCHAWALLER (Staatliches Museum für Naturkunde in Stuttgart). In this material a further new genus of Cryptophagidae was discovered. Its description is given below. The material described is deposited in the Staatliches Museum für Naturkunde in Stuttgart (*SMNS*) and the Zoological Museum of Moscow University (*ZMUM*).

Acknowledgments: I am very grateful to Dr. SCHAWALLER (Stuttgart) for the loan of the material, to Dr. ANTROPOV (Moscow) checking the English of an earlier draft, and to the Russian Foundation Fundamental Studying for awarding me a subsidiary grant (97-0448661).

## 2. Taxonomic part

### *Scytomaria* n.gen. (figs 1–6)

Type species: *Scytomaria himalaica* n.sp. (by monotypy).

#### Diagnosis

Body form elongate (fig. 1); pronotum more or less parallel-sided; greatest width at middle. Antennal club 3-segmented with 3rd segment very elongated. Median process and transversal ridge of mentum present. Gular sutures present. Antennal grooves on head and prosternum absent. Transverse line on vertex of head absent. Pronotum with lateral marginal bead narrow, present at base. Prosternum without parallel lines, procoxal cavity closed internally and partially closed externally; meta-subcoxal lines absent. Tarsal formula 555; tarsomeres not lobed.

#### Description

Head not constricted behind eye; boss on front of head absent; clypeus on the same plane as frons; tubercle on margin of frons absent; antennal grooves absent. Antenna with 3-segmented club; antennomere III 2times longer than antennomere IV; apical antennomere 2times longer than penultimate antennomere (fig. 1). Mandible with one dorsal tubercle; basal sensory pores present. Eye prominent, well developed; ocular setae absent. Line on vertex of the head absent. Subgenal spine absent. Median process on mentum present; transversal ridge on mentum present. Gular sutures present.

Pronotum parallel-sided, greatest width at middle; lateral marginal bead narrow, present in basal half; anterior margin straight; pronotal angularity absent; lateral margin with small knob at middle. Prosternal area punctate. Hypomerone with notch near procoxal cavity (fig. 2). Prosternum in front of procoxae short. Prosternal process without parallel lines; antennal grooves absent. Procoxal cavity closed internally, partially closed externally. Mesepimeron without pit, not fused with mesosternum. Mesosternum with parallel lines and procoxal rest; glandular duct present. Width of mesosternal process (fig. 3) equal to  $\frac{2}{3}$  of that of mesocoxa, the process with lateral processes. Metasternum without longitudinal line; intercoxal process as long as wide; glandular duct present.

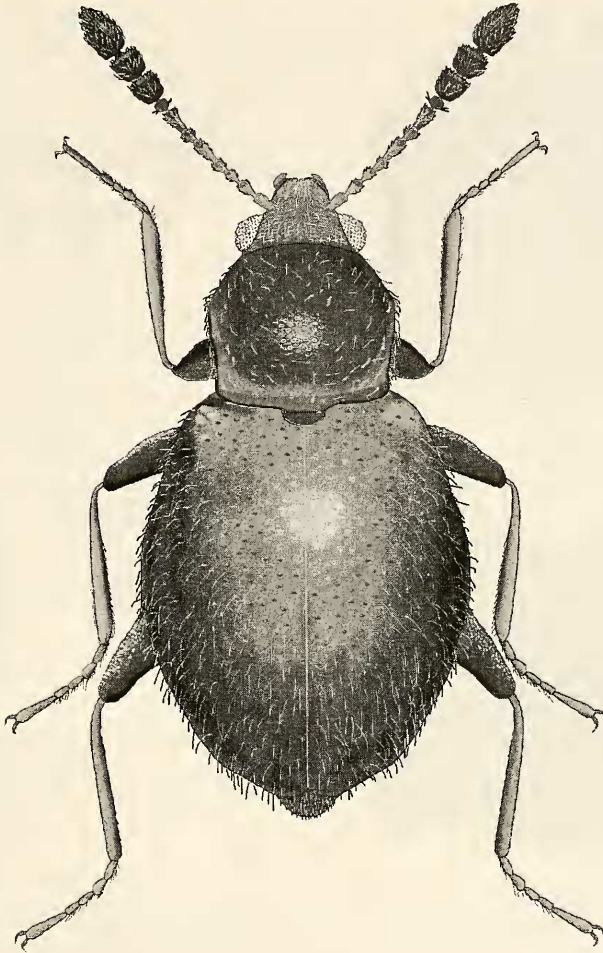


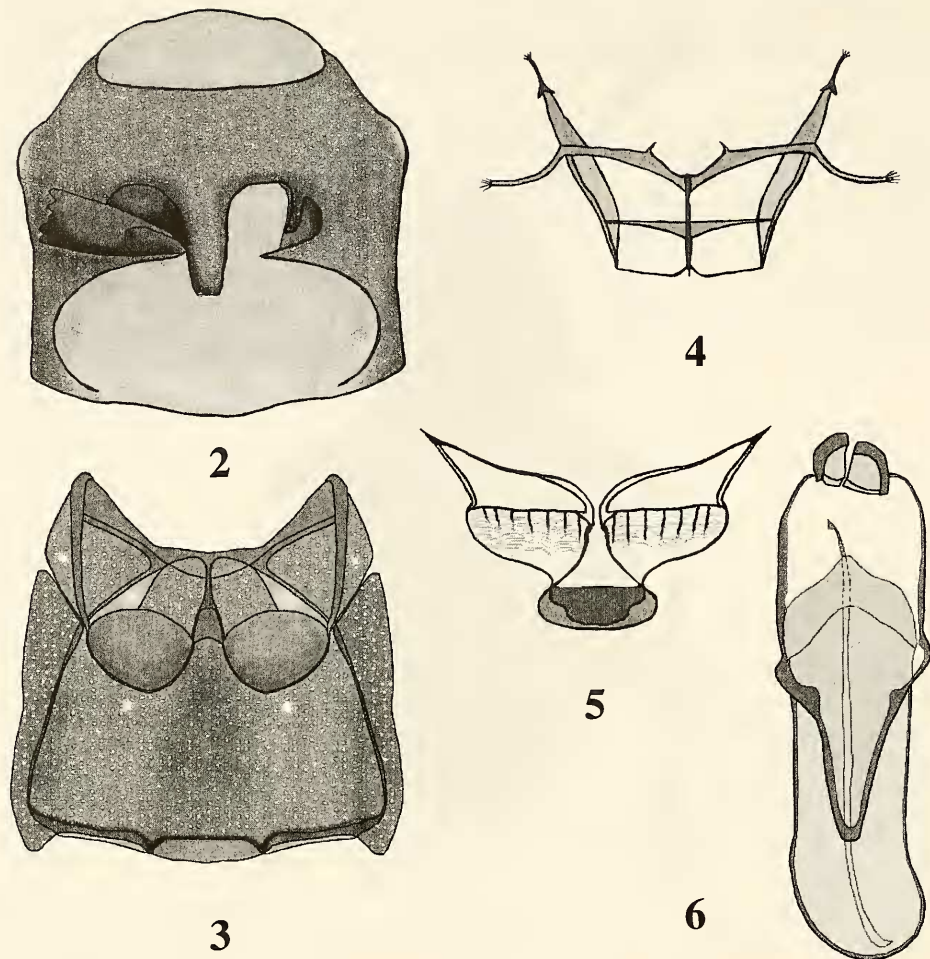
Fig. 1. *Scytomaria* n.gen. *himalaica* n.sp., dorsal view. — Body length 1.6–2.0 mm.

Microsculpture of the praescutum elongate variolate (fig. 5). Setae on anterior edge of the praescutum present. Scutellum transverse. Punctate striae on elytron absent. Epipleuron present to level of posterior margin of ventrite I. Hind wing present, marginal setae of leading edge extending beyond level of RA + ScP vein; basal blinding patch present;  $Cu_{3+4} + AA_{1+2}$ ,  $MP_4 + CuA_1$ ,  $MP_3$ ,  $CuA_{3+4}$  vein absent.

Tibia without apical fringe of spines, with two spurs. Tarsal formula 555 in both sexes; tarsomeres of male with modified setae, slightly or not lobed.

Ventrite I without diskal glandular duct; one lateral glandular duct present on ventrites I–IV.

Male: Orientation of aedeagus vertical. Apex of endophallus rounded. Arms of tegmen narrowly fused at the distal ends. Paramere loosely articulated (fig. 6). Spiculum gastrale narrow, asymmetrical.



Figs 2–6. *Scytomaria* n.gen. *himalaica* n.sp. – 2. Prosternum; – 3. metasternum; – 4. met-endosternite; – 5. praescutum; – 6. aedeagus.

#### Discussion

The genus *Scytomaria* n.gen. belongs to the subfamily Atomariinae. It clearly differs from the tribe Hypocoprini, however its place in the more evolved tribes Cryptafricini and Atomariini within the Atomariinae requires further study. A separate study will be devoted to this question, because the new genus cannot be placed in all existing tribes of Atomariinae (LESCHEN 1996) without detailed discussion. Here it is possible to make only preliminary remarks, concerning the differences of *Scytomaria* n.gen. from various groups of Atomariinae.

The differences from the Hypocoprini are the following: transverse line on vertex of the head absent (present in Hypocoprini); metasternal glandular ducts present (absent in Hypocoprini); one glandular duct at lateral edge of each ventrite present (absent in Hypocoprini).

The differences from *Ephistemus* and related genera are the following: prothorax parallel-sided (widened basally in *Ephistemus*); external closure of procoxal cavity partially closed (completely open posteriorly in *Ephistemus*); orientation of aedeagus in the abdomen vertical (horizontal in *Ephistemus*); arms of tegmen fused and forming an elongate process (arms separate and process shorter in *Ephistemus*); spiculum gastrale of male narrow (broad in *Ephistemus*); apical tibia fringe of spines absent (present in *Ephistemus*); basal binding patch of hind wing present (poorly developed in *Ephistemus*).

*Scytomaria* n.gen. is similar to the Atomariini in the following features: punctation in prosternal area present; median process of mentum present; transverse ridge on mentum present; glandular ducts on mesosternum present; surface of ventrite V unmodified, apex of endophallus rounded basally, hind wing binding patch present.

A strong similarity is observed also with Cryptafricini in the following features: apical antennomere 2times longer than previous antennomere; gular sutures present; pronotal bead present in basal half; procoxal cavity closed internally; pit on mesepimeron absent; concentration of setae at present pores of glandular ducts; glandular ducts on disk of ventrite I absent; orientation of aedeagus vertical; arms of tegmen fused and forming an elongate process; spiculum gastrale of male narrow; setae on anterior edge of praescutum present; marginal setae of leading edge of hind wing extending beyond level of RA + ScP vein; apical fringe of tibial spines absent.

### *Scytomaria himalaica* n.sp.

Holotype (♂): Nepal, Myagdi Distr., upper Myagdi Khola N Dobang, 2800–3100 m, 22.–24. V. 1995 leg. MARTENS & SCHAWALLER (SMNS).

Paratypes: Same data, 6 specimens SMNS, 3 specimens ZMUM.

### Description

Length 1.6–2.0 mm. Bicolorous, prothorax dark brown, elytra light brown. Body form parallel-sided, elongate, elytra convex laterally and much wider than prothorax. Body setae depressed, decumbent, short.

Head transverse, with prominent, hemispherical, finely faceted eyes, somewhat densely covered with small punctures, the latter on the average one diameter apart from their lateral neighbours. Antennae long, extending beyond the basis of prothorax. Segment I not curved, conical; segment II equal on length to the 1th, slightly thinner; segment III somewhat shorter and thinner; segment IV 1.5times shorter than 3rd; segment V very elongate and thin, clearly longer than 3rd; segment VI equal to 4th; segment VII equal to 3rd, but thinner; segment VIII subquadrate; segment IX lengthened; segment X slightly transverse; segment XI lengthened, longest of all antennomeres.

Prothorax broadest before middle, where it is 1.2times as broad as long, slightly shagreened, somewhat densely covered with small punctures, latter on the average one diameter apart from their lateral neighbours. Anterior edge straight, posterior edge slightly convex, with a weak lobe medially. Prothorax without basal pits, with deep transverse impression, lateral edge slightly bordered, slightly concave in basal half.

Elytra strongly convex, at shoulders much wider than prothorax, 2.4–2.6times as long as prothorax and about 1.2–1.3times as long as combined width, with humeral

prominence, without humeral tooth, slightly shagreened, puncture in basal part hardly stronger or equal to those on pronotal disk and about one diameter apart from their lateral neighbours on the average. Elytra separately rounded apically, apex of abdomen visible from dorsal view. Hind wings fully developed.

Aedeagus as in fig. 6.

#### Habitat

Mature subalpine forest with *Tsuga*, *Abies*, *Betula* and *Rhododendron*: soil litter and rotten wood.

#### 3. References

- RESCHEN, R. A. (1996): Phylogeny and revision of the genera of Cryptophagidae (Coleoptera: Cucujoidea). – Kans. Univ. Sci. Bull. **55**: 549–634; Lawrence.
- SEN GUPTA, T. & PAL, T. K. (1980): Ergebnisse der Bhutan Expedition 1972 des Naturhistorischen Museums in Basel. Coleoptera: Fam. Cryptophagidae, genus *Himascelis*. – Ent. basiliensia 5: 42–44; Basel.

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ISSN 0341-0145

Schriftleitung: Dr. Wolfgang Seeger, Rosenstein 1, D-70191 Stuttgart  
Gesamtherstellung: Gulde-Druck GmbH, D-72072 Tübingen



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Stuttgarter Beitr. Naturk.	Ser. A	Nr. 573	13 S.	Stuttgart, 31. 8. 1998
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### Revision of the Genus *Bruchidius*. Part I: The *B. seminarius* Group (Coleoptera: Bruchidae)

By Klaus-Werner Anton, Emmendingen

With 12 figures and 1 table

#### Summary

The present paper deals with results of studies of the *Bruchidius seminarius* group. Important morphological characters and general distribution of the actually known 12 species are presented (Tab. 1, Figs. 1–12). *Bruchidius borowieci* n.sp. is described. *B. fulvescens* (Baudi) and *B. taorminensis* (Blanchard) are valid species. *B. riedeli* Borowiec is a **new synonym** of *B. fulvescens* (Baudi). *B. zampettii* Borowiec is a **new synonym** of *B. anobioides* (Baudi). *B. femoralis* (Gyllenhal) has shown to be a **new synonym** of *B. seminarius* (Linnaeus).

#### Zusammenfassung

Die vorliegende Arbeit befaßt sich mit Ergebnissen von Untersuchungen der *Bruchidius seminarius*-Gruppe. Wichtige morphologische Merkmale und die generelle Verbreitung der aktuell bekannten 12 Arten werden dargestellt (Tab. 1, Abb. 1–12). *Bruchidius borowieci* n.sp. wird beschrieben. *B. fulvescens* (Baudi) und *B. taorminensis* (Blanchard) sind valide Arten. *B. riedeli* Borowiec ist ein **neues Synonym** von *B. fulvescens* (Baudi), *B. zampettii* Borowiec ist ein **neues Synonym** von *B. anobioides* (Baudi). *B. femoralis* (Gyllenhal) erweist sich als **neues Synonym** von *B. seminarius* (Linnaeus).

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## 1. Introduction

The *Bruchidius seminarius* group contains bruchid species with very similar characteristics which often cause difficulties in differentiation. BOROWIEC (1985) gives descriptions, redescriptions and figures of male genitalia and records 10 species with the following combination of characters: body oval; antenna short in both sexes without sexual dimorphism; elytral base with or without tubercle; hind tibia strongly broadened, mucro distinctly longer than coronal denticles; male genitalia: median lobe short with ventral valve triangular, internal sac subbasally with distinct sclerites, lateral lobes simple without keel at their base. ALDRIDGE & POPE (1986), BOROWIEC (1987), BOROWIEC & ANTON (1993), and DECELLE & LODOS (1989) give further information on the *B. seminarius* group.

*Bruchidius apicipennis* (Heyden), mentioned in BOROWIEC (1985) as a member of the *B. seminarius* group, shows a different combination of characters and belongs to the *B. apicipennis* group.

The present paper adds further details to the knowledge of this group. Additional diagnostic characters are a distinct spot of denser and longer hairs at the basal middle of the male abdominal sternite one in 7 species (Tab. 1). This character is similarly developed in all species of the *B. albosparsus* group.

A general picture of the important characters and the global distribution of the species of the *B. seminarius* group is given in Tab. 1 and Figs. 1–12. In the following part a new species is described: *Bruchidius borowieci*. Further on, additional synonymies and less known species are treated concerning types and misidentifications. A redescription of *B. taorminensis* is given. Finally, an identification key for all species of the *B. seminarius* group is presented, based on external morphological and colour characters.

## 2. Material and abbreviations

About 2500 specimens including types from 34 institutional and private collections have been studied. A part of them are used throughout the text with following abbreviations.

<i>CAPT</i>	Collection of A. P. J. A. TEUNISSEN (Vlijmen, The Netherlands);
<i>CCM</i>	Collection of C. MAUS (Freiburg, Germany);
<i>CGG</i>	Collection of G. GILLERFORS (Varberg, Sweden);
<i>CHH</i>	Collection of H. HEBAUER (Rain, Germany);
<i>CIR</i>	Collection of I. RYDH (Olofström, Sweden);
<i>CKWA</i>	Collection of the author;
<i>CRB</i>	Collection of R. BEENEN (Nieuwegien, The Netherlands);
<i>CWV</i>	Collection of W. VELDKAMP (Eibergen, The Netherlands);
<i>DEIC</i>	Deutsches Entomologisches Institut (Eberswalde, Germany);
<i>HNHM</i>	Hungarian Natural History Museum (Budapest, Hungary);
<i>MHNG</i>	Muséum d'Histoire Naturelle (Genève, Switzerland);
<i>MNHN</i>	Muséum National d'Histoire Naturelle (Paris, France);
<i>MRSN</i>	Museo Regionale di Scienze Naturali (Torino, Italy);
<i>MZLU</i>	Museum of Zoology, Lund University (Lund, Sweden);
<i>NIRS</i>	Naturhistoriska Riksmuseet (Stockholm, Sweden);
<i>NMPC</i>	National Museum of Natural History (Praha, Czech Republic);
<i>SMNS</i>	Staatliches Museum für Naturkunde (Stuttgart, Germany);
<i>ZMHB</i>	Museum für Naturkunde, Humboldt-Universität (Berlin, Germany);
<i>ZMPA</i>	Museum of the Institute of Zoology, Polish Academy of Science (Warszawa, Poland).

### 3. Acknowledgements

I wish to express my cordial thanks to Prof. LECH BOROWIEC (Wrocław, Poland) for helpful discussion, information, and making some type and other material available. Thanks are also due to all the curators of the institutions and the private persons mentioned above for the loan of types and material.

### 4. Treated species

#### 4.1. *Bruchidius anobioides* (Baudi) (Tab. 1, Fig. 6)

1886 *Mylabris anobioides* Baudi, Nat. Sicil., 6 (4–5): 72.

1989 *Bruchidius anobioides* (Baudi) in DECELLE & LODOS, Bull. Anns Soc.r.belge Ent., 125: 179.

1985 *Bruchidius zampettii* Borowiec, Pol. Pismo ent., 55: 774–776; n. syn.

1989 *B. zampettii* sensu DECELLE & LODOS, Bull. Anns Soc.r.belge Ent., 125: 199.

1993 *B. zampettii* sensu BOROWIEC & ANTON, Ann. Upp. Siles. Mus., Ent., 4: 134–135.

Type material examined:

Lectotype *Mylabris anobioides*: ♂ (MRSN), Cypro, des. M. F. ZAMPETTI.

Holotype *Bruchidius zampettii*: ♂ (ZMPA), Lebanon, Nahr el Kelb near Beirut, 11. V. 1961, leg. RIEDEL.

Paratype *Bruchidius zampettii*: ♀ (ZMPA), Turkey, 3 km N of Side, Manavgat – Antalya Highway, 27. V. 1979, leg. MALKIN.

Remarks: The examination of the types revealed that *B. zampettii* is a **junior synonym** of *B. anobioides*. See also remarks on *B. fulvescens* (chapter 4.4.).

#### 4.2. *Bruchidius bituberculatus* Schilsky (Tab. 1, Fig. 9)

1905 *Bruchidius pusillus* var. *bituberculatus* Schilsky, in KÜSTER, Käf. Eur., 41: no. 90.

1985 *B. bituberculatus* Schilsky in BOROWIEC, Pol. Pismo ent., 55: 773–774.

Type material examined:

Lectotype: ♂ (ZMHB), Syria, herewith designated.

Paralectotypes: 2 ♂♂ (ZMHB), Syria; 1 ♂ (ZMHB), Graecia, herewith designated.

#### 4.3. *Bruchidius borowieci* n.sp. (Tab. 1, Fig. 11)

Holotype: ♂ (SMNS), Jordan, Arda Road, 700 m, 14. VI. 1957, leg. KLAPPERICH; genitalia slide no. 240895 I.

Paratypes: ♂ (CKWA), ♀ (SMNS), dates as holotype. – ♀ (SMNS), dates as holotype but 5. IV. 1957. – ♂ (SMNS), Jordan, Wadi Shaib, 17. X. 1956. – ♂ (SMNS); Jordan, Amman, 800 m, 8. IV. 1956. – ♂ (SMNS), ♀ (CKWA), same dates but 30. V. 1957. – ♂ (SMNS), Jordan, Amman, 1. VI. 1968. – ♂ (SMNS), same dates but Fuhes, 1000 m, 14. X. 1956. – ♂ (SMNS), ♀ (CKWA); same dates but 23. VI. 1957. – ♂ (SMNS), Jordan, Romana, Zerkatal, 21. X. 1957. – 3 ♂♂ (SMNS, CKWA), Jordan, Tulkarem, 8. VII. 1956; all leg. KLAPPERICH. – ♂ (CKWA), Turkey, Seyhan near Pozanti, 2100 m, 24. V. 1990, leg. WARCHALOWSKI. – ♀ (CKWA), Turkey, Corum, SW of Gümüs, 25. V. 1989, leg. RIEDEL. – ♂ (CKWA), Greece, Pelopones, Nemea, 13. VI. 1986, leg. HEBAUER. – ♂ (CKWA), Spain, Cataluna, Barcelona, Caldetas, 28.–29. IV. 1985, leg. SIEDE. – ♂ (CKWA), Spain, Mallorca, Sierra del Norte, Valldemosa, 10. III. 1994, leg. WESIĄK. – 2 ♂♂ (MHNG, CKWA), Algeria, Gde Kabylie, Djebel Bou-Berak, 350 m, 19. V. 1988, leg. BESUCHET, LÖBL & BURCKHARDT. – ♀ (SMNS), Italy, Sicilia, Pacchino, 4. IV. 1942.

