

**DESCRIPTION OF A NEW SPECIES OF *BOROLINUS* BERNHAUER
(COLEOPTERA: STAPHYLINIDAE: OSORIINAE) FROM YUNNAN, CHINA,
WITH TWO NEW RECORDS FROM SOUTHERN CHINA**

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ABSTRACT. – The genus *Borolinus* Bernhauer is a rove beetle group well adapted to habitats associated with dead wood. Before this study, only 13 species were described in this group and two of them were recorded from China, namely *Borolinus minutus* Laporte and *B. dietmarleutzi* Schillhammer. In this paper, we describe a new species, *B. bisetifer*, new species, from Yunnan province, China. Two species, *B. semirufus* Fauvel and *B. sikkimensis* Bernhauer, are recorded for the first time from China. A key to these five Chinese species is provided.

KEYWORDS. – Coleoptera; Staphylinidae; *Borolinus*; new species; China.

INTRODUCTION

The tribe Leptochirini Sharp is a strange group in the subfamily Osoriinae (Coleoptera, Staphylinidae) with ample diversity in cephalic characters. The Leptochirini currently includes four genera: *Leptochirus* Germar, 1824, *Priochirus* Sharp, 1887, *Thoracochirus* Bernhauer, 1903, and *Borolinus* Bernhauer, 1903, which are distributed mainly in the tropical and subtropical regions of the world and are mostly associated with dead wood.

Within Leptochirini, the genus *Borolinus* is easily recognized by the projecting mandibles and the pair of elongate inner lateral teeth on the head. Until now, this genus included only 13 species worldwide. Most of these species are known from the islands of southeast Asia, only a few of those are distributed more widely. As the northern part of the Oriental region, South China is important from the zoogeographical point of view, for the understanding of the evolution of the genus *Borolinus*. However, this genus is poorly investigated there. Before our study, only two species of this genus were recorded in China, *Borolinus minutus* Laporte, 1840, from Taiwan (may be also from mainland China, but not indicated clearly in Cameron, 1949) and *B. dietmarleutzi* Schillhammer, 2005, from Guizhou. This paper is a taxonomic study of all

species of this genus and distributed in China. One species, *B. bisetifer*, from Yunnan province, is described as new to science. Two species are recorded from China for the first time: *B. semirufus* Fauvel, 1895, from Yunnan and *B. sikkimensis* Bernhauer, 1919, from Sichuan, Guangxi and Guizhou. Thus, a total of five species of *Borolinus* are now known to occur in China. A key to Chinese species of *Borolinus* is provided.

MATERIAL AND METHODS

All specimens were examined through a light microscope. The measurements are given in millimeters (mm) and were done using the microscope ZEISS stemmi 2000-c at 10X magnification. The following abbreviations are used in the text: HL, head length (from lateral lobe to the posterior margin); PL, pronotum length (along medial line); EL, elytron length (from the humeral to the most distal margin); HW, head width (maximal, excluding eyes); PW, pronotum width (maximal); EW, elytra width (maximal).

This study is based on the specimens in the collection of the Institute of Zoology, Chinese Academy of Sciences (IOZ-CAS), and those kept at the Natural History Museum in

Vienna (NMW). All the type specimens are deposited in IOZ-CAS and the Zoological Reference Collection of the Raffles Museum of Biodiversity Research, National University of Singapore (ZRC).

TAXONOMY

Genus *Borolinus* Bernhauer, 1903

Borolinus Bernhauer, 1903: 116, 113; Bernhauer & Schubert, 1910: 15; Cameron, 1921: 350, 399; Cameron, 1925: 4; Cameron, 1930: 92; Scheerpeltz, 1933: 1001; Blackwelder, 1952: 84; Shibata, 1973: 25; Shibata, 1976: 87; Hammond, 1984: 196; Herman, 2001: 1094; Smetana, 2004: 505.

Type species. – *Leptochirus javanicus* Laporte, fixed by subsequent designation (Lucas, 1920).

Diagnosis. – This genus can be easily distinguished from other Leptochirini by the distinctly protruding inner lateral teeth and mandibles. The prosternal process is sunk between the anterior coxae, and its apex is slightly dilated behind rather than expanded, to form a round plate as in *Leptochirus*. The inner lobe of the maxillae is densely ciliate, but not denticulate as in *Priochirus* and *Thoracochirus*.

