

## Contribution to the knowledge of *Nebria* Latreille, 1802 (*Patrobonebria* Bänninger, 1923) from the Nepal Himalaya (Insecta: Coleoptera: Carabidae: Nebriinae)

CHARLES HUBER, Bern & JOACHIM SCHMIDT, Marburg

### Summary

Two new species of the genus *Nebria* Latreille, 1802 (subgenus *Patrobonebria* Bänninger, 1923) from Far Western Nepal are described: *Nebria* (*Patrobonebria*) *pertinax* n. sp. from Api Himal and *Nebria* (*Patrobonebria*) *assidua* n. sp. from Saipal Himal. Both species are the only taxa in the subgenus with slender shoulders due to the strong reduction of the hind wings. *Nebria* (*Patrobonebria*) *desgodinsi* Oberthür, 1883 is reported for the first time from Eastern and Central Nepal. A determination key is given.

### Zusammenfassung

Zwei neue Arten der Gattung *Nebria* Latreille, 1802 (Untergattung *Patrobonebria* Bänninger, 1923) werden aus dem westlichsten Nepal beschrieben: *Nebria* (*Patrobonebria*) *pertinax* n. sp. vom Api Himal und *Nebria* (*Patrobonebria*) *assidua* n. sp. vom Saipal Himal. Es sind die einzigen Arten der Untergattung mit stark reduzierten Hinterflügeln und schmalen Schultern. Von *Nebria* (*Patrobonebria*) *desgodinsi* Oberthür, 1883 wird der Erstnachweis für Nepal erbracht. Der Bestimmungsschlüssel behandelt alle Arten der Untergattung.

**Key words:** Coleoptera, Carabidae, *Nebria*, *Patrobonebria*, taxonomy, new species, Himalaya, Nepal

### 1. Introduction

The subgenus *Patrobonebria* Bänninger, 1923 of the genus *Nebria* Latreille, 1802 is restricted to the Himalaya (LEDoux & ROUX 2005). Four fully winged species are known so far. The distribution areas of *N. himalayica* Bates, 1889 and *N. capillosa* Ledoux & Roux, 1992 cover a wide range from Afghanistan to Central Nepal. *N. elegans* Andrewes, 1925 is restricted to the Northwestern Himalaya from Kashmir to Kumaon. *N. desgodinsi* Oberthür, 1883 is the only species hitherto known from the Eastern Himalaya. All species are restricted to areas of relatively low altitudes up to 3000 m (*N. elegans* up to 4000 m).

BÄNNINGER (1923) defined the subgenus *Patrobonebria* using different morphological characters like the bisetose penultimate labial palpomere, the distinct collar constriction of the neck behind the eyes, the unmarginated prosternal process, the broadened 1<sup>st</sup> and 2<sup>nd</sup> protarsomeres in the male, and the fully developed hind wings.

Recently, five conspicuous specimens of the subgenus *Patrobonebria* were collected by Andreas Weigel (Pössneck/Germany) in 2001 and 2005 during two of his study trips to the Far Western Nepal Himalaya. The specimens show a large reduction of the hind wings and are unable to fly, in contrast to one of the subgeneric characters. They belong to two new species which bear resemblance to each another, and which are described herewith. The reduction of the hind wings as a synapomorphic character separates the two species from all known species of the subgenus *Patrobonebria*.

#### Abbreviations and material depository:

JS	=	coll. Joachim Schmidt, Marburg, Germany
NMBE	=	Natural History Museum Bern, Switzerland
NME	=	Naturkundemuseum Erfurt, Germany
SMNS	=	Staatliches Museum für Naturkunde Stuttgart, Germany

The photographs were made with a Leica DFC 420 digital camera, with a Leica MZ 16A binocular and with the automated multifocus software imageAccess 8.3.

### 2. Results

#### *Nebria* (*Patrobonebria*) *pertinax* n. sp.

**Holotype** ♂: Nepal, Mahakali/Darchula, 12 km N Ghusa, high valley SSW Api, 3600–3900 m, 29°56'22" N, 80°54'20" E, alpine mats, 8.VI.2005, leg. A. Weigel (NME).