Etymology: This species is dedicated to Prof. LECH BOROWIEC (Wrocław, Poland), who revised the *B. seminarius* group.

Description: Length 1.4–2.0 mm (from pronotal apex to elytral apex), width 0.8–1.0 mm (greatest width of combined elytra). Body shape oblong-oval. Cuticle colour black; antennal segments 1–5 (sometimes 6 and 7), fore and mid leg except basal part of femur yellowish-red, fore and mid tarsi apically completely darkened. Pubescence moderately dense, elytron with striking grey-whitish hairs forming two mostly distinct irregular transverse bands, one each subbasally and subapically. – Head of moderate length, with shining median keel. Antenna extending to humeral callus; antennal segments 1–4 cylindrical, 5 subserrate, 6–10 serrate, 5–10 becoming steadily broader, 5 about as broad as long, 6–10 square. – Pronotum about 1.2 times wider than long; sides convex in apical half, nearly parallel in basal half; disc densely double punctured. – Elytra about 1.3 times longer than their combined width, stria 4 basally with flat to sharp, minute tubercle (rarely absent); intervals with irregular row of flat punctures. – Hind femur with small preapical spine on inner margin. Hind tibia with lateral carina well developed; mucro twice as long as coronal denticle at extension of lateral carina.

Male: Pygidium uniformly pubescent. Basal middle of sternite 1 with spot of denser and longer hairs; sternite 5 emarginate. Genitalia: ventral valve of median lobe triangular, weakly curved in ventral direction; internal sac with 5–8 subbasal, short, denticle-like sclerites, their oval base at least as wide as length of their pins (Fig. 11).

Female: Pygidium with large, polished, nearly hairless area. Sternite 5 not emarginate.

Host plant: Unknown.

Remarks: Externally this species is very similar to *B. pusillus*. *B. pusillus* presents a moderate pattern of standard type with greyish, yellowish and brownish hairs on elytra, as well as less pubescent, brilliant area on female pygidium. Characters of male genitalia separate both species distinctly with regard to ventral valve (in *B. pusillus* more elongate, with an acute apex) and concerning denticles (*B. pusillus* shows them in larger quantity and with circular base). See also Table 1. – Two Algerian paratypes and one paratype from Sicily were erroneously recorded as *B. bituberculatus*, two paratypes from Greece and Spain as *B. pusillus* in BOROWIEC & ANTON (1993).

#### 4.4. *Bruchidius fulvescens* (Baudi) (Tab. 1, Fig. 7)

1886 *Mylabris rufisura* var. *fulvescens* Baudi, Nat. Sicil., 6 (4–5): 68.

1962 *Bruchidius rufisurus* a. *fulvescens* Baudi in LUCA, Mem. Soc. Hist. Nat., N.S., 7: 36; as synonym of *B. rufisurus* (Allard).

1985 *B. anobioides* sensu DECELLE & LODOS, Bull. Anns Soc. belge Ent., 125: 179.

1993 *B. anobioides* sensu BOROWIEC & ANTON, Ann. Upp. Siles. Mus., Ent., 4: 102.

Type material examined:

Type *Mylabris rufisura* var. *fulvescens*: ♂ (MRSN), Syria, Kaifa, REITTER, des. K.-W. ANTON. Holotype *Bruchidius riedeli*: ♂ (ZMPA), Lebanon, Nahr el Kelb near Beirut, 11. V. 1961, leg. RIEDEL n. syn.

Remarks: DECELLE & LODOS (1989) and BOROWIEC & ANTON (1993) identified this species as *B. anobioides*, after comparison with specimens deposited in the PIC collection (MNHN). Thus the conclusion was reached that *B. riedeli* is a junior synonym of *B. anobioides* (BOROWIEC & ANTON 1993). However, recent studies of

the types of *M. rufisura* var. *fulvescens* and *B. riedeli* yielded the following results: *fulvescens* gets the rank of a valid species, specimens of *B. anobioides* of the PTC collection are true *B. fulvescens*, *B. riedeli* is now a **new synonym** of *B. fulvescens*.

#### 4.5. *Bruchidius pusillus* (Germar) (Tab. 1, Fig. 8)

1824 *Bruchus pusillus* Germar, Insect. spec. nov.: 181.

1905 *Bruchidius pusillus* (Germar) in SCHILSKY, in: KÜSTER, Käf. Eur., 41: no. 90.

1868 *Bruchus Stierlini* Allard, Ann. Soc. Ent. Belg., 11: 117.

1905 *Bruchidius pusillus* var. *stierlini* (Allard) in SCHILSKY, in: KÜSTER, Käf. Eur., 41: no. 90.

1993 *B. bituberculatus* sensu BOROWIEC & ANTON, Polskie Pismo ent., 55: 106; partim.

Type material examined:

Holotype *Bruchus pusillus*: ♂ (DEIC), Dalmatia, coll. KRAATZ.

Type *Bruchus Stierlini*: ♀ (MNHN), Sicilia, ex Museo E. ALLARD 1899, coll. OBERTHUR-DES-BROCHERS.

Remarks: SCHILSKY (1905) cited *B. stierlini* for the first time as a synonym of *B. pusillus*. He recorded also *B. seminarius*, now a valid species (BOROWIEC 1985, 1987), as a synonym of *B. pusillus*. An examination of the types confirmed SCHILSKY's opinion. – Two specimens from Sicily (Messines) recorded by BOROWIEC & ANTON (1993) as *B. bituberculatus* are misidentifications of true *B. pusillus*.

#### 4.6. *Bruchidius seminarius* (Linnaeus) (Tab. 1, Fig. 5)

1767 *Bruchus seminarius* Linnaeus, Syst. nat., I (II): 605.

1905 *Bruchidius pusillus* var. *seminarius* sensu SCHILSKY, in: KÜSTER, Käf. Eur., 41: no. 90.

1833 *Bruchus femoralis* Gyllenhal, in: SCHOENHERR, Gen. Curc., I: 51; n. syn.

1913 *B. varius* var. *femoralis* sensu PTC, in: JUNK & SCHENKLIN, Col. Cat., 55: 55.

1957 *Bruchidius varius* var. *femoralis* sensu LUKJANOVITCH & TER-MINASSIAN, in: Fauna SSSR, 24 (1): 162.

Type material examined:

Neotype *Bruchus seminarius*: ♂ (ZMPA), Dalmatia, Romolac near Dubrovnik, 26. VIII. 1959, leg. RIEDEL, des. L. BOROWIEC.

Type *Bruchus femoralis*: ♂ (NHRS), Dalmatia, DEJEAN, coll. SCHOENHERR.

Remarks: Hitherto treated as a variation of *B. varius*, the examination of the type of *B. femoralis* showed it to be a **junior synonym** of *B. seminarius*. – *B. femoralis* is also listed as a valid species by LUKJANOVITCH & TER-MINASSIAN (1957). However, the figure of male antenna in this publication proves it to be a species of the *B. varius* group.

#### 4.7. *Bruchidius suratus* (Motschulsky) (Tab. 1, Fig. 12)

1874 *Bruchus suratus* Motschulsky, Bull. Soc. Imp. Nat. Moscou, 46: 233.

1989 *Bruchidius suratus* (Motschulsky) in DECELLE & LODOS, Bull. Annl. Soc. r. belge Ent., 125: 195–196.

1984 *Bruchidius seminarius* sensu ZAMPETTI, Fragm. Ent., 17 (2): 402.

? 1985 *Bruchidius loebli* Borowiec, Pol. Pismo ent., 55: 777.

Type material examined:

Holotype *Bruchidius loebli*: ♀ (MHNG), Iran, Fars, Dasht-e-Arjan, 1650 m, 29°40'N/51°59'E, 1. VI. 1974, leg. SENGLER.

Additional material: ♂ (CIR), Turkey, Antalya, S Elmali, 1200 m, 21.–28. V. 1991; – ♀ (NMPC), Iran, 7 km NW Shul, 2100 m, 17. VI. 1973, Exp. Nat. Mus. Praha.

Remarks: The type(s) of *B. suratus* is (are) still unavailable. The original description includes a comparison with *B. seminarius*. Supposed that both species are closely related, *B. suratus* is a member of *B. seminarius* group. *B. suratus* differs from the remaining species of this group in a scarcely spotted, predominant dark pubescence and nearly completely black cuticle (see Tab. 1). These characters agree with the description of *B. loebli*. The study of the type of *B. loebli* confirms the suspicion of DECELLE & LODOS (1989), who noted a possible synonymy with *B. suratus*. Only few specimens of *B. suratus* are known (DECELLE & LODOS 1989, BOROWIEC & ANTON 1993, ANTON et alii 1997).

#### 4.8. *Bruchidius taorminensis* (Blanchard) (Tab. 1, Fig. 10)

1844 *Bruchus taorminensis* Blanchard, Ann. Soc. Ent. Fr., 2 (2): 83.

1962 *Bruchidius taorminensis* Blanchard in LUCA, Mem. Soc. Hist. Nat., N.S. 7: 37; as synonym of *B. seminarius* (L.).

1993 *B. bituberculatus* sensu BOROWIEC & ANTON, Pol. Pismo ent., 55: 106; partim.

1994 *B. seminarius* sensu DECELLE, Bull. Annl. Soc. r. belge Ent., 130: 132; partim.

Type material examined:

Type: ♂ (MNHN), Taormine, Juillet, coll. BLANCHARD.

Material: ♂ (CKWA), Algeria, Amouchas, 2. VI. 1986, leg. WARCHALOWSKI. – ♂ (MHNG), Algeria, Gde Kabylie, L'Arbatache sur El Kseur, 300–400 m, 18. V. 1988, leg. BESUCHET, LÖBL & BURCKHARDT. – ♂ (CKWA), Algeria, Oran, Sidi near Abbès, leg. PLASON. – ♂ (CKWA), Algeria, Setif, 6. V. 1986, leg. WARCHALOWSKI. – ♂ (CKWA), Algeria, Ziarna, 13. VI. 1986, leg. WARCHALOWSKI. – ♂ (CKWA), Dalmatia, Vinjerac, 2. VII. 1981, leg. HEBAUER. – 1 ♂ 3 ♀♀ (MHNG, CKWA), France, Bouche du Rhône, La Couronne. – ♂ (CKWA), France, NW Orange, Barjac, 1.–5. VI. 1993, leg. MAUS. – ♀ (CRB), Italy, Sardegna, Sassari, Alghero, V. 1990, leg. BEENEN. – ♂ (MHNG), Italy, Sicilia, Ficuzza, VII. 1938, coll. CURTI. – ♂ (CKWA), Italy, Sicilia, Messina, 15. VII. 1942. – ♂ (CKWA), Italy, Toscana, Orbetello, V. 1988, leg. WERNER. – ♀ (CWV), Portugal, Algarve, Albufeira, 25. III. 1993, leg. VELDkamp. – ♀ (CAPT), Portugal, Algarve, Messines, 19. V. 1985, leg. TEUNISSEN. – 4 ♂♂, 1 ♀ (CHH, CKWA), Spain, Alicante, Alcoy, 11. V. 1992, leg. HEBAUER. – ♂ (CKWA), Spain, Andalucía, Malaga, Hanzoina near Coin, 24. III. 1987, leg. SIEDE. – ♀ (CKWA), Spain, Cabrilla, Yunguerra, 1400 m, 18. V. 1988, leg. WARCHALOWSKI. – ♀ (CAPT), Spain, Cadiz, Tarifa, IV. 1991, leg. POOT. – ♂ (CKWA), Spain, Cataluna, Barcelona, Caldetas, 28.–29. IV. 1985, leg. SIEDE. – 4 ♂♂ (CKWA), Spain, Granada, Sierra Almenara, Castillo de Tebas, 2. V. 1985, leg. SIEDE. – ♂ (CGG), Spain, Gran Canaria, Portales, 17. XI. 1988, leg. GILLERFORS. – ♂ (CKWA), Spain, Malaga, Cortes d. l. Frontera, 21. V. 1988, leg. WARCHALOWSKI. – ♀ (CKWA), Spain, Malaga, Loya, 21. V. 1993, leg. HEBAUER. – 3 ♂♂ (CHH, CKWA), Spain, Malaga, Sierra Almijara, 15. V. 1992. – 2 ♂♂ (CHH), Spain, Malaga, Osuna, Arroyo del Peinado, 22. V. 1993, leg. HEBAUER. – ♂ (CKWA), Spain, Mallorca, Alcudia, S Albufera, 12. VI. 1995, leg. MAUS. – 5 ♂♂ (CKWA), Spain, Mallorca, Inca–Sensles, 26. IV. 1992, leg. SIEDE. – ♂ (CCM), Spain, Mallorca, Peguera, 4.–17. VI. 1995, leg. MAUS. – ♂ (CCM), same data but Carla Fornells, 13. VI. 1995, leg. MAUS. – 4 ♂♂, 1 ♀ (CKWA), Spain, Mallorca, Pollensa, 10. VI. 1990, leg. DÖBERL. – ♀ (CKWA), Spain, Mallorca, Porto di Alcudia, Puig de St. Marti, 25. IV. 1992, leg. SIEDE. – ♂ (CKWA), Spain, Mallorca, Ses Salines, Bany de St. Joan, 26. IV. 1992, leg. SIEDE. – 1 ♂, 2 ♀♀ (CKWA), Spain, Tenerife, Barranco de Erques, 850 m, 27. III.–3. IV. 1995, leg. ANTON. – ♀ (CKWA), Spain, Tenerife, Las Mercedes, 6. IV. 1995, leg. ANTON. – ♂ (MZLU), Spain, Tenerife, Las Mercedes, 22. XII. 1982, leg. TÖRNVALL. – 2 ♂♂, 5 ♀♀ (CKWA), Spain, Tenerife, SE Pedro Alvarez, 550 m, 25. III.–2. IV. 1995, leg. ANTON. – ♀ (CKWA), Spain, Sierra Nevada, Ugijar, 14. V. 1992, leg. HEBAUER. – 2 ♂♂ 1 ♀ (CKWA), Spain, Valencia, Jativa, 1. V. 1985, leg. SIEDE. – 3 ♂♂, 3 ♀♀ (CKWA), Tunisia, env. Hammamet, 14. IV.–3. V. 1988, leg. HEMMANN. – ♀ (HNHM), Tunis, (1) 904, leg. UJHELYI. – ♂ (MZLU), Tunisia, 4 km E Ain Sebaa, 23 km E Tabarka, 9. IV. 1994, leg. DANIELSSON. – ♂ (MZLU), Tunisia, 25 km S Kairouan, 11. IV. 1994, leg. DANIELSSON.

Redescription: Length: 1.8–2.6 mm, width: 1.0–1.5 mm. Body shape oval. Cuticle colour black; antennal segments 1–5, fore and mid leg except femoral base yellowish-red; fore and mid tarsi apically somewhat darkened; remaining antennal segments, apex of hind femur and hind tibia indistinct reddish transparent. Pubescence moderately dense, elytron variegated with predominant greyish and yellowish hairs. – Head of moderate length, with smooth, shining keel. Antenna extending to humeral callus of elytra; antennal segments 1–4 cylindrical, 5 subserrate, 6–10 serrate, 5–10 becoming steadily broader, 5 nearly as wide as long, 6–10 square. – Pronotum about 1.3 times as wide as long; sides becoming steadily more convex from base to apex; disc densely double punctured. – Elytra about 1.2 times longer than their combined width, without basal tubercles; intervals with irregular row of flat punctures. – Hind femur with minute preapical spine on inner ventral margin. Hind tibia with lateral carina well developed; mucro twice longer than coronal denticle at extension of lateral carina.

Male: Pygidium uniformly pubescent. Basal middle of sternite one with spot of denser and longer hairs; sternite 5 emarginate. Genitalia: ventral valve of median lobe triangular, weakly curved in ventral direction; internal sac with 3–7 subbasal, long denticle-like sclerites; pin of sclerites distinctly longer than width of their base.

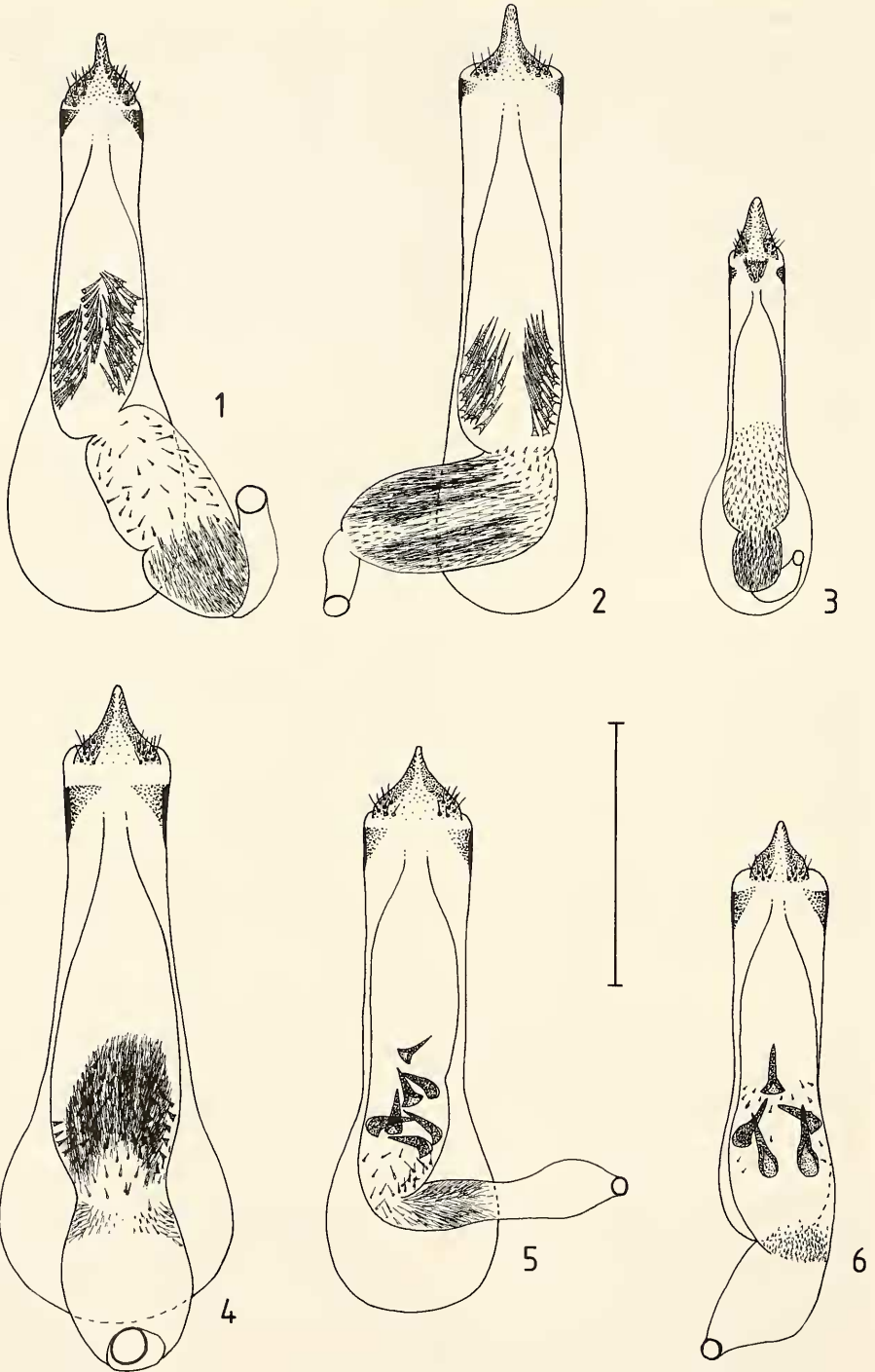
Female: Pygidium with large, polished, nearly hairless area. Sternite 5 not emarginate.

Host plant: Unknown.

Remarks: PIC (1913) recorded *B. taorminensis* as a synonym of *B. seminarius*. This was followed by LUCA (1962), who listed this species correctly within the genus *Bruchidius*. Re-examination revealed, that *B. taorminensis* is a valid species. Concerning affinities see Tab. 1 and remarks about *B. borowieci*. *B. taorminensis* is a Western vicariant of *B. bituberculatus*. Their differentiation becomes somewhat delicate respective to male genitalia, when the number of denticle-like sclerites of the internal sac attains 6 or 7. However, in *B. taorminensis* the median lobe is slender, the ventral valve is always less sclerotized and slimmer than in *B. bituberculatus*. Externally, both species are easily to distinguish in any case by presence (*B. bituberculatus*) or absence (*B. taorminensis*) of the tubercle at the elytral base.

