

NEW SPECIES OF THE GENUS *NEORIBATES* (BERLESE, 1914) (ACARIFORMES: ORIBATIDA) FROM RUSSIA AND ADJACENT COUNTRIES

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ABSTRACT: The studies on oribatid mites deposited at the Zoological Institute, Russian Academy of Sciences, St. Petersburg, Department of Entomology of the Moscow Lomonosov State University, Moscow, and the Siberian Zoological Museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, from territory of the former Soviet Union, have revealed four new species of the genus *Neoribates*: *N. krivolutskyi* sp.n., *N. borealis* sp.n., *N. bulanovae* sp.n. and *N. sibiricus* sp.n.

KEY WORDS: Oribatida, *Neoribates*, new species, collection, oribatid mites

INTRODUCTION

The oribatid mite family *Parakalummidae* Grandjean, 1936 includes a small number of species. Only two genus, *Neoribates* (Berlese, 1914) and *Parakalumma* Jacot, 1912, were known to be found in the North Palaearctic region. The analysis of the material that is presently available let us correct the published data on the distribution of *Neoribates* in Russia (Oribatid mites... 1995). Six species are known now from various regions of Russia and adjacent countries. The distribution of *Neoribates gracilis* Trave, 1972 is similar to that of *Neoribates aurantiacus* (Oudemans, 1914) and *Neoribates borealis* sp.n., which is described in the present paper. *Neoribates sibiricus* sp.n. is common in Siberia. *Neoribates krivolutskyi* sp.n. and *Neoribates bulanovae* sp.n. are found in regions with a mild Mediterranean climate.

Family Parakalummidae Grandjean, 1936 Genus *Neoribates* Berlese, 1914 *Neoribates krivolutskyi* Grishina sp. n.

Figs. 1–5

Color. Light brown.

Measurements (µm). Holotype (female): 830 × 570. Paratypes: 5 females — 830–880 × 570–650; 6 males — 740–830–550–610. Rostral setae 98–115, lamellar 130–142, interlamellar 192–221, sensillae 140–156.

Prodorsum. Rostrum is oval, curved onto venter. Interlamellar (*in*), lamellar (*le*) and rostral (*ro*) setae differ in length, which decreases respectively. Their type and the structure of indumentum (hair covering) is the same. Interlamellar setae in intact specimen rise up the prodorsal plate creating an effect they are longer than the prodorsum itself. Lamellar setae in this case project over the anterior of prodorsum more than a half. If prodorsum is straighten when fixed on permanent micro-

scope slide the interlamellar setae do not extend to the margins of rostrum, while lamellar ones almost reach it, and the rostral ones extend a bit over it. Lamellar lines are directed from bothridia to the anterior part of prodorsum. They are a bit inclined to each other and more than a half of prodorsum in length. The distance between the bases of lamellar setae exceeds the distance between the interlamellar ones. Sensillae (*ss*) arise from bothridia, slightly enlarged and finally make up a club, which is covered by small tiny spines. In the mounted slides the club may appear thin and pointed because of the spines. Exobothridial setae (*ex*) are relatively long and positioned away the bothridium on the distance that is larger than their length. On lateral sides of the prodorsal shield nearby lamellae there is a sublamella or sclerotized pouch, with the porous field inside. Trave (1972) has guessed that these structures were sublamellar sacculae with an opening in the deep pouch in the thick cuticle.

Notogaster. Dorsal shield is oval. Sejugal furrow is bow-like, conspicuous. It includes four pairs of small saccules. They are dark and visible on the back of light notogaster. Saccules *Sa* have a form of follicle being elongated medially and downwards. Ten pairs of notogastral setae present but only their alveoli are conspicuous. Several specimens had anomalies recorded. For example, a specimen with remained setae *lp* was found, and one specimen was having saccules *S₂* and *S₃* fused at both sides. The lower angle of pteromorphs formed by the external and internal margins is about 60°.

Ventral plate. Epimeral formulae: 3–1–3–3. Genital plates have 5 pairs of setae. One pair of aggenital setae is postgenital. Anal plates have 2 pairs of setae. Three pairs of adanal setae present.

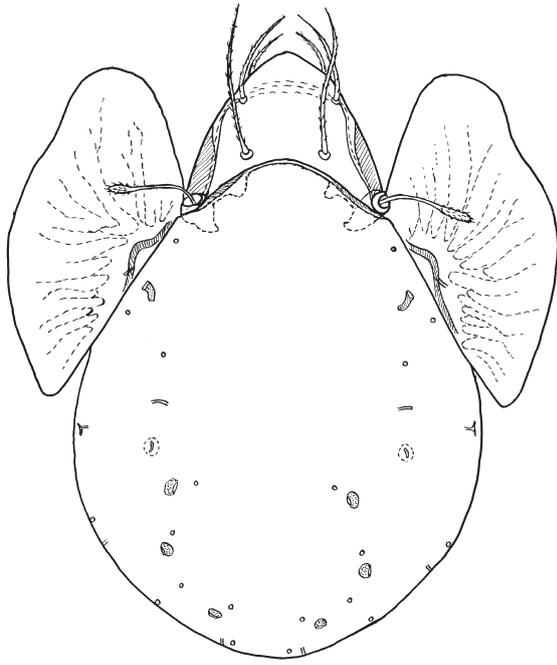


Fig. 1. *Neoribates krivolutskyi* sp.n., dorsal view.

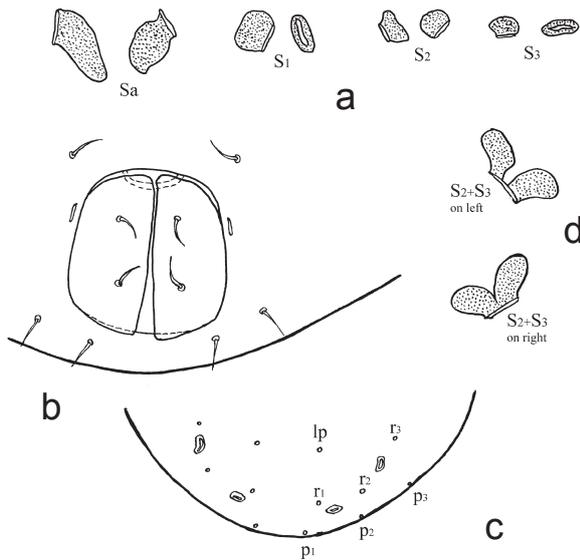


Fig. 3. *Neoribates krivolutskyi* sp.n.: a — notogastral sacculles, b — posterior of ventral plate, c, d — anomalies of sacculles.