**Paratypes:** 1 ♂, 1 ♀, same data as holotype (NME, NMBE).

Body length 14 mm. Colour black, mandibulae and appendages of head brown. Head with two brownish spots on the vertex. Legs brown, femurs dark brown.

Head with a distinct transverse collar impression of the neck behind the eyes. Mandible long. Labrum with anterior margin trisinate, bearing 7–8 setae. Apical margin of clypeus slightly concave. Shallow supraorbital impression wrinkled. Brightened area of the vertex and collar impression distinctly punctate. Eyes prominent. Antennae long and slender extending to the middle of the elytra. Antennal scape elongate, subcylindrical, basally narrowed, as long or longer as the eye's diameter, with 1 dorsal seta. 4<sup>th</sup> antennomere with a few short setae additionally to the apical collar of long setae. Maxillary stipes basolaterally with 5–7 robust setae. Penultimate labial palpomere bisetose. Mentum with bifid medial tooth. Submentum with a row of 6–8 setae. Microsculpture of the head isodiametric.

Pronotum cordate (fig 1), slightly transverse, widest at apical third; ratio width/length of the pronotum = 1.20. Lateral margin convex, narrowed basally, strongly rounded to the anterior angles, narrowed to the posterior angle, concave before the posterior angles. Posterior angles distinctly narrower than the anterior ones (0.86 times). Lateral groove narrow, neither apically nor basally broadened. Anterior angles rounded, slightly protruding. Posterior angles rounded or even slanted, not acute (fig 1a). Basal margin straight. Pronotal disc convex, transversally wrinkled. Basal fovea shallow, anterior and posterior transverse impressions distinct, median longitudinal impression weak. Basal fovea, the anterior and the posterior transverse impressions and the narrow lateral groove tightly and coarsely punctate. Basal

transverse impression obliquely wrinkled, the spots of the wrinkled area ovoid. Apical and basal margination absent. Basolateral seta present. 1 midlateral seta in the apical half of the pronotum; the pore of insertion distorts the lateral bulge. Microsculpture of the pronotum isodiametric, pronotum impunctate on disc. Proepisternum punctate. Prosternal process unmarginated.

Ratio length/width of the elytra = 1.71. Elytral silhouette convex, ovoid-elongate, widest behind the middle. Lateral margin at the basal fourth with a faint concave impression, subapically faintly sinuate. Elytral apex rounded. Basal margination straight, joined at an obtuse angle with the lateral margination (fig 1b). Humeral carina present as a faint edge. Striae weak, distinct on disc, faintly punctate. Striae obliterate apically, basally and laterally; striae 7 and 8 scarcely visible as a row of faint pores. Intervals flat, interval 3 with 3–5 setae. Scutellar seta absent. Microsculpture isodiametric. Mesepisterna coarsely and tightly punctate. Metepisterna twice as long as wide, coarsely and tightly punctate. Metacoxa with 2 basal and 1 apical setae. Hindwings reduced to one fourth of the elytral length.

1<sup>st</sup> sternum (= 2<sup>nd</sup> sternum sensu LEDOUX & ROUX 2005) laterally rough, coarsely punctate. 2<sup>nd</sup> abdominal sternum medially asetose. Third to fifth visible abdominal sterna (sterna 4–6 sensu LEDOUX & ROUX 2005) each with 1–3 posterior paramedial setae which are arranged in a faint furrow. Anal sternum with 1 paramedial seta in the male and 2 in the female. All sterna with faint impressions laterally.

Legs long and slender. All tarsi without a dorsal pubescence. Front tarsus of the male only with tarsomeres 1–2 distinctly broader than in the female, ventrally with pads of adhesive setae. Ventroapical tooth of the metatarsomere 4 as long as half the length of the tarsomere 4, bearing long setae. All tarsomeres 5 long and slender, ventrally with 2 rows of 4–6 short setae. Metatarsomere 5 as long or longer than the metatarsomeres 3+4. Meso- and metatarsomeres not laterally compressed like in all other species of the subgenus *Patrobonebria*.