Key to species of *Borolinus* from China

1. Head with one pair of divergent inner lateral teeth, outer lateral teeth absent *B. semirufus* Fauvel
- Head with one pair of parallel inner lateral teeth and one pair of triangular outer lateral teeth 2
2. Mandible with only one inner tooth behind apical tooth 3
- Mandible with two inner teeth behind apical tooth *B. minutus* Laporte
3. Pronotum and elytra red; clypeus medially with one pair of long setae *B. bisetifer*, new species
- Pronotum and elytra black; clypeus medially with two pairs of long setae 4
4. Vertex not sulcate; smaller size (12-14 mm) *B. sikkimensis* Bernhauer
- Vertex medially sulcate; larger size (18-22 mm) *B. dietmarleutzi* Schillhammer

Borolinus bisetifer, new species (Figs. 1-11)

Material examined. – Holotype- male, China, Yunnan, Xishuangbanna, Menglun, 810 m, 10 Feb.2004, Jie Wu coll.(IOZ-CAS).

Paratypes. – 1 male, 5 females, China, Yunnan, Xishuangbanna, Menglun, 810 m, 10 Feb.2004, Jie Wu & Jiantao Yin coll.(IOZ-CAS); 1 male, same data as in other paratypes (ZRC).

Description. – Body not so depressed as in other species of the genus. Head dark red. Pronotum and elytra red. Abdomen almost dark red except three black terminal segments. Femora, tibiae and tarsi reddish. Antenna dark red.

Head (Fig. 1) transverse, in front furnished with two parallel inner lateral teeth, which are distinctly projecting and pointed, almost reaching apical 2/3 of mandibles viewed from above; frontal depression between inner lateral teeth, deep, slightly longer than wide; outer lateral tooth situated at outer base of inner lateral tooth, triangularly pointed and broadly depressed at its base; lateral lobe situated between eye and outer lateral tooth, not gibbous. Vertex smooth, not sulcate, only in middle of base with an indistinct longitudinal fovea; along lateral and postero-lateral margin with some scattered punctures and long golden pubescence. Eyes glabrous, moderately convex. Clypeus steeply elongate, medially with one pair of long setae.

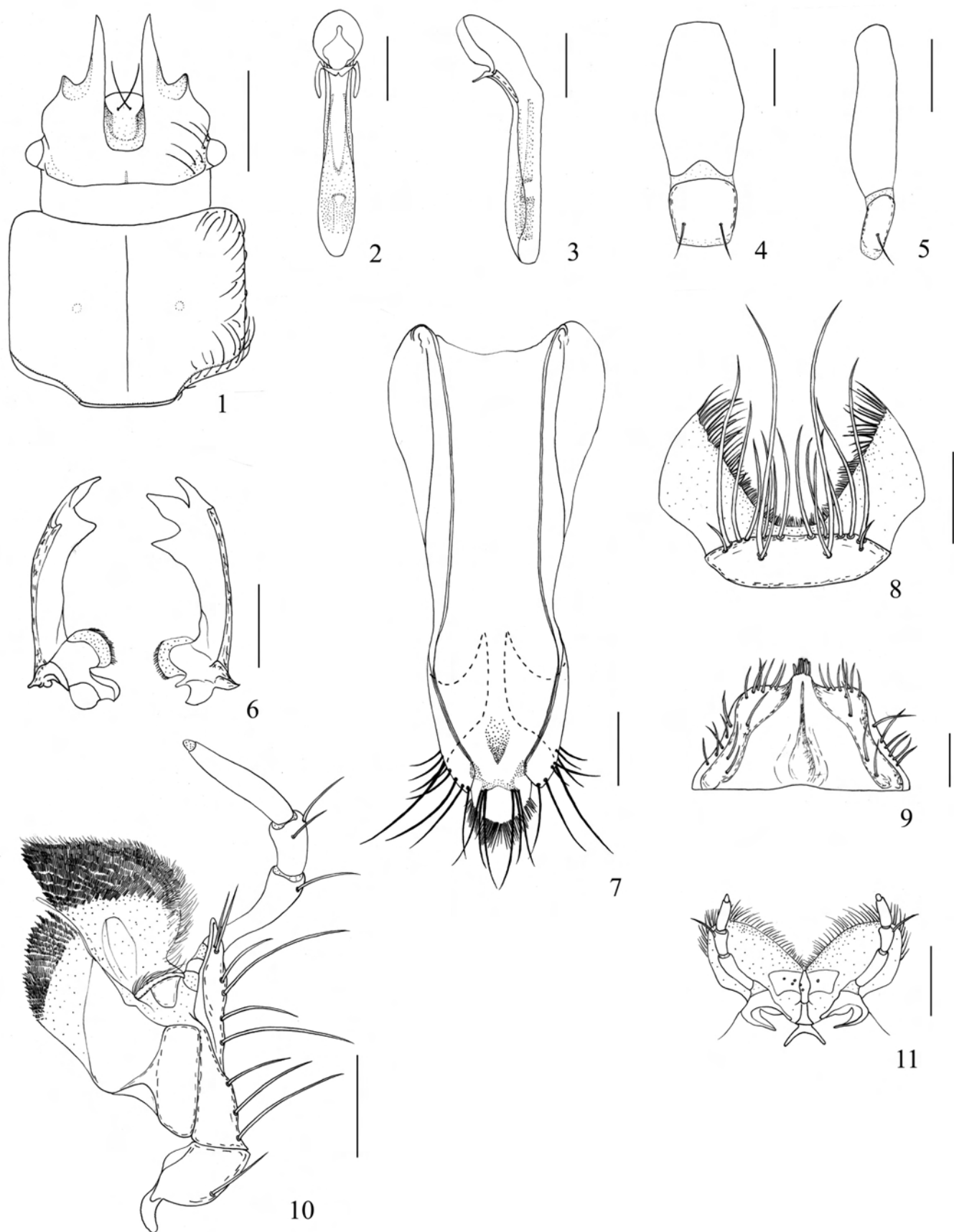
Labrum (Fig. 8) transverse, with two long and ciliate submembranous lobes projecting anteriorly, anterior margin furnished with 6 pairs of setae of various length, behind them in middle with two additional pairs of long setae. Mandibles extremely protruding (Fig. 6), apical tooth pointed, immediately behind which with two sharp teeth on dorsal side and one sharp tooth on inner side. Inner lobe of maxillae (Fig. 10) with one slim and pointed tooth at apex, behind this tooth remaining inner side with dense ciliae in transverse rows; outer lobe hatchet-shaped, anterior half with dense ciliae in rows. Mentum (Fig. 9) trapeziform and setose, depressed laterally, in middle of front margin with a broad protruding denticle, apically ciliated. Paraglossa and glossa (Fig. 11) ciliate anteriorly, not separated from each other.

