

New and Little Known Species of the Genus *Nebria* (Coleoptera, Carabidae) from Altai

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Abstract—The new Altai-Sayan *Nebria* (*Boreonebria*) *sajanica* Bänninger species-group is established, comprising *N. sajanica*, *N. dabanensis* Shilenkov, *N. kerzhneri* Shilenkov, *N. medvedevi* Shilenkov, and *N. kaszabi* Shilenkov, is established. A new species, *Nebria* (*Boreonebria*) *stanislavi* sp. n. from the Kyzylatr Range (central Altai), most closely related to *N. kaszabi* Shilenkov, is described in this group. *N. medvedevi* Shilenkov from the Ukok Plateau (southwestern Altai) has been recorded from Russia for the first time. The distribution of *N. kaszabi* over the Russian and Kazakh Altai is discussed. A map of records of, and a key to Altai species of this group are given.

High mountains of many ranges in the Holarctic Region are inhabited by apterous nival species belonging to various subgenera or species-groups of the genus *Nebria* Latreille. Among these, species of the *N. mellyi* Gebler group, subgenus *Catonebria* Shilenkov, prevail in Altai. In the subgenus *Boreonebria* Jeannel, only *N. kaszabi* Shilenkov was known recently from the alpine zone of Altai. The expeditions with the participation of A.V. Matalin to the southeastern Altai in 1998 and to central Altai in 2000 revealed two more species of this subgenus, closely related *N. kaszabi*. The first one, *N. medvedevi* Shilenkov, has been known previously only from Mongolian Altai (Shilenkov, 1982). The second species, described below, is new to science. An examination of the extensive material on the nival species of the subgenus *Boreonebria*, distributed in the mountains of Middle Asia and southern Siberia, resulted in distinguishing the new *N. sajanica* Bänninger Altai-Sayan species-group.

The types and other material examined is deposited at the Zoological Institute, Russian Academy of Science, St. Petersburg (ZIN); Moscow Pedagogical State University (MPSU); the Siberian Zoological Museum of the Institute of Animal Systematics and Ecology, Siberian Division, Russian Academy of Science, Novosibirsk (SZMN); and also in the collections by D.N. Fedorenko, Moscow (DFc), V.Yu. Savitskii, Moscow (VSc), and Yu.V. Mikhailov, Yekaterinburg (YuMc).

The following measurements were used for the external morphology: width of the head (WH), pronotum (WP), and elytra (WE), measured at the widest place; width of the pronotal base at posterior angles (WB); length of the pronotum along the midline (LP); length of the elytra from the scutellar apex to the apex of the elytral declivity (LE); overall length of the body from the mandibular apex to the apex of the elytral declivity (LB); length of antennae from the base of 2nd segment to the apex of the ultimate one (LA); and length of 1st (LA1) and 3rd (LA3) antennal segments from the base to the apex, as shown in Fig. 2, 1. Preparations of the inflated endophallus were made by the method described by Dudko and Shilenkov (2001).

GENUS *NEBRIA* LATREILLE 1825

Subgenus *BOREONEBRIA* Jeannel 1937

The *Nebria* (*Boreonebria*) *sajanica*

Bänninger, 1931 Group

The group includes 6 species from Altai and Sayan mountains: *N. sajanica*, *N. kaszabi*, *N. medvedevi*, *N. dabanensis* Shilenkov, *N. kerzhneri* Shilenkov, and *Nebria stanislavi* sp. n.

