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A further new species of the leleupidiine genus *Gunvorita* Landin from Nepal

(Insecta, Coleoptera, Carabidae, Zuphiinae)

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As a second supplement to the revision of the leleupidiine genus *Gunvorita* Landin in the Himalayan region (Baehr 1998) a further species from Nepal is described: *G. bihamata*, spec. nov. It is inserted in the recent key to the genus (Baehr 2001).

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Introduction

The Himalayan leleupidiine genus *Gunvorita* Landin recently has proved to be very speciose in its restricted range that extends from Central Nepal in the west to Assam in the east. The recent multiplication of species is almost exclusively due to the very effective sampling efforts of the staffs of the Genève and Stuttgart museums (Baehr 1998, 2001). Again it was W. Schawaller of Staatliches Museum für Naturkunde, Stuttgart, who collected two additional specimens during his most recent trip to Nepal, that afterwards proved to belong to another undescribed species.

Although species of the genus *Gunvorita* are very similar in external shape and structure, their male genitalia are quite distinctive and mostly allow an unequivocally differentiation of the species. This is in particular true for the group of species whose aedeagus is furnished at the apex with a crotchet of very different shape. Hence, males of these species, at least, are almost always determinable at the first glance. Females, however, still are difficult to

identify, and generally, association with males is very helpful.

This paper is rendered a second supplement to my revision of the genus *Gunvorita* (Baehr 1998, 2001). Measurements and techniques were conducted in the same way as in the mentioned papers. The habitus photograph was obtained using SPOT Advanced for Windows 3.5 and subsequently was worked with Corel Photo Paint 10.

The holotype of the new species is deposited in Staatliches Museum für Naturkunde, Stuttgart (SMNS), the paratype in the working collection of the author at Zoologische Staatssammlung, München (CBM).

Gunvorita bihamata, spec. nov.

Figs 1-4

Types. Holotype: ♂, 613 NEPAL: Dolakha Distr. S slope of Khare Khola 2100 m, 2.VI.2000 leg. W. SCHAWALLER (SMNS). – Paratype: ♂, same data (CBM).

Diagnosis. Medium sized species species with

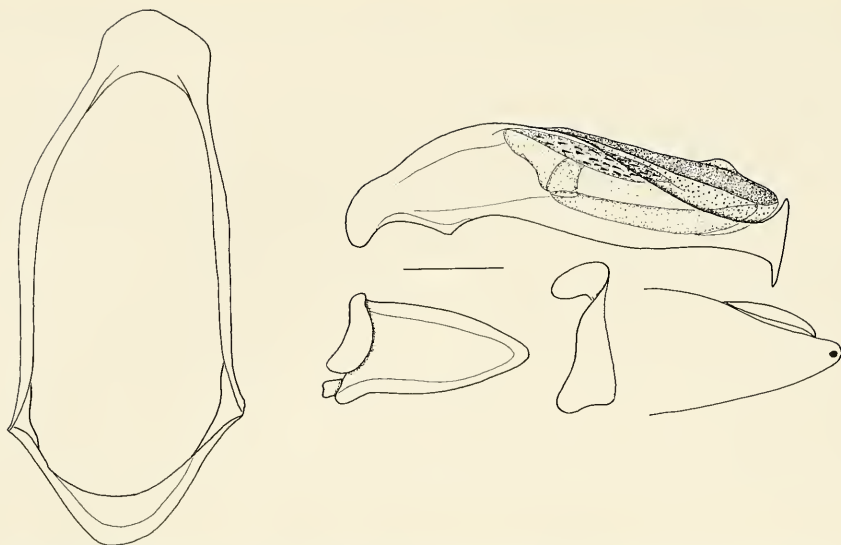


Fig. 1. *Gunvorita bihamata*, spec. nov. ♂ genitalia: aedeagus (left side), shape of apex (from below), left and right parameres, genital ring. Scale: 0.25 mm.

posteriorly widened, rather oval shaped head; further distinguished from the next relatives, *G. hamifera* Baehr and *G. nepalensis* Baehr, by shape of aedeagus which has the apex sharply upturned and bears a straight crotchet at the very tip that forms a straight line with the apex.

Description

Measurements. Length: 4.7–5.0 mm; width: 1.65–1.70 mm. Ratios. Length/width of head: 1.62–1.66; length orbit/eye: 2.85–2.95; length/width of pronotum: 1.17–1.19; width widest part/base of pronotum: 1.68–1.69; width pronotum/head: 1.14–1.15; length/width of elytra: 1.46–1.48; width elytra/pronotum: 1.95–1.98.

Colour. Dark piceous, almost black, the narrow suture of the elytra, labrum, legs, and antennae light reddish, palpi yellowish.