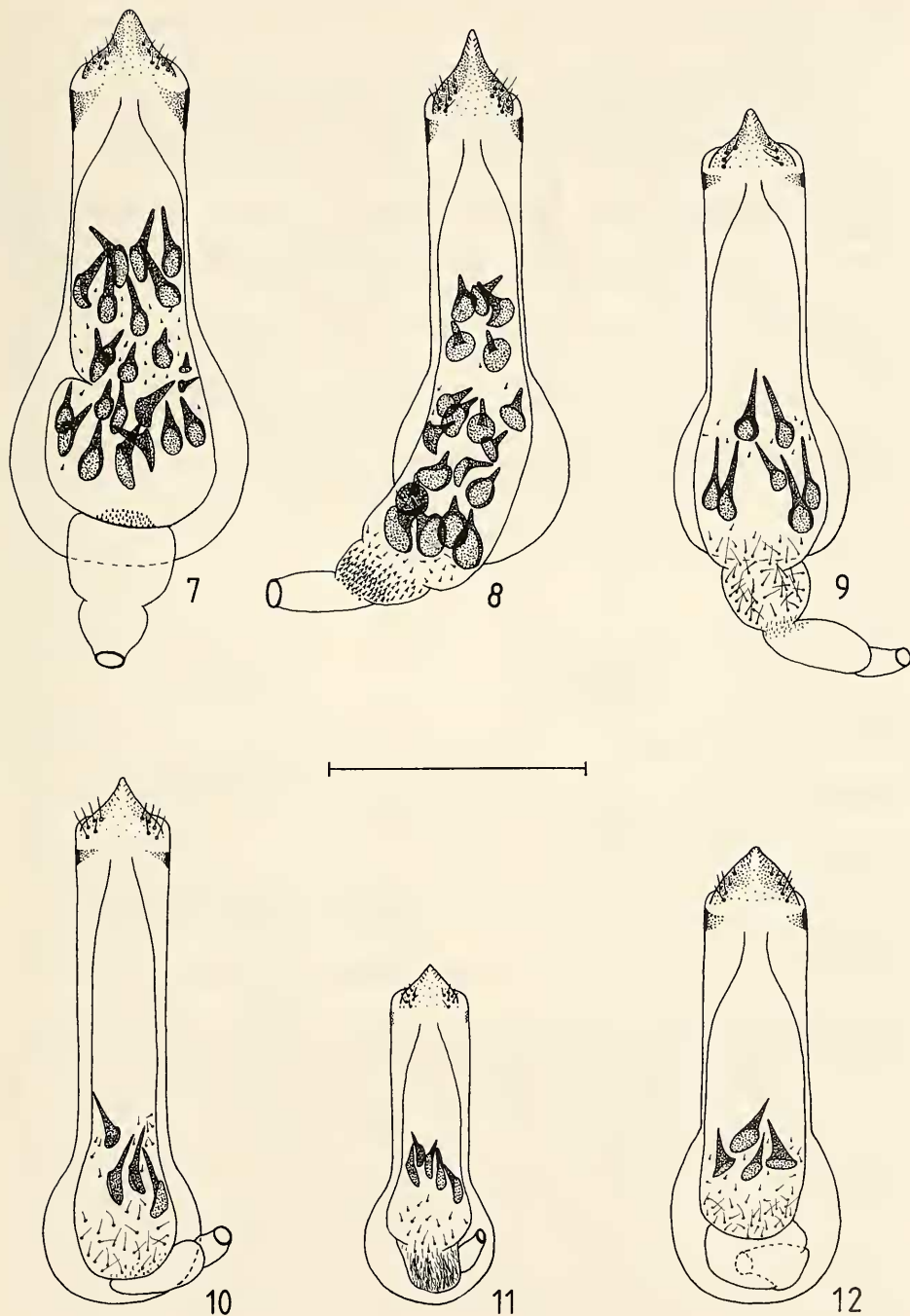
### 5. Identification key (*Bruchidius seminarius* group)

- 1 Elytral stria 4 basally with distinct simple hooked tubercle, rarely hidden by pubescence (dorso-lateral view!). Male abdominal sternite 1 with distinct spot of denser and longer hairs at basal mid ..... 2
- Elytral stria 4 basally with indistinct or without tubercle. Male sternite 1 with or without spot of denser and longer hairs ..... 3
- 2 Elytral pubescence strictly uniform, greyish to pale olive-yellowish. Female pygidial pubescence uniform, without hairless area. Cuticle colour varying: black with antennal segments 1–4 (5), fore and mid leg except tarsi and femoral base yellowish-red, to completely yellowish-red or red-brown. 1.5–2.2 mm. Eastern Mediterranean from Greece to Turkey and Israel ..... (see chapter 4.1.) *anobioides*
- Elytral pubescence variegated, greyish, yellowish and brownish; sometimes with predominant greyish hairs. Female pygidium with polished, nearly hairless area. Cuticle colour black; antennal segments 1–4 (5), fore and mid leg except femoral base yellowish-red; often fore and mid tarsi darkened; rarely femoral apex and hind tibia partially reddish (specimens from Jordan to Iran). 1.7–2.5 mm. Eastern Mediterranean from Croatia to Iran and Israel ..... (4.2.) *bituberculatus*



Figs. 1-6. Median lobe of species of the *Bruchidius seminarius* group. - 1. *B. villosus*; - 2. *B. lividimanus*; - 3. *B. mulsanti*; - 4. *B. rufisurus*; - 5. *B. seminarius*; - 6. *B. anobioides*. - Scale = 0.5 mm.





Figs. 7–12. Median lobe of species of the *Bruchidius seminarius* group. – 7. *B. fulvescens*; – 8. *B. pusillus*; – 9. *B. bituberculatus*; – 10. *B. taorminensis*; – 11. *B. borowieci* n.sp.; – 12. *B. suratus*. – Scale = 0.5 mm.

Tab. 1. Morphological characters and distributions of the species of the *Bruchidius seminarius* group.

	<i>villosus</i> (Fabricius, 1792)	<i>lividimanus</i> (Gyllenhal, 1833)	<i>mulsanti</i> (Brisout, 1863)	<i>rufisurus</i> (Allard, 1883)	<i>seminarius</i> (Linnaeus, 1767)	<i>anobioides</i> (Baudi, 1886)
Hair spot on male sternite 1:	absent	absent	absent	absent	absent	present
Ventral valve:						
● shape	subtriangular	subtriangular	triangular	subtriangular	subtriangular	subtriangular
● apex	acuminate	acuminate	elongate	acute	acute	acute
● curvature (lateral view)	strongly	strongly	weakly	strongly	weakly	strongly
Sclerites:						
● form	spines	spines	needles	needles + spines	moderate denticles	moderate denticles
● number	numerous	numerous	numerous	numerous	3-7	3-7
Disc of female pygidium:	dead, uniform pubescent	dead, uniform pubescent	dead, uniform pubescent	dead, longitudinal spotted	dead, uniform	dead uniform
Cuticle colour:						
● elytron	black	black	black	black	black	red to black
● antennal base, fore + mid leg	red	red	red	red	red	red
● hind leg	black	partially red to completely black	black	black	partially red to completely black	red to black
Elytron:						
● tubercle	absent	absent	absent	absent	absent to very indistinct	distinct
● pubescence	uniform	variegated to nearly uniform	more or less variegated	longitudinal spotted	variegated	uniform
● shape (lateral view)	flatted	flatted	strongly convex	moderately convex	moderately convex	moderately convex
Body shape: (lateral view)	short-oval	short-oval	short-oval	oblonge-oval	moderately oval	moderately oval
Distribution:	Europe, Turkey, Crimea	southern-central Europe, Circum-mediterranean	northern Mediterranean to Central Asia	eastern Mediterranean	Central Europe, Circum-mediterranean	eastern Mediterranean

Tab. 1. (continued).

	<i>fulvescens</i> (Baudi, 1886)	<i>pusillus</i> (Germar, 1824)	<i>borowieci</i> n.sp.	<i>bituberculatus</i> Schilsky, 1905	<i>taorminensis</i> (Blanchard, 1844)	<i>suratus</i> (Motschulsky, 1874)
Hair spot on male sternite 1:	present	present	present	present	present	present
Ventral valve:						
● shape	subtriangular	subtriangular	triangular	triangular	triangular	nearly triangular
● apex	acute	acute	acute	acute	acute	acute
● curvature (lateral view)	strongly	weakly	weakly	weakly	weakly	weakly
Sclerites:						
● form	moderate denticles	short denticles	short denticles	oblonge denticles	oblonge denticles	moderate denticles
● number	16-26	14-25	5-8	6-15	3-7	2-6
Disc of female pygidium:	brilliant, less pubescent	brilliant, less pubescent	polished, nearly hairless	polished, nearly hairless	polished, nearly hairless	polished nearly hairless
Cuticle colour:						
● elytron	red to black	black	black	black	black	black
● antennal base, fore + mid leg	red	red	red	red	red	more or less black
● hind leg	red to black	black	black	black, rarely partially black	nearly black	black
Elytron:						
● tubercle	absent	absent to indistinct	indistinct, rarely absent	distinct	absent	absent
● pubescence	uniform	variegated	transverse banded	more or less variegated	more or less variegated	scarcely spotted
● shape (lateral view)	moderately convex	moderately convex	moderately convex	moderately convex	moderately convex	moderately convex
Body shape (lateral view):	moderately oval	oblonge oval	oblonge oval	moderately oval	moderately oval	moderately oval
Distribution:	eastern Mediterranean	southern-central Europe, northern Mediterranean	southern Mediterranean	eastern Mediterranean	western Mediterranean	eastern Mediterranean

- 3 Body shape short-oval (dorsal view!); body length at most 1.4 times as long as combined width of elytra. Male sternite 1 without spot of denser hairs. Female pygidial pubescence uniform. Elytral stria 4 basally without tubercle ..... 4
- Body shape moderate to oblong-oval; body length at least 1.5 times as long as combined elytral width. Male sternite 1 with or without spot of denser hairs. Female pygidium uniform pubescent or with less pubescent, brilliant area or with polished, hairless area. Elytral stria 4 basally with or without indistinct tubercle ..... 6
- 4 Dorsal side of body strikingly flattened (lateral view!) ..... 5
- Dorsal side of body strikingly convex. Elytral pubescence variegated. Cuticle colour black; antennal segments 1–5, fore and mid leg except tarsi and femoral base yellowish-red. 1.3–1.9 mm. Northern Mediterranean from Spain and S France to Jordan and Tadjikistan ..... *mulsanti*
- 5 Elytral pubescence usually variegated; rarely rather uniform, greyish to yellowish-brown. Cuticle colour black; antenna and legs varying: at least antennal segments 1–6, fore and mid legs except femoral base reddish, at most antenna and all legs nearly completely reddish. 1.7–2.6 mm. Circummediterranean; Central Europe: S Germany, Austria, Czecho-Slovakia ..... *lividimanus*
- Elytral pubescence uniform, greyish. Cuticle colour black; antennal segments 1–4 (5) ventrally yellowish-red, dorsally reddish with segment 1 darkened; often extreme tibial and femoral apex of fore and mid legs dark reddish 1.7–3.0 mm. Europe: from Great Britain to Spain, Greece and Crimea; Turkey ..... *villosus*
- 6 Pygidium oblique, most part visible (dorsal view!). Elytral pubescence variegated, greyish and pale to straw yellowish; elytra and pygidium with distinct elongated spots of denser hairs. Female pygidium without brilliant or polished area. Male sternite 1 without spot of denser hairs. Elytral stria 4 basally without tubercle. Cuticle colour black; antennal segments 1–4, fore and mid legs except femoral base yellowish-red. 1.6–3.5 mm. Eastern Mediterranean from Greece to Turkey and Israel ..... *rufisurus*
- Pygidium vertical, last part visible ..... 7
- 7 Cuticle colour black; often antennal segments 1–3, fore and mid tibia apically reddish. Pubescence generally dark brown; elytral pubescence scarcely greyish spotted. Female pygidium with nearly hairless, polished area. Elytral stria 4 basally without tubercle. Male sternite 1 with spot of denser hairs at basal mid. 1.9–2.5 mm. Eastern Mediterranean: Turkey, Iran, Israel ..... (4.7.) *suratus*
- At least fore and mid tibia nearly completely, and always antennal segments 1–4 yellowish-red. Elytral pubescence uniformly greyish to yellowish, or variegated, rarely with striking irregular transverse bands ..... 8
- 8 Body shape oblong-oval (dorsal view!); body length about 1.7 times as long as combined width of elytra. Elytral sides parallel. Male sternite 1 with spot of denser hairs ..... 9
- Body shape moderate oval; body length at most 1.6 times as long as combined width of elytra. Elytral sides more convex. Other combination of tarsi and elytral pubescence. Male sternite 1 with or without spot of denser hairs ..... 10
- 9 Elytral pubescence variegated. Cuticle colour black; antennal segments 1–4, fore and mid legs except tarsi and femoral base yellowish-red. Female pygidium with brilliant, less pubescent area. Male sternite 1 with spot of denser hairs at basal mid. Elytral stria 4 basally without (specimens from western Mediterranean) or with indistinct flat to sharp tubercle (specimens from eastern Mediterranean) 1.6–2.3 mm. Northern Mediterranean from E Spain and S France to Iran and Israel; S Central Europe: SE Austria, Hungary, Czecho-Slovakia ..... (4.5.) *pusillus*
- Elytral pubescence with striking greyish hairs forming two transverse, irregular bands, one each subbasally and subapically. Cuticle colour black; antennal segments 1–(4)5, 6(7), fore and mid legs except basal half of femur yellowish-red; fore and mid tarsi apically or completely darkened. Elytral stria 4 basally with indistinct flat to rarely sharp tubercle, rarely without tubercle. 1.4–2.0 mm. Southern Mediterranean: Algeria, Spain (including Mallorca), Italy (Sicily), Greece, Turkey, Jordan ..... (4.6.) *borowieci* n.sp.

- 10 Elytral pubescence uniform, greyish to pale yellowish. Female pygidium with brilliant, less pubescent area. Male sternite 1 with spot of denser hairs at basal mid. Elytral stria 4 basally without tubercle. Cuticle colour varying: black with antennal segments 1–4, fore and mid legs except tarsi and femoral base yellowish-red, to completely red with yellowish antenna and legs. Eastern Mediterranean from Crete to Turkey, Iraq, Jordan, Israel . . . . . (4.4.) *fulvescens*  
– Elytral pubescence variegated . . . . . 11
- 11 Elytral pubescence similar to *B. pusillus*, but paler. Female pygidial pubescence uniform, without polished area. Male sternite 1 without spot of denser hairs. Elytral stria 4 basally without (specimens from western Mediterranean) or with very indistinct, flat tubercle (specimens from eastern Mediterranean). Cuticle colour black; antenna and legs varying: antennal segments 1–4, fore and mid legs except femoral base yellowish-red (often in Central Europe), to antenna completely and legs nearly completely yellowish-red (Mediterranean). 1.5–2.6 mm. Central Europe, Circummediterranean, eastwards to Iran . . . . . (4.6.) *seminarius*  
– Elytral pubescence with predominant greyish and yellowish hairs. Female pygidium with polished, nearly hairless area. Male sternite 1 with spot of denser hairs at basal mid. Elytral stria 4 basally always without tubercle. Cuticle colour black; antennal segments 1–5 (6, 7), fore and mid legs except femoral base yellowish-red; fore and mid tarsi apically somewhat darkened; remaining antennal segments and hind tibia not exactly black, but indistinct reddish transparent; very rarely antenna nearly completely yellowish-red. 1.8–2.6 mm. Western Mediterranean from Canary Islands to Tunisia, to S France and Dalmatia . . . . . (4.8.) *taorminensis*.

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ISSN 0341-0145

Schriftleitung: Dr. Wolfgang Seeger, Rosenstein 1, D-70191 Stuttgart  
Gesamtherstellung: Gulde-Druck GmbH, D-72072 Tübingen



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# Stuttgarter Beiträge zur Naturkunde

## Serie A (Biologie)



Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart

Stuttgarter Beitr. Naturk.	Ser. A	Nr. 574	23 S.	Stuttgart, 31. 8. 1998
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## Leiochrini (Coleoptera: Tenebrionidae) from Borneo

By Wolfgang Schawaller\*), Stuttgart

With 45 figures

### Summary

All known and newly collected species of the tenebrionid tribe Leiochrini from Borneo (Banguey, Brunei, Kalimantan, Sabah, Sarawak) are treated with notes on taxonomy and distribution (51 species). Phylogenetic and biological remarks are added. The following species are described as new: *Stethotrypes crockerensis* n.sp., *Stethotrypes dorotheae* n.sp., *Stethotrypes poringicus* n.sp., *Stethotrypes punggulicus* n.sp., *Stethotrypes sayapensis* n.sp., *Leiochrodes christophi* n.sp., *Leiochrodes kinabaluensis* n.sp., *Leiochrodes merkli* n.sp. and *Leiochrodes smetanai* n.sp. *Derispia xantusi* Kaszab 1946 is considered a new synonym of *Derispia octomaculata* (Westwood 1883).

### Zusammenfassung

Alle bekannten und neu gesammelten Arten der Tenebrioniden-Tribus Leiochrini von Borneo (Banguey, Brunei, Kalimantan, Sabah, Sarawak) werden behandelt mit Angaben zur Taxonomie und Verbreitung (51 Arten). Phylogenetische und biologische Bemerkungen werden angefügt. Neue Arten werden beschrieben, eine Synonymie wird errichtet (Taxa siehe „Summary“).

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\*) Contributions to Tenebrionidae, no. 21. – For no. 20 see: Revue suisse Zool. 105: 375–382; 1998.

## 1. Introduction

The Tenebrionidae are a quite polymorphic family among which the Leiochrini form a relatively uniform tribe, with the body shape and often with a colour pattern looking like coccinellids. They occur mostly in the Oriental and Papuan Regions, a few species live in the African tropics and in Madagascar; they are completely lacking in the Neotropics. KASZAB (1946) presented a taxonomic monograph of this group, later he summarized new records and species for the described 11 partly monotypic, partly species-rich genera (KASZAB 1961a, 1961b, 1961c).

The Tenebrionidae of Borneo in general have never been summarized, only GEBIEN (1914) published several species including a few Leiochrini in a comprehensive paper. In connection with the preparation of an actual check-list of all Tenebrionidae from Borneo including newly collected material I try to summarize in this paper the knowledge about the Leiochrini from that island (now 51 species).

Borneo is treated herein as a name for the complete island in a geographical sense, including the political territories Brunei, the Indonesian Kalimantan and the Malaysian Sabah and Sarawak. Records from the small adjacent island Banguay northeast of Borneo are included. Most of the newly collected material originates from Sabah because of easy access, material from other regions is lesser known (in particular from the bigger Kalimantan), thus our knowledge is far from being complete.

Leiochrini are restricted to humid forests; both adults and larvae occur in soil litter, in rotten wood, on and under barks, feeding very probably on mosses and algae. Thus they are very threatened by cutting primary forests and we must be afraid that many species extinguished before being scientifically discovered.

### Abbreviations

<i>CAO</i>	Collection ANDO, Osaka (Dr. K. ANDO);
<i>CBB</i>	Collection BECVAR, Ceske Budejovice (S. BECVAR);
<i>CBH</i>	Collection BREMER, Heidelberg (Prof. H. J. BREMER);
<i>CSO</i>	Collection SHIBATA, Osaka (Dr. K. ANDO);
<i>HNHM</i>	Hungarian Natural History Museum, Budapest (Dr. O. MERKL);
<i>MHNG</i>	Muséum d'Histoire naturelle, Genève (Dr. I. LÖBL);
<i>SMNS</i>	Staatliches Museum für Naturkunde, Stuttgart (author).

### Acknowledgments

I thank Dr. KIOSHI ANDO (Osaka), STANDA BECVAR (Ceske Budejovice), Prof. Dr. HANS J. BREMER (Heidelberg), Dr. IWAN LÖBL (Geneva) and Dr. OTTO MERKL (Budapest) for the loan of material under their care. The authorities of Sabah Parks kindly permitted field work of the author in autumn 1996, which was supported also by DOROTHEE GRIMM (Würzburg) and Dr. CHRISTOPH HÄUSER (Stuttgart).

## 2. Species list

### 2.1. *Stethotrypes bicornutus* Gebien 1914

Records: Banguay (GEBIEN 1914), KASZAB (1946).

Material: Not seen.

Remarks: This and 4 further species of *Stethotrypes* I have not seen, thus they are not figured in this paper. However, they can be identified quite easily by the figures given in KASZAB (1946, 1961c).

Distribution: Banguay northeast of Borneo.

### 2.2. *Stethotrypes bituberculatus* Kaszab 1946

Records: Southeastern Borneo/Martapura (KASZAB 1946).

Material: Not seen.

Distribution: Borneo.

### 2.3. *Stethotrypes borneensis* Kaszab 1961

Records: Sarawak (KASZAB 1961c).

Material: Sarawak, Kuching, Santubong, 26. III. 1990 leg. RIEDEL, 2 ex. SMNS. – Sarawak, Kuching, Bako NP, 27.–29. III. 1990 leg. RIEDEL, 8 ex. SMNS. – Sarawak, confluence of Sun Oyan and Mujong river, E Kapit, 50 m, 18. V. 1994 leg. LÖBL & BURCKHARDT, 8 ex. MHNG, 1 ex. SMNS. – Kalimantan, Gunung Palung NP, 1°13'S/110°7'E, 18.–28. VII. 1993 leg. MERKL, 1 ex. HNHM (det. MERKL).

Remarks: The elytra of some specimens are dark brown with 2 indistinct reddish spots whereas in the description the elytra are said to be unicoloured dark brown. This is considered to be due to infraspecific variability because the structure of the aedeagus coincides quite well with the figures given in the description (KASZAB 1961: figs 1–2).

Distribution: Borneo.

### 2.4. *Stethotrypes clypealis* Kaszab 1961

Records: Sarawak (KASZAB 1961c).

Material: Not seen.

Distribution: Borneo.

### 2.5. *Stethotrypes crockerensis* n.sp. (figs 1–2)

Holotype (♂): Sabah, Crocker Range NP, NW Keningau, 900–1200 m, 16.–20. XI. 1996 leg. SCHAWALLER (SMNS).

Paratype: Same data as holotype, 1 ♂ SMNS.

Derivatio nominis: Named after the Crocker Range NP.

Diagnosis: To be recognized by the asymmetrical shape of the aedeagus, by the lack of distinct horns on the male head and by unpunctured elytra.