Description. Body small (8.1–11.2 mm), without metallic shine. Head without red spots on vertex. Elytra oval, widest in posterior third; humeri rounded; wings strongly reduced. No discal pores present on elytra; less frequently, 1 or 2 small pores present in third interstria. Abdominal sternites III–V with 1 or 2 (usually 2) pairs of setae before posterior margin; base of hind coxa with 1 seta. Fifth segment of all tarsi, in

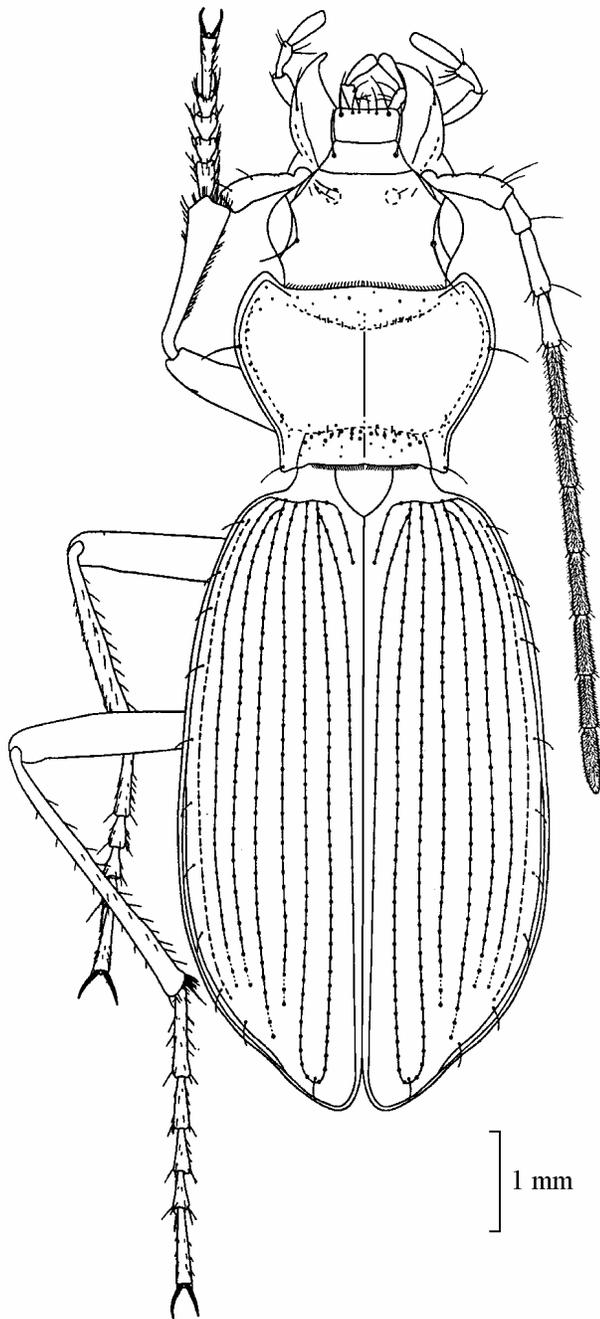


Fig. 1. *Nebria stanislavi* sp. n. (holotype).

addition to usual 1 pair of subapical setae, with 2 or 3 pairs of additional fine setae on upper side. Aedeagus narrow; strongly, but uniformly bent.

The species listed, assigned previously to the Middle-Asian *N. schrenki* Gebler group (Shilenkov, 1982) or subgenus *Pseudonebriola* Ledoux et Roux, 1989, differ from these in the more slender aedeagus, less strongly widened male fore tarsus, and presence of additional setae on the upper side of 5th tarsal segment. Species of the *N. sajanica* group are distrib-

uted within the Altai–Sayan highland, whereas the *N. schrenki* group occurs in the mountains of Middle Asia, reaching the Saur Range in the northeast.

Nebria (Boreonebria) stanislavi Dudko et Matalin
sp. n.

Material. Holotype: ♂, “Central Altai, E slope of Kyzylart Range, Achin River sources, at snow margin on the lake shore, $h = 2100\text{--}2300$ m, 16–18.VII.2000, A.V. Matalin and S.S. Demidov” (ZIN). Paratypes: 27 ♂ and 21 ♀, as holotype (ZIN, MPSU, SZMN).

Description. Habitus as in Fig. 1. Body black, shining; tarsi and palps reddish brown; antennae (except 1st segment), tibiae, and median part of thorax usually dark brown or brownish. LB 8.4–10.4 (9.05) mm in male, 9.6–11.2 (10.12) mm in female.

