

# *Guanobius borneensis* n. gen., n. sp. from Borneo (Coleoptera: Tenebrionidae: Alphitobiini)

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## Abstract

The tenebrionid beetle *Guanobius borneensis* **n. gen., n. sp.** is described from caves in Borneo. *Guanobius* **n. gen.** is similar to *Alphitobius* Stephens, but differs in size, shape of head, form of clypeus, genae on underside of head as well as the obliterated primary structure of elytra. The asymmetrical base of the aedeagus, which is protruded ventrad on the left, is discussed and considered as a possible autapomorphic character of the tribe Alphitobiini.

**Key words:** Tenebrionidae, Alphitobiini, Borneo, Malaysia, Sabah, Sarawak, new genus, new species, phylogeny, cave beetle.

## Zusammenfassung

Der Schwarzkäfer *Guanobius borneensis* **n. gen., n. sp.** aus Höhlen in Borneo wird beschrieben. *Guanobius* **n. gen.** unterscheidet sich von der ähnlichen Gattung *Alphitobius* Stephens durch die Größe, die Form und Gestalt von Kopf und Clypeus, die Wangen auf der Unterseite des Kopfes sowie die verwischte primäre Struktur der Oberseite der Flügeldecken. Es ist möglich, dass die an der linken Seite nach unten vorgezogene, asymmetrische Basis des Aedoeagus ein autapomorphes Merkmal der Tribus Alphitobiini darstellt.

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## 1 Introduction

A few years ago, the author received some specimens of an unknown darkling beetle collected by Dr. K. HANDKE (Ganderkesee) in the Gomantong Caves in Sabah (Malaysia, Borneo). In 2007 the author had the chance to visit the caves and to collect a larger series of this strange species. It is common in the faeces of bats and cave swifts in which the larvae dwell. One specimen was caught in Tambunan (Sabah) at light. Additional specimens originating from other caves were discovered by Dr. W. SCHAWALLER (Stuttgart) in the collections of the BMNH.

According to DOYEN (1989), DOYEN et al. (1989), and AALBU et al. (2002) the tribe Alphitobiini Reitter, 1917 (subfamily Tenebrioninae) includes the genera *Alphitobius* Stephens, 1829, *Diaclina* Jacquelin Du Val, 1861, and *Metaclisa* Jacquelin Du Val, 1861. BREMER (1992) pointed out that some genera of the Ulomini sensu GEBIEN (1940), i.e. *Alphitobius*, *Diaclina*, *Epipedodema* Gebien, 1920, and *Donisellus* Bremer, 1992, are characterized by the asymmetrical base of the aedeagus which is protruded ventrad on the left. This fact is also true for the new genus.

## Acronyms of depositories

BMNH	Natural History Museum, London, United Kingdom
CKH	Collection Dr. KLAUS HANDKE, Ganderkesee, Germany
CRG	Collection Dr. ROLAND GRIMM, Tübingen, Germany
HNHM	Hungarian Natural History Museum, Budapest, Hungary
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
ZSM	Zoologische Staatssammlung, München, Germany