Antennae long, posteriorly reaching shoulder of elytra, weakly geniculate, 1st segment baculiform, apically emarginate to hold 2nd segment, about as long as 2nd-4th segments combined, 2nd smallest, almost quadrate, 3rd long and narrowed at base, twice as long as 2nd, 4th-6th slightly elongate, 7th-9th moniliform, 10th slightly transverse, 11th conical, bluntly pointed, about 2 times as long as 10th. In addition to usual setae, segments 6th-11th with tomentose pubescence, gradually becoming denser toward apex.

Pronotum transverse, its frontal margin regularly emarginate, sides parallel, median longitudinal sulcus narrow, almost covering whole length of pronotum, disc of pronotum with finely vermiform microsculpture and on each side of sulcus with a distinct puncture; lateral line continuing, but turning upward at anterior angle, vanishing before reaching middle, basally bent dorsad at hind angle, forming curved ridge, continuing along posterior constriction and reaching basal line; sides of pronotum, along lateral line, with moderately dense setiferous punctures and golden setae, especially denser at posterior angle.

Protibiae externally with 13-15 denticles, which gradually becoming shorter basally. Middle and hind tibiae densely setose.

Elytra almost quadrate, disc with distinctly coriaceous micropunctures, slightly expanding laterally at posterior part, posterior margin weakly emarginate, small setiferous punctures moderately dense along lateral margin.



Figs. 1-11. *Borolinus bisetifer*, new species: 1, head and pronotum in dorsal view; 2, aedeagus in dorsal view; 3, aedeagus in lateral view; 4, 9th abdominal sternite of male; 5, left half of 9th abdominal sternite of female; 6, mandibles; 7, 9th and 10th abdominal tergites of male; 8, labrum; 9, mentum; 10, maxilla; 11, ligula and labial palpi. Scale bars: Figs. 1, 6 = 1 mm; Figs. 2-5, 7-10, 11 = 0.25 mm.

Abdomen cylindrical, weakly broadened to 7th segment, 3rd-6th segments with anterior and posterior row of long golden setae, these setae denser at lateral side, but gradually becoming sparser medially, 7th and 8th irregularly covered with long golden setae, but in middle of 7th with a broad glabrous region.

Male. Aedeagus (Fig. 2, 3) with median lobe slightly bulbous at base, curved behind basal orifice, posterior part baculiform, rounded at apex and weakly sclerotized on dorsal side; basal orifice roundly emarginate above, parameres short, thin and pointed, with basal part protruding dorsally and connecting each other to form a characteristic triangular structure, apically emarginate. Ninth tergite (Fig. 7) sclerotized with left and right plates separated, each with 8 or 9 setae of various length. Tenth tergite almost membranous except for sclerotized apical part, posterior margin emarginate in middle, with 3 pairs of setae. Ninth sternite (Fig. 4) composed of two plates, apical plate sclerotized except for membranous apex, with two long setae, basal plate less sclerotized, broadened in middle.