Median lobe (fig 3A): Basal part of the median lobe small. Mid-shaft strongly curved at base and to the apex. Mid-shaft narrowed directly after the basal part and parallel towards apex. Apex slender, acute, faintly deflected to the left.

**Diagnosis:** *N. pertinax* n. sp. differs from *N. assidua* n. sp. (see below) by the rounded posterior angles of the pronotum, which are rectangular and acute in *N. assidua*. In *N. pertinax* n. sp. the outline of the pronotum is less cordate than in *N. assidua* n. sp. The incision of the pronotum before the hind angles is less distinct in *N. pertinax* n. sp. than in *N. assidua* n. sp. In *N. pertinax* n. sp. the vertex and the collar impression behind the eyes are distinctly punctate, whereas in *N. assidua* n. sp. the vertex is impunctate and the collar impression is only faintly punctate. It differs (as *N. assidua* n. sp.) from all other known species of the subgenus *Patrobonebria* by its narrow shoulders due to the reduced hind wings, and by its very faint elytral striae.

**Etymology:** The specific epithet refers to the necessary persistence for surviving in extreme living conditions [pertinax (latin) = persistent]; adjective.

**Geographical range** (fig 4): Only known from the type locality on the southern slope of Api Himal, Far Western Nepal.

### *Nebria (Patrobonebria) assidua* n. sp.

**Holotype** ♂: Nepal, Prov. Seti, Distr. Bajura, 19 km W Simikot, Kuwadi Khola, 3500 m, 29°53'14" N, 81°38'40" E, river side, 4.VII.2001, leg. A. Weigel (NME).

**Paratype:** 1 ♂, same data as holotype (NMBE).

Body length 13–14 mm. Colour black, mandibulae and appendages of head brown. Head with two brownish spots on the vertex. Legs brown, femurs dark brown.

Head with a distinct transverse collar impression of the neck behind the eyes. Mandible long. Labrum with anterior margin trisinate, bearing 6 setae. Apical margin of clypeus slightly concave. Shallow supraorbital impression longitudinally wrinkled. Collar impression of the neck faintly punctate, the brightened area of the vertex impunctate. Eyes prominent. Antennae long and slender extending to the middle of the elytra. Antennal scape elongate, subcylindrical, basally narrowed, as long or longer as the eye's diameter, with 1 dorsal seta. 4<sup>th</sup> antennomere with a few short setae additionally to the apical collar of long setae. Maxillary stipes basolaterally with 8–9 robust setae. Penultimate labial palpomere bisetose. Mentum with bifid medial tooth. Submentum with a row of 12 setae. Microsculpture of the head isodiametric.

Pronotum cordate (fig 2), slightly transverse, widest at apical third; ratio width/length of the pronotum = 1.25. Lateral margin convex, narrowed basally, strongly rounded to the anterior angles, strongly narrowed to the posterior angle, distinctly concave before the posterior angles. Posterior angles distinctly narrower than the anterior ones (0.81 times). Lateral groove narrow, neither apically nor basally broadened. Anterior angles rounded, slightly protruding. Posterior angles long, rectangular and acute (fig 2a). Basal margin straight. Pronotal disc convex, faintly transversally wrinkled. Basal fovea distinct, anterior and posterior transverse impressions distinct, median longitudinal impression weak. Basal fovea, the anterior and the posterior transverse impressions and the narrow lateral groove sparsely punctate. Basal transverse impression faintly transversally wrinkled. Apical and basal margination absent. Basolateral seta present. 1 midlateral seta in the apical half of the pronotum; the pore of insertion distorts the lateral bulge. Microsculpture of the pronotum isodiametric, pronotum impunctate on disc. Proepisternum punctate. Prosternal process unmarginated.

Ratio length/width of the elytra = 1.65. Elytral silhouette convex, ovoid-elongate, widest behind the middle. Lateral margin at the basal fourth straight or with a very faint concave impression, subapically faintly sinuate. Elytral apex rounded. Basal margination curved, joined without any angle to the lateral margination (fig 2b). Humeral carina present as a very faint edge. Striae weak, distinct on disc, faintly punctate. Striae obliterate apically, basally and laterally; striae 7 and 8 scarcely visible as a row of faint pores. Intervals flat, interval 3 with 4 setae. Scutellar seta absent. Microsculpture isodiametric. Mesepisterna coarsely and tightly punctate. Metepisterna twice as long as wide, coarsely and tightly punctate. Metacoxa with 2 basal and 1 apical setae. Hindwings reduced to one fourth of the elytral length.