The third pair (ad_3) is positioned posteriad to anal opening. All the ventral setae are thin and small.

Legs. Legs I and II are of the same shape and size. Genu I is a bit longer than genu II. Leg III is of the same shape as legs I and II. Trochanter and femur of leg III are similar to those of leg IV. Leg IV is distinguished by its distal part that is longer than in other legs. There is a solenidium present on a well-developed apophysis of tibia I and II and on a small tubercle of tibia III. All tarsi heterotridactylous. The central claw is stronger than the lateral ones. Setal formulae of legs:

I: 1-5-3(1)-4(2)-20(2)-3;

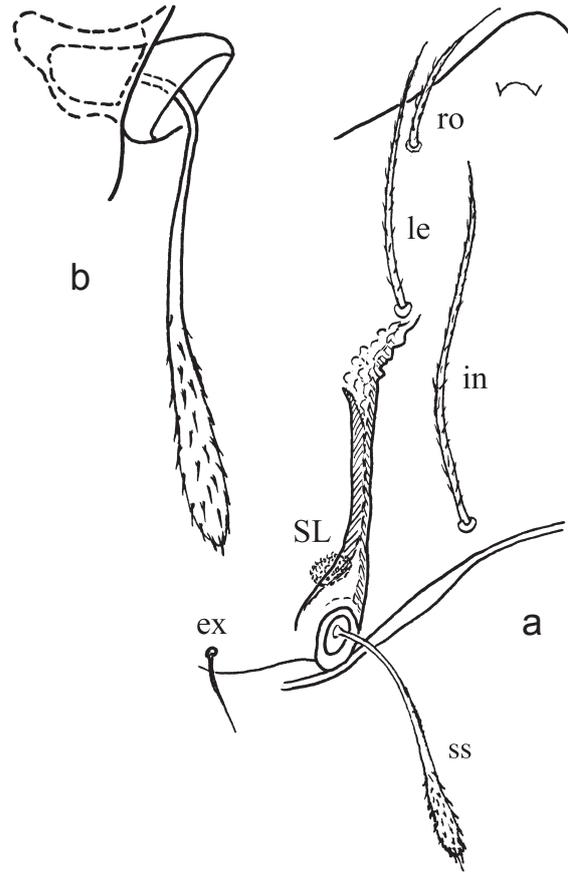


Fig. 2. *Neoribates krivolutskyi* sp.n.: a — a half of prodorsum, b — sensilla.

II: 1-5-3(1)-4(1)-15(2)-3;

III: 2-3-1(1)-3(1)-15(0)-3;

IV: 1-2-2(0)-4(0)-12(0)-3.

Material examined. Ukraine: Crimea, Alush-ta, Chyr-Alan reserve, beech-oak wood, soil litter, July 1955, coll. E.M. Bulanova-Zakhvatkina; Russia: Sochi, soil under cypress trees, 7.04.1960, coll. N.G. Bregetova; Azerbaijan: Lenkoransky reserve, forest with poplar, chestnut-leaved oak and argan tree with lianas; the soil is water-logged yellow podzolic, 1966, coll. D.A. Krivolutsky; Abkhazia: Sulevo, hornbeam rotten log, 18.07.1971, coll. L.G. Grishina.

Type specimens. Holotype from Azerbaijan, reserve Lenkoransky, 1966, coll. D.A. Krivolutsky. Holotype is deposited in the collections of the Zoological Institute, Russian Academy of Sciences, St. Petersburg. Paratypes: 4 specimens from the same place; 2 specimens from Crimea, reserve Chyr-Alan, 1955, coll. E.M. Bulanova-Zakhvatkina; 7 specimens from Sochi, under cypress, 1960, coll. N.G. Bregetova; 2 specimens from Abkhazia, rotten log, 1971, coll. L.G. Grishina. Paratypes are deposited in the collections Siberian zoological museum of the Institute of Systematics and Ecol-