Female. Ninth sternite (Fig. 5) with hemisternite less sclerotized, anterior margin not strongly rounded, second gonocoxite strongly sclerotized except for membranous apex, with one stout seta.

Measurements. – Body length: 14-16 mm; HL: 0.78 mm; HW: 1.62 mm; PL: 1.92 mm; PW: 2.46 mm; EL: 2.34 mm; EW: 2.52 mm.

Etymology. – The species name is a combination of the Latin prefix “*bi-*” and the adjective “*setifer*” to indicate the pair of setae on the clypeus.

Remarks. – This new species can be easily distinguished from *B. semirufus* by having one pair of outer lateral teeth, and from other Chinese species by the reddish coloration and the clypeus having only one pair of long setae. This species is similar to *B. antilope* Fauvel, 1895, but can be distinguished by the more reddish head and abdomen, and by the pronotum having two distinct punctures on each side of the median sulcus.

Distribution. – China (Yunnan).

Borolinus semirufus (Fauvel, 1895)

(Figs. 12-20)

Leptochirus semirufus Fauvel, 1895: 181 (type locality: Burma, Carin Cheba, 900-1100 m; Asciiu Cheba).

Priochirus semirufus Heller, 1898: 8.

Borolinus semirufus Bernhauer, 1903: 134; Bernhauer & Schubert, 1910: 15; Cameron, 1930: 93; Scheerpeltz, 1933: 1001; Herman, 2001: 1097.

Material examined. – 10 males, 5 females, China, Yunnan, Xishuangbanna, Mengla, 940 m, 19 Feb.2004, Jie Wu and Yongping Lu coll.(IOZ-CAS); 1 male, 1 female, China, Guangxi, Napo, 1005 m, 12 Apr.1998, Haisheng Zhou coll.(IOZ-CAS); 1 female,

Burma, Klima ex coll.(NMW); 2 males, 3 females, Tonkin, Hao-Binh, A. de Cooman coll.(IOZ-CAS).

Diagnosis. – Head and abdomen black, pronotum and elytra reddish. This species is characterized by widely divergent inner lateral teeth, outer lateral teeth absent, mandible with two ventral teeth, vertex with a distinct fovea in middle of base, pronotum with two distinct foveae on each side of median sulcus.

Remarks. – New record for China.

Measurements. – Body length: 13-16 mm; HL: 0.98 mm; HW: 2.08 mm; PL: 1.95 mm; PW: 3.12 mm; EL: 2.70 mm; EW: 2.86 mm.

Distribution. – China (Guangxi; Yunnan), Vietnam, Burma.

Borolinus sikkimensis Bernhauer, 1919

(Figs. 21-29)

Borolinus sikkimensis Bernhauer, 1919: 359 (type locality: Himalaya, Sikkim); Cameron, 1930: 94; Scheerpeltz, 1933: 1001; Scheerpeltz, 1965: 98; Abdullah & Qadri, 1970: 116; Biswas & Biswas, 1985: 142; Herman, 2001: 1097.

Material examined. – 5 males, 6 females, China, Sichuan, Baoxing, 1600 m, 13 Aug.2003, Jie Wu coll.(IOZ-CAS); 4 males, 8 females, China, Hubei, Shennongjia, 1240-1800 m, 18 Jul.1998, Haisheng Zhou coll.(IOZ-CAS); 1 female, China, Guizhou, Leishan Co., SE Kaili, NE Leishan, E-slope of Leigong Shan, 26°22.74' N 108°12.99' E, env. of pass between Leishan and Fangxian, 1700-1800 m, 24 Jun.2001 (IOZ-CAS).

Diagnosis. – Body black. This species is similar to *B. minutus*, but may be distinguished by larger size, less protruding inner lateral teeth (their apex only reaching half length of mandibles viewed from above), more transverse pronotum, mandible with only one inner tooth.

Measurements. – Body length: 13-14 mm; HL: 0.97 mm; HW: 1.89 mm; PL: 2.08 mm; PW: 2.93 mm; EL: 2.54 mm; EW: 2.73 mm.

Remarks. – New record for China.

Distribution. – China (Hubei; Sichuan; Guizhou), India, Burma, Bangladeshi.

Borolinus minutus (Laporte, 1840)

(Figs. 30-38)

Leptochirus minutus Laporte, 1840: 186 (type locality: Java); Fauvel, 1878: 186; Fauvel, 1879: 72; Fauvel, 1886: 144; Fauvel, 1905: 77; Cameron, 1936: 26.

Priochirus minutus Heller, 1898: 8; Cameron, 1930a: 160.