Description: Body shape as usual in the genus, body length 2.5 mm. Dorsal side unicoloured castaneous, head somewhat darker, disc of elytron lighter with on-

ly the sutural part and the lateral sides in the middle darker castaneous as pronotum. Male head (fig. 2) without distinct horns but with distinctly elevated anterior corners of the clypeus, head without tubercles; antenna with the 3 basal antennomeres lighter, antennomere 3 about 1.2 times longer than antennomere 4. Pronotum without peculiarities, without punctation. Elytra shiny and without punctation, lateral margin to be seen in dorsal view only in the anterior half. Legs without peculiarities. Aedeagus (fig. 1) bent in lateral view, penis long and distinctly asymmetrical, of tube-like shape with 2 basal sclerite plates.

Discussion: See *Stethotrypes sayapensis* n.sp. (chapter 2.13.).

### 2.6. *Stethotrypes cruciatus* Kaszab 1961

Records: Sarawak (KASZAB 1961c).

Material: Not seen.

Distribution: Sumatra, Borneo.

### 2.7. *Stethotrypes dorotheae* n.sp. (figs 3–4)

Holotype (♂): Sabah, Mt. Kinabalu NP, Sayap, 1000 m, 25.–29. XI. 1996 leg. SCHAWALLER (SMNS).

Derivatio nominis: Named after DOROTHEE GRIMM (Würzburg) for various support during our joint field work in Sabah.

Diagnosis: To be recognized by the asymmetrical shape of the aedeagus, by broad horns on the male head, by unpunctured elytra and by bigger body size.

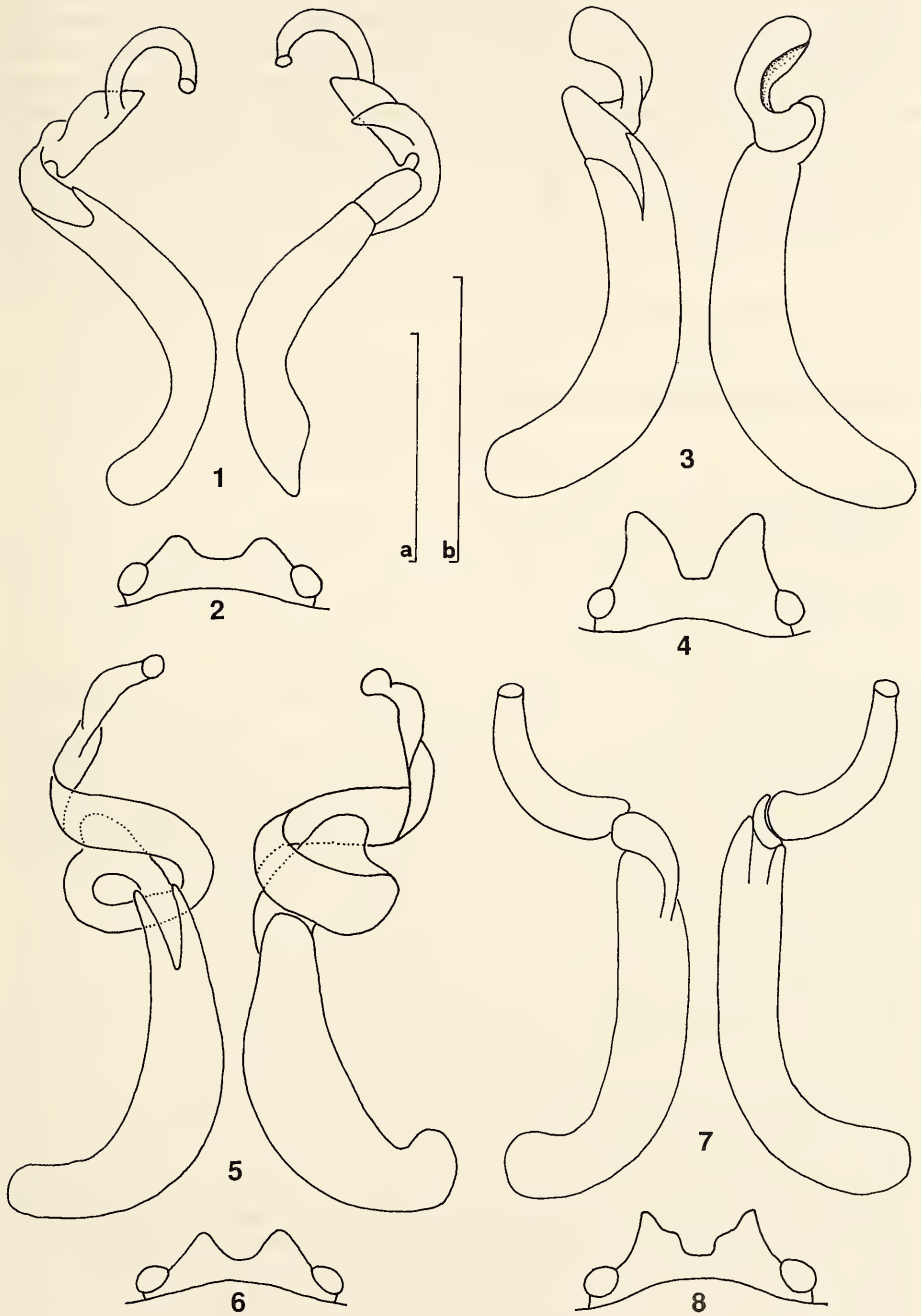
Description: Body shape as usual in the genus, body length 2.8 mm. Dorsal side unicoloured castaneous, head somewhat darker, elytron with 2 indistinctly bordered lighter spots. Male head (fig. 4) with 2 broad and short horns bent somewhat outwards, base of the horns separated in the middle of the clypeus, head without tubercles; antenna with the 3 basal antennomeres lighter, antennomere 3 about 1.1 times longer than antennomere 4. Pronotum without peculiarities, without punctation. Elytra shiny and without punctation, lateral margin to be seen in dorsal view only in the anterior half. Legs without peculiarities. Aedeagus (fig. 3) bent in lateral view, penis short and distinctly asymmetrical like a distorted spoon.

Discussion: See *Stethotrypes sayapensis* n.sp. (2.13.).

### 2.8. *Stethotrypes glaber* Gebien 1914

Records: Kinabalu (GEBIEN 1914); Kinabalu, 1500 m (KASZAB 1946).

Material: Borneo, Baujn, German Mission, 4 ex. HNHM. – Sarawak, Kapit Distr., Rumah Ugap, Sut river, 3.–9. III. 1994 leg. HORÁK, 18 ex. CBH. – Sarawak, Kapit Distr., Sebong, Baleh river, 9.–21. III. 1994 leg. HORÁK, 1 ex. CBH. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 485 m, 21.–29. VIII. 1988 leg. SMETANA, 7 ex. MHNG, 2 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 29. XI.–2. XII. 1996 leg. SCHAWALLER, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Sayap, 1000 m, 25.–29. XI. 1996 leg. GRIMM & SCHAWALLER, 10 ex. SMNS. – Sabah, Bingkor N Keningau, 400–500 m, 19.–20. XI. 1996 leg. SCHAWALLER, 5 ex. SMNS. – Sabah, Crocker Range NP, NW Keningau, 900–1200 m, 16.–20. XI. 1996 leg. GRIMM & SCHAWALLER, 3 ex. SMNS. – Sabah, Crocker Range NP, Mawar waterfall, 17. VI. 1996 leg. KODADA, 7 ex. SMNS. – Sabah, Crocker Range NP, Longkogunan, 750–850 m, 19.–21. VI. 1996 leg. KODADA, 1 ex. SMNS. – Sabah, Crocker Range, Gunung Emas, 15.–27. IV. 1993 leg. JENIŠ & STRBA, 3 ex. CBH. – Sabah, Crocker Range, Gunung Emas, 500–1900 m, 6.–21. V. 1995 leg. JENIŠ, 3 ex. CBH.



Figs 1-8. Aedeagus and male head. - 1-2. *Stethotrypes crockerensis* n.sp.; - 3-4. *Stethotrypes dorotheae* n.sp.; - 5-6. *Stethotrypes poringicus* n.sp.; - 7-8. *Stethotrypes sayapensis* n.sp. - Scales: 1.0 mm (*a*: head, *b*: aedeagus).

Remarks: This species seems to have a similar colour variability as *borneensis*. The specimens of the type series are said to be unicoloured brownish, whereas the new specimens from Poring have the elytra dark brown with 3 indistinct reddish spots (2 smaller spots in the basal part, 1 bigger spot in the medial part), and the new specimens from Bingkor have the elytra brownish with different lighter longitudinal spots. The aedeagi of all available males are built as figured in KASZAB (1946: figs 13–14).

Distribution: Borneo.

### 2.9. *Stethotrypes latifrons* (Pic 1921)

Records: Kinabalu (KASZAB 1946).

Material: Not seen.

Distribution: Borneo (type locality Kinabalu).

### 2.10. *Stethotrypes longicornis* (Pic 1921)

Records: Sarawak (KASZAB 1961c).

Material: Western Sarawak, Quop, 16. III. 1914 leg. BRYANT, 1 ex. HNHM.

Distribution: Malayan Peninsula, Sumatra (type locality), Borneo.

### 2.11. *Stethotrypes poringicus* n.sp. (figs 5–6)

Holotype (♂): Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 23.–24. XI. 1996 leg. SCHAWALLER (SMNS).

Paratypes: Same data as holotype, 9 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, eastern ridge trail, 790 m, 16. VIII. 1988 leg. SMETANA, 20 ex. MHNG, 5 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, Langanan creek, 885 m, 22. VIII. 1988 leg. SMETANA, 1 ex. MHNG, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, Kipungit creek, 530 m, 26. VIII. 1988 leg. SMETANA, 3 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 11. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG.

Derivatio nominis: Named after the type locality Poring Hot Springs.

Diagnosis: To be recognized by the asymmetrical shape of the aedeagus, by the lack of distinct horns on the male head and by unpunctured elytra.

Description: Body shape as usual in the genus, body length 2.5 mm. Dorsal side unicoloured castaneous. Male head (fig. 6) without distinct horns but with distinctly elevated anterior corners of the clypeus, head without tubercles; antenna with the 3 basal antennomeres lighter, antennomere 3 about 1.2 times longer than antennomere 4. Pronotum without peculiarities, without punctation. Elytra shiny and without punctation, lateral margin to be seen in dorsal view only in the anterior half. Legs without peculiarities. Aedeagus (fig. 5) bent in lateral view, penis long and distinctly asymmetrical of distorted band-like shape without basal sclerite plates.

Discussion: See *Stethotrypes sayapensis* n.sp. (2.13.).

### 2.12. *Stethotrypes pungulicus* n.sp. (figs 9–10)

Holotype (♂): Sabah, Bajaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ (MHNG).

Derivatio nominis: Named after the type locality Batu Punggul.

**Diagnosis:** To be recognized by the asymmetrical shape of the aedeagus, by long and narrow horns on the male head and by unpunctured elytra.

**Description:** Body shape as usual in the genus, body length 2.6 mm. Dorsal side unicoloured castaneous. Male head (fig. 10) with 2 narrow and long horns, base of the horns separated in the middle of the clypeus, head without tubercles; both antennae broken. Pronotum without peculiarities, without punctuation. Elytra shiny and without punctuation, lateral margin to be seen in dorsal view only in the anterior half. Legs without peculiarities. Aedeagus (fig. 9) more or less straight, penis extraordinarily long and distinctly asymmetrical of distorted band-like shape without basal sclerite plates.

**Discussion:** See *Stethotrypes sayapensis* n.sp. (2.13.).

### 2.13. *Stethotrypes sayapensis* n.sp. (figs 7–8)

Holotype (♂): Sabah, Mt. Kinabalu NP, Sayap, 1000 m, 28. XI. 1996 leg. GRIMM (SMNS).  
Paratypes: Same data as holotype, 2 ex. SMNS.

**Derivatio nominis:** Named after the type locality Sayap.

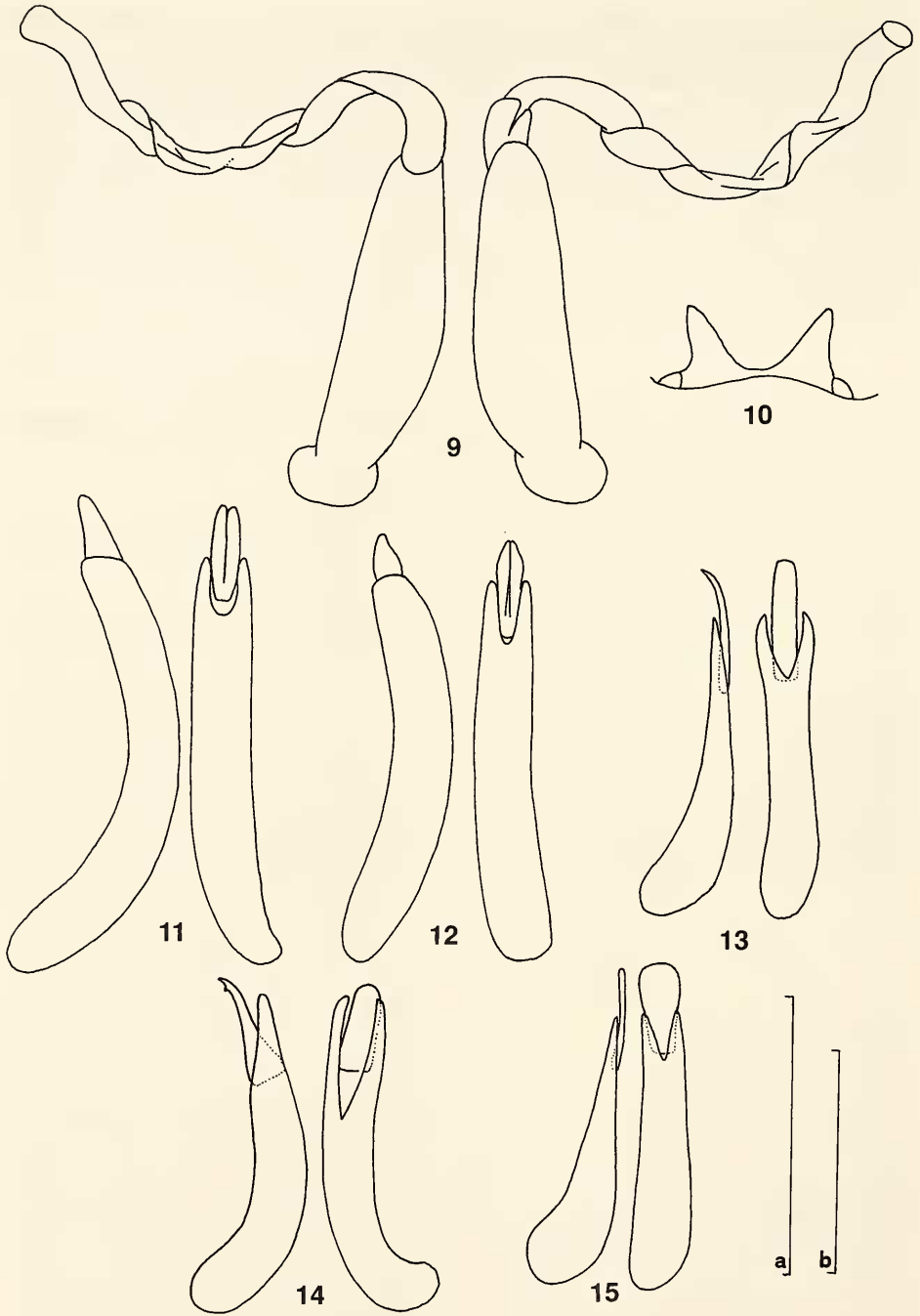
**Diagnosis:** To be recognized by the asymmetrical shape of the aedeagus, by broad and short horns on the male head and by unpunctured elytra.

**Description:** Body shape as usual in the genus, body length 2.4–2.6 mm. Dorsal side black, elytron with a distinct castaneous colour pattern, 1 round spot near base, 1 round spot on the disc and 1 wide spot near the tip. Male head (fig. 8) with 2 broad and short horns, distinctly sinuate at the interior margin, base of the horns separated in the middle of the clypeus, head without tubercles; antenna with the 3–4 basal antennomeres lighter, antennomere 3 about 1.1 times longer than antennomere 4. Pronotum without peculiarities, without punctuation. Elytra shiny and without punctuation, lateral margin to be seen in dorsal view only in the anterior half. Legs without peculiarities. Aedeagus (fig. 7) bent in lateral view, penis long and distinctly asymmetrical of bent band-like shape with 1 basal sclerite plate.

**Discussion:** The genus contains up to now 13 species only 3 possess an asymmetrical aedeagus with a bent or distorted penis: *boettcheri* Kaszab 1946 (Philippines), *borneensis* Kaszab 1961 (Borneo) and *glaber* Gebien 1914 (Borneo). In *boettcheri* and *glaber*, the bent or distorted penis is long and of tube-like shape with a blunt tip, in *borneensis* the distorted penis is shorter and possesses an acute tip (see figs in KASZAB 1946, 1961c), in comparison with these species the aedeagus of *crockerensis* n.sp., *dorotheae* n.sp., *poringicus* n.sp., *punggulicus* n.sp. and *sayapensis* n.sp. are distinctly different as herein described and figured. The aedeagi of *glaber* and *sayapensis* n.sp. are similar, however in *glaber* the penis is of tube-like shape, whereas in *sayapensis* n.sp. the penis is flat and of band-like shape (and the male head is different). The bent or distorted, asymmetrical aedeagus is considered as an apomorph character which proves these species to be a monophyletic group.

The shape of the horns on the male head is of lesser taxonomic value. In *crockerensis* n.sp. and *poringicus* n.sp. these horns are reduced to elevated anterior corners of the clypeus like in *latifrons* (Pic 1921). In *dorotheae* n.sp. these horns are similar to those of *longicornis* (Pic 1921); this species, however, has a quite different, namely symmetrical aedeagus. In *sayapensis* n.sp. these horns are similar to those of *unicolor*; this species has also a different symmetrical aedeagus.

The lack of punctuation on the elytra share *crockerensis* n.sp., *dorotheae* n.sp., *po-*



Figs 9–15. Aedeagus and male head. – 9–10. *Stethotrypes pungulicus* n.sp.; – 11. *Derispia javana* (NW Keningau); – 12. *Derispia javana* (Rafflesia Centre); – 13. *Derispia gibbosa*; – 14. *Derispia insularis*; – 15. *Derispia octomaculata*. – Scales: 1.0 mm (a: aedeagus, b: head).



*ringicus* n.sp., *punggulicus* n.sp. and *sayapensis* n.sp. with most of the other congeners. However, this character should be checked carefully, because traces of punctural rows sometimes exist on the ventral side of the elytra shining through the light cuticula.

#### 2.14. *Derispia borneensis* Kaszab 1946

Records: Sandakan (KASZAB 1946).

Material: Not seen.

Distribution: Borneo.

#### 2.15. *Derispia gibbosa* (Pic 1921) (fig. 13)

Records: Borneo (KASZAB 1946); Sarawak, Kuching, Penang (KASZAB 1961a).

Material: Sarawak, Belaga Distr., Long Linau, 17.–21. III. 1990 leg. RIEDEL, 1 ex. SMNS.

Remarks: The aedeagus of the above listed male (fig. 13) fully corresponds to the figure given in KASZAB (1946; fig. 83). The male (female unknown to me) possesses a distinct acute tubercle in the middle of the labrum, an unusual and as yet unknown character.

Distribution: Borneo (type locality), Sumatra.

#### 2.16. *Derispia insularis* Kaszab 1961 (fig. 14)

Records: Mt. Mulu, Sarawak (KASZAB 1961a).

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, near Bat Cave, 600 m, 10. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 550–600 m, 9. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Sayap, 1000 m, 26. XI. 1996 leg. GRIMM, 3 ex. SMNS. – Sabah, Mt. Kinabalu, Ma Mut, 12. VII. 1970 leg. ANDO, 2 ex. CAO. – Sabah, Crocker Range, km 63 on road between Kota Kinabalu and Tambunan, 1200 m, 19. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Crocker Range, Gunung Emas, 500–1900 m, 6.–21. V. 1995 leg. JENIŠ, 3 ex. CBH, 1 ex. SMNS.

Remarks: Parameres with 2 very small teeth each ventrolaterally near the tip (fig. 14), which are not mentioned in the original description and which occur also in investigated specimens from Sumatra (MHNG, SMNS). All other characters coincide with the description.

Distribution: Malayan Peninsula, Borneo, Sumatra.

#### 2.17. *Derispia javana* Kaszab 1946 (figs 11–12)

Records: Borneo (KASZAB 1961a).

Material: Sabah, Crocker Range, Gunung Emas, 15.–27. IV. 1993 leg. JENIŠ & STRBA, 6 ex. CBH. – Sabah, Crocker Range NP, NW Keningau, 900–1200 m, 16.–20. XI. 1996 leg. SCHAWALLER, 8 ex. SMNS. – Sabah, Crocker Range NP, Rafflesia Centre, 1100–1400 m, 21. XI. 1996 leg. SCHAWALLER, 21 ex. SMNS. – Sabah, Crocker Range, km 60 on road between Kota Kinabalu and Tambunan, 1350 m, 17. V. 1987 leg. BURCKHARDT & LÖBL, 5 ex. MHNG, 2 ex. SMNS. – Sabah, Mt. Kinabalu NP, Headquarters, Liwagu river trail, 1655 m, 11. VIII. 1988 leg. SMETANA, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Headquarters, 1500–1600 m, 11.–15. XI. 1996 leg. SCHAWALLER, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, eastern ridge trail, 1060 m, 17. VIII. 1988 leg. SMETANA, 1 ex. SMNS. – Sabah, Mt. Kinabalu, Ma Mut, 12. VII. 1970 leg. ANDO, 1 ex. CAO.

