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Nebria (*Pseudonebriola*) *tsambagarav* sp. nov., a new alpine species from the Mongolian Altai (Coleoptera, Carabidae)

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Abstract

Nebria (*Pseudonebriola*) *tsambagarav* **sp. nov.** is described from an alpine altitude in the Mongolian Altai. The new species is separated from other two *Pseudonebriola* species from the Mongolian Altai Mountain range, *N. kerzhneri* and *N. medvedevi*, by morphometric and morphological analyses. The new species and its habitat are illustrated, the subgeneric key is amended, and a distribution map is given.

Key Words

carabids, morphometry, multivariate ratio analysis, taxonomy, distribution, high altitude

Introduction

The subgenus *Pseudonebriola* Ledoux & Roux, 1989, genus *Nebria* Latreille, 1802 comprises 13 species and two subspecies (Huber 2017), distributed over the mountain ranges of Central Asia in Kazakhstan, Kirgizia, China, Mongolia, and Russia. The distribution area of *Pseudonebriola* extends from the Yssyk Kul in Kirgizia to the Baikal Lake in South Eastern Russia. Only the recently described *N.* (*P.*) *mingyii* Ledoux & Roux, 2014 from the Qilian Shan, Qinghai, China, stands isolated from the distribution area of the other species known so far (Ledoux and Roux 2014). Species of the subgenus *Pseudonebriola* generally inhabit alpine altitudes between 2000 and 3500 m a.s.l.

Up to now four *Pseudonebriola* species are known from the Altai Mountains, a border mountain range common to Kazakhstan, Russia, China, and Mongolia: *N. kaszabi* Shilenkov, 1982 from the Kazakhstan and Russian part, *N. stanislavi* Dudko & Matalin, 2002, an endemic species in the Russian Altai, *N. medvedevi* Shilenkov, 1982 from the Mongolian (and Russian) Altai, and *N. kerzhneri* Shilenkov, 1982, endemic to the Gobi Altai, the Southeastern continuation of the Mongolian Altai (Shilenkov 1982a, b; Dudko and Matalin 2002; Ledoux and Roux 2005; Huber 2017).

Pseudonebriola specimens were collected by the junior author on the occasion of an expedition in 2016 to the Tsambagarav uul, Mongolian Altai, Northwestern Mongolia. The Tsambagarav Mountain is part of the central Mongolian Altai bordering the Great Lakes Depression and is separated from the main ridges of the Mongolian Altai by a straight tectonogenic hollow (Borodavko et al. 2018). The collected specimens do not agree either morphologically or morphometrically with any of the known species. Hence they are described below as a new species of the subgenus *Pseudonebriola*.

Materials and methods

The edeagi and gonocoxae were dissected and dehydrated in alcohol and xylene, and finally embedded in Fluka DPX Mountant on transparent mounting cards.

For a morphometric analysis we measured eleven characters (Table 1) of 31 specimens of four *Pseudonebriola* taxonomic units from the Altai Mountain range:

Table 1. Characters measured in the *Nebria kerzhneri* species complex for use in a morphometric analysis.

Abbreviation	Character	Definition	Conversion factor
eye.l	eye length	length of eye	0.074
ant.w	antennomere 1 width	maximum width of antennomere 1	0.074
ant.l	antennomere 1 length	length of antennomere 1	0.074
ely.w	elytra width	maximum width of elytra	0.01
ely.l	elytron length	length of elytron from basal margin to apex	0.01
fro.w	frons width	width of frons between the eyes	0.026
hea.w	head width	maximum width of the head (over eyes)	0.026
pra.w	pronotum anterior width	width between the anterior angles of the pronotum	0.026
prm.w	pronotum maximum width	maximum width of the pronotum	0.026
prm.l	pronotum median length	median length of the pronotum	0.026
prp.w	pronotum posterior width	width between the posterior angles of the pronotum	0.026

N. kaszabi (eigth specimens) which belongs to the *sajanica* species group (sensu Ledoux and Roux 2005), *N. medvedevi* (two type specimens) and *N. kerzhneri* (holotype specimen), both of the *kerzhneri* species group, and a sample of 20 specimens of the type series of the new species from Mt Tsambagarav, Mongolia. The measurements were taken using a Leica MZ 16 stereo-microscope with an ocular micrometer. Measurements of males and females were pooled, since their values were entirely overlapping in range. We applied multivariate ratio analysis (MRA) of Baur and Leuenberger (2011) to our data of a complex of four operational taxonomic units (OTU), the *kerzhneri*, *medvedevi*, *kaszabi* and *tsambagarav* units. For information on the application of the principal component analysis of shape (shape PCA) and the linear discriminant analysis (LDA) ratio extractor, we refer to the studies on the species complexes of *Nebria* (*Patrobonebria*) *paropamisos* Huber, Schmidt & Baur, 2013 (Huber et al. 2013), of *N.* (*P.*) *desgodinsi* Oberthür, 1883 (Huber and Baur 2016), of *N.* (*Eunebria*) *xanthacra* Chaudoir, 1850 (Huber and Schmidt 2018), and of *Encarsia pergandiella* Howard, 1907 (Hymenoptera, Aphelinidae; Gebiola et al. 2017). Morphometric analyses were done using the R statistical environment (R Core Team 2013).