Borolinus minutus Bernhauer, 1903: 134; Bernhauer & Schubert, 1910: 15; Bernhauer, 1922: 221; Cameron, 1928: 94; Bernhauer, 1928: 1; Wendeler, 1928: 117; Cameron, 1930: 94; Cameron, 1931: 355; Scheerpeltz, 1933: 1001; Cameron, 1937: 84;

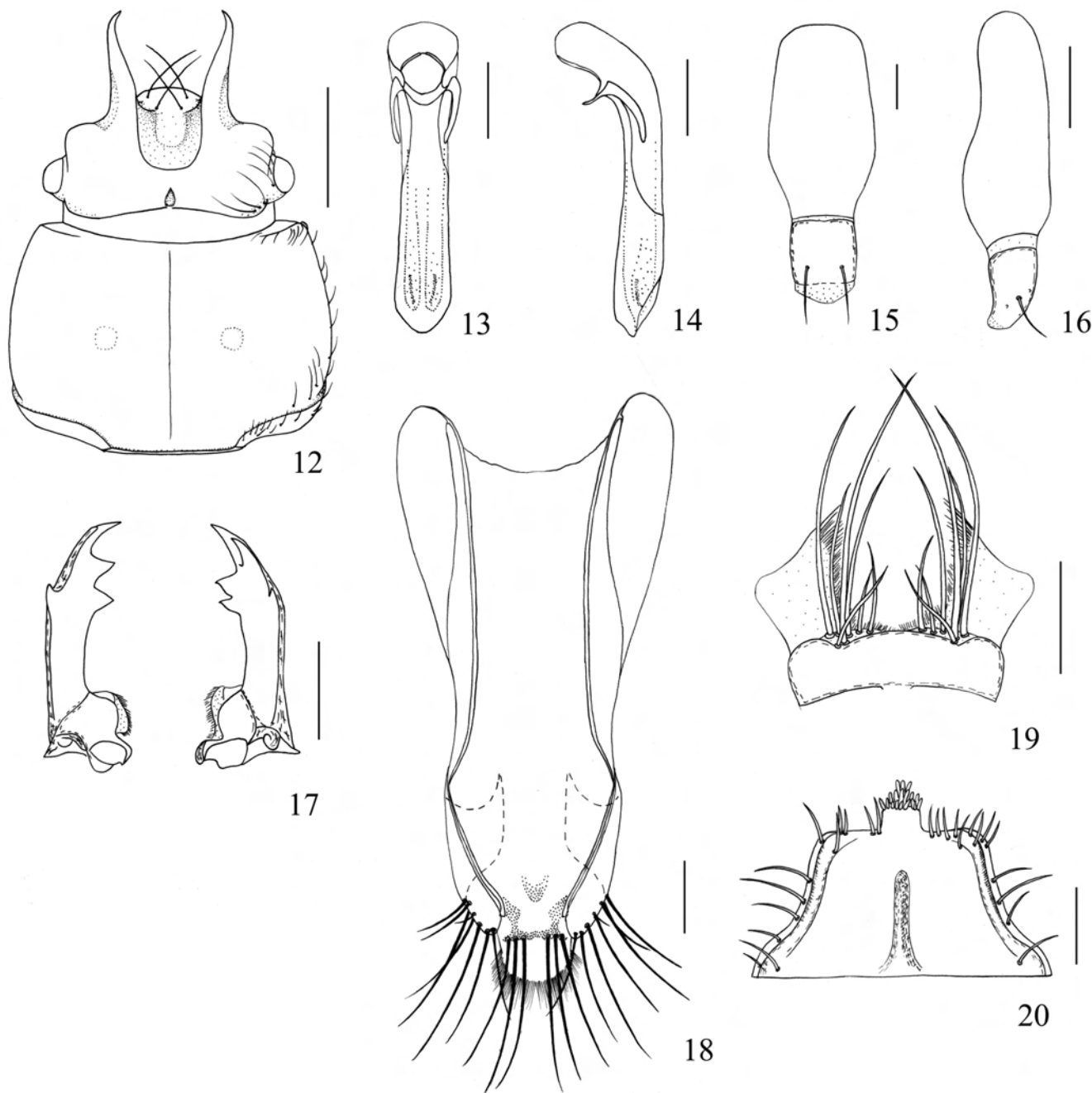
Paulian, 1941: 132; Cameron, 1949: 456; Scheerpeltz, 1965: 98; Abdullah & Qadri, 1970: 116; Coiffait, 1981: 332; Frank, 1982: 6; Biswas & Biswas, 1985: 142; Herman, 2001: 1095.