## Acknowledgements

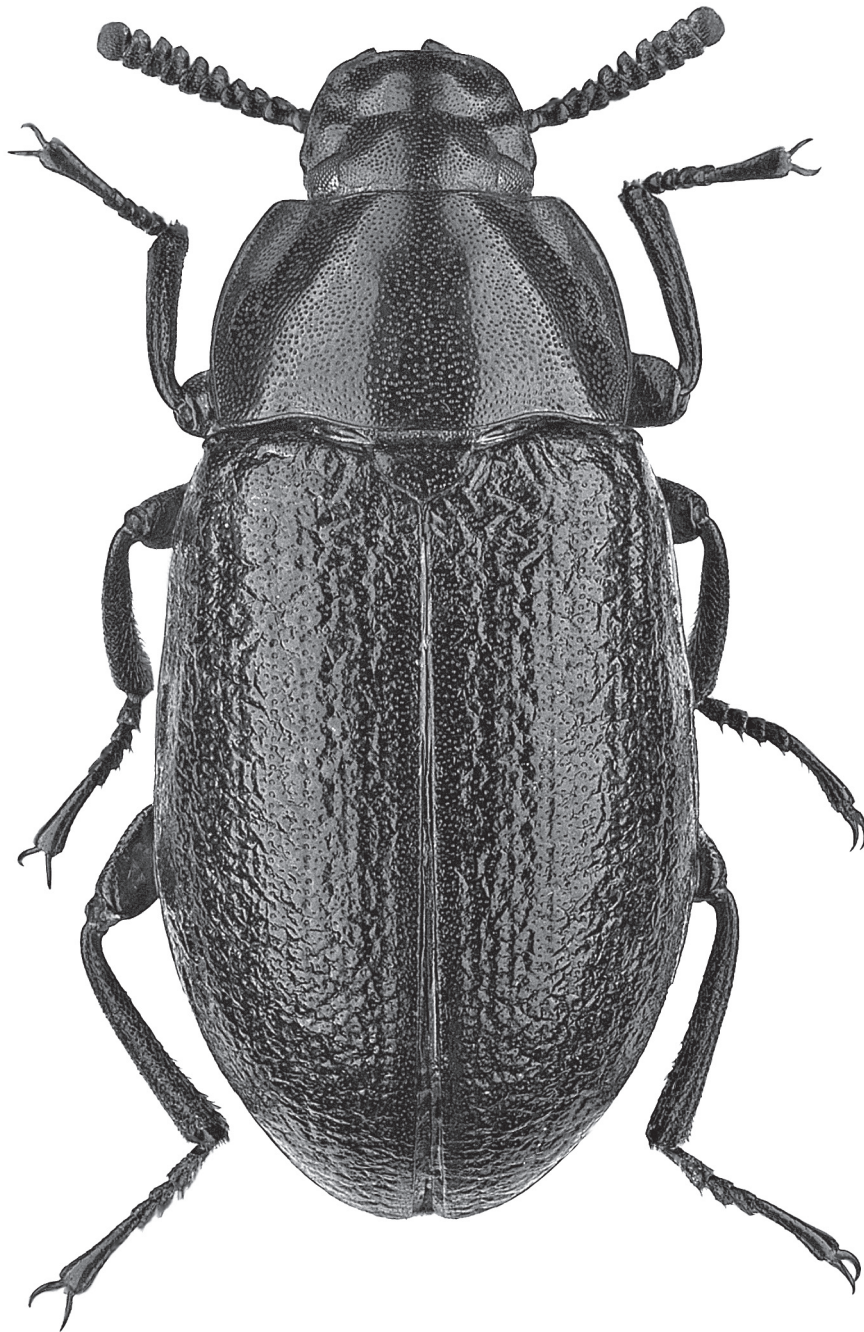
For the gift and/or loan of material I thank Drs. M. BAEHR (ZSM), M. BARCLAY (BMNH), K. HANDKE (Ganderkesee), and W. SCHAWALLER (SMNS). J. REIBNITZ (SMNS) kindly produced the photograph. Furthermore, I am grateful to Drs. O. MERKL (HNHM) and W. SCHAWALLER for reviewing the manuscript.

## 2 Description of *Guanobius borneensis* n. gen., n. sp.

### 2.1 *Guanobius* n. gen.

(Figs. 1, 3)

Type species: *Guanobius borneensis* n. sp.



**Fig. 1.** *Guanobius borneensis* n. gen., n. sp., dorsal view, holotype. – Scale: 5 mm.

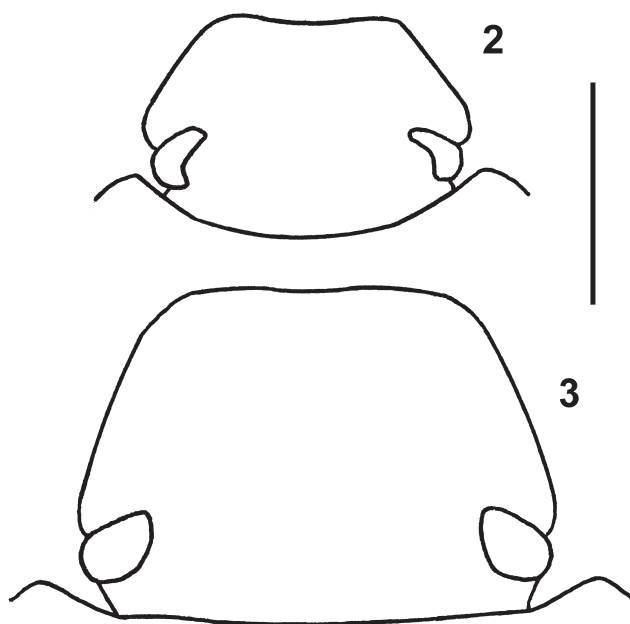
#### Etymology

Combination of guano (accumulated excrements of birds and bats) and Greek *bios* (place of residence).