The photographs were taken with a digital camera Leica MC 190 HD using a motorised focusing drive. The pictures are composites processed using the Leica Application Suite X (LAS X) 3.6.0.20104 software, and were retouched using Adobe Photoshop version 10.0.1. The median lobes of the type specimens of both *N. kerzhneri* and *N. medvedevi* were originally glue-fixed on mounting cards. The photographs of the median lobes were taken in that dried situation. The habitus photograph was taken by a digital microscope Keyence VHX-2000 with the objective VH-Z20R.

The distribution map (Fig. 11) was drawn using the QGIS Version 3.8 Zanzibar Software. Additional localities were taken from Shilenkov (1982b; *N. medvedevi*, *N. kerzhneri*) and from Dudko and Matalin (2002; *N. kaszabi* (selection), *N. stanislavi*, *N. medvedevi*). In case of non-georeferenced localities we used approximate geographic coordinates of online systems (Google Earth, Google Maps), which are given in square brackets.

Collections examined with acronyms:

NMBE Natural History Museum Bern, Switzerland.
ZIN Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia.
cBK private collection of I.A. Belousov and I.I. Kabak, St Petersburg, Russia.
cSCHN collection Peer Schnitter, Halle, Germany.

For abbreviations of morphological characters see Tab. 1.

Type material examined [with authors' remarks or supplements in square brackets]:

N. medvedevi: Holotype ♂ and 1 paratype ♂: [red label] Holotype [and Paratype respectively; printed, in Latin letters], Nebria medvedevi sp. nov. Shilenkov det. 1981 [handwritten, in Latin letters] // [white label] 7. 7. 1980; MNR Kobdosk. aim. Mongolsk. Altai, per. Ulan-Daba [47°23.96'N; 91°12.23'E], G. Medvedev [handwritten, in Cyrillic letters] // 3000–3200 m, под камнями у снежниов [handwritten, in Cyrillic letters] (ZIN). Original description of the type locality by Shilenkov (1982b, p. 254): Mongolia, border of Kobdoskii and Bayan-Ulzgzai aimaks, Mongolian Altai, per. Ulan-Daba, 3000–3200 m, leg. G. Medvedev.

N. kerzhneri: Holotype ♂ [red label]: Holotypus [printed, in Latin letters], Nebria kerzhneri sp. nov. Shilenkov det. 1980 [handwritten, in Latin letters] // [white label] 28. 6. 1973, Gobi-Altai Aimak, Dschargalan [46°58.59'N; 95°55.07'E], в старых ходах рогохвоста [handwritten, in Cyrillic letters]. V. Yanovskiy [printed, in Cyrillic letters] (ZIN).

Additional material examined:

N. kaszabi: 2 ♀ Vostochno-Kasachst., Marka-Kul, above Urunkhaika, 2400 m, 25. 6. 1986, leg. Shilenkov [in Cyrillic letters] // Nebria kaszabi Shil., det Shilenkov 1994 (NMBE). 3 ♂, 3 ♀ RUS SW-Altai, Markakol Lake/ Urunkhaika, 2400 m [48°45.90'N; 86°09.62'E], 19. 6. 1997, leg. Dudko, det. Dudko (NMBE).

Additional localities of non-examined specimens used for the distribution map (Fig. 11):

N. medvedevi: In June 1998 A. Matalin and D. Fedorenko collected *N. medvedevi* specimens for the first time in a Russian area: Ukok Highland, Teplyy Klyuch, 2640 m [49°07.703'N; 87°26.605'E].

N. kerzhneri: Paratypes: Hasagt-Khairkhan, 15 km South of Jargalan, 14.8.1970, leg. Kerzhner [46°47.42'N; 95°48.23'E]. Taishirin-Ula, 15 km Southeastern of Altai [Altai = village in the Northwestern part of the Gobi Altai: 46°12.96'N; 96°27.66'E], 20.8.1970, leg. Emelyanov (Shilenkov 1982b).

N. stanislavi: Central Altai, Eastern slope of Mt. Kyzylart [50°32.20'N; 87°12.28'E], spring of river Achin, 2100–2300 m (Dudko and Matalin 2002).

Results

Morphometry

The scatterplots of the first scape PC against isosize of the four OTUs do not overlap and show no sign of allometry (Fig. 1). The *kerzhneri* red dot, which seems to be close to the *tsambagarav* scatterplot, lies in a double distance far from the regression line as the furthermost *tsambagarav* outlier. We consider all units as distinctly separated.

The LDA ratio extractor provides the best ratios to separate the groups. The best two ratios to discriminate the tsambagarav unit from the sample of the two *kerzhneri* and *medvedevi* units (ker+med in Fig. 2A) from the Mongolian Altai are the antennal scape length/eye length on the one hand and the elytral width/median pronotum length on the other (Fig. 2A). We use the former in the determination key below, the second-best ratio is unusual in taxonomy.

Furthermore, we examined eight specimens of *N.* (*P.*) *kaszabi*, a member of the *sajanica* species group, as a geographical and taxonomic outgroup. The LDA extractor provides the same ratio (the antennal scape length/eye length) as best ratio to separate the tsambagarav and kaszabi units, supported by the second best ratio of elytral length/head width (Fig. 2B).