Microsculpture of dorsal side isodiametrical: distinct on elytra and sides of pronotum, fine on pronotal disc, and obsolete on head.

Head of medium size, eyes convex, $WP/WH = 1.19\text{--}1.32$ (1.27). Frontal foveae superficial. Antennae long and slender, reaching middle of elytra in male and nearly so, in female: $LB/LA = 1.62\text{--}1.92$ (1.78) in male, $1.76\text{--}2.06$ (1.94) in female; $LA/WH = 2.51\text{--}2.97$ (2.76). Scape rather long, weakly S-curved, narrow in basal third, gradually widened to apex, usually with 2 setae before apex and 1 seta in the middle of antero-dorsal surface (Fig. 2, 1–5); $WH/LA1 = 2.70\text{--}3.07$ (2.83), $LA/LA1 = 7.28\text{--}8.10$ (7.80), $LA3/LA1 = 0.84\text{--}0.91$ (0.87) (Fig. 3). Pedicel longer than wide, with 1 short seta on underside and 1, less frequently 2 or 3, on dorsal and lateral surfaces. Penultimate segment of labial palp with 3 setae. Mentum with 3 pairs of setae: at base of lateral lobes, on median tooth, and in basal half of middle part (from base to the middle of mentum). Median tooth bifurcate, reaching 1/3 of lateral lobes. Submentum with transverse row of 11–14 setae.

Pronotum cordate, wider than long, widest in anterior third; $WP/LP = 1.43\text{--}1.49$ (1.46); $WP/WB = 1.44\text{--}1.54$ (1.50) (Fig. 3). Sides rather widely flattened and reflexed, noticeably emarginate before acute posterior angles; anterior angles rounded, distinctly projecting forwards. Basal and apical transverse depressions well defined, median line deepened, basal pits deep. Disc smooth; lateral margins and apical depression sparsely, and basal depression, densely and coarsely punctate. One pair of setiferous pores situated in anterior third of pronotum at the distance from lateral margin, equal to pore width; second pair, in posterior corners of pronotum.

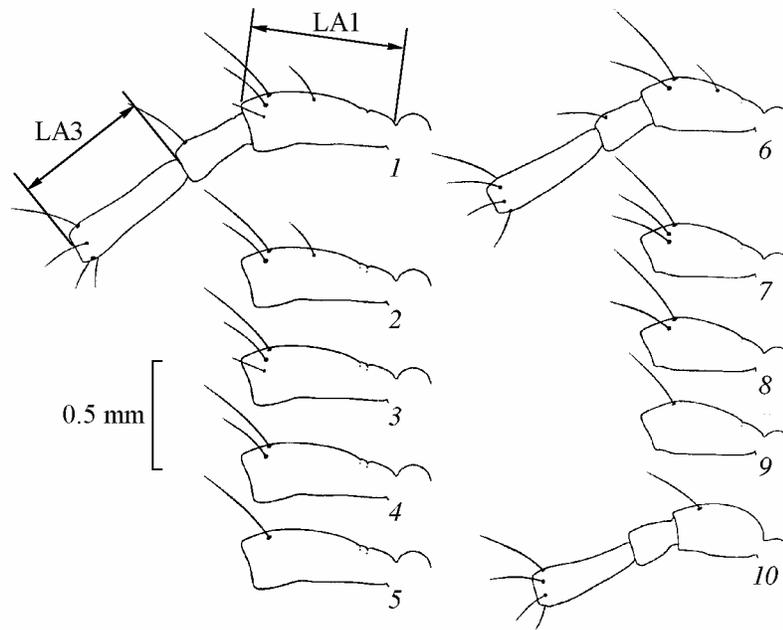


Fig. 2. *Nebria* spp., antennal base: (1–5) *N. stanislavi* sp. n., (6–9) *N. kaszabi*; (10) *N. medvedevi*; (1) holotype, (2–5) paratypes.