Head (Figs 2, 4). Comparatively elongate, posteriorly considerably widened, rather oval shaped, widest near base, orbit posteriorly rounded off. Upper surface gently convex. Eyes small, depressed, length c. $\frac{1}{3}$ of orbit length to beginning of curvature. Clypeus anteriorly slightly convex, surface in middle convex, uneven, lateral angles (above base of antenna) distinctly projecting. Clypeal seta far removed from apex, at apex on either side two hairs. Clypeal suture postero-laterally with a large, deep groove each side. Frons convex, between eyes

with a shallow, circular, slightly oblique groove on either side. Labrum anteriorly gently excised, 6-setose, inner 4 setae shorter, lateral margin rather sparsely pilose. Mandibles short, at apex sharply incurved. Mentum with short and wide, triangular tooth. Labium anteriorly concave. Maxillary palpus rather short, apex obliquely cut. Terminal palpomere of labial palpus large but comparatively short. Antenna moderately short, slightly surpassing middle of pronotum. Median antennomeres about as long as wide, 3rd antennomere c. $\frac{2}{3}$ as long as 1st, slightly longer than 2nd antennomere. Surface glossy, with traces of microreticulation only on clypeus. Punctuation sparse, fine and superficial, distance between punctures c. 5× as wide as diameter of punctures. Pilosity sparse, very elongate, hirsute, erect, inclined anteriorly. Both supraorbital setae elongate, though not much longer than pilosity, posterior supraorbital setae situated far behind eye at base of head.

Pronotum (Figs 3, 4). Rather elongate, fairly cordiform, considerably longer than wide, wider than head, widest in anterior third. Upper surface markedly convex. Lateral margin convex in anterior two thirds, gently sinuate in front of posterior angles. Apex fairly wide, excised, anterior angles obtuse, slightly projecting. Base narrow, laterally oblique but not ex-

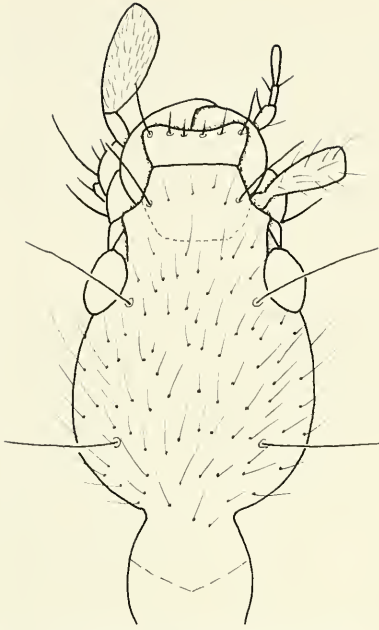


Fig. 2. *Gunvorita bihamata*, spec. nov. Head.

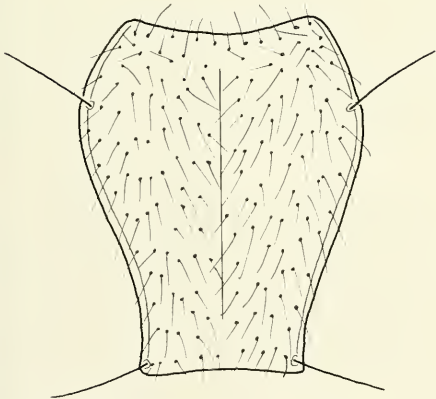


Fig. 3. *Gunvorita bihamata*, spec. nov. Prothorax.

cised, basal angles slightly projecting, obtuse. Lateral margin rather inconspicuous, without distinct border line, marginal channel absent. Median line fine, not impressed. Prebasal grooves almost invisible. Anterior marginal seta elongate, situated at anterior third of pronotum, posterior marginal seta shorter, situated right on basal angle. Surface without microreticulation, glossy, with moderately sparse, coarse puncturation. Distance between punctures c. $2\times$ as wide as diameter of punctures.



Fig. 4. *Gunvorita bihamata*, spec. nov. Habitus. Length: 5 mm.

Pilosity moderately sparse, elongate, hirsute, irregularly inclined, though generally rather erect.

Elytra (Fig. 4). Fairly wide, triangular, laterally slightly curved, widest in posterior third, upper surface moderately convex, at base slightly raised. Humeri narrow, oblique, slightly projecting. Apex wide, transversal, almost straight, not redressed towards suture. Striae irregularly marked by rows of punctures, puncturation rather sparse, coarse, rather irregular, in apical and lateral parts punctures slightly finer. Odd intervals faintly and irregularly raised. Fixed setae on third interval hardly recognizable within the coarse puncturation. Series of marginal pores very difficult to detect when setae broken, consisting of 8 basal, 3 postmedian, 6 apical pores, and 1 pore at apex of 3rd stria. Setae

very elongate. Surface without microreticulation, glossy. Pilosity rather sparse, elongate, hirsute, irregular, inclined posteriorly, fairly depressed.

Male genitalia (Fig. 1). Genital ring rather narrow, elongate, in basal two thirds almost parallel, with wide apical plate, very slightly asymmetric. Aedeagus moderately elongate, straight, barely curved near base, lower surface gently convex, apex on upper side curved upwards to a sharp tooth, on lower surface with a sharp, straight crotchet at the very tip. Apex almost perpendicular and absolutely straight, narrow though obtuse as seen from below. Internal sac in middle with large, coiled, denticulate sclerite. For parameres see fig. 1, left paramere rather elongate, with slightly obtuse, triangular tip.

Female genitalia. Unknown.

Variation. Very little variation noted.