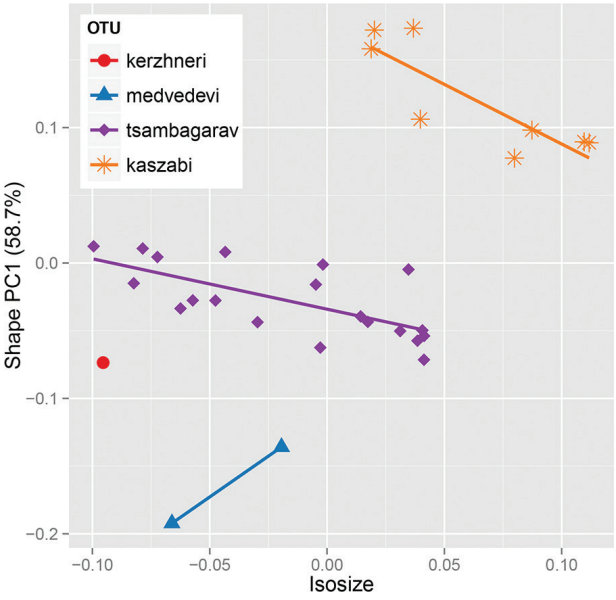

Figure 1. Multivariate ratio analysis. Scatterplot of isosize against first shape PC of four Altai *Pseudonebriola* OTUs, including all eleven examined variables. OTU = operational taxonomic units.

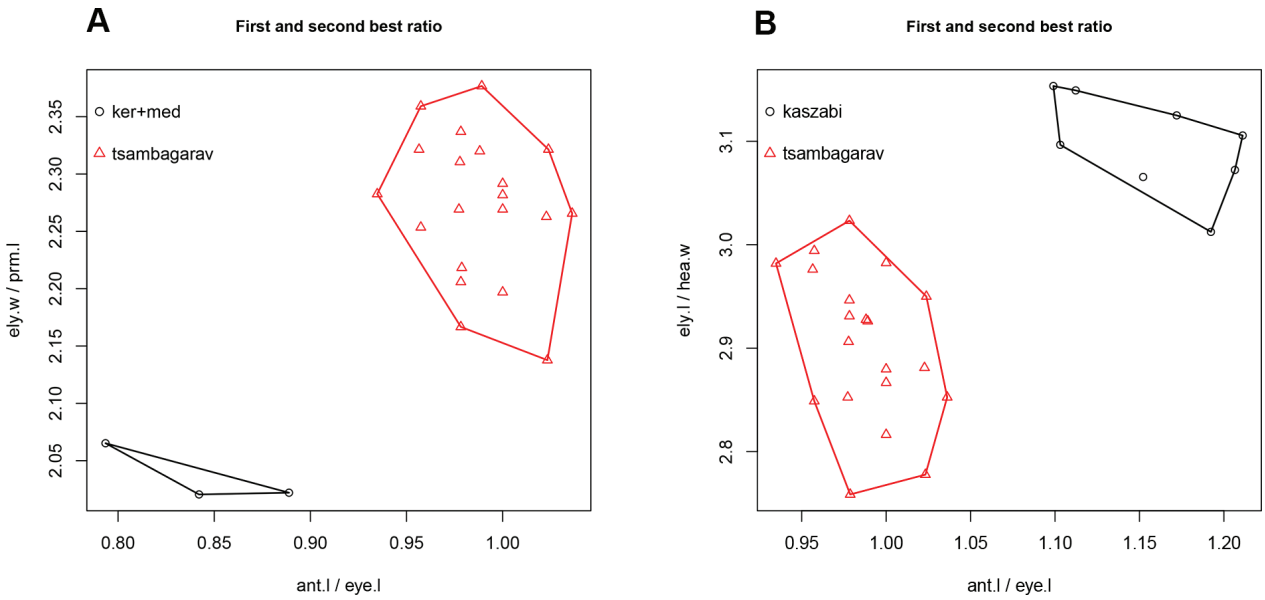

Figure 2. Best and second-best diagnostic ratios by linear discriminant analysis (LDA) ratio extractor for separating groups: **A**, in *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov. and the two other species of the Mongolian Altai *N.* (*P.*) *medvedevi* Shilenkov, 1982 and *N.* (*P.*) *kerzhneri* Shilenkov, 1982 (= ker+med); **B**, in *N.* (*P.*) *tsambagarav* sp. nov. as a member of the *kerzhneri* species group and *N.* (*P.*) *kaszabi* Shilenkov, 1982 as a member of the *sajanica* species group of the Kazakhstan and Russian Altai.

Taxonomy

***Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov.**

http://zoobank.org/49BA78BD-7423-410B-A311-9BD18A1C134D

Figs 3–8

Type material. Holotype ♂: 48°41'27.1"N, 90°40'33.4"E; Mongolei, Bajan Ulgij Aimak, Tsambagarav uul; alpine Zone: Bachufer; 3168 üNN; 1. 7. 2016; 20 MG 2016 [internal abbreviation of the collector: location No. 20, Mongolia expedition 2016]; leg. Schnitter (NMBE).

Paratypes: 31 ♂, 22 ♀, same data as holotype (NMBE, ZIN, cBK, cSCHN).

Description. Body size: 7.5–9 mm.

Colour: Dorsal surface black, head black, without lightened spots on the vertex; appendages of the head brownish lightened, always lighter than the head. Antennal scape black, antennomeres 2–11 brown with darkened apices. Femora black, tibiae and tarsomeres brown, apices of tarsomeres usually black.