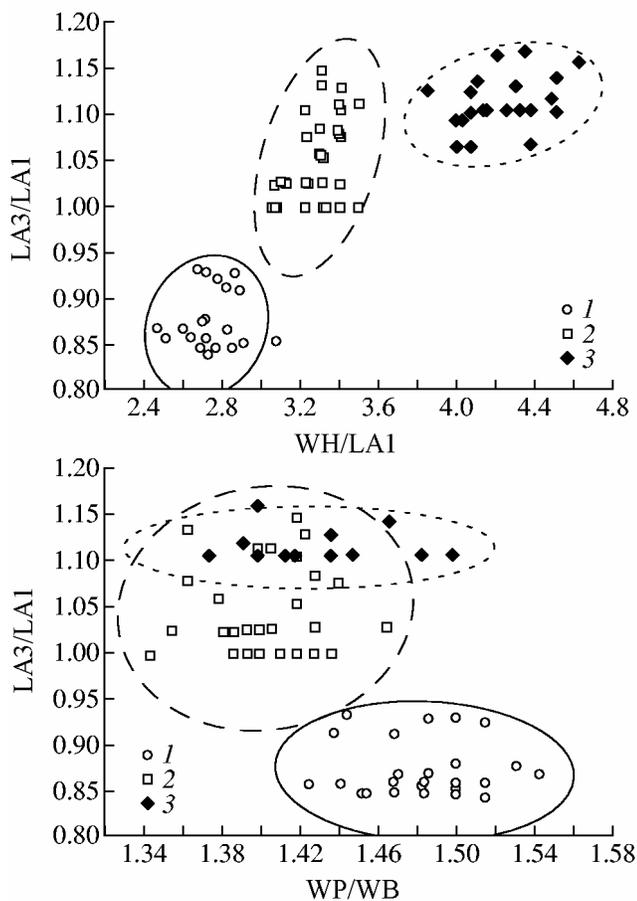


Fig. 3. Diagram of differences in the morphometric characters between the Altai species of *N. sajanica* group: (1) *N. stanislavi* sp. n., (2) *N. kaszabi* Shilenkov, (3) *N. medvedevi* Shilenkov.

Elytra suboval, flattened, slightly widened backwards, widest in apical third; LE/WE = 1.46–1.57 (1.53), WE/WP = 1.42–1.53 (1.49). Humeri rounded. Basal margination slightly bent or nearly straight; arcuately, or at a very obtuse angle passing into lateral margin. Elytral striae deep, rather coarsely punctate; interstriae nearly flat. Prescutellar and discal pores missing, 1 or 2 fine pores rarely present before apex in 3rd interstria. Apex with 1 pore, margin with 7–10 pores along entire 9th interstria, without clear subdivision into humeral and preapical groups. Subapical fold inconspicuous, elytral apices rounded. Wings reduced.

Prosternum finely sparsely punctate, occasionally smooth medially. Margination of median process entire; less frequently, obliterate at apex; sides of process converging at acute angle; apex narrowly rounded. Central area of meso- and metasterna smooth; sides with sparse, rather coarse punctation. Length of metepisterna along inner margin 1.52–1.63 (1.57) times their anterior width. Abdomen smooth; lateral margins of sternite I sparsely coarsely punctate; those of sternites II–VI with shallow depressions. Sternites III–V with 3–5 (usually, 4) subapical setae. Sternite VI with 1 pair of apical setae in male and 2 pairs, in female.

Legs narrow and long. Penultimate segment of middle and hind tarsi with short external process on underside. Three basal segments of male fore tarsus widened (3rd segment nearly as long as wide), with adhe-