1<sup>st</sup> sternum (= 2<sup>nd</sup> sternum sensu LEDOUX & ROUX 2005) laterally rough, coarsely punctate. 2<sup>nd</sup> abdominal sternum medially asetose. Third to fifth visible abdominal sterna

(sterna 4–6 sensu LEDOUX & ROUX 2005) each with 2–4 posterior paramedial setae which are arranged in a faint furrow. Anal sternum with 1 paramedial setae in the male and 2 in the female. All sterna with faint impressions laterally.

Legs long, less slender than in *N. pertinax* n. sp. All tarsi without a dorsal pubescence. Front tarsus of the male only with tarsomeres 1–2 distinctly broader than in the female, ventrally with pads of adhesive setae. Ventroapical tooth of the metatarsomere 4 as long as half the length of the tarsomere 4, bearing long setae. All tarsomeres 5 long and slender, ventrally with 2 rows of 4–6 short setae. Metatarsomere 5 as long or longer than the metatarsomeres 3+4. Meso- and metatarsomeres not laterally compressed like in all other species of the subgenus *Patrobonebria*.

Median lobe (fig 3B): Basal part of the median lobe small. Midshaft strongly curved at base and moderately to the apex. Midshaft evenly narrowing from base to apex. Apex slender, acute, faintly deflected to the left. The shaft of the everted internal sac without setae.

**Diagnosis:** see above.

**Etymology:** The specific epithet refers to a lasting residence [assiduus (latin) = domiciled, resident]; adjective.

**Geographical range** (fig 4): Only known from the type locality on northeastern slope of Saipal Himal, Far Western Nepal.

### *Nebria (Patrobonebria) desgodinsi* Oberthür, 1883

The distribution area of *N. desgodinsi* is indistinct. Specimen of the Western Himalaya (from Afghanistan to Western Nepal) turn out to be *N. capillosa* Ledoux & Roux, 1992. *N. desgodinsi* seems to be restricted to Sikkim (LEDOUX & ROUX 1992, 2005), even LEDOUX & ROUX (2005) mention an immature and unconfirmed specimen from the Daxue Shan (Sichuan province, China) a long distance apart. Six specimen of *N. desgodinsi* are reported herewith from Solu Khumbu Himal in Eastern and Central Nepal:

1 ♂ Junbesi, Junbesi Khola/Solu Khumbu Himal, Nepal, 2600 m, 24.4.1993, leg. Kleeberg, det. J. Schmidt (JS);

1 ♂ Umgeb. Jiri, Shivalaya, Kimti Khola/S. Khumbu Himal, Nepal, 1707 m, 1.5.1993, leg. Kleeberg, det. J. Schmidt (JS);

1 ♂ Umg. Shivalaya, Ufer Kimti Khola, Nepal, 2.5.1993, leg. Kleeberg, det. J. Schmidt (NMBE);

1 Ex. Khimti Khola, Shivalaya, Nepal, 1800 m, 9.4.1973, leg. J. Martens, det. C. Huber (SMNS);

2 Ex. Khimti Khola near Shivalaya, Ramechhap Distr., Nepal, 1800 m, 5.5.1997, leg. M. Hauser & W. Schawaller, det. C. Huber (SMNS, NMBE).