Head: Mandibles short; stipes flat, smooth, with 4–6 setae. Anterior margin of the labrum straight, bearing six setae. Anterior margin of the clypeus straight or slightly concave; clypeus laterally unisetose. Frontoclypeal suture concave. Frons with transverse wrinkles, which roundly merge into the lateral and longitudinal supraorbital wrinkles. Eyes protruding, temples present, oblique. Head supraorbitally unisetose. Disc impunctate with an isodiametric microreticulation. Antennae long and thin, extending to the end of the basal third of the elytra. Antennal scape as long as the eye's diameter (ratio antennal scape length/eye length = 0.98±0.03 (0.93–1.04), slightly conical to suboval, distinctly narrowed basally and slightly apically, with one dorsoapical seta (Fig. 4). Ratio antennal scape length/scape width = 2.16±0.07 (2.05–2.26). 2nd antennomere with one long ventroapical and one long dorsoapical seta, and generally (in 89% of the examined specimens) with 1–2 additional, often hardly visible short setae on the apex; therefore the 2nd antennomere trisetose (in 47%) or even quadrisetose (in 42%) (Fig. 5). Ligula short, triangular, broad at base, with two apical setae. Penultimate labial palpomere trisetose. Mentum bidentate, medially hardly incised. Median teeth with one seta

Figure 3. *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov., habitus, holotype. Scale bar: 5 mm.

Figure 4. Antennal scape: **A**, *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov. paratype; **B**, *N.* (*P.*) *medvedevi* Shilenkov, 1982, paratype. Scale bar: 0.5 mm.

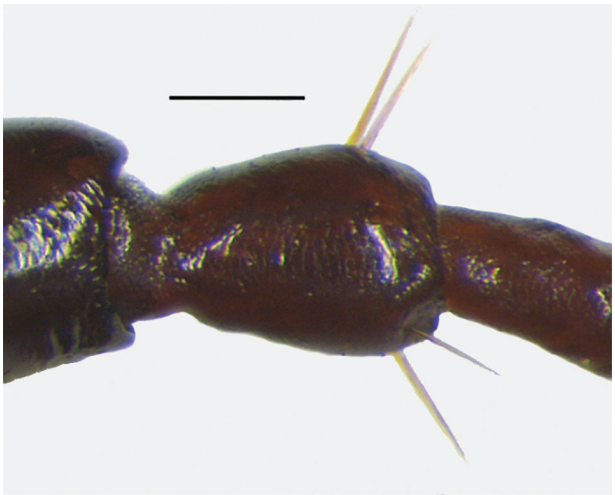

Figure 5. Second antennomere of right antenna of *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov., paratype, with four apical setae. Scale bar: 0.1 mm.

at each side. Lobus lateralis of the mentum wide, apically faintly rounded or even rectilinearly narrowed, spina apicalis short, triangular, incisio lateralis distinct. Submentum bilaterally with 3–4 setae.

Pronotum (Fig. 6): Cordate, widest at apical third or even forth; ratio maximum width/length = 1.43±0.03 (1.39–1.49). Anterior angles widely rounded, faintly protruding. Lateral margin evenly rounded to the anterior angles, faintly rounded to the posterior angles with a distinct sinuation in front of the posterior angle. Lateral margin of the posterior angles long. Posterior angles rectangular or even acutely turned outwards. Ratio apical pronotal width/maximum pronotal width = 0.80±0.02 (0.78–0.84). Apical margination of the pronotum restricted to lateral one-third. Basal margin straight, occasionally laterally faintly curved, the posterior angles not protruding backwards. Basal width of the pronotum 0.92 (0.88–0.97) times the anterior width. Lateral groove distinct, narrow, flat, impunctate or with isolated dents, laterally narrowly edged, slightly broadened to the anterior angle, posteriorly joining the deep basal fovea. One midlateral seta present near widest point of the pronotum; occasionally bilateral-bisetose (2%) or asymmetrically uni-/bisetose (2%). Basolateral seta present. Apical and basal transverse impression coarsely but sparsely punctate. Median longitudinal impression distinct, reaching the posterior border of the pronotum. Disc with isodiametric microreticulation. Prosternal process wide, triangular, laterally slightly margined, medially flat, apically bulging and immarginate. Proepisternum smooth and impunctate.

Elytra: Silhouette suboval, apically faintly expanded, maximum width at two thirds. Ratio length/width of the elytra = 1.53 ± 0.02 (1.51–1.57). Elytral width = 1.59 ± 0.04 (1.51–1.66) times the pronotal width. Lateral margin faintly rounded, apex acutely rounded. Basal margination slightly curved, joined at an obtuse angle with the lateral margination. Shoulder flatly curved. Hindwings vestigial. Humeral and apical carinae little pronounced. Striae 1–7 distinct, punctate, stria 8 as a row of punctures. Striae 1–3 reaching the apex, the other striae obliterate slightly in front of the apex. Intervals on disc flat, interval 3 generally asetose (76%) on disc, disregarding the always present apical seta, occasionally with one seta on the disc (24%). Scutellar seta absent. Microsculpture isodiametric.

Ventral surface: Mes- and Metepisterna smooth and impunctate. Metacoxa basally and apically unisetose. Sternum II laterally faintly and widely dispersed punctate. Sternum III medially asetose. Sterna IV–VI each with one posterior paramedial seta. Anal sternum paralaterally unisetose in the male, bisetose in the female.