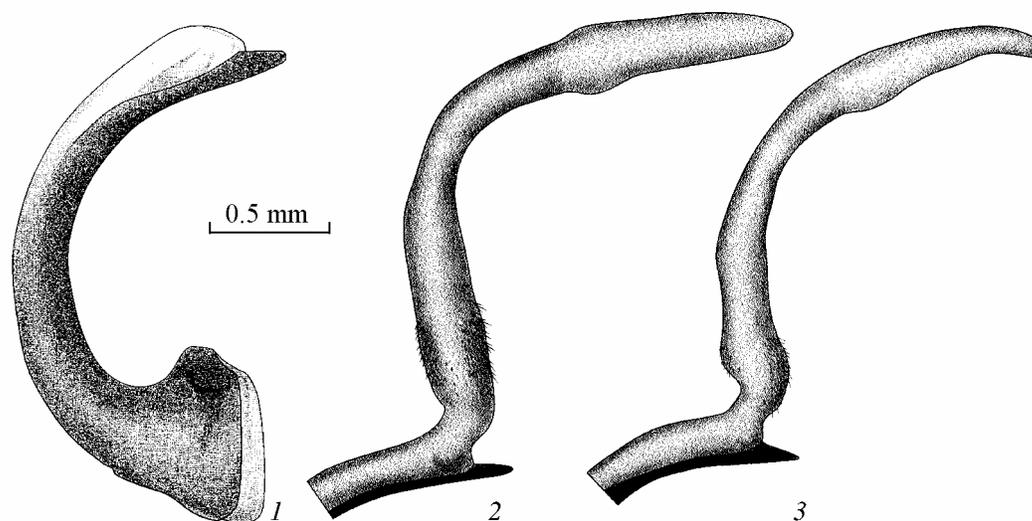


Fig. 4. *Nebria* spp., male genitalia: (1) *N. stanislavi* sp. n. (paratype), aedeagus, view from the left; (2–3) endophallus, view from the left [(2) *N. stanislavi* sp. n., paratype; (3) *N. kaszabi*, vicinities of Urunkhaika Village].

sive sole surface. Fifth segment of all tarsi, in addition to usual 1 pair of subapical setae, with 4–7 additional fine setae on upper side. Base of hind coxa with 1 seta.

Aedeagus narrow; strongly, but uniformly bent; lamella with straightly converging sides and rounded apex (Fig. 4, 1). Endophallus very narrow and long, subcylindrical, with 2 constrictions at base and in the middle; slightly or strongly swollen near middle constriction, with inconspicuous tubercle at base of basal constriction. Basal part without additional tubercles or swellings, with two groups of fine yellowish spines visible even in the not inflated endophallus. Apical half noticeably swollen immediately behind middle constriction (Fig. 4, 2).

Genitalia have been examined in 28 males, in 10 specimens endophallus was inflated.

Distribution. Known only from the type locality in the Kyzylart Range (Fig. 5).

Ecology. The species inhabits stony screes along shores of circle lakes, preferring a weakly eroded soil occasionally covered with sparse moss, at the border of thawing snow, never occurring at the shoreline.

Comparative notes. *Nebria stanislavi* sp. n. clearly differs from all the known species of the *N. sajanica* group in the very long antennal scape narrowed in the basal third: $WH/LA1 = 2.70–3.07$ (2.83); $LA3/LA1 = 0.84–0.91$ (0.87) (fig. 2, 1–5 and 3, 1). The species most closely related to the new one, *Nebria kaszabi*, differs in the presence of two additional tubercles on

the dorsal and ventral sides at the endophallus base (Fig. 4, 3), shorter scape [$LA3/LA1 = 1.00–1.15$ (1.06) (Figs. 2, 6–9 and 3, 1)], pronotum less strongly narrowed at the base [$WP/WB = 1.34–1.46$ (1.40) (Fig. 3, 2)], and margination of the prosternal process developed only in the basal half. *N. medvedevi*, occurring in Altai, clearly differs from *N. stanislavi* in the very short scape widened from the base [$WH/LA1 = 4.00–4.38$ (4.16), $LA3/LA1 = 1.07–1.17$ (1.11) (Figs. 2, 10 and 3, 1)], more convex body, and not emarginate sides and base of the pronotum. *N. stanislavi* sp. n. differs from the other species of the genus in the distinctly punctate elytral striae, depressions on the pronotum, and body underside, and also in the chaetotaxy of head appendages and shape of the endophallus.

Etymology. The species is named for S.S. Demidov, who took part in the expedition together with A.V. Matalin and collected a part of the type series.