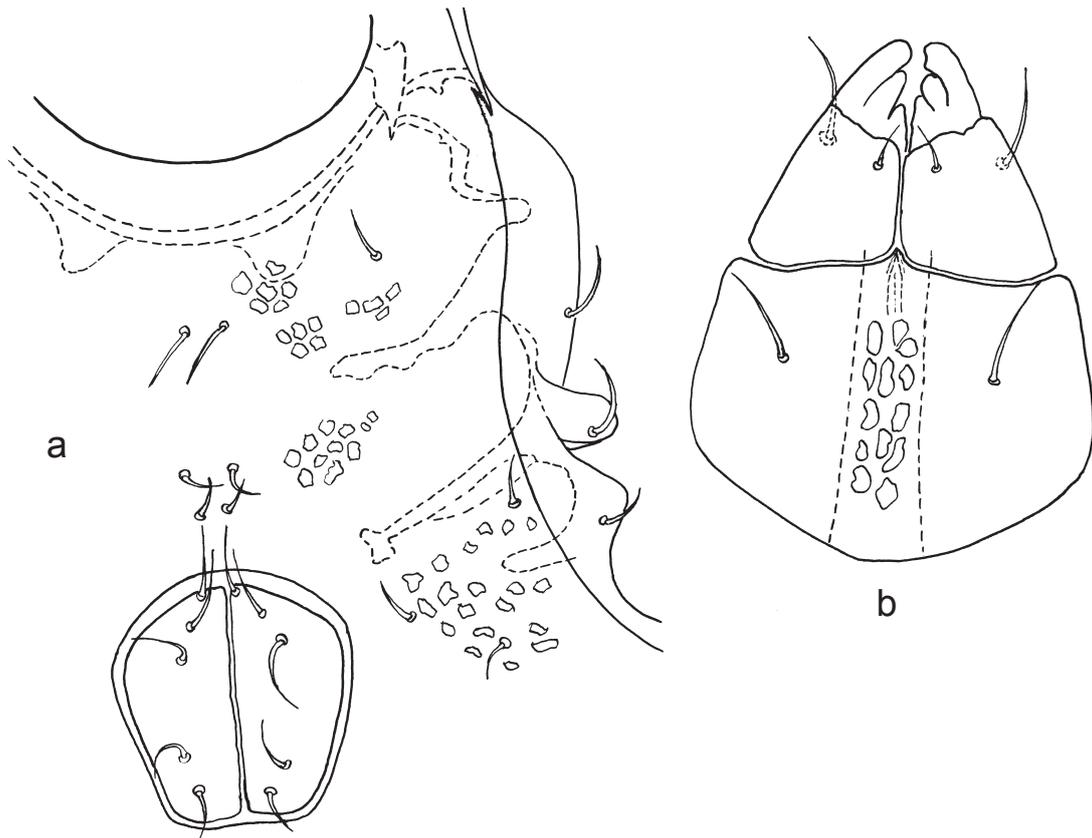


Fig. 4. *Neoribates krivolutskyi* sp.n.: a — anterior of ventral plate, b — hypostome.

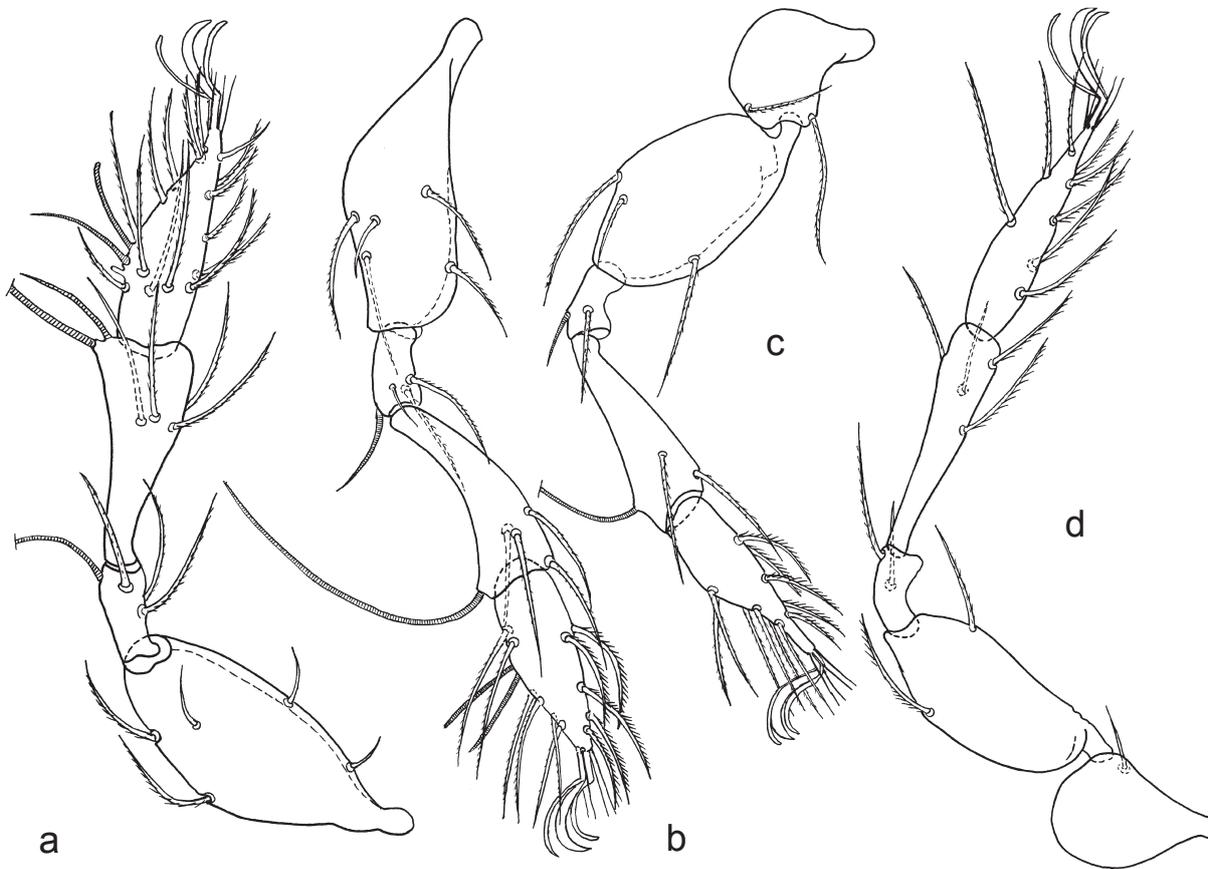


Fig. 5. *Neoribates krivolutskyi* sp.n.: a — leg I, b — leg II, c — leg III, d — leg IV.

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Etymology. The species is named after the late Professor Dmitry Krivolutsky, Corresponding Member of the Russian Academy of Sciences, a distinguished acarologist.

Differential diagnosis. *Neoribates krivolutskyi* sp.n. is larger in size than other known species. It is most similar to *N. aurantiacus* by having. Both species have the saccules of the same shape and color, the same location of *le* concerning *in*, and also similar structure of indumentum of the prodorsal setae. The species referred to as *N. aurantiacus* by Aoki (Aoki 1966) notably differs from the *N. aurantiacus* specimens, known from Russia. For example, specimens from Japan have sensilli with lanceolate heads, and their genital plates have four pairs of setae. All the specimens in our collection possess club-shaped sensilli, which are rounded, and have 5 pairs of genital setae. As we stated the distinctive characteristic that differentiates *N. aurantiacus* from previously known species is the peculiar arrangement of epimeral setae *1a*. They are located closer to *2a* and along with *3a* form a sort of row. All these setae are long and conspicuous.

***Neoribates borealis* Vladimirova sp. n.**

Figs. 6–9

This new species is represented in all landscape zones of Russia and adjacent countries. It inhabits the forest soil litter, anthills, nests of birds and rodents. We studied material from the collections of the Zoological Institute, Russian Academy of Sciences, St. Petersburg, the Department of Entomology of the Moscow Lomonosov State University, Moscow, the Siberian zoological museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk. Up to the present time this species was not correctly identified and was represented in publications as *Neoribates* cf. *roubali* (Berlese, 1910) (Grishina and Sergiyenko 1978; Byzova et al. 1986; Grishina and Machmudova 1989; Grishina et al. 1998).