Legs: All tarsomeres dorsally glabrous; metatarsomere 4 ventrally with a short projecting tooth. Metafemur dorsoapically with a few short setae.

Male genitalia: Edeagus (Fig. 7C): Base of the median lobe small; the base decreasing abruptly to the thin mid-shaft. Mid-shaft strongly curved at base on inner side, moderately curved to the apex. Apex straight, faintly deflected to the left, in front of the long tip ventrally faintly convex. Mid-shaft of the endophallus with short setae.

Female genitalia: Gonocoxa (Fig. 8A): Gonocoxite 2 slender, dagger-like, curved, two fifth the length of gonocoxite 1, broad at base, distinctly narrowing near base, narrowing towards apex which is faintly deflected. Apex rounded, hardly arcuate and grooved dorsally. Ventral preapical insertion furrow short-oval, with two nematiform setae. Gonocoxites ventrally unjointed and continuously sclerotized, dorsally separated by a membranous area.

Habitat (Figs 9, 10). The new species was found in the alpine region of the Tsambagarav uul exclusively un-

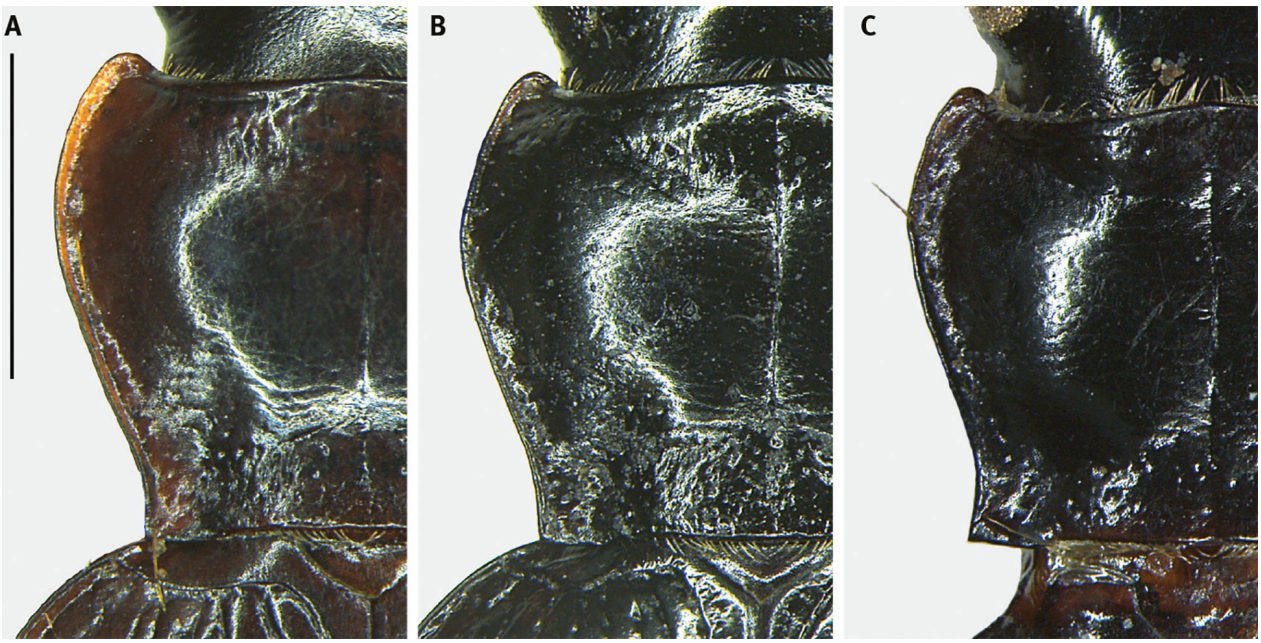

Figure 6. Pronotum: **A**, *Nebria* (*Pseudonebriola*) *kerzhneri* Shilenkov, 1982, holotype; **B**, *N.* (*P.*) *medvedevi* Shilenkov, 1982, paratype; **C**, *N.* (*P.*) *tsambagarav* sp. nov., paratype. Scale bar: 1 mm.

Figure 7. Median lobes; A–B dried lobes, C–D embedded lobes, A–C with partially everted endophallus: **A**, *Nebria* (*Pseudonebriola*) *kerzhneri* Shilenkov, 1982, holotype; **B**, *N.* (*P.*) *medvedevi* Shilenkov, 1982, paratype; **C**, *N.* (*P.*) *tsambagarav* sp. nov., holotype; **D**, *N.* (*P.*) *kaszabi* Shilenkov, 1982, Urunkhaika, Marakol Lake, Kazakhstan. Scale bar: 1 mm.

der bigger stones along the riverbanks of small rivulets. The water ran off higher snowfields. Directly at the snow fields not any specimen was found.

Ecology. Hydrophilic, ripicol, cold-preferring, alpine level.

Etymology. The specific epithet refers to the type locality, the Tsambagarav uul; noun in apposition.

Distribution (Fig. 11). *N. tsambagarav* sp. nov. is known only from the type locality at an altitude of 3168 m a.s.l. at the Tsambagarav uul, a mountain (with the summit at 4165 m a.s.l.) of the Mongolian Altai in the westernmost province of Bayan Ölgii of Mongolia.