#### Diagnosis

Body length 10–12 mm; hind wings developed. Head (Fig. 3) subtrapezoidal, with clypeus slightly bent up; la-

brum about 2.5 times as wide as long, with the labro-clypeal membrane concealed; mandible with bifid incisors; eyes emarginate by genal canthus; genae in front of eyes about as broad as eyes; antenna incrassate, bearing compound sensoria on apical six segments; genae on underside of head besides eye with a tooth-like protrusion; mentum without protuberance. Pronotum wider than long,



**Figs. 2–3.** Shape of head. – 2. *Alphetobius diaperinus* (Panzer, 1797). 3. *Guanobius borneensis* n. gen., n. sp. – Scale: 0.5 mm.

widest in front of base, convex, with lateral borders separated from the discal convexity by a narrow submarginal depression running in line with the lateral border; prosternal process bent down behind coxa, distant from mesosternal cavity. Elytra with nine striae, scutellary striole present; covered with wrinkles eliminating the primary structure of the striae and interstriae; humeral angle prominent; lateral margination visible from above throughout whole length; pseudopleuron complete, apical part with crested outer border. Process of first abdominal segment acute; femora surpassing the lateral border of the elytra. Protibia with its outer edge bluntly rounded, only slightly dilated towards apex. Abdominal sternites 3 and 4 with exposed intersegmental membrane. Aedeagus not inverted, with an asymmetrical base.

#### Remarks

The new genus (Figs. 1, 3) is similar to *Alphetobius* (Fig. 2) but differs by larger size (*Alphetobius* 5–8 mm), the shape of the head (compare Figs. 2 and 3) and slightly bent up border of the clypeus, protruding genae on the underside of the head, obliterated striae and wrinkled surface of the elytra, and bluntly rounded outer side of the protibia (in *Alphetobius* edging at least indicated). As far as known, *Alphetobius* is an Ethiopian faunal element, though two synanthropic species are known to be cosmopolitans.

## 2.2 *Guanobius borneensis* n. sp.

(Figs. 1, 3–7)

**Holotype:** ♂, Borneo (Malaysia, Sabah), S Sandakan, Gomantong Caves, 13.III.2007, R. GRIMM leg. (CRG).

**Paratypes:** Same data as holotype, 68 specimens (CRG), 7 specimens (SMNS), 5 specimens (ZSM), 2 specimens (HNHM). – Borneo (Malaysia, Sabah), Tambunan, 500 m, at light, 28.–31.III.2007, R. GRIMM leg., 1 specimen (CRG). – Borneo (Malaysia, Sabah), Gomantong Caves, 3.–22.IV.1995, K. HANDKE leg., 5 specimens (CKH). – Borneo (Malaysia, Sarawak), Gunung Mulu National Park, R. G. S. Exped. 1977–8, J. D. HOLLOWAY et al., B. M. 1978–206, Deer Cave, 19.VI.1978, V. F. EASTOP, 2 specimens (BMNH). – Borneo (Malaysia, Sabah), SSE, Telupid, R. Karamuak, 0 m, 200 ft., 1.–7.IX.1977, Dampbat & Swift dung, M. E. BACCHUS, B. M. 1978–48, 3 specimens (BMNH).