Color. Light brown.

Measurements (µm). Holotype (male): 480 × 300. According to measuring of 20 males and 17 females from the pine forest in the vicinities of Novosibirsk males: 428–490 × 286–364, females: 461–532 × 325–390.

Prodorsum. Rostrum is slightly elongated and curved downwards, thus appearing to be

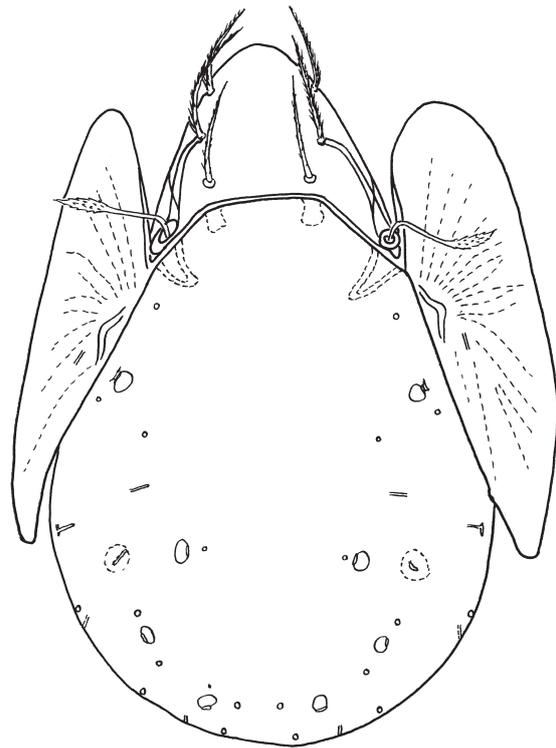


Fig. 6. *Neoribates borealis* sp.n., dorsal view.

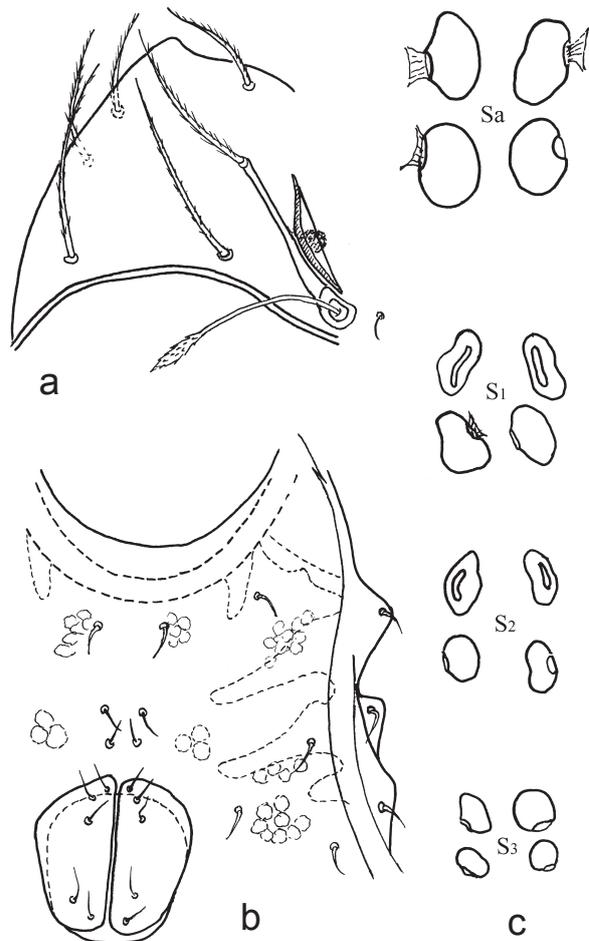


Fig. 7. *Neoribates borealis* sp.n.: a — prodorsum, b — anterior of ventral plate, c — saccules.

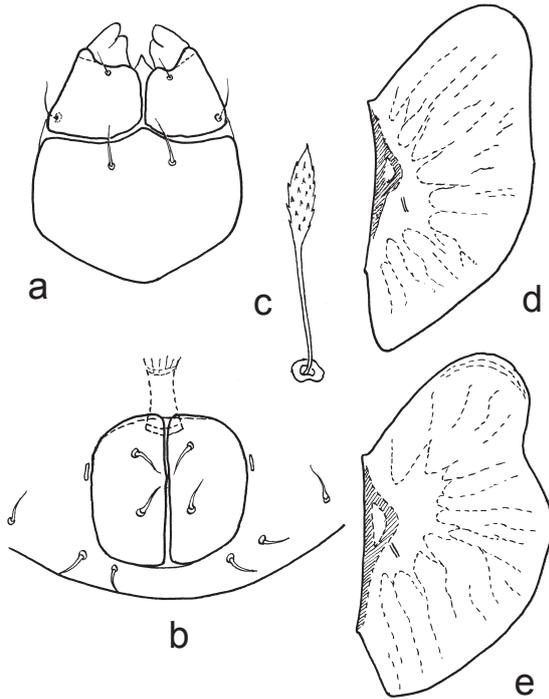


Fig. 8. *Neoribates borealis* sp.n.: a — hypostome, b — posterior of ventral plate, c — sensilla, d — pteromorph. *Neoribates gracilis* Trave, 1972: e — pteromorph.



Fig. 9. *Neoribates borealis* sp.n.: a — leg I, b — leg II, c — leg III, d — leg IV.

smoothly rounded if viewed dorsally. The bases of rostral setae (*ro*) are located on the ventral side of prodorsum. The lengths of interlamellar (*in*) and lamellar setae (*le*) are approximately equal. Interlamellar setae extend to the bases of rostral setae but not to the edge of the rostrum. Rostral and lamellar setae are densely barbed, whilst the interlamellar ones are not significantly barbed. The distance between lamellar setae is distinctly larger than the distance between interlamellar ones. Sensillae (*ss*) are equal in length to interlamellar and lamellar setae. They are enlarged distally, forming a club, pointed at the end and covered by tiny spines. Exobothridial setae (*ex*) are short and positioned close to bothridia. Lamellae are straight lines on the lateral sides of prodorsum. The bases of lamellae enfold bothridium. Sublamella is positioned laterally, forming a pouch that contains rounded area porosa.