Leptochirus bispinus Erichson, 1840: 827 (type locality: Java); Fauvel, 1878: 186 (synonym of *minutus*); Fauvel, 1905: 77; Bernhauer & Schubert, 1910: 15; Cameron, 1930: 94; Scheerpeltz, 1965: 98; Herman, 2001: 1096.

Leptochirus cruentus Fauvel, 1895:181 (variety of *minutus*; type locality: Malacca; Singapore; Sumatra; Borneo); Heller, 1898: 8; Bernhauer & Schubert, 1910: 15 (synonym of *minutus*); Cameron, 1921: 362, 399; Cameron, 1928: 94; Scheerpeltz, 1933: 1001; Herman, 2001: 1096.

Leptochirus inermis Fauvel, 1902: 10 (variety of *minutus*; type locality: Sumatra: Palembang); Bernhauer & Schubert, 1910: 15 (synonym of *minutus*); Herman, 2001: 1096.

Material examined. – 8 males, 10 females, China, Yunnan, Xishuangbanna, Mengla, 940 m, 19 Feb.2004, Jie Wu & Yongping Lu coll.(IOZ-CAS); 1 male, 5 females, China, Guangxi, Nanping, Jiangpo, 300 m, 10 Aug.2004, Jie Wu coll.(IOZ-CAS); 1 female, SUMATRA: Fort de Kock, 920 m, Jun.1922, Scheerpeltz ex coll. (NMW); 1 male, SUMATRA: Mentawai Island, Klima ex coll.(NMW).



Figs. 12-20. *Borolinus semirufus*: 12, head and pronotum in dorsal view; 13, aedeagus in dorsal view; 14, aedeagus in lateral view; 15, 9th abdominal sternite of male; 16, left half of 9th abdominal sternite of female; 17, mandibles; 18, 9th and 10th abdominal tergites of male; 19, labrum; 20, mentum. Scale bars: Figs. 12, 17 = 1 mm; Figs. 13-16, 18-20 = 0.25 mm.

Diagnosis. – Body black. This species is similar to *B. sikkimensis*, but may be distinguished by smaller body size, more protruding inner lateral teeth (their apex exceeding 2/3 length of mandibles viewed from above), and each mandible with two inner teeth.

Measurements. – Body length: 8–10 mm; HL: 0.66 mm; HW: 1.46 mm; PL: 1.59 mm; PW: 1.93 mm; EL: 1.84 mm; EW: 2.09 mm.

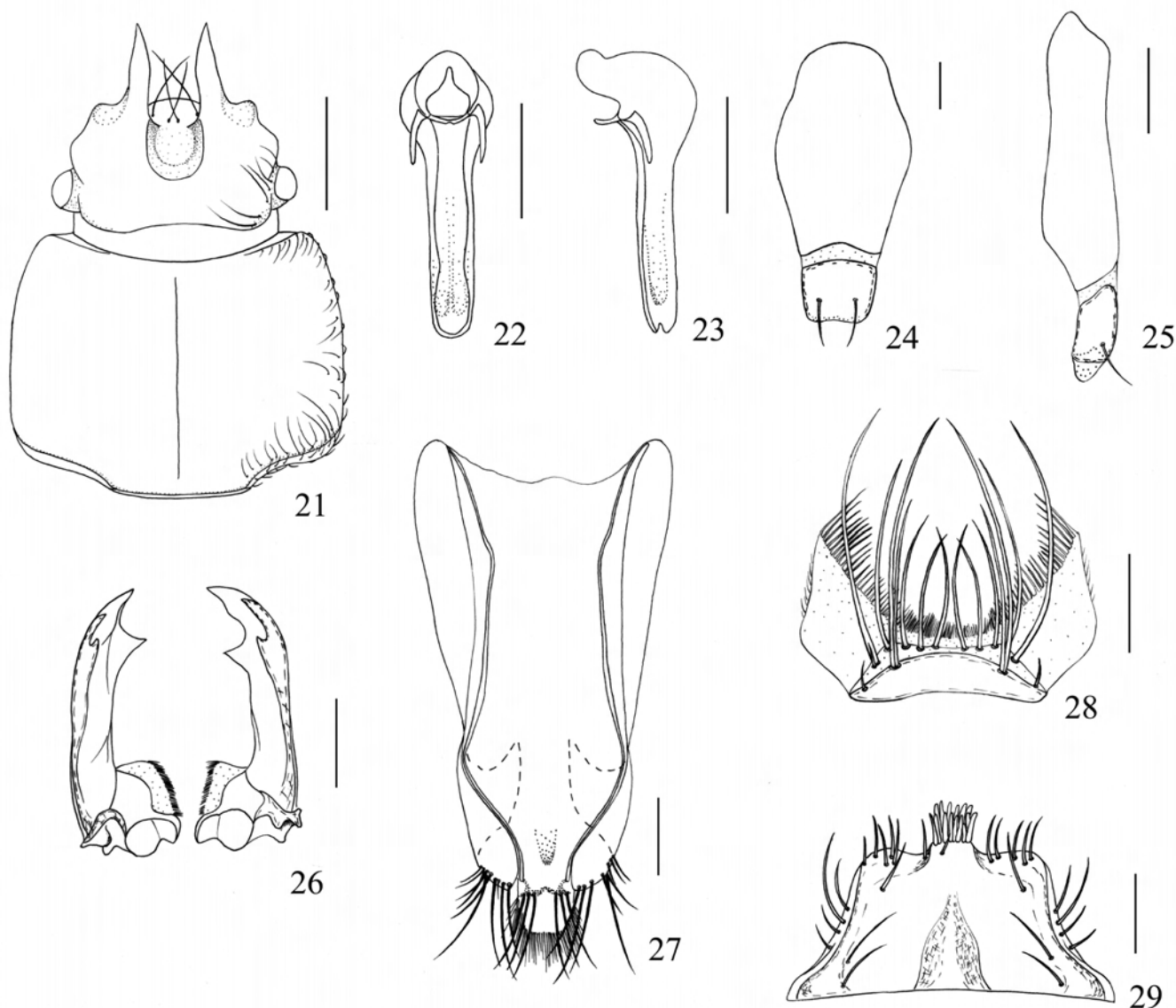
Distribution. – China (Yunnan; Guangxi; Taiwan), India, Bangladesh, Thailand, Burma, Singapore, Malaysia (Borneo), Philippines, Indonesia (Java, Sumatra, Halmahera, Irian Jaya), New Zealand.