The Mongolian *Pseudonebriola* species are restricted to the main ridge of the Mongolian Altai (*N. medvedevi*), to the Tsambagarav mountain, the easternmost

Figure 8. Right gonocoxa (in ventral view): **A**, *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov., paratype; **B**, *N.* (*P.*) *kaszabi* Shilenkov, 1982; Urunkhaika, Marakol Lake KAZ. Scale bar: 0.5 mm.

ridge bordering the Great Lakes Depression (*N. tsambagarav* sp. nov.), and to the Northwestern part of the Gobi Altai (*N. kerzhneri*).

Differential diagnoses to *Pseudonebriola* species of the Mongolian Altai

Antennae: Antennal scape (in relation to the eye length) in *N. tsambagarav* sp. nov. longer than in *N. kerzhneri* and in *N. medvedevi*, the ratio scape length/eye length distinctly different: 0.98 in *N. tsambagarav* sp. nov., 0.89 in *N. kerzhneri*, and 0.82 in *N. medvedevi* (see also fig. 2 in Dudko and Matalin (2002), p. 1079).

Second antennomere of *N. tsambagarav* sp. nov. oligosetose with (2)3–4 setae (Fig. 5). The examined specimens are oligosetose on the 2nd antennomere in 89% of the cases, and bisetose in 11%. This seta character of the 2nd antennomere was not mentioned by Shilenkov (1982b), when he described *N. kerzhneri*, but explicitly mentioned as bisetose (and sometimes unisetose) in *N. medvedevi*. Shilenov (1982b) pictured this seta character in a drawing (fig. 19, p. 251) with an unisetose 2nd antennomere in *N. kerzhneri* in contrast to a bisetose one in *N. medvedevi* (fig. 20, p. 251). Ledoux and Roux (2005) did not mention this character either in *N. kerzhneri* or in *N. medvedevi*.

Pronotum: In *N. tsambagarav* sp. nov. the lateral groove of the pronotum at the anterior angle is wider than

Figure 9. Tsambagarav uul, Bajan Ölgii province, Western Mongolia. Photo: Peer Schnitter.

Figure 10. Habitat of *Nebria* (*Pseudonebriola*) *tsambagarav* sp. nov. on Tsambagarav uul; rivulet at 3168 m a.s.l. Photo: Peer Schnitter.

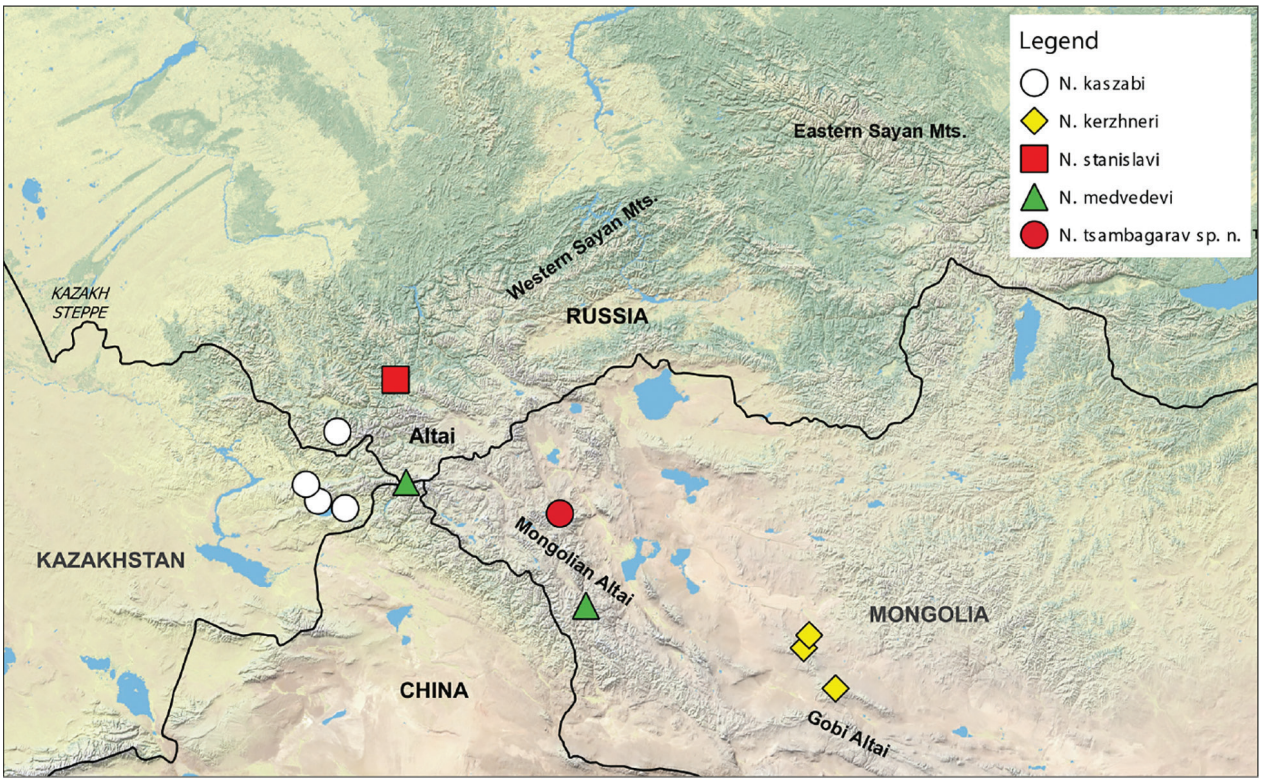

Figure 11. Map of the Altai Mountain range displaying the distribution of *Pseudonebriola* species.