Notogaster. Sejugal line is distinct, wide and oval, more or less trapezoid in shape. At the place of pteromorphs attachment to notogaster there is a thick sclerotized fold from which indistinct lines radiate. Their ornament has no diagnostic value.

There is a small slit-like opening (*ia*) near this thickening. The lower angle of pteromorphs, which is formed by their inner and external edges, is about 60°. There are 10 pairs of notogaster setae present. They are minute and visible only by strong magnification; usually only their alveoli are conspicuous. Four pairs of saccules present, in form of transparent rounded follicles. Saccules *Sa* are larger than the others. The openings of the *Sa* directed towards pteromorphs, while *S*₁ directed centrad and *S*₂ to the lateral edges of the body, *S*₃ directed downwards.

Ventral plate. Apodemas are of regular shape. Epimeral formulae: 3-1-3-3. Five pairs of genital setae, and 1 pair of aggenital setae present. Anal plates bearing 2 pairs of setae. Three pairs of adanal setae present. The lengths of *ad*₁ and *ad*₂ are shorter than the distance between them. Seta *ad*₃ is located on the same line (that is parallel to the rounded line of the ventral plate) with the first pair of adanal setae, but is positioned from them at a large distance.

Legs. All tarsi heterotridactylous. The central claw is stronger than the lateral ones. Setal formu-

lae of legs: I: 1–5–3(1)–4(2)–19(2)–3; II: 1–5–3(1)–4(1)–15(2)–3; III: 2–3–1(1)–3(1)–15–3; IV: 1–2–2–4–12–3.

Material examined. Russia: the Murmansk Region, Kandalakshsky reserve, Brevnushka luda (tinning alloy), gull nest, July 1983, coll. Yu.B. Byzova; the Leningrad Region, Old Peterhof, mixed forest, soil litter, 30.07.1967, coll. L.G. Sitnikova; the Kaliningrad Region, Rybachiy settlement, forest, moss, soil litter, 7.10.1966, coll. E. Koroleva; the Gorkyi Region, Borsky District, fir, green moss, 2.09.1964, coll. M.P. Chistyakov; the Voronezh Region, pine forest, soil litter, 28.08.1962, coll. V.N. Tanasiychuk; the Novosibirsk Region, city of Novosibirsk vicinities, whortleberry pine forest, soil litter, 14.08.1996, coll. O.I. Knor; the Novosibirsk Region, Karachy village, birch forest stand, soil litter, 17.08.1984, coll. V.S. Andrievsky; Tomsk, grove on the territory of the university, under the Siberian pine, 3.05.1990, coll. L.G. Grishina; the Tomsk Region, Karagorsk village, river-side inundated forest, under the bird cherry, 12.09.1986, coll. S.A. Yenshina; the Tyumen Region, Reshetnikovo, birch forest, soil litter, 12.08.1963, coll. K. Breev; the Altay Mountains, Kebezen' villadge, lowland bog bushy, flood-plain osier-bed, birch-aspen forest, August 2006, coll. N.V. Vladimirova; the Krasnoyarsk Territory, Nazarovo village, park-like birch grove, 20.06.1985, coll. V.S. Andrievsky; Tuva, Danilovka, mixed forest, under the aspen, 8.06.1976, coll. L.G. Grishina; Yakutiya, Tazvalka, moss in the permafrost zone, 5.08.1963, coll. D.N. Shteinberg; the Amur Region, pine forest, 1975, coll. V.Ya. Kramnoy; the Primor'e Territory, Sikhote-Alinskiy reserve, under the bird cherry and Amur cork tree, 8.06.1971, coll. A.D. Petrova. Finland: Lieto, Littoinen, Havukallio, moss on the steps, 15.09.1983, coll. R. Niemi. Lithuania: Vilnius area, bank of the river Salka, bushes, 30.04.1957, coll. I.S. Eitminaviciute. Belarus: the Brest Region, mixed forest, from the nest of *Apodemus flavicollis*, 20.10.1967, coll. I.V. Chikilevskaya. Ukraine: the Chmel'nitskiy Region, M. Chernovtsy, *Formica rufa* anthill, 14.08.1966, coll. V.D. Sevastyanov; the Vinniza Region, Brazlavsky forest district, oak forest, ground litter, 5.06.1971, coll. G.D. Sergienko; the Cherkassy Region, Kanevsky reserve, mixed forest, from the nest of *Clethrionomys glareolus*, 21.05.1976, coll. V.I. Uyrkina.

Type specimens. Holotype from the Novosibirsk Region, Sokur, birch forest, soil litter,

17.05.1992, coll. O.I. Knor. Paratypes (12 specimens) — same place. The holotype is deposited in the collections of the Zoological Institute, Russian Academy of Sciences, St. Petersburg, paratypes are deposited in the collections of the Siberian Zoological Museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk.

Etymology. The name "*borealis*" relates to a wide distribution of the new species in the boreal climate.

Differential diagnosis. The new species is similar to *Neoribates gracilis* Trave, 1972 in its size, color and shape of *ro*, *le*, *in*. These species often could be found together in soil samples. *N. borealis* sp.n. has a distinct feature that easily differentiates it from other species of the genus *Neoribates*. The tips of lamellar lines in *N. gracilis* and *N. rimosus* Suzuki, 1978 (Suzuki 1978) are directed to the center of the prodorsum and the mutual distance of setal pair *le* and that of *in* is equal; in contrast, lamellar lines in *N. borealis* are located laterally on the prodorsum and the mutual distance of *le* is distinctly larger than that of between *in*. All prodorsal setae, as well as those on the ventral shield in *N. gracilis* are distinctly longer than those in *N. borealis*. The form of sacculi is also a distinguishing characteristic of the new species. Sacculi in *N. gracilis* and *N. aurantiacus* are slightly elongated, dark, whilst in *N. borealis* the sacculi are rounded and light-colored. Setae *ad*₃ in *N. gracilis*, *N. aurantiacus*, and *N. rimosus* are placed anterior to the anal opening, whilst in *N. borealis* these setae are located aligning at about 2/3 the length of the anal plates. Leg I of *N. gracilis* has 20 setae, while that of *N. borealis* and *N. rimosus* has 19.