***Borolinus dietmarleutzi* Schillhammer, 2005**
(Fig. 39)

Borolinus dietmarleutzi Schillhammer, 2005: 217 (type locality: China, Guizhou, Leishan, 1800 m).

Material examined. – Paratype- 1 female, China, Guizhou, Leishan Co., SE Kaili, 15 km E Leishan, E-slope of Leigong Shan, 26°23.39'N 108°13.33'E, ca. 2.5 km E of pass between Leishan and Fangxian vill., ca. 1800 m, 23–24 Jun.2001 (IOZ-CAS).

Diagnosis. – Body black. This species can be easily distinguished from other species by relatively shorter inner lateral teeth (never reaching half of length of mandibles viewed from above) and larger body size. The distinct median sulcus on vertex is also different from other species.



Figs. 21–29. *Borolinus sikkimensis*: 21, head and pronotum in dorsal view; 22, aedeagus in dorsal view; 23, aedeagus in lateral view; 24, 9th abdominal sternite of male; 25, left half of 9th abdominal sternite of female; 26, mandibles; 27, 9th and 10th abdominal tergites of male; 28, labrum; 29, mentum. Scale bars: Figs. 21, 26 = 1 mm; Figs. 22–25, 27–29 = 0.25 mm.

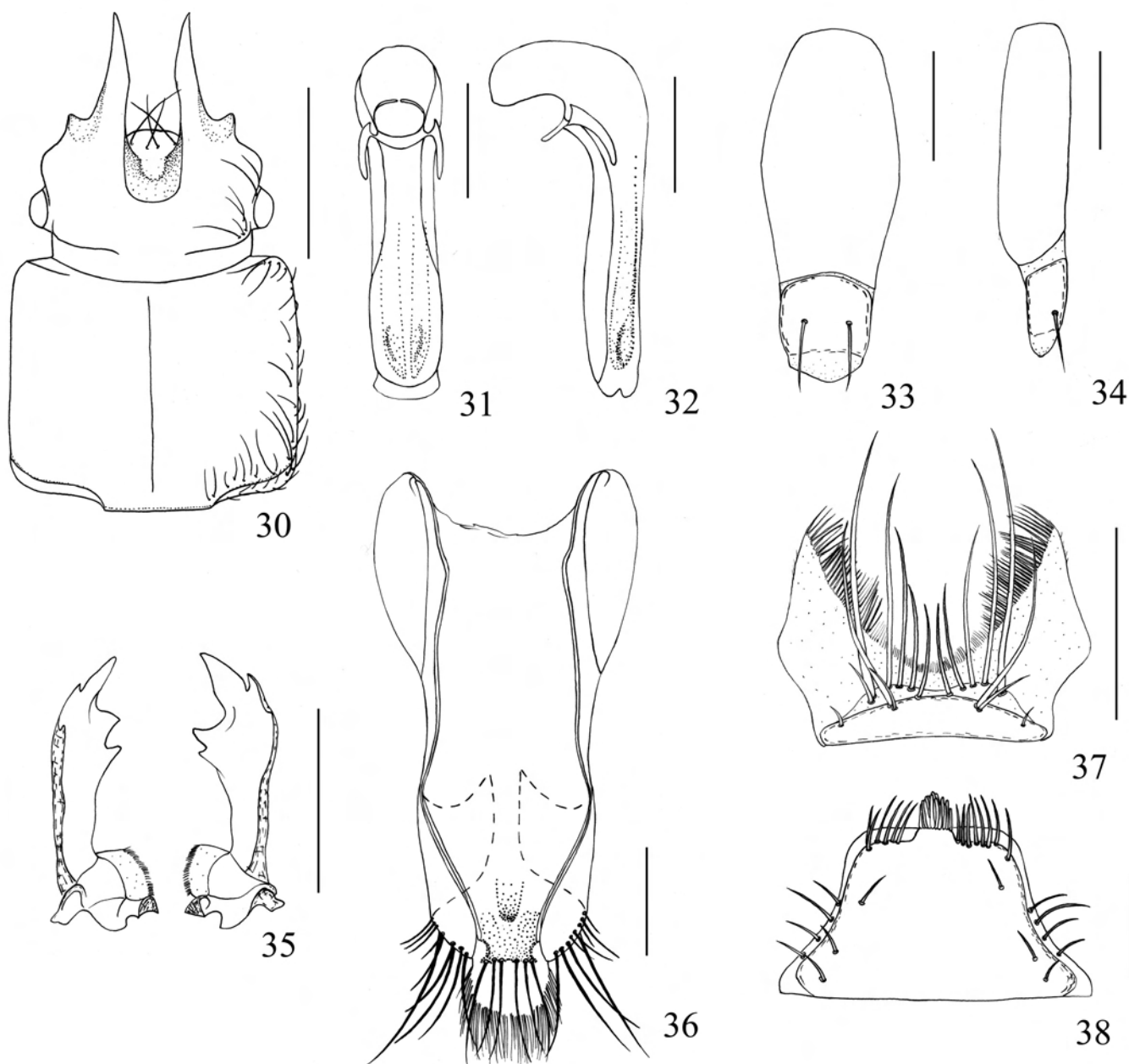
Measurements. – Body length: 20 mm; HL: 1.25 mm; HW: 2.57 mm; PL: 3.12 mm; PW: 4.37 mm; EL: 3.9 mm; EW: 4.13 mm

Distribution. – China (Guizhou).

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Figs. 30-38. *Borolinus minutus*: 30, head and pronotum in dorsal view; 31, aedeagus in dorsal view; 32, aedeagus in lateral view; 33, 9th abdominal sternite of male; 34, left half of 9th abdominal sternite of female; 35, mandibles; 36, 9th and 10th abdominal tergites of male; 37, labrum; 38, mentum. Scale bars: Figs. 30, 35 = 1 mm; Figs. 31-34, 36-38 = 0.25 mm.

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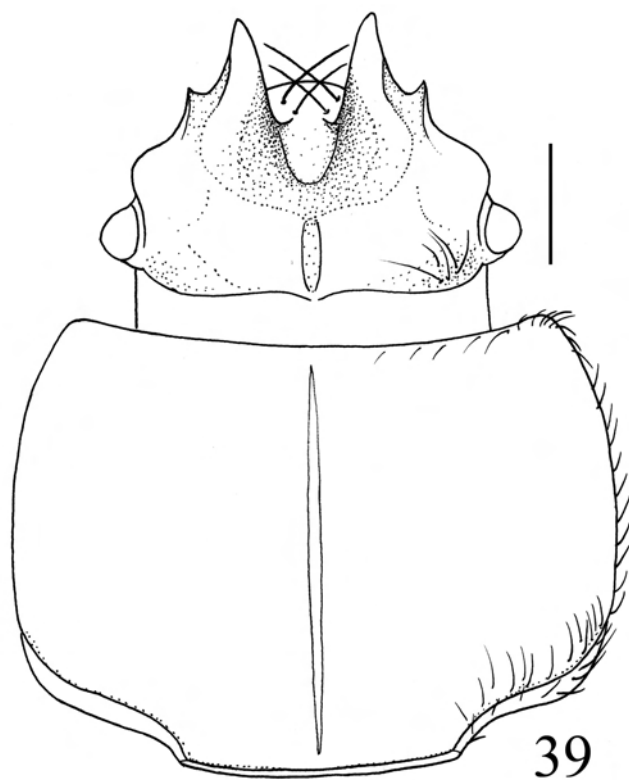


Fig. 39. *Borolinus dietmarleutzi*: head and pronotum in dorsal view. Scale bar = 1 mm.

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