Remarks: The aedeagus (figs 11–12) was unknown (female holotype), however the punctured elytra combined with the bordered clypeus and the dorsal colour pattern point to this species. Not coinciding with the description is the colour of the antennae, the distal part of the antenna is dark in all specimens and not fully light. Unfortunately I have no males from Java at hands to check the structure of the aedeagus, so conspecificity of the Java and Borneo populations remains somewhat insecure.

The firstly listed specimens from NW Keningau have the body unicoloured castaneous and the parameres somewhat different (fig. 11), all other characters are identical. These specimens are probably freshly moulted, still uncoloured specimens, collected together with larvae (see fig. 45) and pupae.

KASZAB (1961a) confused in the species key a main character to separate *javana* from *octomaculata*. In *javana* (with punctured elytra), the elytral lateral margin can be seen in dorsal view only in the basal part near the shoulders, in *octomaculata* (with unpunctured elytra), the elytral lateral margin can be seen on its total length (correctly described in KASZAB 1946).

Distribution: Java, Borneo.

#### 2.18. *Derispia kuntzeni* Kaszab 1946

Records: Southeastern Borneo (KASZAB 1946).

Material: Not seen.

Distribution: Borneo.

#### 2.19. *Derispia octomaculata* (Westwood 1883) (fig. 15)

*Derispia xantusi* Kaszab 1946 **n.syn.**

Records: Sarawak (KASZAB 1946, 1961a).

Material: Sarawak, Kuching, Santubong, 8.–9. III. 1990 leg. RIEDEL, 1 ex. SMNS. – Sabah, Kinabalu, Ma Mut, 12. VII. 1970 leg. ANDO, 1 ex. CAO. – Sabah, Bunsit, 28. VI. 1970 leg. ANDO, 4 ex. CAO, 1 ex. SMNS. – Sabah, near Ranau, 2. III. 1993 leg. UENO, 3 ex. CBH. – Sabah, Crocker Range 12 miles NW Keningau, 1200 m, 27.–28. III. 1991 leg. KATO, 2 ex. CAO. – Sabah, Bingkor N Keningau, 400–500 m, 19.–20. XI. 1996 leg. GRIMM & SCHAWALLER, 4 ex. SMNS.

Remarks: The single female from Santubong cannot be identified with certainty but has the same colour pattern on the elytra as the female holotype of *Derispia xantusi*. Later (KASZAB 1961a) assigned *xantusi* as one colour variation among others to *octomaculata*. Herein this taxon is formally synonymized, because the colour differences reflect no specific differences. Aedeagus see fig. 15.

Distribution: Borneo.

#### 2.20. *Derispia parvula* Kaszab 1961

Records: Sarawak, Matang (KASZAB 1961a).

Material: Not seen.

Distribution: Borneo.

#### 2.21. *Leiochrodinus tetraphyllus* Kaszab 1961

Records: Sarawak (KASZAB 1961c).

Material: Not seen.

Distribution: Borneo.

### 2.22. *Leiochrinus bifurcatus* Kaszab 1946

Records: Docsonlauden (KASZAB 1946), Sarawak (KASZAB 1961c).

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500–800 m, 15.–30. XII. 1995 leg. HÄUSER, 1 ex. SMNS.

Remarks: The above listed specimen is a female, with the pronotum deeply excavated at the anterior margin, and with the antenna black in the distal part and the antennomere 4 narrow.

Distribution: China, Assam, Burma, Borneo, Sumatra.

### 2.23. *Leiochrinus fulvicollis* Westwood 1883

Records: Sarawak (GEBIEN 1914), Borneo (KASZAB 1961c).

Material: Not seen.

Remarks: Probably, this species does not occur on Borneo. In the KASZAB collection in Budapest (HNHM) no specimen from Borneo could be found.

Distribution: New Guinea and adjacent small islands, ? Borneo.

### 2.24. *Leiochrinus lutescens* Westwood 1883

Records: Banguay (GEBIEN 1914), Kinabalu (KASZAB 1946), Sarawak (KASZAB 1961c).

Material: Sarawak, Kapit Distr., Sebong, Baleh river, 9.–21. III. 1994 leg. HORÁK, 1 ex. CBH. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500–800 m, 15.–30. XII. 1995 leg. HÄUSER, 1 ex. SMNS. – Sabah, Sepilok, IV.–V. 1982 leg. BURCKHARDT, 2 ex. MHNG. – Sabah, Sepilok, IV.–V. 1982 leg. HORÁK, 1 ex. SMNS. Sabah, Sepilok, 5.–11. VIII. 1983 leg. NOTSU, 1 ex. CAO.

Remarks: All listed specimens are females, with the pronotum feebly excavated at the anterior margin, and with the antenna yellow and the antennomere 4 wide.

Distribution: Borneo, Sumatra, Banguay, Sulawesi, Philippines, Korea.

### 2.25. *Leiochrinus rufofulvus* Westwood 1883

Records: Kinabalu, Imugin, Viscaya (KASZAB 1946).

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500–800 m, 15.–30. XII. 1995 leg. HÄUSER, 5 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 15.–16. XI. & 29. XI.–2. XII. 1996 leg. GRIMM & SCHAWALLER, 7 ex. SMNS. – Sabah, Mt. Kinabalu NP, Sa-yap, 1000 m, 25.–29. XI. 1996 leg. GRIMM & SCHAWALLER, 14 Expl. SMNS. – Sabah, Bunsit, 28. VI. 1970 leg. ANDO, 1 ex. CAO.

Remarks: Pronotum not excavated at the anterior margin, aedeagus as figured by KASZAB (1946).

Most of the specimens were collected at light. A female from Poring was infested by a nematod of 52 mm length.

Distribution: Borneo, Sumatra, Key.

2.26. *Leiochrodes affinis* Kaszab 1961

Records: Borneo (KASZAB 1961b).

Material: Not seen.

Distribution: Borneo.

2.27. *Leiochrodes bispilotus* Westwood 1883 (fig. 33)

Records: Sarawak (KASZAB 1946, 1961c).

Material: Western Sarawak, Quop, 3. III. 1914 leg. BRYANT, 1 ex. HNHM. – Sarawak, Sebadai Park, 9 km SW Kapit, 50 m, 20. V. 1994 leg. LÖBL & BURCKHARDT, 1 ex. MHNG. – Sabah, Crocker Range, Gunung Emas, 15.–27. IV. 1993 leg. JENIŠ & STRBA, 2 ex. CBH, 1 ex. SMNS. – Sabah, Crocker Range, Gunung Emas, 6.–21. V. 1995 leg. JENIŠ, 1 ex. SMNS.

Remarks: The aedeagus (fig. 33) was not figured up to now. The colour pattern of the dorsal side seems to be variable: 2 specimens from Gunung Emas have the elytra light brown with a humeral round and a distal sickle-shaped black spot, the other specimens, also from the same locality, are coloured as described by KASZAB (1949). Body length 3.0–3.9 mm.

Distribution: Borneo.

2.28. *Leiochrodes castaneus* Westwood 1883 (fig. 23)

Records: Sarawak (KASZAB 1946, 1961c).

Material: Western Sarawak, Mt. Matang, I. 1914 leg. BRYANT, 1 ex. HNHM. – Sarawak, Belaga, Long Linau, 17.–21. III. 1990 leg. RIEDEL, 3 ex. SMNS. – Sabah, Poring Hot Springs, 500 m, 8. V. 1987 leg. BURCKHARDT & LÖBL, 2 ex. MHNG, 1 ex. SMNS.

Remarks: The aedeagus (fig. 23) was not figured up to now but described when discussing the relations of *hayekae* (KASZAB 1961b).

Distribution: Borneo, Banguay, Sumatra.

2.29. *Leiochrodes christophi* n.sp. (figs 38–39, 44)

Holotype (♂): Sabah, Crocker Range, km 51 on road A 3 between Kota Kinabalu and Tambunan, 1600 m, leg. BURCKHARDT & LÖBL (MHNG).

Paratypes: Same data as holotype, 15 ex. MHNG, 5 ex. SMNS. – Sabah, Mt. Kinabalu, 1500 m, 21. V. 1987 leg. BURCKHARDT & LÖBL, 7 ex. MHNG. – Sabah, Mt. Kinabalu, road Ranau to Kota Kinabalu, 1150 m, 24. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Crocker Range NP, Rafflesia Centre, 13.–14. VI. 1996 leg. KODADA, 1 ex. SMNS.

Derivatio nominis: Named after Dr. CHRISTOPH HÄUSER (Stuttgart) for the organization of a joint travel to Sabah and his help during field work.

Diagnosis: To be recognized by the sexually dimorph metatibia which is in males abruptly broadened in the middle, by a distinct longitudinal furrow on the dorsal side of the metatibia in both sexes, by the structure of the aedeagus with deeply divided parameres, by unpunctured elytra and by small body size below 3 mm.

Description: Body length 2.5–2.8 mm. Dorsal and ventral side, antennae and legs unicoloured castaneous, elytra along basis and sutura somewhat lighter. Head without punctation and without carina on vertex; antenna with antennomere 3 relatively short and with antennomere 4 as narrow as antennomere 3 (fig. 39). Pronotum shiny and without punctation, basal margin unbordered, distal margin with fine bor-

der, lateral margin somewhat sinuate in the distal part. Elytra shiny and without punctuation, lateral margin to be seen in dorsal view in the anterior half. Metatibia in both sexes with a distinct longitudinal furrow on the dorsal side; metatibia of male on internal side abruptly broader in the distal half, external side uniform bent (fig. 44). Aedeagus (fig. 38) relatively small, distinctly bent in lateral view, basal piece about twice as long as parameres, parameres divided nearly up to the basis in 2 separate fingers, penis longer or as long as parameres depending from extension.

Discussion: The new species is quite similar in the outer appearance (body shape and size, shiny and unpunctured dorsal size) with the widespread *convexus* Lewis 1894, in particular both species possess the sexually dimorphic metatibia, which is quite unusual in the genus. However, it seems possible that this character was hitherto overlooked in some species, for example in *ruficornis* Kaszab 1946 from the Philippines ("Hinterschienen stark gekrümmt"). Quite unique in the genus is the distinct longitudinal furrow on the dorsal side of the metatibia in both sexes. Additionally, *christophi* n.sp. possesses a quite distinct structure of the aedeagus with separated parameres which is similar only in the Philippine species *glabriceps* Kaszab 1946, however with a distinctly shorter basal piece and with a shorter penis; furthermore *glabriceps* is significantly bigger (4.2 mm) and has no sexually dimorphic metatibia.

### 2.30. *Leiochrodes circulus* Kaszab 1961

Records: Sarawak (KASZAB 1961b).

Material: Not seen.

Distribution: Borneo.

### 2.31. *Leiochrodes convexipennis* Pic 1918 (fig. 16)

Records: Brunei (KASZAB 1946).

Material: Sabah, Mt. Kinabalu NP, Headquarters, 1560–1660 m, 24. IV. 1987 leg. SMETANA, 1 ex. MHNG. – Sabah, Mt. Kinabalu, 1500–1650 m, 23. IV.–22. V. 1987 leg. BURCKHARDT & LÖBL, 9 ex. MHNG, 2 ex. SMNS. – Sabah, E Kinabalu, road between Ranau and Kota Kinabalu, 1150 m, 24. V. 1987 leg. BURCKHARDT & LÖBL, 3 ex. MHNG, 1 ex. SMNS.

Distribution: Borneo, Sumatra, Engano (type locality), Mentawai.

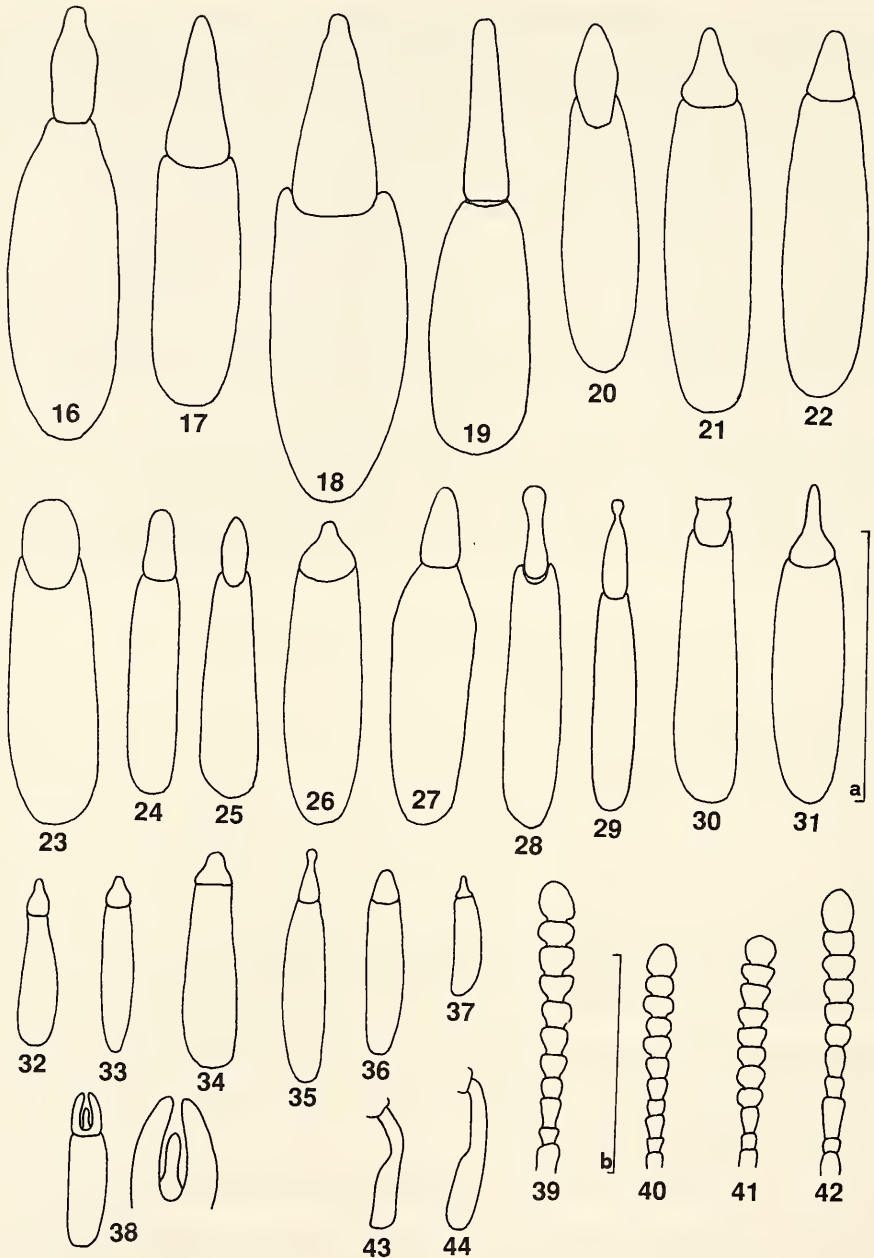
### 2.32. *Leiochrodes cyclops* Kaszab 1961

Records: Borneo (KASZAB 1961b).

Material: Northern Borneo, Sapulut, 9. IV. 1982 leg. YAMAMOTO, 1 ex. CSO.

Remarks: The description of this species was based on a single female without exact locality on Borneo. The above listed specimen possess the described flat body shape and colour pattern (pronotum red with longitudinal black spot, elytra black with a light yellow spot on the disc) but is a female too. Thus the status of this "species" without knowledge of the aedeagus remains somewhat doubtful.

Distribution: Borneo.



Figs 16–44. Aedeagus, antenna and male metatibia of *Leiochrodes* species. – 16. *convexipennis*; – 17. *rufofulvus* (Batu Punggul); – 18. *rufofulvus* (Keningau); – 19. *subaeneus*; – 20. sp. A (Poring); – 21. sp. B (Rafflesia Centre); – 22. sp. B (Sayap); – 23. *castaneus*; – 24. *ruficollis* (Gunung Emas); – 25. *ruficollis* (Liwagu river); – 26. sp. C (Matang); – 27. *semipunctatus*; – 28. *suturalis*; – 29. *glabratus*; – 30. *kinabaluensis* n.sp.; – 31. *smetanai* n.sp.; – 32. *limbatus*; – 33. *bispilotus*; – 34. *discoidalis*; – 35. *minutus*; – 36. *hayekae*; – 37. *merkli* n.sp.; – 38. *christophi* n.sp.; – 39. *christophi* n.sp.; – 40. *kinabaluensis* n.sp.; – 41. *merkli* n.sp.; – 42. *smetanai* n.sp.; – 43. *kinabaluensis* n.sp.; – 44. *christophi* n.sp. – Scales: 1.0 mm (a: aedeagus, b: antenna and male metatibia).

2.33. *Leiochrodes discoidalis* Westwood 1883 (fig. 34)

Records: Banguay (GEBIEN 1914); Brunei, Matang, Simujon river, Sadong river, Serawi, Putus Sibau (KASZAB 1946); Sarawak (KASZAB 1961c).

Material: Sabah, Sepilok, 13. V. 1981 leg. YAMAMOTO, 2 ex. CSO. – Sabah, Tambunan, 29.–30. III. 1984 leg. HANGAY, 24 ex. HNHM. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. KODADA, 14 ex. SMNS.

Distribution: Malayan Peninsula, Borneo, Banguay, Sumatra, Java, Sumbawa, Nias, New Guinea.

2.34. *Leiochrodes glabratus* (Walker 1859) (fig. 29)

Records: Kinabalu, southeastern Borneo (KASZAB 1946); Sarawak (KASZAB 1961c).

Material: Sarawak, Kapit Distr., Sabong, Baleh river, 9.–21. III. 1994 leg. HORÁK, 5 ex. CBH, 1 ex. SMNS.

Distribution: Sikkim, Indochina, Sri Lanka, Borneo, Sumatra, Nias, Andamans, Java, Bali, Flores, Philippines, Taiwan.

2.35. *Leiochrodes harpagon* Kaszab 1961

Records: Borneo (KASZAB 1961b).

Material: Not seen.

Distribution: Borneo.

2.36. *Leiochrodes hayekae* Kaszab 1961 (fig. 36)

Records: Sarawak (KASZAB 1961b).

Material: Sarawak, Belaga Distr., Long Linau, 17.–21. III. 1990 leg. RIEDEL, 3 ex. SMNS. – Sabah, Crocker Range, km 48 on road A 3 between Kota Kinabalu and Tambunan, 1000 m, 5. IX. 1988 leg. SMETANA, 6 ex. MHNG, 2 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 7. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 520 m, 13. V. 1987 leg. SMETANA, 1 ex. MHNG.

Remarks: The uppersides of the specimens from Sabah are nearly black and not castaneous as indicated in the description, all other characters, in particular the shape of the aedeagus, coincide with the description.

Distribution: Borneo.

2.37. *Leiochrodes kinabaluensis* n.sp. (figs 30, 40, 43)

Holotype (♂): Sabah, Mt. Kinabalu NP, above Poring Hot Springs, 520 m, 15. VIII. 1988 leg. SMETANA (MHNG).

Derivatio nominis: Named after Mount Kinabalu with the surrounding National Park, in which hopefully numerous endemic Coleoptera can survive.

Diagnosis: To be recognized by the sexually dimorph metatibia which is in males abruptly broadened in the middle, by the structure of the aedeagus with the short and blunt parameres, by unpunctured elytra and by small body size below 3 mm.

Description: Body length 2.2 mm. Dorsal and ventral side, antennae and legs unicoloured castaneous. Head without punctation and without carina on vertex; antenna with antennomere 3 relatively short and with antennomere 4 as narrow as an-

tennomere 3 (fig. 40). Pronotum shiny and without punctation, basal margin unbordered, distal margin with fine border, lateral margin somewhat sinuate in the distal part. Elytra shiny and without punctation, lateral margin to be seen in dorsal view in the anterior half. Metatibia without distinct longitudinal furrow on the dorsal side; metatibia of male on internal side abruptly broader in the distal half, external side bent before the middle and distal part straight (fig. 43). Aedeagus (fig. 30) distinctly bent in lateral view, basal piece nearly 6 times longer than parameres, parameres short with blunt tip.

Discussion: This species possesses a sexually dimorphic metatibia, which occurs only in very few congeners (see also *christophi* n.sp.). The shape of the aedeagus with the short and blunt parameres cannot be mixed up with those of other published species.

### 2.38. *Leiochrodes limbatus* Westwood 1883 (fig. 32)

Records: Sandakan (KASZAB 1946), Sarawak (KASZAB 1961c).

Material: Northern Borneo, Sapulut, 7. IV. 1982 leg. YAMAMOTO, 1 ex. CSO. – Sabah, Bajnaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ, 1 ex. HNHM, 1 ex. CBH.

Remarks: The single specimen from Sapulut has the characteristically shaped and small aedeagus (fig. 32) but the elytra are more or less uniformly ferrugineous (and not ferrugineous with black margins). This difference is considered herein not as specific. Under this aspects it seems probably that *rufescens* Kaszab 1946 with quite similar shape of the aedeagus (described from the Philippines) might be a junior synonym of *limbatus* Westwood 1883, because both can be separated only by the colouration (KASZAB 1946). The shape and size of the aedeagus in *bispilotus* is similar (fig. 33), but the parameres are somewhat broader and shorter in *limbatus*. Unfortunately the material of both *bispilotus* and *limbatus* is too poor to recognize the variability of this character, this concerns also the colour pattern of the dorsal side.

Distribution: Malayan Peninsula, Borneo.

### 2.39. *Leiochrodes merkli* n.sp. (figs 37, 41)

Holotype (♂): Kalimantan, Gunung Palung NP, Cabang Panti research site, 1°13'S/110°7'E, 18.–26. VII. 1993 leg. MERKL (HNHM).

Paratype: Eastern Borneo, Batan Bessi, 1937 leg. WALSH, 1 ex. HNHM (n.sp. aff. *bispilotus* det. KASZAB).

Derivatio nominis: Named after Dr. OTTÓ MERKL (Budapest), who collected the holotype.

Diagnosis: To be recognized by the structure and little size of the aedeagus and the dorsal colour pattern.