in *N. kerzhneri* and *N. medvedevi*. Lateral margin of the pronotum at the anterior angle distinctly edged as in *N. medvedevi*; such an edged anterolateral margin is absent in *N. kerzhneri*. In *N. tsambagarav* sp. nov. the pronotum is distinctly concave in front of the posterior angles (Fig. 6C), therefore the posterior angle is acute and prominently turned outwards in contrast to the rectangular angle in *N. kerzhneri* and *N. medvedevi* respectively, in the latter the pronotal margin in front of the posterior angle is only faintly concave (Fig. 6B).

Edeagus: The tip of the edeagus in *N. tsambagarav* sp. nov. is longer (Fig. 7C) in contrast to those in *N. kerzhneri* and *N. medvedevi* (Fig. 7A, B). Whereas the apex in *N. tsambagarav* sp. nov. is straight and ventrally faintly convex as in both *N. kerzhneri* and *N. medvedevi*, the shortly pointed apex of the edeagus of *N. kaszabi* is regularly bent without any ventral convexity (Fig. 7D), an indication that *N. kaszabi* (from Kazakhstan and Russian Altai) may belong to another species group.

Gonocoxa: Gonocoxite 1 of *N. tsambagarav* sp. nov. (Fig. 8A) wider and gonocoxite 2 less curved than in *N. kaszabi* (Fig. 8B). Due to scarce material we are not able to evaluate if the observed differences in the gonocoxa habitus are of specific or of species group value.

Discussion

N. tsambagarav sp. nov. is clearly identifiable by its oligosetose 2nd antennomere. In general the 2nd antennomere of all *Pseudonebriola* species has a single ventral seta. According to Ledoux and Roux (2005, p. 159) *N. stanislavi* from the Kazakhstan and Russian Altai also seems to be oligosetose on the 2nd antennomere ("deuxième article avec deux soies en dessus et une en dessous"), a statement which does not accord with the original description by Dudko and Matalin (2002). There (table p. 1082), the 2nd antennomere is reported to be unisetose (in 66% of the cases), asymmetrically uni-/bisetose (in 21%) and bilaterally bisetose in 11%; in only 1 single specimen of 47 examined specimens (= 2%) a third seta on the 2nd antennomere was observed. Therefore, indication in Ledoux and Roux (2005) is incorrect. According to Dudko and Matalin (2002) the 2nd antennomere in *N. stanislavi* is exceptionally bi- or trisetose (in 13%), whereas in *N. tsambagarav* sp. nov. the 2nd antennomere is exclusively (in 100%) bi-, tri- or even quadrisetose. Additionally the two species differ by the bisetose sterna IV–VI and the antennal scape, which is oligosetose and distinctly longer than the eye length in *N. stanislavi*, whereas in *N. tsambagarav* sp. nov. the sterna IV–VI are unisetose, and the antennal scape, which is unisetose, and only as long as the eye length. Within the subgenus *Pseudonebriola* the oligosetose 2nd antennomere as a non-incidental peculiarity seems to be limited to *N. tsambagarav* sp. nov.

Ledoux and Roux (2005) divided the subgenus *Pseudonebriola* into five species groups without specifying any main group characters. The members of the *sajanica* species group (*N. sajanica* Bänninger,

1932, *N. stanislavi*, *N. kaszabi*) are characterized by the long antennal scape (see figures in Dudko and Matalin (2002) and Ledoux and Roux (2005)). This scape character is vaguely given by Ledoux and Roux (2005) as "long", "very long" or "about two and a half times as long as wide" in *N. stanislavi*, "quite long" or "two times as long as wide" in *N. kaszabi*. Effectively this scape slenderness seems to be more pronounced in both species. The measurement of eight specimens of *N. kaszabi* of the NMBE revealed a ratio scape length/scape width in *N. kaszabi* of 2.47±0.06 (2.38–2.52), a value given by Ledoux and Roux (2005) for *N. stanislavi*. Referring to the figures in Dudko and Matalin (2002; fig. 2, p. 1079) the ratio in *N. stanislavi* is about 2.8–3.0. Consequently, this deficient description is dissatisfying. It must be an aspect of a general revision of the subgenus *Pseudonebriola* (which is not the aim of the paper on hand) to clarify and to define characters on which species group arrangement is exactly based. However, the antennal scape in *N. tsambagarav* sp. nov. is distinctly shorter (ratio scape length/scape width = 2.16) than in *N. kaszabi* and *N. stanislavi* of the *sajanica* species group, but is comparable to those of *N. kerzhneri* and *N. medvedevi* (2.16 and 1.91 respectively) of the *kerzhneri* species group.