#### Etymology

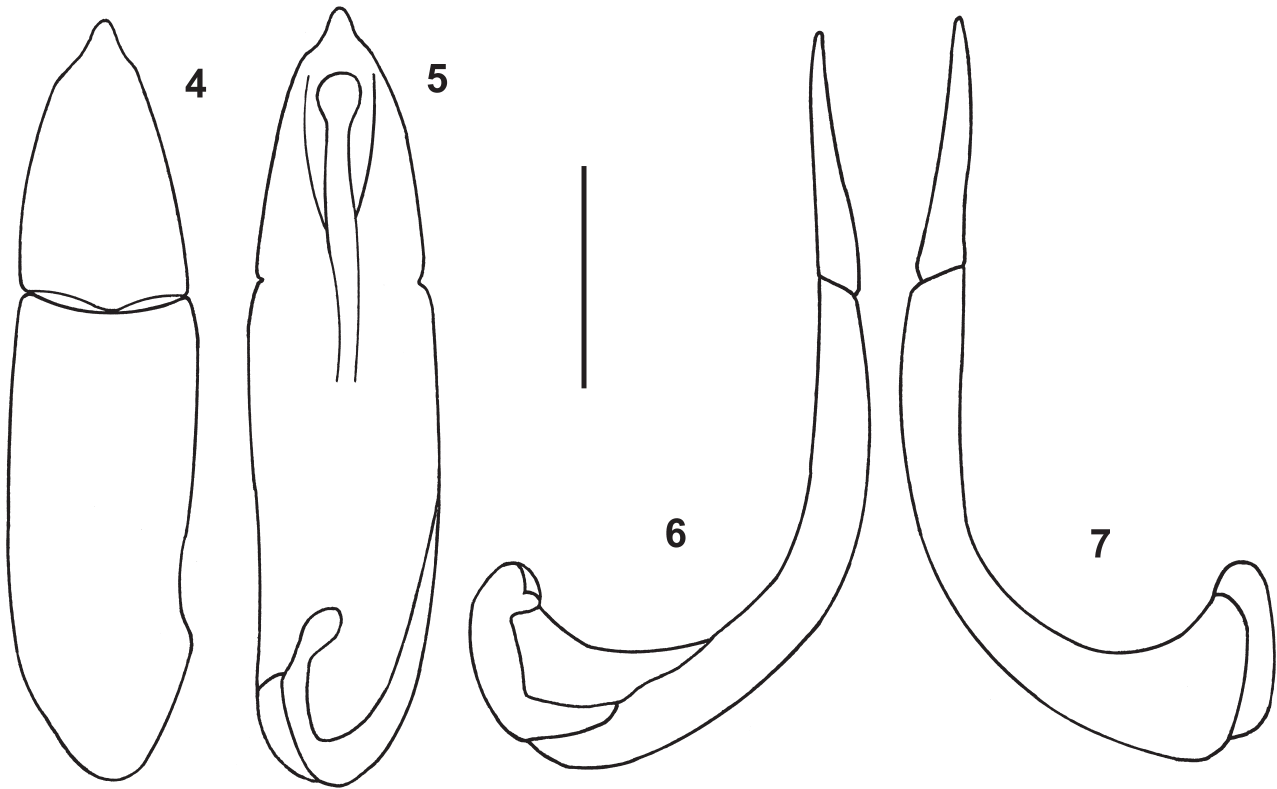
Named after the island of Borneo where the type series was collected.

#### Description

Black to blackish brown, shining, appendages in part and underside occasionally castaneous. Body length 10.0–11.8 mm, width at broadest point behind middle of elytra 4.5–5.3 mm.

Head (Fig. 3) sub-trapezoidal, puncturation coarser and denser on vertex and frons, but finer and sparser on clypeus. Fronto-clypeal suture distinct; clypeus slightly convex, its border weakly bent up, feebly emarginated in the middle and there thinner than lateral parts when seen from the front; outline continuous, not interrupted between clypeus and front. Eyes large, constricted by genal canthus, dorsal part smaller than ventral part. Genae in front of eyes with an impression, about as wide as eyes, genal canthus not projecting outwards beyond contour of eye; underside of head beside eye with a tooth-like protrusion. Submentum broader than long, trapezoidal, narrowed towards base, pubescent; anterior border shallowly emarginated. Apical palpomere of maxillary palpi axe-shaped. Antennae thickened, proximal four antennomeres simple, the following ones serrate.

Pronotum transverse convex, width/length ratio 1.64–1.79 (width measured at widest point, length in the middle), widest between middle and base, with dense and fine, mostly round punctures as on vertex; sides shallowly rounded, narrower towards anterior than to posterior border; anterior border shallowly emarginated, posterior border bisinuate; all borders margined, lateral borders and lateral parts of posterior border carinate and separated from discal convexity by a narrow submarginal depression running in line with border; anterior border with fine carinula at sides; anterior angles rectangular, posterior angles obtuse. A shallow, roundish impression in the middle of the sloping lateral surface, close to lateral border, and a very fine, median linear longitudinal impression or line present; besides this line sometimes with an addi-



**Figs. 4–7.** *Guanobius borneensis* n. gen., n. sp., aedeagus. – 4. Dorsal view. 5. Ventral view. 6. Lateral view, left side. 7. Lateral view, right side. – Scale: 0.5 mm.

tional shallow roundish impression in the middle. Propleuron with interrupted longitudinal wrinkles and with fine scattered pubescence; border mainly even, with interspersed punctures; prosternum rough; prosternal process pubescent, with apical portion bent downwards between procoxal cavities, flat and broadened at apex.