Nebria medvedevi Shilenkov, 1982

Material. Holotype and 28 paratypes, “People’s Mongolian Republic, Kobdoskii Aimak, Mongolian Altai, Ulan-Daba Pass, 07.VII.1980, G. Medvedev” (ZIN). 61 specimens, “Russia. SE Altai, Ukok Plateau, Teplyi Klyuch Pass, 2640 m, among rocks near snow, 07.VI.1998, A. Matalin, D. Fedorenko” (ZIN, MPSU, SZMN, DFC).

The species has been known previously only from the type series collected in Mongolian Altai (Shilenkov, 1982) and is recorded here from Russia

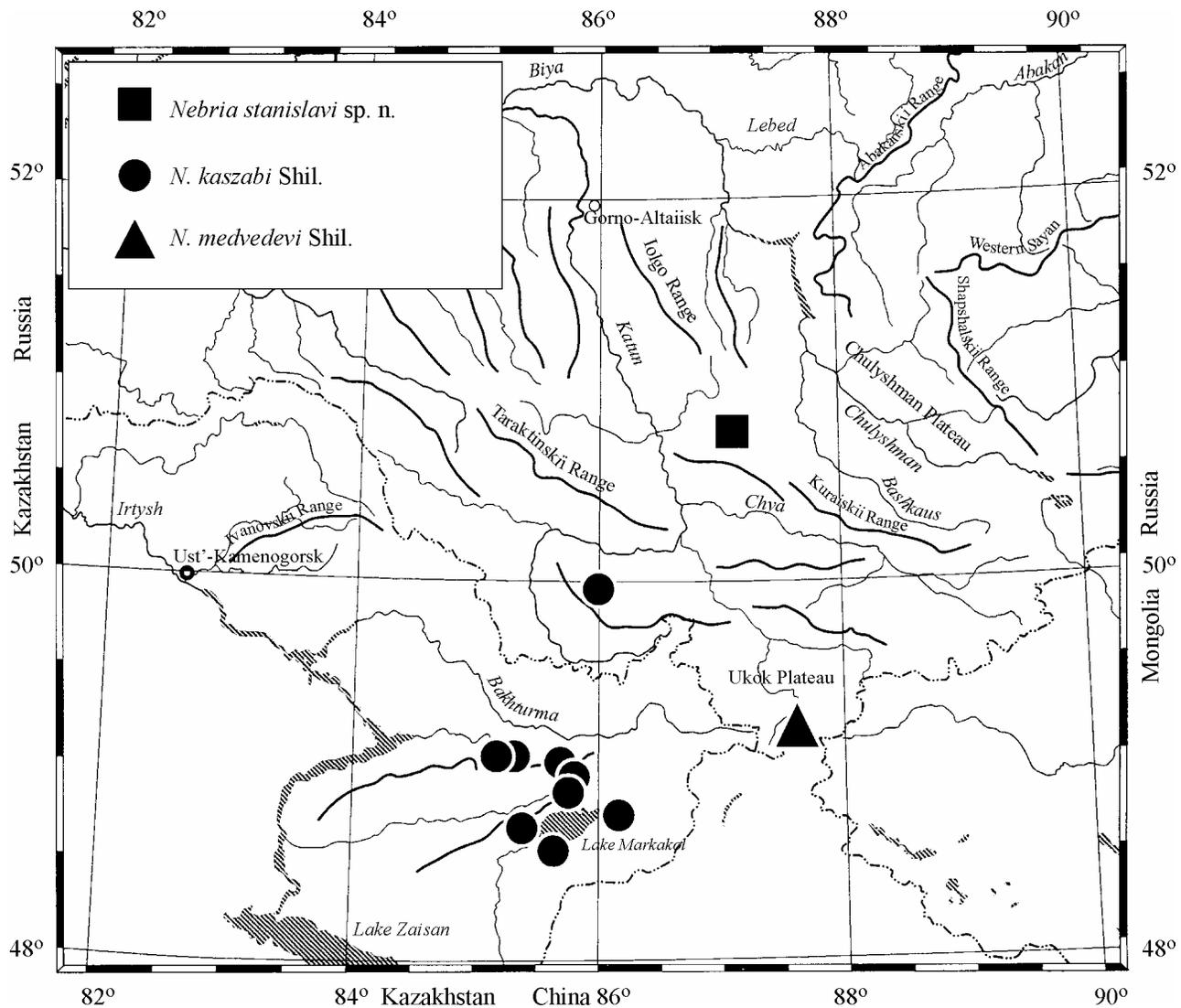


Fig. 5. Distribution of the *Nebria sajanica* group over Altai.