The members of the *sajanica* species group are distributed in the Kazakhstan and Russian part of the Altai Mountain range, in the Sajan Mountains as far as to the Khamar Daban South of Baikal Lake. The members of the *sajanica* species group of the Kazakhstan and Russian Altai (*N. sajanica*, *N. kaszabi*, *N. stanislavi*) are characterized by the long antennal scape, which is bi- or oligosetose, and by the tarsomeres with a few dorsal setae. In contrast, the members of the *kerzhneri* species group (*N. kerzhneri*, *N. medvedevi*) are characterized by tarsomeres which are glabrous dorsally, and by the unisetose and short antennal scape. Due to its unisetose and short antennal scape, the dorsally glabrous tarsomeres, and due to the geographic position within the Mongolian Altai the new species *N. tsambagarav* sp. nov. is assigned to the *kerzhneri* species group within the subgenus *Pseudonebriola*.

Key

The determination key of the subgenus *Pseudonebriola* in Ledoux and Roux (2005) has to be modified in step 8 as follows:

8 Lateral margin of the pronotum faintly concavely sinuate in front of the posterior angles, posterior angles rectangular, not protruding outwards. 2nd antennomere unisetose. Mongolia, Russia; main ridge of the Mongolian Altai ..... *N. medvedevi* Shilenkov, 1982

– Lateral margin of the pronotum distinctly concavely sinuate in front of the posterior angles, posterior angles acute and protruding outwards. 2nd antennomere bi- or oligosetose. 8a

8a Colour brown. Lateral margin of the posterior angles short, slightly protruding outwards. 2nd antennomere generally bisetose, occasionally unisetose. Elytra elliptic with lateral margin straight. Ratio antennal scape length/eye length < 0.9. Mongolia, Gobi Altai. ..... *N. kerzhneri* Shilenkov, 1982

– Colour black. Lateral margin of the posterior angles long, distinctly protruding outwards. 2nd antennomere generally tri- or quadrisetose. Elytra suboval with lateral margin rounded. Ratio antennal scape length/eye length > 0.9. Mongolia, Mongolian Altai, Tsambaragav uul. ..... *N. tsambagarav* sp. nov.

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References

Baur H, Leuenberger C (2011) Analysis of Ratios in Multivariate Morphometry. Systematic Biology 60: 813–825. https://doi.org/10.1093/sysbio/syr061

Borodavko PS, Volkova ES, Mel`nik MA, Litvinov AS, Demberel O (2018) Climate change impact on hight-altitude geomorphological systems. IOP Conference Series: Earth and Environmental Science 211: 012004. https://doi.org/10.1088/1755-1315/211/1/012004

Dudko RY, Matalin AV (2002) New and little known species of the genus *Nebria* (Coleoptera, Carabidae) from the Altai. Entomological Review 82(8): 1077–1083.

Gebiola M, Monti MM, Johnson RC, Wolley JB, Hunter MS, Giorgini M, Pedeta PA (2017) A revision of the *Encarsia pergandiella* species complex (Hymenoptera: Aphelinidae) shows cryptic diversity in parasitoids of whitefly pests. Systematic Entomology 42: 31–59. https://doi.org/10.1111/syen.12187

Huber C (2017) Tribe Nebriini Laporte, 1834 (except genus *Leistus*). In: Löbl I, Löbl D (Eds) Catalogue of Palaearctic Coleoptera, Volume 2, second edition: Archostemata – Myxophaga – Adephaga. Brill Leiden-Boston, 31–60.

Huber C, Baur H (2016) *Nebria* (*Patrobonebria*) *incognita* n. sp. and *Nebria* (*P.*) *hiekeiana* n. sp., two new species from the Western Himalaya, with remarks on *Nebria* (*P.*) *desgodinsi* (Coleoptera, Carabidae, Nebriinae). Entomologische Blätter und Coleoptera 112(1): 203–214.

Huber C, Schmidt J (2018) Description of two new *Nebria* (*Eunebria*) species from Central Nepal with remarks on *N. xanthacra* Chaudoir, 1850 and *N. cinctella* Andrewes, 1925 (Insecta: Coleoptera: Carabidae: Nebriini). In: Hartmann M, Barclay M, Weipert (Eds) Biodiversität und Naturausstattung im Himalaya VI, Verein der Freunde und Förderer des Naturkundemuseums Erfurt e. V.: 283–296.

Huber C, Schmidt J, Baur H (2013) *Nebria* (*Patrobonebria*) *paropamisos*, a new species from the Hindu Kush (Coleoptera, Carabidae). Contributions to Natural History 22: 1–14. https://www.e-periodica.ch/digbib/view?pid=cnh-001:2013:0#24

Ledoux G, Roux P (2005) *Nebria* (Coleoptera, Nebriidae). Faune mondiale. Saint-Just-la-Pendue, Chirat, 976 pp.

Ledoux G, Roux P (2014) Une nouvelle espèce de *Pseudonebriola* de Chine (Coleoptera, Caraboidea, Nebriidae). Le Coléoptériste 17: 74–75.

R Core Team (2013) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna. http://www.R-project.org

Shilenkov VG (1982a) A new species of the genus *Nebria* Latr. (Coleoptera, Carabidae) from the Altai. Folia Entomologica Hungarica. Rovartani Közlemények (S.N.) 43(1): 151–154.

Shilenkov VG (1982b) Novye i maloizvestiye zhuzhelitsy roda *Nebria* Latr. (Coleoptera, Carabidae) iz Azii. [New and little-known ground-beetles of the genus *Nebria* Latr. (Coleoptera, Carabidae) from Asia.] Nasekomye Mongolii 8: 241–283.