Description: Body length 2.2–2.4 mm. Dorsal side with colour pattern, head and pronotum castaneous or pronotum castaneous with an indistinct dark patch, elytra dark brown with a light castaneous longitudinal band at the suture and light castaneous longitudinal lateral sides, antennae with the 3 basal segments somewhat lighter and legs unicoloured castaneous. Head without punctation and without carina on vertex but with a weak impression besides each insertion of the antennae; antenna with antennomere 3 twice as long as antennomere 2 and with antennomere 4 broader than antennomere 3 (fig. 41). Pronotum shiny and without punctation, ba-



sal margin unbordered, distal margin with fine border, lateral margin regularly rounded. Elytra shiny and without punctation, lateral margin to be seen in dorsal view nearly on its total length. Legs without peculiarities. Aedeagus (fig. 37) very small and feebly bent in lateral view, basal piece about 4 times long as parameres, parameres spatula-like.

Discussion: This species belongs to the group around *limbatus* and *bispilotus* with a relatively very small aedeagus, but the shape of the joint parameres is distinctly different (figs. 37), even considering a certain variability. Additionally, the colour of the dorsal side shows a specific pattern (by which already the late Dr. KASZAB recognized and labelled the specimen from Batan *bessi* as new).

#### 2.40. *Leiochrodes minutus* Pic 1918 (fig. 35)

Records: Brunei, Kinabalu, southeastern Borneo (KASZAB 1946); Sarawak (KASZAB 1961c).

Material: Sarawak, Kapit Distr., Sebung, Baleh river, 9.–21. III. 1994 leg. HORÁK, 2 ex. CBH. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 485 m, 29. VIII. 1988 leg. SMETANA, 28 ex. MHNG, 6 ex. SMNS. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. KODADA, 1 ex. SMNS.

Distribution: Sumatra, Borneo (type locality), Philippines.

#### 2.41. *Leiochrodes penangensis* Kaszab 1961

Records: Penang (KASZAB 1961b).

Material: Sabah, Crocker Range, Gunung Emas, 500–1900 m, 6.–21. V. 1995 leg. JENIŠ, 1 ex. CBH, 1 ex. SMNS.

Remarks: The aedeagus is quite small (length about 0.6 mm) and of the shape as figured by KASZAB (1961b). Quite similar in shape is the aedeagus of *Leiochrodes* sp. C (see below 2.50.), but its size is with more than 1 mm distinctly larger (fig. 26).

Distribution: Borneo.

#### 2.42. *Leiochrodes ruficollis* (Fairmaire 1893) (figs 24–25)

Records: Sarawak (KASZAB 1961c).

Material: Sabah, Mt. Kinabalu, 1750 m, 21. IV. 1987 leg. BURCKHARDT & LÖBL, 5 ex. MHNG, 3 ex. SMNS. – Sabah, Mt. Kinabalu, 1500–1550 m, 25.–30. IV. 1987 leg. BURCKHARDT & LÖBL, 3 ex. MHNG. – Sabah, Mt. Kinabalu NP, Headquarters at Liwagu river, 1500 m, 30. IV. & 16. V. 1987 leg. SMETANA, 2 ex. MHNG, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Headquarters at Liwagu river, 1495 m, 12. VIII. 1988 leg. SMETANA, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Headquarters at Silau-Silau trail, 1550 m, 14. VIII.–2. IX. 1988 leg. SMETANA, 2 ex. MHNG. – Sabah, Mt. Kinabalu NP, Headquarters, 1560 m, 3.–13. VIII. 1988 leg. SMETANA, 1 ex. MHNG. – Sabah, Headquarters, 24. V. 1981 leg. YAMAMOTO, 1 ex. CSO. – Sabah, Crocker Range NP, Gunung Emas, 1600 m, 6.–18. VI. 1996 leg. KODADA, 23 ex. SMNS, 2 ex. CBH.

Remarks: The species was described from Singapore, KASZAB (1946) assigned material from Sumatra and Java to this species and figured the aedeagus, although he could not check type material. The above listed specimens have the aedeagus quite similar to this figure, however the parameres are nearly parallel (fig. 24) or slightly narrowed (fig. 25). I could not find further differences, thus I consider the shape of the parameres somewhat variable.

Distribution: Malayan Peninsula, Sumatra, Borneo, Java.

### 2.43. *Leiochrodes rufofulvus* Westwood 1883 (figs 17–18)

Records: Matang, Sandakan, Pontianak (KASZAB 1946).

Material: Sarawak, Belaga, 14.–16. III. 1990 leg. RIEDEL, 1 ex. SMNS. – Sarawak, Belaga Distr., Long Linau, 17.–21. III. 1990 leg. RIEDEL, 2 ex. SMNS. – Sabah, Keningau, 13. III. 1989 leg. ITOH, 1 ex. CAO. – Sabah, Bajnaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ, 1 ex. HNHM. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. KODADA, 3 ex. SMNS.

Remarks: The shape of the aedeagus, in particular the shape of the basal piece, of this widespread species seems to be somewhat variable. In the specimen from Keningau (fig. 18) the basal piece is distinctly broader than the base of the parameres, in one specimen from Batu Punggul (fig. 17) the basal piece is narrower. These differences might be connected with the grade of sclerotization of that organ.

Distribution: Sikkim, Burma, Borneo, Banguay, Sumatra, Lombok, Sulawesi, Philippines.

### 2.44. *Leiochrodes semipunctatus* Kaszab 1946 (fig. 27)

Material: Sabah, Mt. Kinabalu NP, Summit trail Pondok Ubah, 2050 m, 26. IV. 1987 leg. SMETANA, 1 ex. MHNG.

Remarks: The species was described from Sumatra and the new record from Borneo is identical in the shape of the antenna, in the shape of the nearly conical pronotum with straight lateral margins and in the distinct punctation of the elytra. The aedeagus (fig. 27) is somewhat different in the length relation parameres/basal piece and the tip of the parameres of the Bornean male is without any excavation (slightly excavated in the figure given by KASZAB 1946).

Distribution: Borneo (new record), Sumatra.

### 2.45. *Leiochrodes smetanai* n.sp. (figs 31, 42)

Holotype (♂): Sabah, Mt. Kinabalu NP, Poring Hot Springs, 480–500 m, 8.–10. V. 1987 leg. SMETANA (MHNG).

Paratypes: Same data as holotype, 8 ex. MHNG, 3 ex. SMNS. – Sabah, Mt. Kinabalu NP, Headquarters, Liwagu river, 1500 m, 16. V. 1987 leg. SMETANA, 1 ex. MHNG.

Derivatio nominis: Named after Dr. ALES SMETANA (Ottawa), who sifted not only this new species but numerous other Leiochrini in Sabah.

Diagnosis: To be recognized by the structure of the aedeagus with finger-like parameres.

Description: Body length 2.7–3.0 mm. Dorsal and ventral side, antennae and legs unicoloured castaneous. Head without punctation and without carina on vertex; antenna with antennomere 3 nearly long as the antennomeres 4 and 5 together and with antennomere 4 narrow as antennomere 3 (fig. 42). Pronotum shiny and without punctation, basal margin unbordered, distal margin with fine border, lateral margin regularly rounded. Elytra shiny and without punctation, lateral margin to be seen in dorsal view in the anterior half. Legs without peculiarities. Aedeagus (fig. 31) feebly bent in lateral view, basal piece about 3 times as long as parameres, parameres finger-like.

Discussion: The shape of the aedeagus with the long and finger-like parameres is unique in the genus, at least I could not find any published species with such a

structure. Faintly similar is *lanceolatus* Kaszab 1961 (Yunnan, Nepal), but the parameres are shorter and the body is distinctly larger.

#### 2.46. *Leiochrodes subaeneus* Pic 1918 (fig. 19)

Records: Banguey (KASZAB 1946), Sarawak (KASZAB 1961c).

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 11. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 480–485 m, 24. VIII. 1988 leg. SMETANA, 1 ex. MHNG, 1 ex. SMNS.

Distribution: Sikkim, Banguey (type locality), Borneo, Java.

#### 2.47. *Leiochrodes suturalis* Westwood 1883 (fig. 28)

Records: Banguey (GEBIEN 1914 sub *nigripennis*), Sarawak (KASZAB 1961c).

Material: Sarawak, Kapit Distr., Sebong, Baleh river, 6.–21. III. 1994 leg. BILY, 10 ex. CBB, 3 ex. SMNS. – Sabah, Tambunan, 30. III. 1984 leg. HANGAY, 1 ex. HNHM. – Sabah, Bajanaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ, 1 ex. HNHM. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. KODADA, 2 ex. SMNS. – Sabah, Sepilok, IV.–V. 1982 leg. HORÁK, 6 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 485 m, 14.–31. VIII. 1988 leg. SMETANA, 19 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500–800 m, 15.–30. XII. 1995 leg. HÄUSER, 25 ex. SMNS, 5 ex. MHNG. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 29. XI.–2. XII. 1996 leg. GRIMM & SCHAWALLER, 3 ex. SMNS. – Sabah, Mt. Kinabalu NP, Headquarters, 1500–1600 m, 11.–15. XI. 1996 leg. SCHAWALLER, 3 ex. SMNS. – Sabah, Crocker Range NP, NW Keningau, 900–1200 m, 16.–20. XI. 1996 leg. GRIMM & SCHAWALLER, 3 ex. SMNS. – Sabah, Crocker Range NP, Longkoganun, 750–850 m, 19.–21. VI. 1996 leg. KODADA, 11 ex. SMNS.

Distribution: Malayan Peninsula, Sumatra, Mentawai, Borneo, Java, Palawan, Philippines, New Guinea, Australia, Aru, Solomon, Hebrides.

#### 2.48. *Leiochrodes* sp. A (fig. 20)

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, Langanan falls, 900–950 m, 12. V. 1987 leg. BURCKHARDT & LÖBL, 2 ex. MHNG, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, Langanan river, 850 m, 14. V. 1987 leg. BURCKHARDT & LÖBL, 2 ex. MHNG.

Remarks: This small series cannot be identified with certainty nor described as new. The shape of the parameres (fig. 20) is somewhat intermediate between *convexipennis* (fig. 16) and *ruficollis* (figs 24–25). As long as the infraspecific variability of the shape of the parameres in both widespread species is unknown I desist from describing these specimens as a new species.

#### 2.49. *Leiochrodes* sp. B (figs 21–22)

Material: Sabah, Mt. Kinabalu NP, Sayap, 1000 m, 28. XI. 1996 leg. GRIMM, 1 ex. SMNS. – Sabah, Crocker Range NP, Rafflesia Centre, 13.–14. VI. 1996 leg. KODADA, 1 ex. SMNS.

Remarks: These both males can neither be identified because of the same reasons as the above treated *Leiochrodes* sp. A. The shape of the parameres (figs 21–22) points to the species-group around *ruficollis* (figs 24–25).

#### 2.50. *Leiochrodes* sp. C (fig. 26)

Material: Sarawak, Gunung Matang, 20 km east of Kuching, 850 m, 25. V. 1994 leg. LÖBL & BURCKHARDT, 5 ex. MHNG, 1 ex. SMNS.

Remarks: This series could not be identified because of the same reasons as above, aedeagus see fig. 26. The shape of the parameres is quite similar to the parameres of *penangensis* (see above 2.41.), but its size is distinctly larger than in *penangensis*.

### 2.51. *Leiochrota marginellus* (Thomson 1878)

Material: Sabah, Mt. Kinabalu NP, Poring Hot Springs, 500 m, 29. XI.–2. XII. 1996 leg. SCHAWALLER, 1 ex. SMNS.

Remarks: The above listed specimen is a female and obviously not *varicolor* because of different body shape and size, different antenna and other characters, but its species identification remains insecure. The female is about 5.0 mm long, uniformly castaneous, has the pronotum and elytra without any punctuation and the last antennal segment fully light yellow. KASZAB (1946) did not study the type of *marginellus* (Thomson 1878) (Java) but of *uniformis* (Westwood 1883) (Sulawesi) and synonymized the latter. Later (KASZAB 1961c) he considered both as different species and separated them mainly by the colour of the last antennal segment (in *marginellus* last segment only partly yellow, in *uniformis* fully yellow). Additionally, KASZAB (1946) described *marginellus* with a dense punctuation on the elytra, later (1961c) he mentioned only a feeble punctuation for this species. I assign the single Bornean female to *marginellus* because this is the oldest valid name.

The status of the 2 Philippine species *philippinensis* (Gebien 1922) and *gracilicornis* (Kaszab 1946) is likewise unclear. I have material from Leyte, Luzon and Mindanao at hands (SMNS) which can neither be assigned with certainty to *philippinensis* nor to *gracilicornis* by the published characters.

Distribution: Java, Sulawesi, ? Borneo.

### 2.52. *Leiochrota varicolor* Westwood 1883

Records: Pontianak, Sandakan (KASZAB 1946); Sarawak (KASZAB 1961c).

Material: Sarawak, Belaga, Long Linau, 17.–21. III. 1990 leg. RIEDEL, 1 ex. SMNS. – Sabah, 16 miles from Keningau, 9. III. 1993 leg. UENO, 1 ex. CBH. – Sabah, Banjaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ, 2 ex. CBH.

Distribution: Assam, Malayan Peninsula, Borneo, Java, Sumatra, Mentawai.

### 2.53. *Crypsis borneensis* Kaszab 1961

Records: Sarawak (KASZAB 1961c).

Material: Sarawak, Mt. Merinjak, 600 ft., 21. V. 1914 leg. BRYANT, 1 paratype HNHM.

Distribution: Borneo.

### 2.54. *Pimplena hemisphaericum* (Laporte 1831)

Records: Borneo (GEBIEN 1914 sub *Leiochrodes tenebrosus*); Brunei, Sarawak, Kinabalu, Tandjong (KASZAB 1946).

Material: Sarawak, Belaga, Long Linau, 17.–21. III. 1990 leg. RIEDEL, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Poring Hot Springs, 485 m, 29. VIII. 1988 leg. SMETANA, 7 ex. MHNG. – Sabah, Mt. Kinabalu NP, Mt. Kinabalu, 1500 m, 21. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG. – Sabah, Mt. Kinabalu NP, Mt. Kinabalu, 1900 m, 26. IV. 1987 leg. BURCKHARDT &

LÖBL, 1 ex. MHNG. – Sabah, Mt. Kinabalu, road Ranau to Kota Kinabalu, 1150 m, 24. V. 1987 leg. BURCKHARDT & LÖBL, 1 ex. MHNG, 1 ex. SMNS. – Sabah, Mt. Kinabalu NP, Headquarters, Bukit Ular trail, 1750 m, 29. IV. 1987 leg. SMETANA, 1 ex. MHNG, 1 ex. SMNS. – Sabah, Banjaran Maitland, Batu Punggul, 25.–27. V. 1995 leg. JENIŠ 13 ex. CBH. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. JENIŠ, 1 ex. MHNG. – Sabah, Batu Punggul resort, 24. VI.–1. VII. 1996 leg. KODADA, 7 ex. SMNS. – Sabah, Crocker Range NP, Mawar waterfall, 17. VI. 1996 leg. KODADA, 1 ex. SMNS.

Remarks: The “species” is quite variable in external characters (punctuation on head and pronotum, shape of pronotum and elytra, structure of elytral intervals and others) and also the aedeagus shows a somewhat different shape in some checked populations from the wide distribution area. Thus it might be possible that we face not only a single but several different species. Unfortunately the material at hands is too poor for solving this problem; additionally all type series of the different “synonyms” (see KASZAB 1946) should be checked.

Distribution: India, Nepal, Borneo, Sumatra, Java, Philippines, New Guinea.

### 3. Phylogeny

The status of the Leiochrini as a monophyletic group is accepted and based on several characters both of adults and larvae (WATT 1974), the same author placed the Leiochrini together with the American Nilionini in the tenebrionid subfamily Nilioninae. After WATT (1974), the sister-group of Nilioninae is the group containing the Toxicinae, Phrenapatinae, Diaperinae, Gnathidiinae, Tenebrioninae and Alleculinae. KASZAB (1946) considered the Diaperini as the closest relatives of the Leiochrini, however presenting only characters for similarities, not for relationship.

In contrast to the monophyly of the tribe, not a single of all 11 Leiochrini genera is characterized as a monophyletic unit by a synapomorphic character. For example, the tarsal morphology is considered as an important character for separating the genera (tarsal joints simple in *Derispia* and *Stethotrypes*, prolonged differently in *Leiochrodes*, *Crypsis* and others). It cannot be excluded, that tarsal morphology is only an adaptation to a special habitat, having evolved convergently in different genera, thus tarsal morphology cannot be used as apomorphic character. Additionally, *Derispia* and *Stethotrypes* are mainly separated traditionally by the head morphology (male head with horns in *Stethotrypes*, without horns in *Derispia*). In the meantime, some *Stethotrypes* are described (also in this paper) with males without distinct horns but with only elevated cheeks. On the other hand, at least one *Derispia* species (*rufescens* Pic 1921) is said to have the cheeks elevated. Further studies are necessary to prove the monophyly of the Leiochrini genera, considering also outgroups.

It is striking, that in all species-rich genera of the Leiochrini species groups exist with completely different shape of the aedeagus. In *Stethotrypes*, *Derispia* and *Leiochrodes*, the species can be arranged to groups with a simple symmetrical aedeagus with quite uniform parameres and penis up to groups with quite complicated, asymmetrical structures, which can be surely considered as apomorphic. However, it is not known, whether these species groups based on aedeagal morphology represent natural groups.

#### 4. Distribution

From the 51 Bornean Leiochrini species, 29 species (57%) have been found only on Borneo and Banguay combined, or even only on Banguay. 8 species (16%) occur not only on Borneo but also on other Sunda islands like Sumatra, Mentawai, Java or Sulawesi. The rest of the species (about 30%) are known also from the Asian continent on the Malayan Peninsula up to Burma and China, from the Philippines and from New Guinea. Although all members of Leiochrini have fully developed wings, the range of distribution seems different in the different genera. The genera *Stethotrypes* and *Derispia* contain the most species with smaller areas, whereas the members of *Leiochrinus* and *Pimplena hemisphaericum* possess quite wide distributions.

The data base is too small to give detailed informations about the horizontal and/or vertical distribution of the Leiochrini species in Borneo proper. Although some species are known only from Sarawak or only from Sabah, or in Sabah even only in the Kinabalu NP or in the Crocker Range NP, this surely reflects only deficiencies of our knowledge and not the real distributional patterns. There might be some tendencies in a vertical horizontation of the species but further collections will distinctly disarrange the present picture. For example, *Leiochrodes semipunctatus* is known from Borneo by a single record at Mount Kinabalu in an altitude of 2050 m being the highest record of all Leiochrini on Borneo – but this species was described from Sumatra from distinctly lower altitudes.

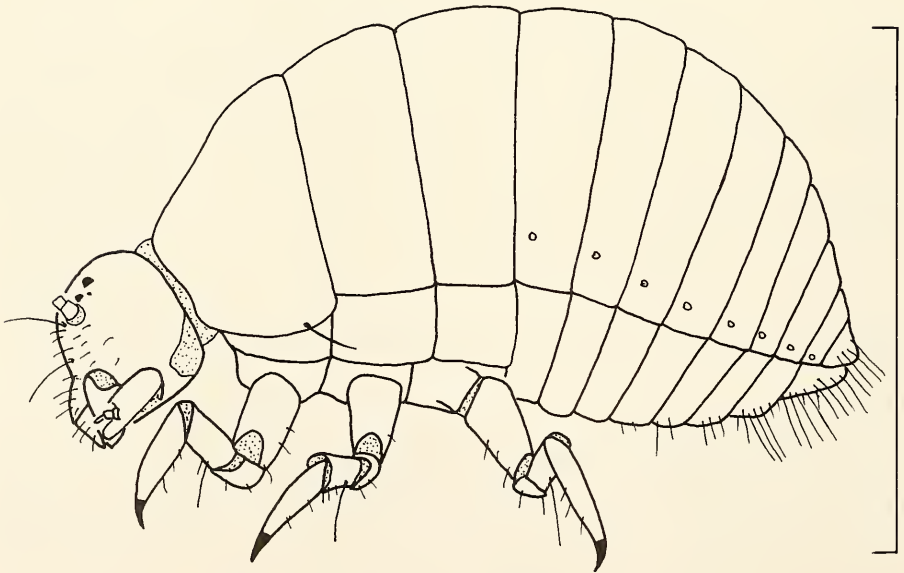


Fig. 45. Larva of *Derispia javana* (Crocker Range NW Keningau, 900–1200 m, 16.–20. XI. 1996 leg. SCHAWALLER) in lateral view. – Scale: 2.0 mm.

## 5. Biology

According to my own observations in the Himalayas, the Philippines and in Borneo, the species of the Leiochrini feed on mosses and algae covering rocks, tree barks, rotten wood and in the forest litter. Never I found them feeding on fungi like members of the Diaperini and many other tenebrionids. Leiochrini mainly prefer humid habitats, but I could find them active in a few cases also in dry conditions. In Borneo I found adults of *Stethotrypes poringicus* n.sp. and of *Derispia javana*, feeding together with their larvae on wet tree barks. A larva of Leiochrini was firstly figured by BÖVING & CRAIGHEAD (1931: plate 59), their general shape is oniscoid (fig. 45) and quite different from other tenebrionid larvae.

The prolonged tarsal joints occurring in some genera of the Leiochrini may be interpreted as an adaptation to smooth and wet habitats on rocks and barks. Similar tarsal structures exist convergently in some groups of Byrrhidae living in comparable habitats.

At least some of the Leiochrini species are active during day. This holds true in particular for the species with a striking colour pattern. It seems probable that mimicry relations have coevolved with the quite similar shaped and figured Coccinellidae, as a defence for those species of the Leiochrini feeding on open rocks and barks not covered by vegetation. But Leiochrini might be active during night too. The unicoloured *Leiochrinus rufofulvus* is attracted regularly by light traps, as well as the fully winged species of *Stethotrypes* and *Leiochrodes*.