for the first time (Fig. 5). The beetles were collected under rocks among spots of thawing snow on the strongly eroded loamy soil along temporary brooks. Five 3rd-instar larvae were also collected there. This cryophilous adnival species hibernates the as adults and last-instar larvae.

Nebria kaszabi Shilenkov, 1982

Material. 162 spms., "Altai, N macroslope of Katunskii Range, 12–15 km S of Multa, 2700–2800 m, 23–24.VI.1999, A. and R. Dudko;" 1 spm., "SW Altai, E Narymskii Range, upper course of Ozernaya River, 2300–2700 m, 19.VII.1997, R. Dudko, V. Zinchenko;" 12 spms., "SW Altai, W Sarymsakty Range, 10 km SSW of Medvedka, upper course of Siralka River, 2000–2300 m, 06–13.VII.1998, D. Lomakin, A. and N.

Menshchikov;" 62 spms., "SW Altai, upper course of Sarymsakty River, tundra, 2500–2800 m, 02.VII.1997, R. Dudko, V. Zinchenko;" 18 spms., same locality, rocky scree ["kurkumy," in Russian text], 18.VI.2001, Yu. Mikhailov; 85 spms., same locality, 30.VI–06.VII.2001, V. Savitskii; 1 spm., "SW Altai, Kurchumskii Range, 7 km W of Lake Markakol, alpine zone, 2300–2400 m, 14.VII.1997, R. Dudko, V. Zinchenko;" 15 spms., "SW Altai, N slope of Kurchumskii Range, 10 km W of Aksubas, 2400 m, 03–04.VII.1997, R. Dudko, V. Zinchenko;" 9 spms., "SW Altai, pass at upper course of Topolevka River, 2550 m, 04.VII.1997, R. Dudko, V. Zinchenko;" 2 spms., "SW Altai, Azu Tau Range, 20 km NE of Alekseevka Vill., 2100 m, 27.VI.1986, I. Kabak;" 102 spms., "SW Altai, Azu Tau Range, 10 km SE of

Population variability of the chaetotaxy of the basal antennal segments in *Nebria kaszabi* and *N. stanislavi* sp. n.

Species		Number of chaetae (on the left and right antennae)											Average number of chaetae on scape and pedicel	
		scape							pedicel					
		1-1	1-2 2-1	2-2	2-3 3-2	3-3	2-4 4-2	0-0	0-1 1-0	1-1	1-2 2-1	2-2		2-3 3-2
<i>Nebria kaszabi</i>	Katunskii Range	30	18	18	1	0	0	52	9	6	0	0	0	1.6
	Sarymsakty Range	6	8	37	4	2	0	16	14	27	0	0	0	2.5
	Vicinity of Urunkhaika Vill.	1	2	56	17	4	0	0	6	72	2	0	0	3.1
<i>N. stanislavi</i> sp. n.		0	1	19	17	9	2	0	0	31	10	5	1	3.6

Matobai, 2200–2300 m, 10.VII.1997, R. Dudko, V. Zinchenko;” 170 spms., “SW Altai, near Lake Markakol, 10 km ESE of Urunkhaika Vill., 2200–2400 m, 19–20.VI.1997, R. Dudko, V. Zinchenko” (ZIN, SZMN, MPSU, VSc, YuMc).

The genitalia have been examined in 42 males, in 19 specimens endophallus was inflated.