Distribution. Eastern Nepal. Known only from type locality.

Collecting circumstances. Most probably the specimens were collected by sieving soil and leaf litter at median altitude.

Etymology. The name refers to the angulate upper and lower edges of the apex of the aedeagus.

Relationships. According to body shape and structure of aedeagus, this species belongs to the group of species that concentrate around *G. nepalensis* Baehr, and probably it is most closely related to *G. hamifera* Baehr.

Recognition

For identification of the new species the key to the genus in my revision (Baehr 1998) as well as the revised key in Baehr (2001) can be used. In either key follow on to caption 9. From there, the key must be altered as mentioned below. As the published figures of the yet described species are of great value for the identification, in the key below the numbers of the respective figures have been added under the chiffre **B98** fig. = Baehr 1998, fig. For a valuable identification, therefore, the reader should use both, this key and the figures in the revision.

- 9. Head elongate, posteriorly markedly oval-shaped, ratio l/w >1.6 (**B98** figs 41, 42); aedeagus as figured in **B98** figs 3, 4. North-eastern India 10.
- Head shorter, posteriorly more shortly rounded, ratio l/w <1.6 (Figs 2, 4; **B98** figs 43, 44); aedeagus as figured in Fig. 1 and in **B98** figs 5, 6. Nepal 11.

then follow on to caption 11:

- 11. Aedeagus rather short and stout, crotchet long, acute, straightly directed down, apex on upper side markedly upturned and angulate, apical margin perpendicular and absolutely straight (Fig. 1). Eastern Nepal *bihamata*, spec. nov.
- Aedeagus longer and less stout, crotchet short or long, more obliquely directed back, apex on upper side barely upturned, not angulate, apical margin neither perpendicular nor absolutely straight (**B98** figs 5, 6) 11a.
- 11a. Head longer and narrower with smaller eyes, ratio l/w of head 1.51-1.60 (**B98** fig. 43); elytra shorter, ratio l/w 1.38-1.44, wider in relation to prothorax (**B98** fig. 27); aedeagus with shorter crotchet and with one elongate, coiled, denticulate sclerite (**B98** fig. 5). Central Nepal *nepalensis* Baehr
- Head shorter and wider with larger eyes, ratio l/w of head 1.42-1.47 (**B98** fig. 44); elytra longer, ratio l/w 1.53-1.55, narrower in relation to prothorax (**B98** fig. 28); aedeagus with longer crotchet and with two narrow, denticulate sclerites (**B98** fig. 6). Eastern Nepal *hamifera* Baehr

Remarks

It is puzzling to see how the number of recorded species of the genus *Guntvorita* in a rather small part of the Himalayas is growing with every collecting trip that makes use of sieving ground litter. Certainly, the actual number of existing species is by no means yet known and probably, it will be much greater than we presently expect.

Generally, species of this genus are very homogenous with respect to their external shape and structure. But moreover, in some species

groups not even any external differences can be noted that could be used for species distinction. Differentiation of these, probably very locally ranging, highly similar species is only possible using their very differently shaped and easily distinguished male genitalia. Why these are so different, is still unknown, because at present, or at least at the present state of knowledge, all species seem to be allopatric. Admittedly, this may have been different previously and perhaps the species evolved by sympatric speciation originating from one or few widely ranging ancestor(s). In this case, however, the highly different male genitalia would have made sense. At present, unfortunately, we know much too less even about the actual number of species occurring and of their distribution, not to speak of their phylogenetic relations and biogeographic history.

The single statement that can be made at the present state of knowledge, is that the genus is lacking with high probability from the western part of Nepal as well as from the whole western Himalayas. Very careful sampling at various altitudes carried out by J. Schmidt (Rostock) and other collectors in the Annapurna and Dhaulagiri areas failed to detect any *Gunvorita* (pers. information of J. Schmidt), even when I directed the attention of the mentioned collectors to these beetles and to the required methods of sampling.

At the present state of knowledge this absence could be explained by two different hypotheses that either make use of present ecological conditions, either of biogeographic history.

According to the ecological, in particular the climatic conditions, the absence of any *Gunvorita* from the western Himalayas may be due to generally drier and less suitable environments there, than in the eastern part of this range. Being litter inhabiting beetles they probably need a certain amount of constant humidity that may not be guaranteed in the generally

drier and apparently also more erratic climate in the western Himalayas.

However, because *Gunvorita* is an element of an old Gondwanan fauna that probably reached its present range drifting on terranes that presently make up the eastern part of Nepal, northeast India, and northern Burma (Baehr 1998), the ancestor(s) of the existing species most likely occupied their present range from the east, and thus, the group still may be in the course of an east to west range extension along the southern slope of the Himalayas. A conceivable idea, therefore, would be that the genus just was not yet able to migrate further west, though it would be able to do this in future.

At the present state of knowledge, no decision between both hypotheses is possible. In this context, however, it is worth remembering that the distribution pattern of Leleupidiini in the Australasian region shows some strange gaps (Baehr 1998), without our knowing, whether these apparent gaps are simply caused by insufficient sampling, whether they are real distribution gaps due to any sort of unknown biogeographic events in the past.

Acknowledgement

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