***Neoribates bulanovae* Grishinae sp.n.**

Figs. 10–13

Color. Light brown.

Measurements (µm). Body rounded, of golumnoid type. Holotype (male): 840 × 660, height 450. Measurements of 4 specimens: 830–904 × 660–740. Lengths of rostral setae 190, lamellar setae 210, interlamellar setae and sensillae each 240.

Prodorsum. Rostrum smooth, without projection in its medial part. Prodorsal setae delicate, thin, finely barbed. Lamellar setae (*le*) shorter than interlamellar ones (*in*), and rostral setae (*ro*) shorter than lamellar ones. Sensillae (*ss*) equal to interlamellar setae and have similar indumentum. Exo-

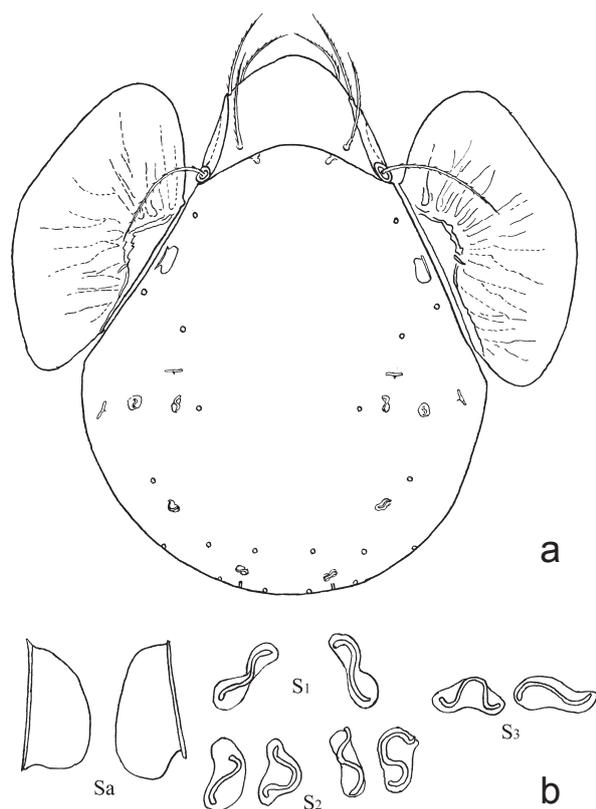


Fig. 10. *Neoribates bulanovae* sp.n.: a — general view, dorsal aspect, b — saccules, variations.

bothridial setae (*ex*) thin, their length shorter than the distance between their bases and bothridia.

Lamellae are straight lines on the lateral sides of prodorsum and reach the bases of lamellar setae. Distance between lamellar setae is longer than that between interlamellar ones.

Notogaster. Rounded in shape. Sejugal furrow slightly arched and conspicuous. Four pairs of transparent sacculi present. Sacculi *Sa* large and elongated, positioned along pteromorphs. Sacculi *S₁*, *S₂*, and *S₃* similar in shape, all having curved apertures. There is no any evidence of notosetae, only 10 pairs of alveoli present. Pteromorphs rounded, close to oval. Their lateral (distal) margin has no distinct incision. Posterior margin broadly rounded. Sclerotized arched strium near inner (proximal) margin distinct, but with rough outline. Marginal sclerotized stripe along the pteromorph attachment line not noticeable.

Ventral region. Epimeral formula 3–1–3–3. All setae in coxisternal region and on genital apertures have small barbs. Setae *1c*, *3c*, *4c* are very often longer than respective setae *a* and *b*. Genital plate has 5 pairs of setae. In our material one specimen had 6 setae on one plate. Anal and adanal setae are very small, thin, without barbs. Setae *ad₃*

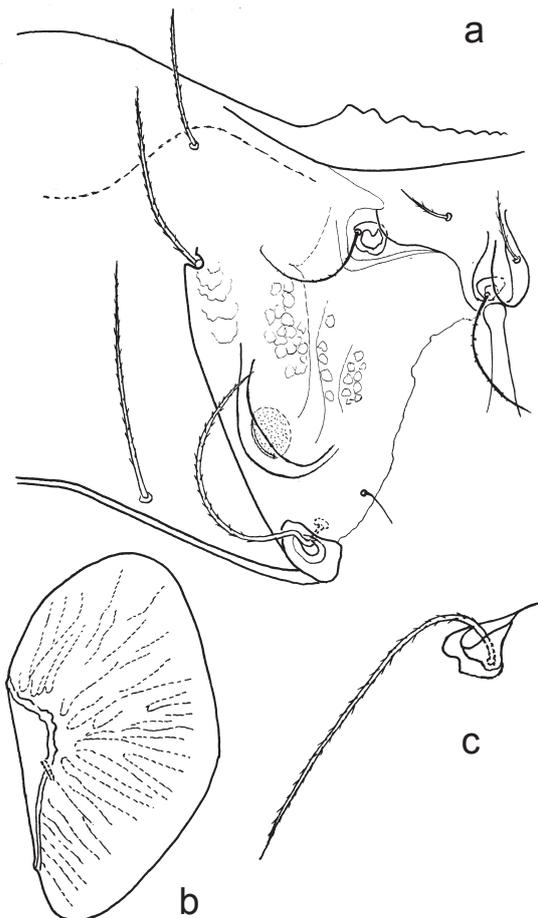


Fig. 11. *Neoribates bulanovae* sp.n.: a — part of prodorsum, dorsal, lateral, ventral aspects, b — pteromorph, c — sensilla.

situated in the anterior part of adanal region, either close to slit organs *iad* or anterior to them.

Legs. All tarsi heterotridactylous. Medium claw stronger, lateral claws have distal notches. Setal formulae of legs: I: 1–5–3(1)–4(2)–20(2)–3; II: 1–5–3(1)–4(1)–15(2)–3; III: 2–3–1(1)–3(1)–15(0)–3; IV: 1–2–2(0)–4(0)–12(0)–3.