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ISSN 0341-0145

Schriftleitung: Dr. Wolfgang Seeger, Rosenstein 1, D-70191 Stuttgart  
Gesamtherstellung: Gulde-Druck GmbH, D-72072 Tübingen



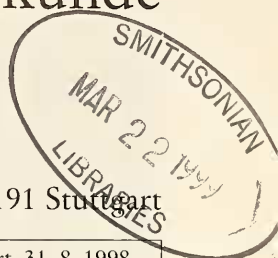
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# Stuttgarter Beiträge zur Naturkunde

## Serie A (Biologie)

Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart



Stuttgarter Beitr. Naturk.

Ser. A

Nr. 575

8 S.

Stuttgart, 31. 8. 1998

### *Borneolaena* gen.n. *riedeli* sp.n. from Sarawak, the First Species of Laenini (Coleoptera: Tenebrionidae) from the Sunda Islands

By Wolfgang Schawaller\*), Stuttgart

With 15 figures

#### Summary

*Borneolaena* gen.n. *riedeli* sp.n. is described from lowland forests of Sarawak/Borneo. Because of a combination of features including the lack of abdominal defensive glands it belongs to the tenebrionid tribe Laenini. Main diagnostic characters are the deep punctation and dense clavate setation of the surface, the modified antennae with a relatively broad antennomere 7 and a short antennomere 8, as well as the long claw segment of the tarsi. The new taxon shows an extreme external similarity to an as yet undescribed genus of the Adeliini from Australia, being explained by convergence. It seems possible that the present restricted area of *Borneolaena* gen.n. in Sarawak is the place of origin of this interesting genus, indicating the existence of an old fragment of Gondwana within recent Borneo.

#### Zusammenfassung

*Borneolaena* gen.n., *riedeli* sp.n. aus Tieflandwäldern von Sarawak/Borneo wird beschrieben. Wegen der Kombination von Merkmalen einschließlich des Fehlens abdominaler Verteidigungsdrüsen gehört sie zum Tribus Laenini der Tenebrionidae. Als diagnostische Merkmale gelten hauptsächlich die tiefe Punktierung und dichte, gekaute Behaarung der Oberseite, die modifizierte Antenne mit einem relativ breiten Glied 7 und einem kurzen Glied 8, und das lange Klauenglied der Tarsen. Das neue Taxon besitzt eine starke äußerliche Ähnlichkeit mit einer noch unbeschriebenen Gattung der Adeliini aus Australien, was durch Konvergenz erklärt wird. Es scheint möglich, daß das rezente begrenzte Areal von *Borneolaena* gen.n. in Sarawak der Entstehungsort dieser interessanten Gattung ist, was auf die Existenz eines alten Gondwana-Fragmentes im heutigen Borneo hinweisen könnte.

\*) Contributions to Tenebrionidae, no. 22. - For no. 21 see: Stuttgarter Beitr. Naturk. (A) 574, 1998.

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## 1. Introduction

In the northern hemisphere the tribe Laenini of the Tenebrionidae contains hitherto morphologically quite homogeneous members. The genus *Laena* Latreille 1829 is widely distributed from eastern Europe through all the Palaearctic to Japan, species-rich in particular in the Himalayas (SCHUSTER, 1916, 1926, 1935; KASZAB, 1977; MASUMOTO, 1990), but also in Thailand (SCHAWALLER, 1998), in Malaysia (SCHAWALLER, 1995) and in China and Vietnam (MASUMOTO, 1996). Additionally the monospecific genera *Psilolaena* Heller 1923 from Sichuan, *Rhacolaena* Kaszab 1979 from southern India and *Prolaena* Kaszab 1980 from Sri Lanka have been described. In the southern hemisphere the Laenini occur on Madagascar and in southern Africa (ENDRÖDY-YOUNGA, pers. comm.).

Recently I received Tenebrionidae from Borneo for study containing also a species of Laenini which has been sifted in lowland forests of Sarawak by ALEXANDER RIEDEL (Munich) in 1990 and by DANIEL BURCKHARDT and IWAN LÖBL (Geneva) in 1994. A detailed study shows that for this species a new genus of Laenini must be created being the first record of this tribe from the Sunda Islands.

## Abbreviations

*HNHM* Hungarian Natural History Museum, Budapest; – *MHNG* Muséum d'Histoire Naturelle, Genève; – *SAMA* South Australian Museum, Adelaide; – *SMNS* Staatliches Museum für Naturkunde, Stuttgart.

## Acknowledgments

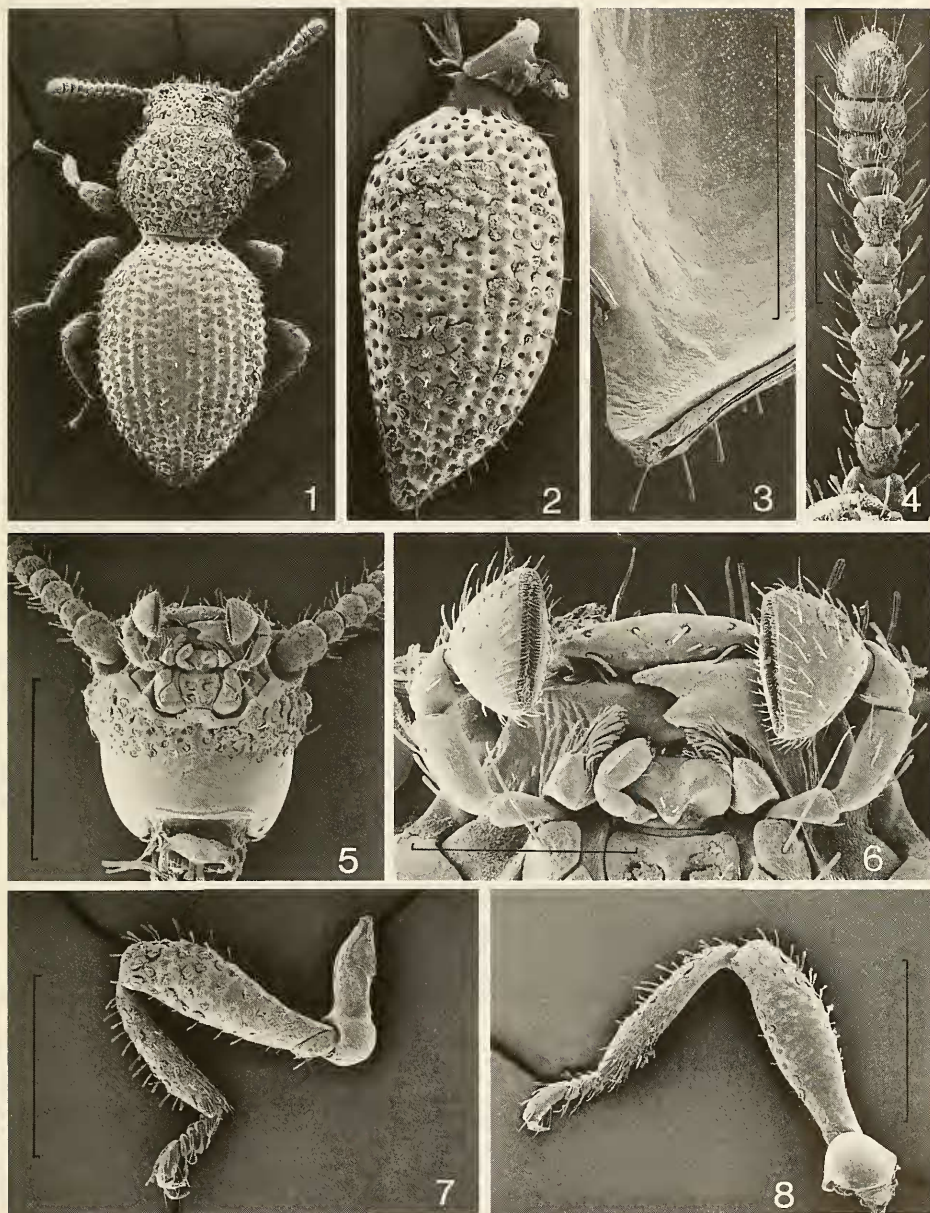
I thank ALEXANDER RIEDEL (Munich) for depositing his Tenebrionidae in the Stuttgart Museum and Dr. IWAN LÖBL (Geneva) for the loan of material under his care. Dr. ERIC MATTHEWS from the South Australian Museum (Adelaide) helped with valuable comments on these specimens and allowed me to publish them. SUSANNE LEIDENROTH (Stuttgart) supported this study with technical assistance at the SEM.

## 2. Taxonomy

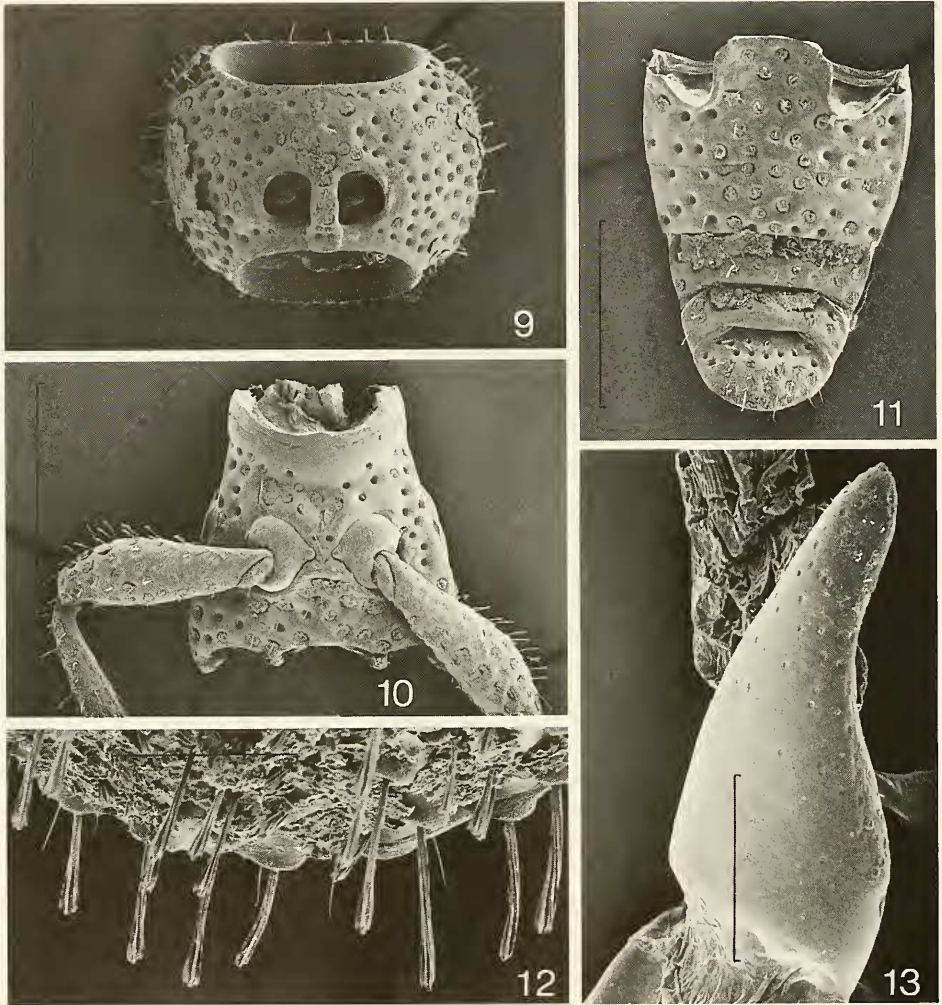
2.1. *Borneolaena* gen.n.

Type species: *B. riedeli* sp.n. by monotypy and present designation.

Diagnosis: With all characters of the Laenini including the lack of defensive glands in abdominal segments 7 and 8. Head, pronotum, elytra, prothoracic and abdominal sternites with deep punctation and with dense stout clavate setation. Modified antennae with antennomere 7 enlarged, antennomere 8 distinctly smaller than



Figs 1-8. *Borneolaena* gen.n. *riedeli* sp.n. - 1. Dorsal view (scale line 1 mm); - 2. elytron in dorsal view (0.5 mm); - 3. tip of elytron internally with microspines (0.5 mm); - 4. antenna (0.5 mm); - 5. head in ventral view (0.5 mm); - 6. maxillary palps (0.2 mm); - 7. anterior leg (0.5 mm); - 8. posterior leg (0.5 mm).



Figs 9–13. *Borneolaena* gen.n. *riedeli* sp.n. – 9. Prosternum (scale line 0.5 mm); – 10. mesosternum (0.5 mm); – 11. abdominal sternites (0.5 mm); – 12. clavate setation (0.1 mm); – 13. parameres with sensillae (0.05 mm).

antennomere 7, antennomeres 1–7 with stout and clavate setation, antennomeres 8–11 with acute setation, apical parts of antennomeres 9–11 additionally with dense sensilla. No lateral pronotal carina and no epipleural carina (except apically). Elytra with clavate setation but without setiferous umbilicate pore(s). Claw segment long, that of metatarsi longer than remaining segments combined. Aedeagus with extremely long basal piece in comparison with the joint parameres.

Etymology: Combination of Borneo and the genus *Laena*, gender feminine.

Distribution: Sarawak/Borneo.

## 2.2. *Borneolaena riedeli* sp.n. (Figs 1–14)

Holotype (♂): E Malaysia, Sarawak, Kuching, Santubong, 26. III. 1990 leg. A. RIEDEL (SMNS).

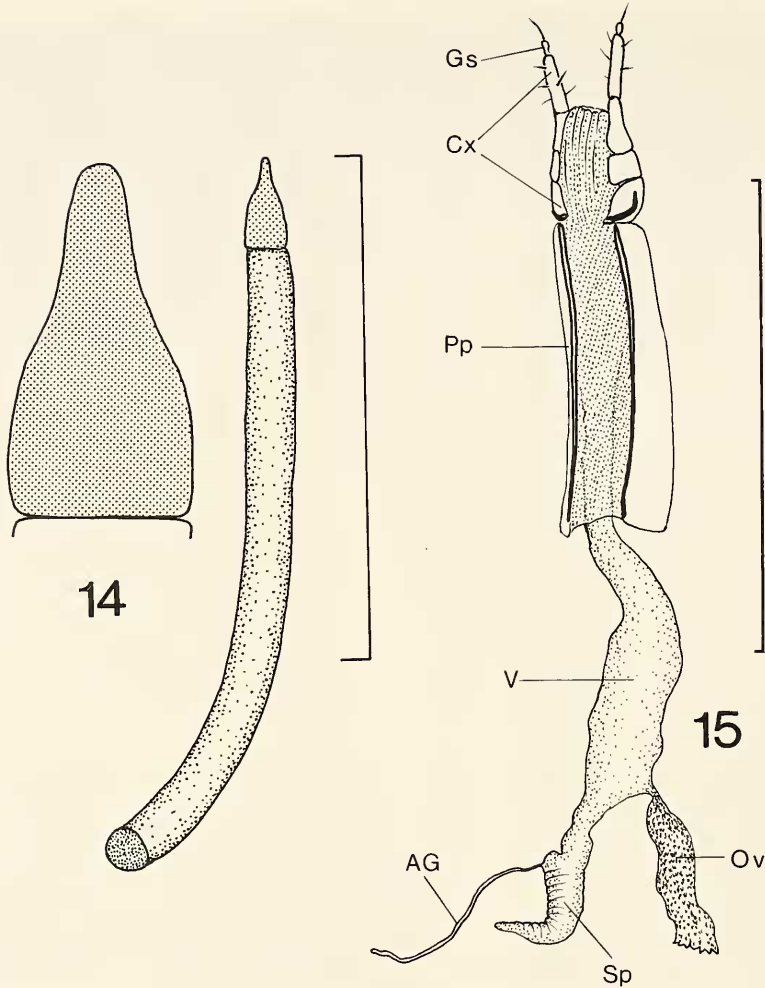
Paratypes: Same data as holotype, 1 ex. SMNS. – E Malaysia, Sarawak, Santubong, 32 km N Kuching, 0–100 m, 11.–16. V. 1994 leg. I. LÖBL & D. BURCKHARDT, 2 ex. MHNG. – E Malaysia, Sarawak, confluence of Suan Oyan and Mujong rivers, E Kapit, 150 m, 19. V. 1994 leg. I. LÖBL & D. BURCKHARDT, 37 ex. MHNG, 4 ex. HNHM, 4 ex. SAMA, 5 ex. SMNS.

**Etymology:** Named after ALEXANDER RIEDEL (München), who discovered this interesting species.

**Description:** Surface of body (Fig. 1) mostly covered with dense layer of soil detritus between setation. Head (Fig. 1) uneven, with rough and deep punctation, distance between punctures equal to 1–4 diameters, surface with dense stout clavate setation (Fig. 12); ventral side of head (Fig. 5) basally without punctation, mentum with 2 basal setae and 4 impressions, last segment of maxillary palps broad and with a distal groove with dense sensilla (Fig. 6); small round prominent eyes; for proportions of antennomeres see Fig. 4, in both sexes antennomere 7 enlarged, antennomere 8 distinctly smaller than antennomere 7, last antennomere not prolonged, antennomeres 1–7 with stout clavate setation, antennomeres 8–11 with acute setation, antennomeres 9–11 additionally with dense sensilla. For proportions of pronotum see Fig. 1, surface with rough and deep punctation, distance between punctures at most equal to 1 diameter, surface with dense stout clavate setation; no distinct lateral margin; propleures and prosternum (Fig. 9) deeply punctured like pronotum, but punctures on prosternum sparser than on pronotum; prosternal process not surpassing basal margin of prosternum. Mesosternum (Fig. 10) punctured as prosternum. Wings lacking. Elytra (Fig. 2) with 11 rows of deep punctures, intervals convex and laterally with tubercles; setation dense, stout and clavate as on pronotum; no epipleural carina except apically; internal side of elytra with microspines (Fig. 3). Abdominal sternites (Fig. 11) deeply punctured, punctures on sternite 1 and 2 larger and sparser than on last (visible) segment 5; segment 1 and 2 combined as long as segments 3–5 combined; intercoxal process of segment 1 broad. Femora and tibiae of legs with clavate setae, claw segment of protarsi (Fig. 7) as long as remaining segments combined, claw segment of metatarsi (Fig. 8) longer than remaining segments combined. Aedeagus (Figs 13–14) with extremely long basal piece and triangular joint parameres, joint parameres distally with scattered impressed sensilla (Fig. 13). Ovipositor (Fig. 15) of typical lagriine form, with coxite lobe 4 long and digitate, gonostyles attached apically. Gonostyles small, coxites shorter than paraprocts (approximate ratio 3/8 to 5/8). Female tract without vaginal sclerites, without bursa copulatrix, at anterior end with single large tapering spermatheca and filiform accessory gland. No distinct external sexual dimorphism. Body length 1.8–2.6 mm.

## 3. Phylogeny

The characters given in the generic diagnosis do not allow us to include this interesting species in the genus *Laena* Latreille 1829. For example, the deep punctation and dense clavate setation of the surface, the modified antennae, and the long claw segments of the tarsi cannot be found in all more than 200 hitherto described species of *Laena*. Thus a new genus for the Sarawak species must be created, even if a de-



Figs 14–15. *Borneolaena* gen.n. *riedeli* sp.n. – 14. Aedeagus in dorsal view (scale line 1 mm); – 15. ovipositor and female reproductive tract in ventral view, proctiger omitted (1 mm) (by E. G. MATTHEWS) (abbreviations: AG = accessory gland; CX = coxite lobes; Gs = gonostyles; Ov = common oviduct; Pp = paraproct; Sp = spermatheca; V = vagina).

tailed phylogenetic analysis of all Laenini is not possible at the moment. Such a study must firstly determine whether *Laena* with its numerous species is really a monophyletic group or not. It seems possible that at least a few species (for example those from the Malayan peninsula) belong to a different evolutionary line and must be excluded from *Laena*. Secondly, such an analysis must include also the African representatives of the Laenini. Thus, the phylogenetic position of *Borneolaena* gen.n. within the Laenini still remains unclear.

MATTHEWS (in press) considered the Laenini and the Adeliini to be separate tribes, being sister groups and extremely similar externally. The main difference is the lack

(Laenini) or existence (Adeliini) of the abdominal defensive glands. *Borneolaena* gen.n. *riedeli* sp.n. has to be placed in the Laenini because of the lack of those glands, but is extremely similar externally to an as yet undescribed genus of Adeliini from Australia (MATTHEWS in press). Thus we face a remarkable case of convergence, difficult to explain. Perhaps the Adeliini and the Laenini retained most of the genes of their common ancestor and therefore tend to produce similar forms independently in response to the same environments in tropical lowland forests.

The ovipositor (Fig. 15) is of the primitive type seen in most Lagriinae, with digitate or styliform fourth coxite lobe and terminal gonostyles. The female tract, on the other hand, while being basically similar to that of other Laenini and of Adeliini, is unique in having only a single large spermatheca shaped like a tapering sac. In all other Laenini and Adeliini examined (MATTHEWS, pers. comm.) the spermatheca is divided into a number of filiform tubules each attached separately to the anterior end of the vagina. The spermatheca of *Borneolaena* gen.n. *riedeli* sp.n. conforms to the hypothetical primitive state of this structure, which is believed to be derived from the original bursa copulatrix. The most primitive known form of the female tract is that of Lagriini, which has a primary bursa but no spermatheca.

#### 4. Zoogeography

The Laenini have a Gondwanian distribution, but most of the species apparently occurred in a more northern area of Gondwana than the Adeliini. Fragments of Gondwana are believed to have drifted into Malaysia. In spite of intensive siftings by the same collectors (and by the author) in other parts of Borneo, in particular in Sabah, *Borneolaena* gen.n. *riedeli* sp.n. has been collected only in a small lowland area of Sarawak and is probably restricted to this area because of its limited dispersal abilities (being wingless). It seems possible that the present restricted area of *Borneolaena* gen.n. in Sarawak is the original distribution area of this interesting genus, indicating the existence of an old fragment of Gondwana within recent Borneo.