### 3. Key

(based on LEDOUX & ROUX (2005) with changes)

- 1 Fully winged species with shoulder distinct. Elytra with striae deeply engraved. Meso- and metatarsomeres laterally compressed. .... 2
- Species with hind wings reduced to small stubs, shoulder slender. Elytra with inconspicuous striae, which are faintly punctate. Meso- and metatarsomeres laterally not compressed. .... 5

- 2 Appendices yellow, distinctly brighter than the body. Lateral margin of the elytra parallel. .... 3
- Appendices brown to black, scarcely brighter than the body. .... 4
- 3 Pronotum slender (1.25 times as large as long). Posterior angles of the pronotum acute and laterally protruding. 4<sup>th</sup> antennomere with a few setae additionally to the apical collar of setae. Vertex faintly punctate. Afghanistan to Western Central Nepal. ....  
..... *N. capillosa* Ledoux & Roux, 1992
- Pronotum larger (1.4 times as large as long). Posterior angles of the pronotum subrectangular, not laterally protruding. 4<sup>th</sup> antennomere without additional setae. Vertex and collar impression tightly and strongly punctate. Eastern Central Nepal to Sikkim. ....  
..... *N. desgodinsi* Oberthür, 1883
- 4 Outline slender. Shoulder less distinct, elytra ovoid-elongate. Kashmir to Kumaon Himalaya. ....  
..... *N. elegans* Andrewes, 1925
- Outline robust. Shoulder distinctly produced, elytra subparallel. Afghanistan to Central Nepal. ....  
..... *N. himalayica* Bates, 1889
- 5 Posterior angles of the pronotum rounded. Vertex and collar impression distinctly punctate. Southern slope of Api Himal, Far Western Nepal. .... *N. pertinax* n. sp.
- Posterior angles of the pronotum acute and rectangular. Vertex impunctate, collar impression faintly punctate. Northeastern slope of Saipal Himal, Far Western Nepal. .... *N. assidua* n. sp.