The species was described from a single specimen labeled “Altai” and “coll. Reitter” (Shilenkov, 1982). This cryophilous adnival species occurs in the southwestern Altai (Fig. 5), preferring there boulder screes (kurumy) on strongly or moderately eroded soils near snow patches. It is also common on rocks nearly free of soil. The population from Katunskii Range is more distinctly cryophilous and petrophilous. *N. kaszabi* is sympatric there to another adnival species, *Nebria (Catonebria) baenningeri katunensis* Dudko et Shilenkov, substituting it at the altitudes exceeding 2700 m.

The distinctive, but variable chaetotaxy of the scape and pedicel in *N. stanislavi* sp. n. and *N. kaszabi* should be noted. This character is usually used as a rather constant one for the specific and, occasionally, supraspecific diagnostics in various groups of the genus *Nebria*. In *N. kaszabi*, scape bears 1, 2, or even 3 chaetae. In the first two cases, the chaetae are always situated before the apex on the anterodorsal surface. In the third case, one chaeta is usually shifted to the middle of the segment. The anterodorsal surface of the pedicel bears 1 chaeta, if at all (Fig. 2, 6–9). *N. stanislavi* sp. n. is characterized by a better-developed chaetotaxy of the basal antennal segments. In most of the specimens, the scape has 3 setae (at least, at one side). The pedicel always bears 1, occasionally 2 chaetae (Fig. 2, 1–5). Note that both the species frequently exhibit a different number of chaetae on segments of the left and right antennae.

The variability of the chaetotaxy of the basal antennal segments between populations of *N. kaszabi* is geographically conditioned (see table). The lowest number of chaetae was observed in the population from Katunskii Range. Most of its individuals have 1 or, less frequently, 2 chaetae on the scape (a single specimen has 3 chaetae on one side of the scape) and no chaetae on the pedicel. Specimens of the population from the Sarymsakty Range usually possess 2 chaetae on the scape and 1, but frequently none, on the pedicel. The population from the vicinity of Urunkhaika Village shows the most developed chaetotaxy. These specimens usually bear 2, rather frequently, even 3 chaetae on the scape and, nearly always, 1 seta on the pedicel.

To illustrate the variability of the chaetotaxy, the average number of chaetae on the basal segments in the specimens examined was calculated (see table). This number is 1.6 in the *N. kaszabi* population from Katunskii Range, 2.5 in that from Sarymsakty Range, 3.1 in that from the vicinity of Urunkhaika Village, and 3.6 in the series of *N. stanislavi*. Thus, in addition to the significant individual variability, *N. kaszabi* also exhibits a distinct geographical variability, with the number of chaetae increasing in the direction from the north to the south. Differences in the chaetotaxy of the basal antennal segments in *N. kaszabi* and *N. stanislavi* are the most distinct in the geographically close forms, which allows this character to be used in the species diagnostics.

A Key to Species of the *N. sajanica* Group from Altai

- 1 (2) Scape short (WH/LA1 = 4.0–4.4), widened from base (Fig. 2, 10). Sides of pronotum shallowly emarginate before posterior angles
 *N. medvedevi* Shilenkov.

- 2 (1) Scape long ($WH/LA1 = 2.7-3.5$), more or less narrowed in basal third, gradually widened to apex (Fig. 2, 1-9). Sides of pronotum distinctly emarginate before posterior angles 3.
- 3 (4) Scape as long as, or shorter than 3rd antennal segment: $LA3/LA1 = 1.00-1.15$; usually with 1 or 2 setae before apex; pedicel with or without 1 seta on upper side (Fig. 2, 6-9). Pronotum less strongly narrowed to base: $WP/WB = 1.34-1.46$. Endophallus with dorsal and ventral tubercles in basal part (Fig. 4, 3) *N. kaszabi* Shilenkov.
- 4 (3) Scape longer than 3rd antennal segment: $LA3/LA1 = 0.84-0.91$, usually with 2 or 3 setae before apex; pedicel with 1 or 2 setae on upper side (Fig. 2, 1-5). Pronotum more strongly narrowed to base: $WP/WB = 1.44-1.54$. Endophallus without additional tubercles in basal part (Fig. 4, 2) *N. stanislavi* sp. n.

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