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ISSN 0341-0145

Schriftleitung: Dr. Wolfgang Seeger, Rosenstein 1, D-70191 Stuttgart  
Gesamtherstellung: Gulde-Druck GmbH, D-72072 Tübingen



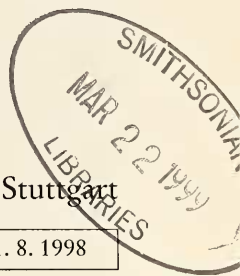
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# Stuttgarter Beiträge zur Naturkunde

## Serie A (Biologie)

Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart



Stuttgarter Beitr. Naturk.	Ser. A	Nr. 576	8 S.	Stuttgart, 31. 8. 1998
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### *Curimata vari*, a New Curimatid Fish (Characiformes: Curimatidae) from Santa Catarina, Brazil

By Julia Gaye-Siesseger and Ronald Fricke, Stuttgart

With 1 figure and 1 table

#### Summary

*Curimata vari* n. sp. is described from the Rio Cubatao in southeastern Brazil (27°41'30"S). It is a member of the lineage *C. cisandina* (Amazon system), *C. inornata* (Amazon system) and *C. roseni* (Rio Negro) which is characterized by a low number of tubular pored scales in the lateral line, a short head, the presence of a midlateral stripe from below the posterior end of the dorsal fin to the caudal peduncle (stripe broadening caudally), and a discrete black mid-dorsal stripe from the rear of the rayed dorsal fin to beyond the adipose fin. *Curimata vari* is the first species of the genus to be found south of 6°45'S.

#### Zusammenfassung

*Curimata vari* n. sp. wird vom Rio Cubatao in Südostbrasilien (27°41'30"S) beschrieben und gehört zu der Artengruppe *C. cisandina* (Amazonas-Gebiet), *C. inornata* (Amazonas-Gebiet) und *C. roseni* (Rio Negro). Charakteristisch für diese neue Art sind eine geringe Anzahl von Schuppen in der Seitenlinie und der relativ kurze Kopf. Die Körperseiten tragen ein breites Band, das unterhalb des Rückenflossenendes beginnt und sich bis zum Schwanzstiel erstreckt, wo es sich verbreitert. Ein schwarzer Streifen erstreckt sich vom Ende der Dorsalflosse bis hinter die Fettflosse. *Curimata vari* ist die erste Art der Gattung, die südlich von 6°45'S gefunden wurde.

#### 1. Introduction

Species of the genus *Curimata* have moderate body sizes (up to 225 mm standard length). The genus is recognized as a monophyletic subunit of the family Curimatidae on the basis of six synapomorphies in the buccopharyngeal complex, the gill arches and the palatine arch (VARI, 1989a). It is characterized by three large fleshy folds with additional parallel secondary folds in the roof of the mouth in adults, by the complete lateral line and a maximum of 76 lateral line scales between supraclei-

thrum and hypural joint (VARI, 1989a). The genus is distributed in the lowlands of South America; a single species of *Curimata* is found in trans-Andean South America, while 12 species were known from east of the Andean mountain range.

A key to the eight genera of the family Curimatidae was given by VARI (1992b). During the past 15 years, VARI revised all genera of the family: *Curimata* (VARI, 1989a), *Curimatella* (VARI, 1992b), *Curimatopsis* (VARI, 1982), *Cyphocharax* (VARI, 1992a), *Potamorhina* (VARI, 1984a), *Psectrogaster* (VARI, 1989b), *Pseudocurimata* (VARI, 1989c) and *Steindachnerina* (VARI, 1991). ESCHMEYER (1990) considered the genus *Curimata* (BOSC, 1817) as valid.

In 1889, EIGENMANN & EIGENMANN recognized 39 species of *Curimata*. Even more recently, curimatid species which were first described under the generic name *Curimata*, were later assigned to other genera of the family (e.g. BRITSKI, 1980: now *Cyphocharax vanderi*; VARI & GÉRY, 1985: now *Steindachnerina fasciata*; VARI & NIJSSSEN, 1986: now *Cyphocharax punctatus*; BRAGA & AZPÉLICUETA, 1987: now *Steindachnerina biornata*; VARI, 1987: now *Cyphocharax spilotus*). VARI (1992a) synonymized *Curimata gnaca* Azpelicueta & Braga, 1988 with *Cyphocharax spilotus* (VARI, 1987). VARI (1989a) restricted the genus *Curimata* to 12 species: *C. aspera* Günther, 1868 (upper Rio Amazonas) (GÜNTHER, 1868); *C. cerasina* VARI, 1984 (Rio Orinoco) (VARI, 1984b); *C. cisandina* (Allen in EIGENMANN & ALLEN, 1942) (Rio Amazonas system); *C. cyprinoides* (Linné, 1766) (lower Rio Orinoco) (LINNÉ, 1766), *C. incompta* VARI, 1984 (Rio Orinoco basin); *C. inornata* VARI, 1984 (Rio Amazonas system); *C. knerii* Steindachner, 1877 (middle and upper Rio Amazonas) (STEINDACHNER, 1877); *C. macrops* Eigenmann & Eigenmann, 1889 (Rio Parnaíba); *C. miwartii* Steindachner, 1878 (Rio Magdalena and associated rivers) (STEINDACHNER, 1878); *C. ocellata* Eigenmann & Eigenmann, 1889 (Rio Amazonas basin); *C. roseni* VARI, 1988 (Rio Negro); *C. vittata* Kner, 1859 (Rio Amazonas system) (KNER, 1859).

VARI & REIS (1995) described an additional species, *Curimata acutirostris*, from the upper Rio Araguaia in the southeastern portion of the Rio Amazonas drainage basin. This species was found to be related to *C. cisandina*, *C. inornata*, and *C. roseni*. *Curimata acutirostris* shares seven of the nine synapomorphies of the clade. However, it is lacking the discrete black middorsal stripe extending from the rear of the dorsal fin to beyond the adipose fin. *Curimata acutirostris* brought the total number of valid species of the genus to 13.

The genera *Acuticurimata* (FOWLER, 1941), *Allenina* (FERNÁNDEZ-YÉPEZ, 1948), *Bitricarinata* (FERNÁNDEZ-YÉPEZ, 1948), *Bondichthys* (WHITLEY, 1953), *Lambepiedra* (FERNÁNDEZ-YÉPEZ, 1948), *Peltapleura* (FOWLER, 1906), *Semitapicis* (EIGENMANN & EIGENMANN, 1889) and *Stupens* (WHITLEY, 1954) were synonymized with *Curimata* Bosc, 1817 by VARI (1989a).

During an ichthyological survey in Santa Catarina (U. SCHULZ, H.-J. TROSCHER and R. BERG, 1993), an additional, undescribed species of the genus was found which is described in the present paper.

## 2. Methods and Material

Methods follow VARI (1989a). Measurements were made using dial calipers on the left side of the specimens. Sections of the head and body were measured on a parallel to the sagittal plane; fin base lengths from the beginning to the end of the fin base, in a straight line. Fin lengths are the lengths of the longest rays of the fins. Morphometric data were recorded to the tenth of a millimetre. The standard length (*SL*) was measured from the upper lip to the hyp-

ural joint. In the description, measurements are given as *thousands of SL* (in Tab. 1, also as a quotient “ $x/SL$ ” which was used by VARI (1989a), and as “ $x$  in *SL*”,  $x$  = measurement). Counts of total vertebrae were taken from radiographs.

In the description, data of the paratypes follow those of the holotype, in parentheses ( ).

The type specimens of the new species are deposited in the fish collection of the Staatliches Museum für Naturkunde in Stuttgart (*SMNS*), and the National Museum of Natural History, Smithsonian Institution, Washington D.C. (*USNM*).

### 3. Systematics

#### *Curimata vari* n. sp. (Fig. 1)

Vari's Curimata

#### Material

Total: 3 specimens.

Holotype: *SMNS* 17508, 1 specimen, 144.3 mm *SL*, Brazil, Santa Catarina, Rio Cubatao, 2 km above national highway bridge, 200 m above little suspension bridge, 27°41'30"S 48°40'50"W, U. SCHULZ, H.-J. TROSCHER & R. BERG, 14 Mar. 1993.

Paratypes: *SMNS* 19170, 1 specimen, 125.7 mm *SL*, same data as holotype; *USNM* 345527 1 specimen, 124.0 mm *SL*, same data as holotype.

#### Etymology

The new species is named in honour of Dr. RICHARD P. VARI appreciating his excellent revisions of curimatid fishes.

#### Diagnosis

A moderately large species of *Curimata* with 39–42 pored scales in the lateral line, short head (227–233% of *SL*), body with a midlateral stripe from below the end of the dorsal fin to the caudal peduncle (there broadening) and a discrete black middorsal stripe from the rear of the rayed dorsal fin to beyond the adipose fin, dorsal fin with 8 branched rays, anal fin with 7 rays.

#### Description

D iii,8 (iii,8). A ii,7 (ii,7). P<sub>1</sub> ii,14 (ii,14–15). P<sub>2</sub> i,8 (i,8). C (iii),i,16,i,(iii) [(iii),i,17–18,i,(iii)]. Lateral line complete. All scales of lateral line pored; number of lateral line scales from supracleithrum to hypural joint 39 (37–42). Transverse scale rows 6 + 6 (6 + 5–6). Predorsal scales 13 (13). Total vertebrae counts 15 + 16 = 31, including Weberian apparatus. Measurements see Tab. 1.

Head very short; head length 227 (232–233); maximum head depth 253 (256–263); maximum head width 140 (130–136). Mouth terminal. Roof of mouth with three large fleshy folds with additional parallel secondary folds. Eye diameter 66 (64–66). Adipose eyelid developed, with a vertical ovoid opening over middle of eye. Interorbital distance 97 (98–101). Preorbital length 69 (68–70).

Body compressed, moderately elongate. Body depth at dorsal fin origin 344 (338–344). Body depth at anal fin origin 209 (218–223). Dorsal profile in front of the vertical through posterior nostril convex, then straight towards the tip of the supraoccipital spine, then slightly convex to the origin of the dorsal fin. Dorsal fin base straight to slightly convex, moderately inclined posteroventrally. Back between base

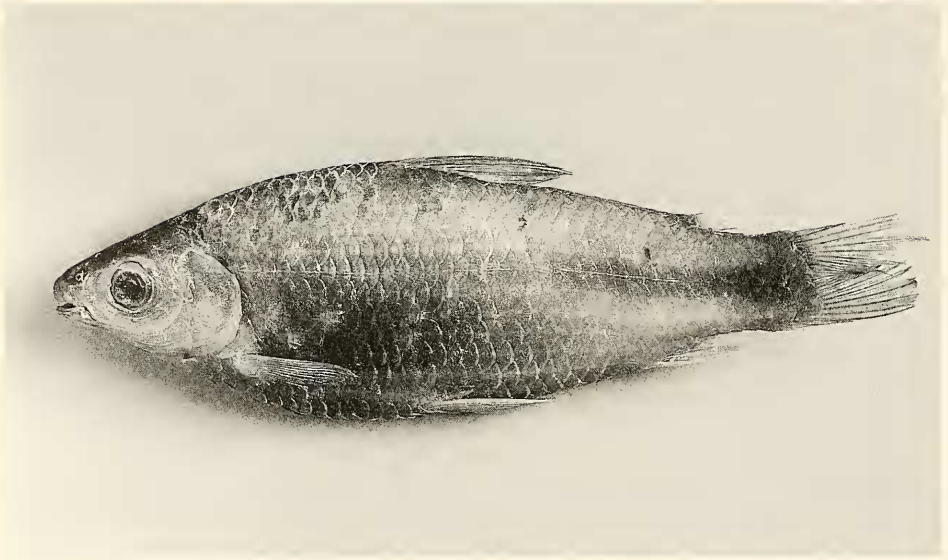


Fig. 1. *Curimata vari* n. sp.; holotype, SMNS 17508, 144.3 mm SL, Rio Cubatao, Santa Catarina, Brazil; lateral view.

of last dorsal fin ray and adipose fin origin straight to slightly convex. Caudal peduncle dorsally and ventrally slightly concave. Ventral profile of body gently curved from tip of lower jaw to caudal peduncle. Prepelvic region flattened, with lateral angles of the body wall nearly right.

Dorsal fin length 243 (245–256). Dorsal fin base length 143 (140–149). Predorsal length 430 (443–450). Anal fin length 155 (152–155). Anal fin base length 98 (89–99). Preanal length 792 (788–796). Pectoral fin length 162 (173–185). Pectoral fin nearly reaching the vertical through the beginning of the dorsal fin when laid back. Prepectoral length 227 (233–239). Pelvic fin length 192 (192–194). Prepelvic length 490 (479–480). Caudal peduncle length 138 (128–129). Caudal peduncle depth 123 (127–132). Maximum observed SL 144.3 mm. Adipose fin well developed. Caudal fin forked, with two series of scales at the basis.

Colour in alcohol: Head and body tan to light brown, darker on dorsal portions of head and body. Specimens lacking guanine on scales. Head with small melanophores on premaxilla and maxilla, around the eyes, on interorbital and supraoccipital region. Opercle with scattered melanophores. Throat light brown. Body with a dark midlateral body stripe from below the end of the dorsal fin to the caudal fin base, broadening on caudal peduncle, and a discrete black middorsal stripe from the rear of the rayed dorsal fin to beyond the adipose fin. Isolated scales on the dorsal side of the body with dark pigmentation. Dorsal fin more pigmented distally. Caudal fin with more melanophores than other fins.

Table 1. Measurements of *Curimata vari* n. sp. expressed using three different methods.

Holotype (144.3 mm SL)	% of SL	x/SL	in SL
Body depth at dorsal fin origin	344	0.34	2.91
Body depth at anal fin origin	209	0.21	4.79
Head length	227	0.23	4.40
Maximum head depth	253	0.25	3.96
Maximum head width	140	0.14	7.14
Eye diameter	66	0.07	15.26
Interorbital	97	0.10	10.30
Preorbital length	69	0.07	14.50
Prepectoral length	227	0.23	4.40
Predorsal length	430	0.43	2.32
Prepelvic length	490	0.49	2.04
Preanal length	792	0.79	1.26
Preadipose length	843	0.84	1.19
Maximum dorsal fin length	243	0.24	4.12
Dorsal fin base length	143	0.14	6.98
Maximum anal fin length	155	0.16	6.47
Anal fin base length	98	0.10	10.23
Maximum pectoral fin length	162	0.16	6.18
Maximum pelvic fin length	192	0.19	5.21
Caudal peduncle length	138	0.14	7.23
Caudal peduncle depth	123	0.12	8.10
Pectoral to pelvic fin origin	253	0.25	3.95
Pelvic fin origin to anal fin origin	313	0.31	3.20
Dorsal fin origin to hypural joint	522	0.52	1.92
Anal fin origin to hypural joint	214	0.21	4.67
Paratypes (124.0–125.7 mm SL)			
Body depth at dorsal fin origin	338–344	0.34	2.90– 2.96
Body depth at anal fin origin	218–223	0.22	4.49– 4.58
Head length	232–233	0.23	4.30
Maximum head depth	256–263	0.26	3.80– 3.90
Maximum head width	130–136	0.13–0.14	7.37– 7.70
Eye diameter	64– 66	0.06–0.07	15.24–15.70
Interorbital	98–101	0.10	9.90–10.25
Preorbital length	68– 70	0.07	14.34–14.62
Prepectoral length	233–239	0.23–0.24	4.19– 4.30
Predorsal length	443–450	0.44–0.45	2.22– 2.26
Prepelvic length	479–480	0.48	2.08– 2.09
Preanal length	788–796	0.79–0.80	1.26– 1.27
Preadipose length	831–845	0.83–0.84	1.18– 1.20
Maximum dorsal fin length	245–256	0.24–0.26	3.90– 4.09
Dorsal fin base length	140–149	0.14–0.15	6.72– 7.17
Maximum anal fin length	152–155	0.15–0.16	6.45– 6.56
Anal fin base length	89– 99	0.09–0.10	10.06–11.22
Maximum pectoral fin length	173–185	0.17–0.18	5.41– 5.77
Maximum pelvic fin length	192–194	0.19	5.16– 5.20
Caudal peduncle length	128–129	0.13	7.73– 7.81
Caudal peduncle depth	127–132	0.13	7.57– 7.85
Pectoral to pelvic fin origin	242–255	0.24–0.26	3.92– 4.13
Pelvic fin origin to anal fin origin	311–323	0.31–0.32	3.10– 3.22
Dorsal fin origin to hypural joint	541–548	0.54–0.55	1.82– 1.85
Anal fin origin to hypural joint	198–209	0.20–0.21	4.79– 5.04

### Distribution

The new species is known only from the Rio Cubatao, Santa Catarina, Brazil. At the type locality, the river was 25–50 m broad, with a current of 0.10–0.25 m/s, a natural profile, a temperature of 25.8°C, a pH of 4.5, and a conductivity of 46.0 µS.

### Relationships

*Curimata vari* n. sp. is closely related to the lineage of *C. cisandina*, *C. inornata* and *C. roseni* in the cladogram of the most parsimonious hypothesis of relationships for species of the genus *Curimata* (VARI, 1989a). This lineage is characterized by several synapomorphies, including a discrete black middorsal stripe reaching from the rear of the rayed dorsal fin to beyond the adipose fin; that stripe is absent in the sister clade *C. aspera*, *C. cerasina*, *C. mivartii* and the remaining species of the genus. *Curimata vari* can be distinguished from the closely related lineage of *C. cisandina*, *C. inornata* and *C. roseni* by the low number of pored lateral line scales (37–42) and the low body depth (338–344). Additionally, *C. cisandina* has more branched anal fin rays (10–12).

*Curimata vari* is closely related to *C. acutirostris*, a species recently described by VARI & REIS (1995). However, one of the characters, the black middorsal stripe, is lacking in *C. acutirostris*. *Curimata acutirostris* has more pored lateral line scales (54–56) than *C. vari*, and more branched anal fin rays (9–11).

*Curimata ocellata* can be distinguished from *C. vari* and the other species by an elongate fusiform body shape. Additionally, all species of the genus except *C. ocellata* and *C. mivartii* have a distinct flattened prepelvic region with lateral angles of the body wall nearly right.

*Curimata vari* is lacking the series of vertical bars on the dorsal portion of the body that is present in *C. vittata*, and elongate dorsal and ventral rays of the caudal fin and filamentous anterior rays of the dorsal fin which are present in *C. knerii* and *C. cyprinoides*.

### Remarks

In his revision of *Curimata*, VARI (1989a) restricted the range of the genus to the tropical regions of South America between 11°N and 6°45'S. A single species, *Curimata macrops* from the Rio Parnaíba (6°45'S), was found south of the Amazon system. As *Curimata vari* n. sp. was collected in Santa Catarina, southeastern Brazil, it represents an enormous southern extension of the range of the genus. It is the only species of the genus known from a subtropical latitude. Two close relatives *C. cisandina* and *C. inornata* are found in the Rio Amazonas system; another, *C. roseni* in the Rio Negro drainage.

### 4. Acknowledgments

We would like to thank U. SCHULZ (Universidade Federal de Santa Catarina, Florianópolis, Brazil), H.-J. TROSCHER (Hugstetten, F.R.G.) and R. BERG (Fischereiforschungsstelle Langenargen, F.R.G.) for presenting an extensive collection of fishes from Santa Catarina, including the type species of *C. vari*. I. KOCH (Zoologisch-Botanischer Garten Wilhelma, Stuttgart) provided X-ray photographs, T. WISCHUF (SMNS, Stuttgart) took the photo, and S. PETRI (SMNS, Stuttgart) facilitated inter-library literature loans.

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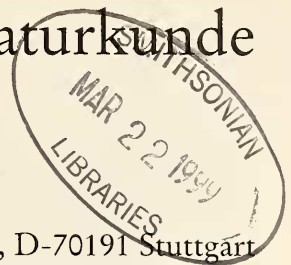
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# Stuttgarter Beiträge zur Naturkunde

## Serie A (Biologie)

Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart



Stuttgarter Beitr. Naturk.	Ser. A	Nr. 577	5 S.	Stuttgart, 31. 8. 1998
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## A New Species of *Eviota* with Vertical Trunk Bars from the Loyalty Islands (Teleostei: Gobiidae)

By Ronald Fricke, Stuttgart

With 1 figure and 1 table

### Summary

*Eviota corneliae* n.sp. is described on the basis of two specimens from the west coast of Maré Island, Loyalty Islands, New Caledonia, Southwest Pacific. The species is characterized within the *Eviota-epiphanes* species-group by having a bright yellow body, 5 thin vertical blackish brown trunk bars, the last trunk bar developed as a saddle on the caudal peduncle, the other bars reaching three-fourths across the sides of the body, trunk bars discrete, uniform; head with three additional bars, the mark on the fleshy pectoral fin base developed as a narrow streak, equal in intensity to trunk bars.

### Zusammenfassung

Die Korallengrundel *Eviota corneliae* n.sp. wird auf Grund von 2 Exemplaren von der Westküste der Insel Maré, Loyalty Islands, Neukaledonien, Südwestpazifik beschrieben. Die neue Art ist innerhalb der *Eviota-epiphanes*-Artengruppe charakterisiert durch ihren hellgelben Körper, 5 dünne vertikale Streifen auf der Körperseite, den letzten Streifen nur als dorsalen Sattel auf dem Schwanzstiel ausgeprägt, die übrigen Streifen 3/4 über die Körperseite reichend, ihren Kopf mit 3 zusätzlichen Vertikalstreifen, Brustflossenbasis mit einem dünnen Streifen, der genauso breit wie die Seitenstreifen ist.

### 1. Introduction

The family Gobiidae contains of 5 subfamilies (Oxudercinae, Amblyopinae, Sicydiinae, Gobionellinae and Gobiinae (NELSON, 1994: 414–417). The Gobiinae lives worldwide in marine, occasionally also in brackish and freshwater habitats; it comprises about 130 genera with approximately 1,800 described species. *Eviota* is a genus of small, Indo-Pacific coral reef or coralline rock associated gobiine species.