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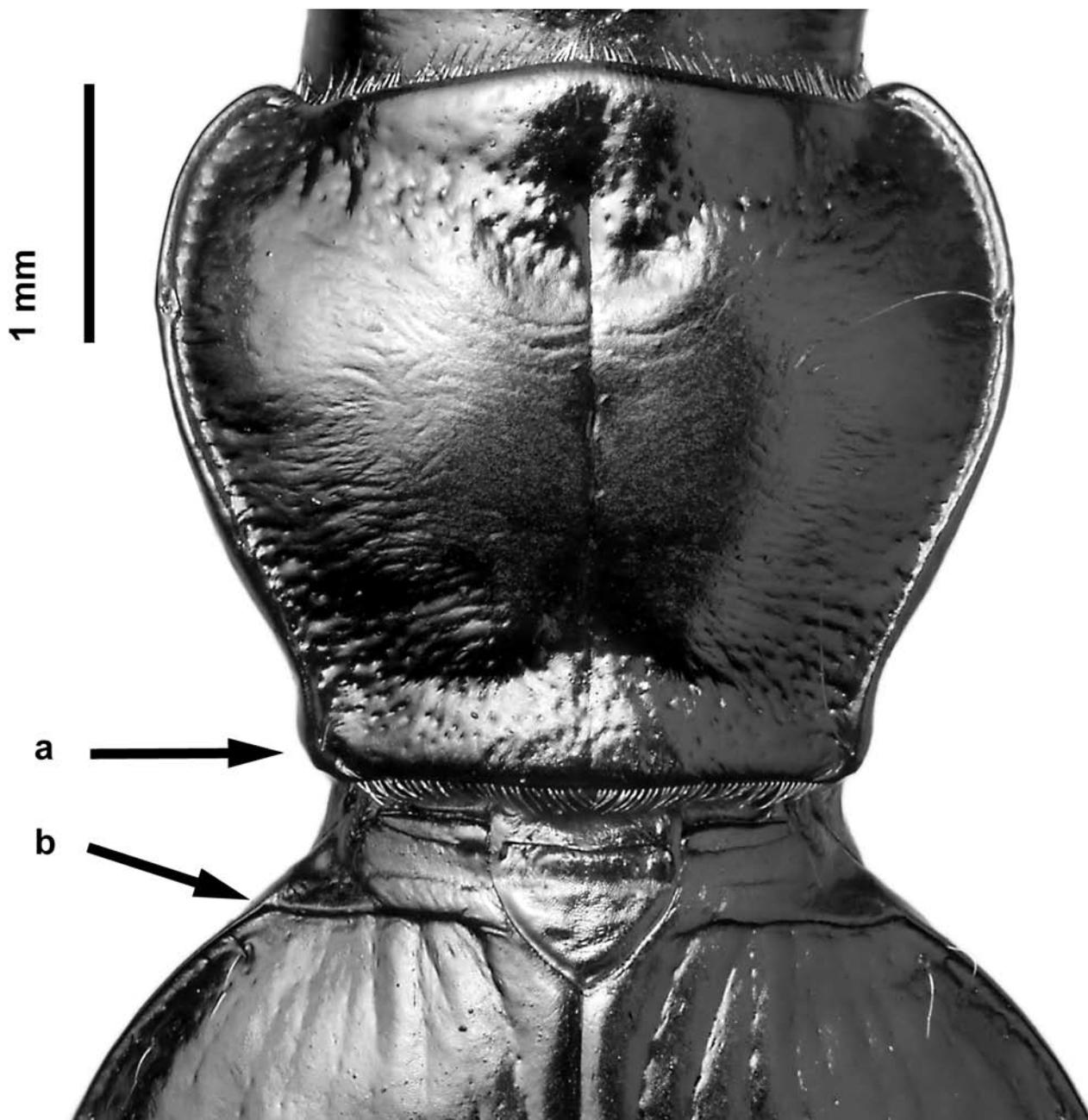
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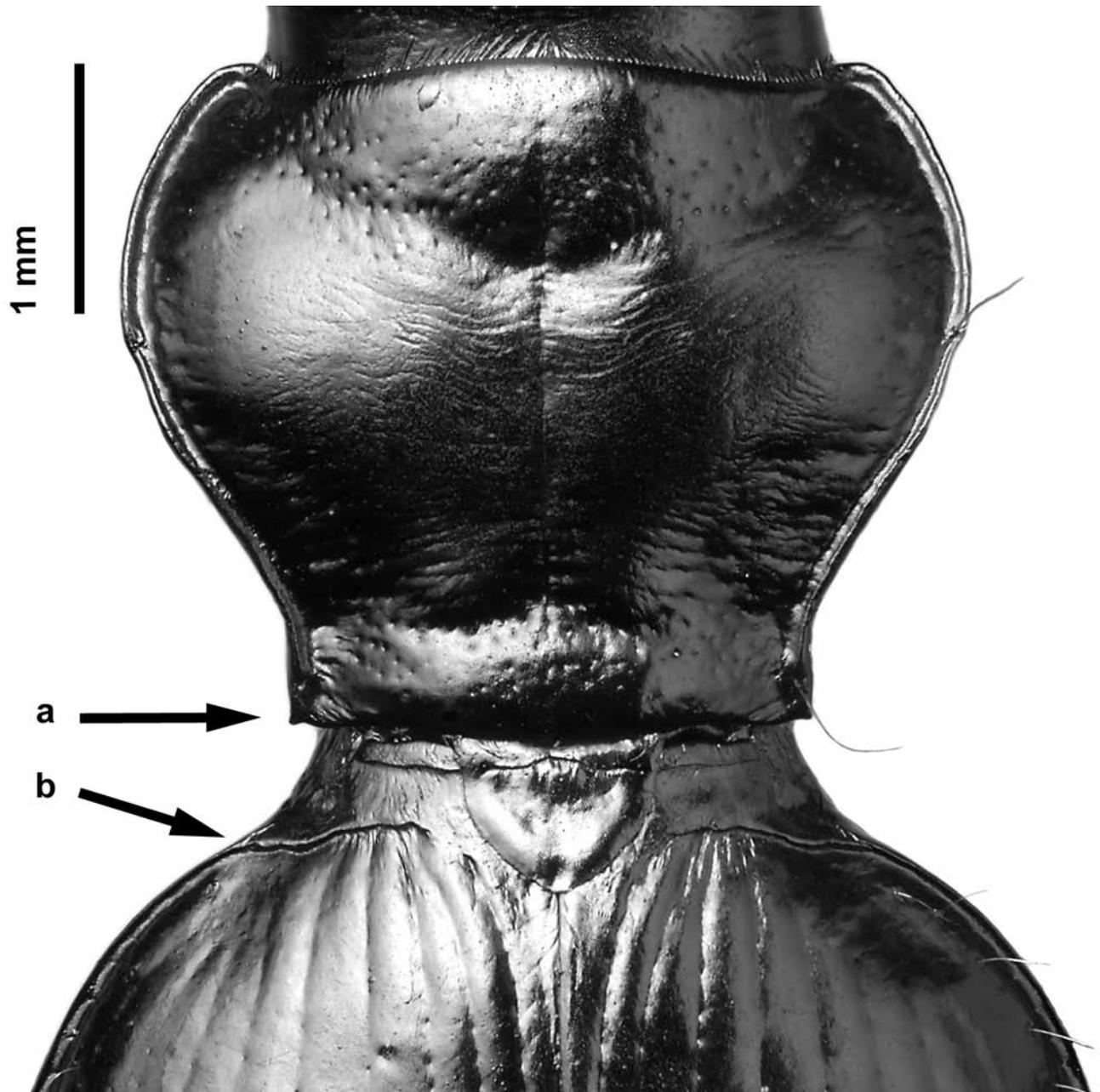
**Authors addresses:**