Elytra convex, wider than pronotum, with faintly rounded, almost sub-parallel sides; humeral angles obtuse, distinct; sides gradually and faintly dilated backwards, including the point of greatest width behind middle, then rounded and strongly narrowed towards apex, the latter rounded. Scutellum large, triangular, punctured. Elytra with nine striae, scutellary striole present; punctures of rows like those of pronotum, the interstriae between the rows slightly convex, much broader than the rows and covered with punctures a little finer than those of the rows, bearing very fine, small setae; along the sides with a very fine and narrow sub-marginal depression, the lateral margination visible from above; whole surface covered with wrinkles eliminating the primary structure of the striae and interspaces. Pseudopleura slightly narrowed from base to about middle, then almost parallel towards the apex, and in front of the apex again narrowed; carinate laterally in about distal half, and covered with dense, fine

rough punctures. Mesosternum depressed apically, with a smooth, oblong triangular, backwards broadened median part, and with a dense and rough, rugose punctation on the sides. Metasternum longer than first abdominal sternite, with dense coarse punctures and dense pubescence; posterior border in front of metacoxal cavity broadly margined by a deep transverse groove; anterior border in the middle strongly margined; a small depression in front of process of first abdominal segment covered with very fine dense microgranulation beside the visible part of metasternal suture. Abdominal sternites dense, coarsely punctured, pubescent. Fifth abdominal sternite in the middle near its base with a very shallow rounded impression.

Legs without modifications; femora compressed, with underside laterally carinate, and slightly excavate, dilated towards apex; tibiae rounded, without any spines or crenulation; tarsi slender.

Aedeagus (Figs. 4–7) with an asymmetrical base.

No external sexual dimorphism.

#### Habitat

Dwelling in caves, in the faeces of bats and cave swifts.

### Distribution

The species is known only from northeastern Borneo, Malaysian states of Sabah and Sarawak.

### 3 Phylogeny

As BREMER (1992) already pointed out, the asymmetrical base of the aedeagus in some members of the tribe Ulomini sensu GEBIEN (1940) may be a taxonomic criterion. Apart from *Alphitobius* (8), *Diaclina* (9), *Epipedodema* (1), *Donisellus* (not seen; according to BREMER 1992), and *Guanobius* (1), the asymmetrical base of the aedeagus also exists in *Basanopsis* Gebien, 1914 (1), *Curtopeltoidea* Pic, 1916 (2), *Leptoscapa* Fairmaire, 1886 (3), and *Sciophagus* Sharp, 1885 (1); the number of species studied by the author is given in parentheses. According to an unpublished diploma thesis of MEYER (see MEYER 1994), this kind of asymmetrical base of the aedeagus also occurs in *Platybolium* Blair, 1938.

The asymmetrical base of the aedeagus is most probably an apomorphic character and occurs several times in the Tenebrionidae. It is used by ARDOIN (1962) to characterize the Amarygmini Gistel, 1856, and according to a personal communication by O. MERKL (HNHM) it is characteristic for the New Guinea genus *Bothrichara* Borchmann, 1915 (Lagriini Latreille, 1825). Nevertheless, it is probable that the asymmetrical base of the aedeagus, which is protruded on the left, is an autapomorphic character of the Alphitobiini. Additional investigations are needed to prove this assumption.

According to DOYEN (1989), *Metaclisa* is placed in the tribe Alphitobiini rather than in the Tenebrionini. Own examinations of *M. viridis* (Motschulsky, 1859), *M. azurea* (Waltl, 1838), and *M. marginalis* Horn, 1870, however, found that in all three species the base of the aedeagus is

characteristic indeed, but not asymmetric, and that the aedeagus is inverted. In *Metaclisa*, the base of the aedeagus narrows convergently. The phallobase is expanded and anteriorly curved. In ventral view the phallobase has the lateral borders bent inwards, therefore the base of the aedeagus looks somewhat conical. A similar structure of the aedeagus is also found in the monotypic genus *Tharsus* LeConte, 1862 (Triboliini) in which the aedeagus is similarly inverted.

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