All setae have small barbs irrespective of their location on the dorsal, ventral or lateral sides. Solenidia ω_1 and ω_2 on tarsi have almost the same length, but ω_1 thicker and with rounded tip. Solenidium ω_2 has form of a regular seta. Fastigial seta *ft'* much longer than solenidia. Setae *it* and *tc* have indumentum that is similar to that of ventral setae. Solenidium σ of genu II equal in length to seta *l''* and much shorter than setae *l'* and *v'*. Solenidium σ of genu III equal to the half of genu seta length. Dorsal seta *d* on the tibia IV no longer than the other setae of this leg segment. Setae of basal trochanters I and II thin and long, not similar to setae of other leg segments.

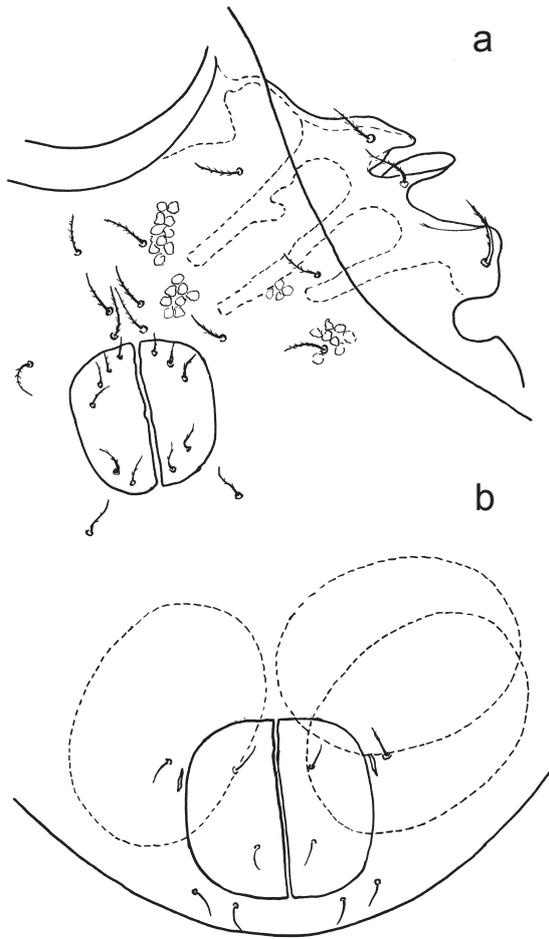


Fig. 12. *Neoribates bulanovae* sp.n.: a — coxisternal region and genital plates, b — posterior part of ventral shield (eggs are shown by dotted line).

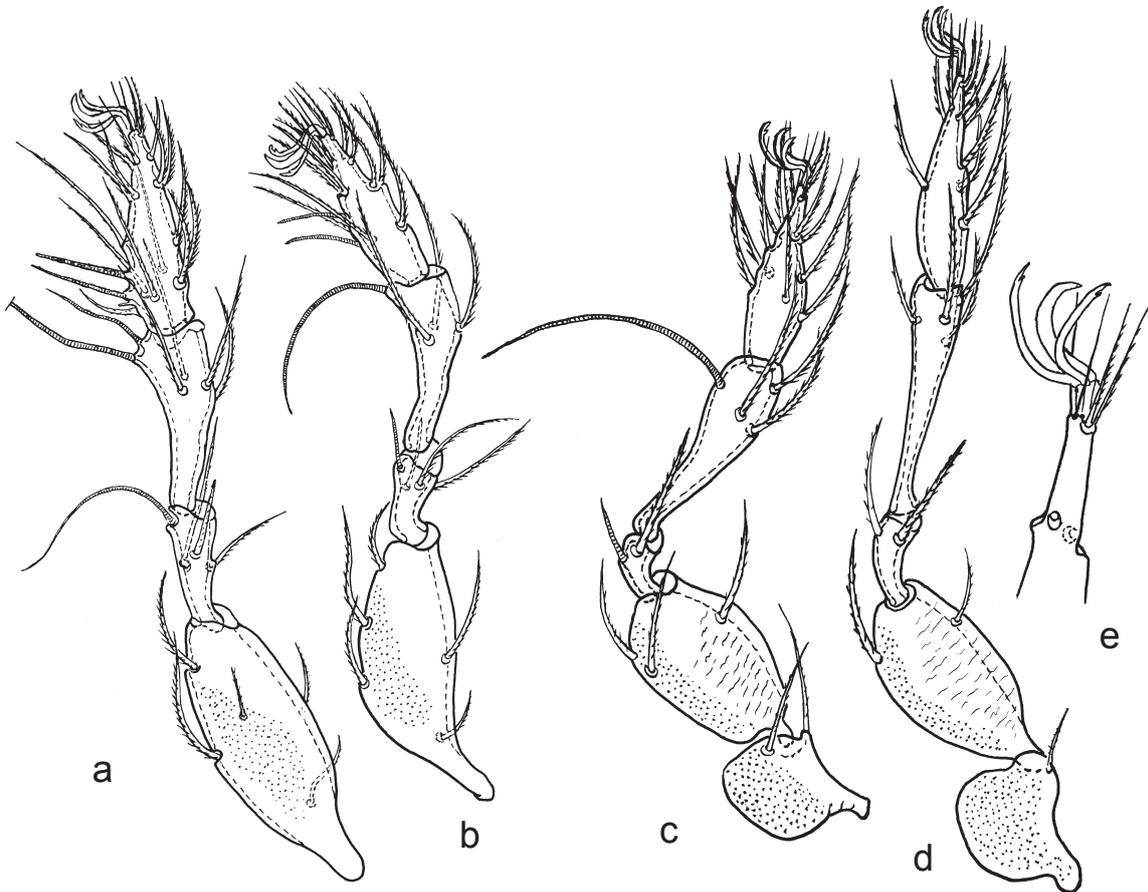


Fig. 13. *Neoribates bulanovae* sp.n.: a — leg I, b — leg II, c — leg III, d — leg IV, e — tip of leg IV tarsus.