Dr. Charles Huber  
Naturhistorisches Museum  
Bernastrasse 15  
CH-3005 Bern  
E-mail: charles.huber@nmbe.ch

Joachim Schmidt  
Faculty of Geography  
University of Marburg  
Deutschhausstr. 10  
D-35037 Marburg  
E-mail: schmidt@agonum.de



**Fig 1:** *Nebria (Patrobonebria) pertinax* n. sp. Pronotum and basal part of the elytra. a: Left posterior angle rounded. b: Basal and lateral margination of the elytra joined at an obtuse angle.



**Fig 2:** *Nebria (Patrobonebria) assidua* n. sp. Pronotum and basal part of the elytra. a: Left posterior angle acute. b: Basal and lateral margination of the elytra joined without angle.

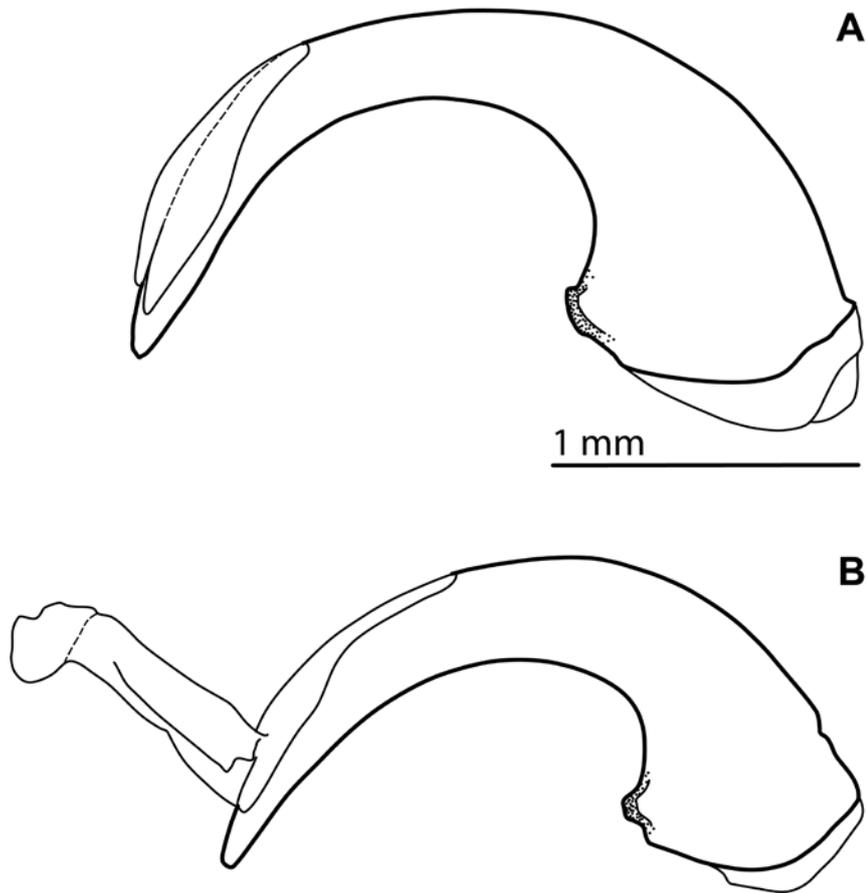


Fig 3: Median lobe (lateral). A: *Nebria (Patrobonebria) pertinax* n. sp. B: *Nebria (Patrobonebria) assidua* n. sp. with everted internal sac.

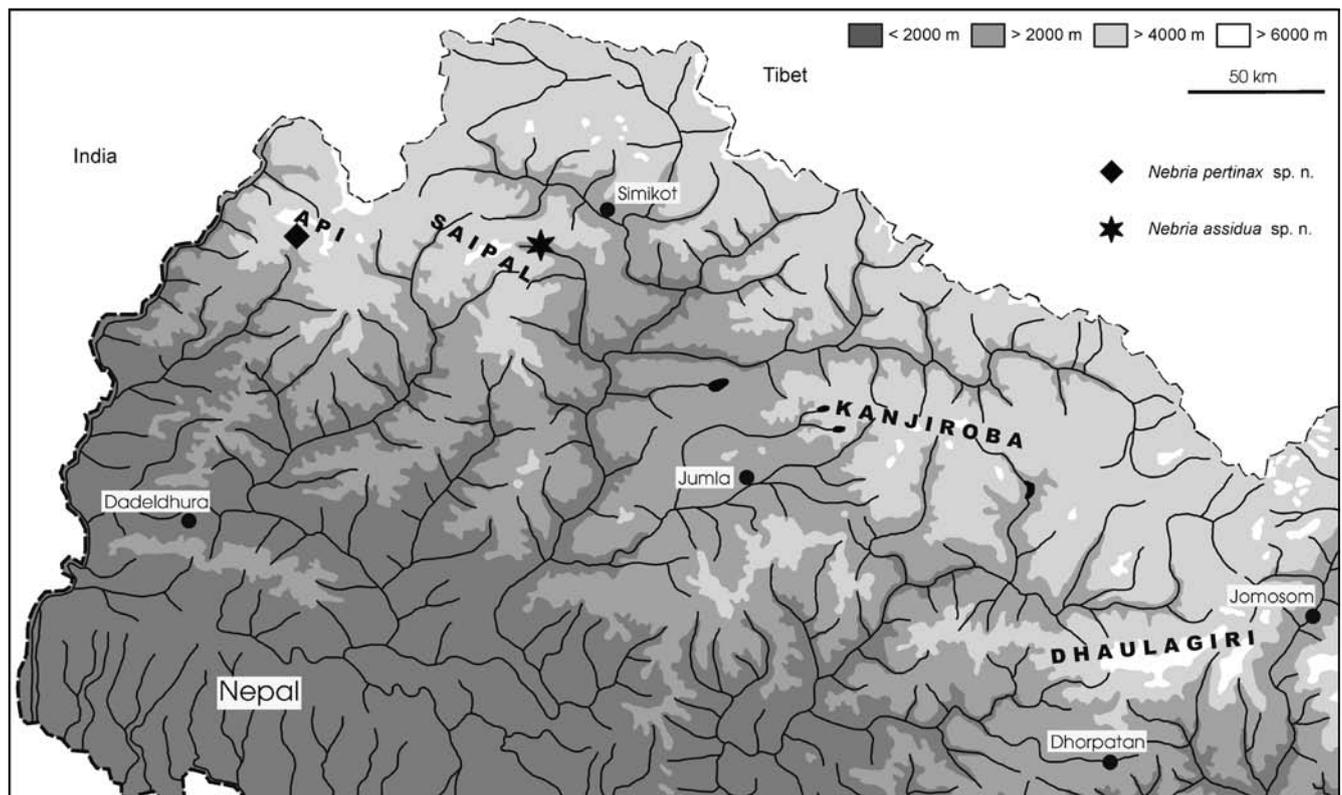


Fig 4: Map of localities of *Nebria (Patrobonebria) pertinax* n. sp. (diamond) and *Nebria (Patrobonebria) assidua* n. sp. (star) in Far Western Nepal.