Material examined. Ukraine: Crimea, Alush-ta, beech-oak forest, soil litter, July 1954, coll. E.M. Bulanova-Zakhvatkina; Crimea, Kasse river, hornbeam-oak forest, soil litter, 24.06.1961, coll. N. Egorova; Crimea, the Sevastopol Region, Or-linoe village, beech-oak forest, soil litter, 8.11.2003, coll. L.G. Grishina; Russia: Daghestan, the Makhachkala Region, Tarhata mountain, shiblyak, May 1986, coll. U. Shtanchaeva.

Type specimens. Holotype from Ukraine, Crimea, the Sevastopol Region, Orlinoe village, beech-oak forest, soil litter, 8.11.2003, coll. L.G. Grishina. The holotype is deposited in the collec-tions of the Zoological Institute, Russian Academy of Sciences, St. Petersburg. Three paratypes are deposited in the collections of the Siberian Zoo-logical Museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk.

Etymology. The species is named after one of the collectors, Elizaveta Bulanova-Zakhvatkina, a distinguished Soviet acarologist.

Differential diagnosis. *Neoribates bulano-vae* sp.n. differs from the other known species by its larger size, rounded body, setiform sensillae and by the shape of notogastral saccules.

***Neoribates sibiricus Vladimirova* sp.n.**

Figs. 14–18

This species inhabits vast territories of the Asian part of Russia from the Ural Mountains in the west to the Kamchatka Peninsula in the east, and from Taimyr Peninsula in the north to Tuva in the south. It inhabits the following landscapes: zonal and mountain tundra, alpine meadows, vari-ous types of forests, and meadows. It has been col-lected from litter and the upper layer of the soil, plant residues of various type, including lemming food residues, rotten logs, and anthills.

Color. Light brown.

Measurements (μm). Holotype (male): 570 \times 390. Measurements: 8 males: 570–630 \times 390–420, 4 females: 620–650 \times 440–490.

Prodorsum. Rostrum bent ventrally, having the form of rounded projection. Rostral (*ro*), lamellar (*le*) and interlamellar (*in*) setae have the same thickness, conspicuously barbed. In intact specimens the characteristic ring-shaped thicken-ings near setal bases can be noticed. In mounted and fragmented specimens these structures are less noticeable. Sensillae (*ss*) lanceolate: originat-ing in bothridia, they become thicker in distal half to form an enlarged head, which ends in spike dis-

tally. Exobothridial setae (*ex*) small and at a sig-nificant distance from bothridia. Lamellar lines broken anteriorly. A wrinkled area is posterior to the bases of lamellar setae.

Notogaster. Oval in shape. Sejugal furrow broadly arched, conspicuous. Four pairs of trans-parent saccules present, all irregular in shape. Sac-cules *Sa* larger than the others. Notogaster with 10 pairs of setae, represented either by microsetae or only by alveoli. Pteromorphs usually elongated, with their outer line having a small incision. Pos-terior angle of pteromorphs is about 60°.

Ventral region. Epimeral formula: 3–1–3–3. Setae *3c*, *4c* barbed, longer than the respective setae *a*, *b*. Five pairs of genital setae present; one studied specimen had 6 pairs of setae on one gen-ital plate and 4 pairs on the other one. Two pairs of setae present on anal plate. Three pairs of adanal setae present. Setae *ad*₃ positioned posterior to anal opening, like the other two pairs, but are po-sitioned far from anal valves, so that insertions of the three pairs forms a line that is parallel to round-ed margin of the ventral shield. Lengths of *ad*₁ and *ad*₂ are equal to distance between them. Additional “rings” can be seen through the cuticle under the bases of adanal setae, similar to those under the bases of prodorsal setae.

Legs. All tarsi heterotridactylous. Medium claw being much thicker than the others. Lateral claws have pronounced notches. Setal formulae of legs: I: 1–5–3(1)–4(2)–19(2)–3; II: 1–5–3(1)–4(1)–15(2)–3; III: 2–3–1(1)–3(1)–15(0)–3; IV: 1–2–2(0)–4(0)–12(0)–3.

Lateral and especially dorsal setae of leg seg-ment have fewer hairs than ventral setae. Solenid-ium of tarsi ω_1 thick with almost parallel sides and rounded tip. Solenidium ω_2 thin, flagelliform, very long, longer than the fastigial setae *ft'*. So-lenidium σ of genu II of equal length to setae *l'* and *v'*. Solenidium σ of genu III equal to or longer than respective setae of same segment. Dorsal setae *d* on tibia IV very long, longer than the other seta of the segment; with no barbs, thus resem-bling solenidium.

Material examined. The species is very wide-spread. We list only examples of distribu-tion. Russia: the Tomsk Region, Kargasokskiy District, Vanzhil-Kynak village, Siberian pine for-est, soil litter, 18.07.1985, coll. L.G. Vartopetov; the Kemerovo Region, Kuzedeevo village, aspen forest, soil litter, 3.09.1972, coll. L. Lihacheva; the Novosibirsk Region, Karasukskiy District,

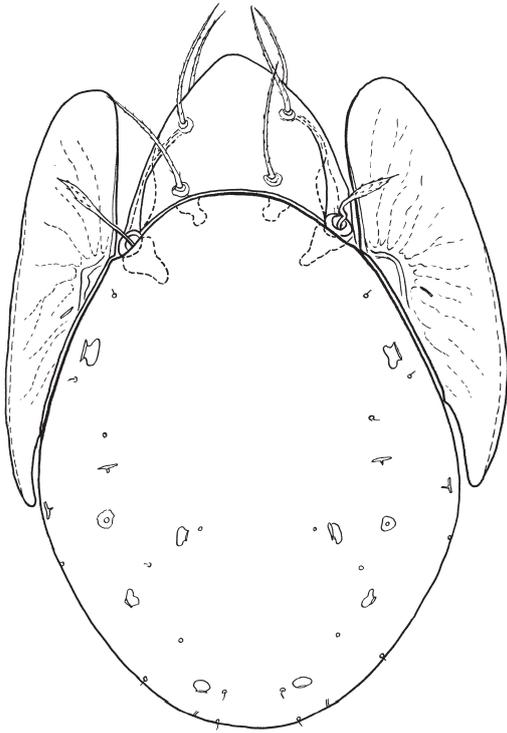


Fig. 14. *Neoribates sibiricus* sp.n., dorsal aspect.

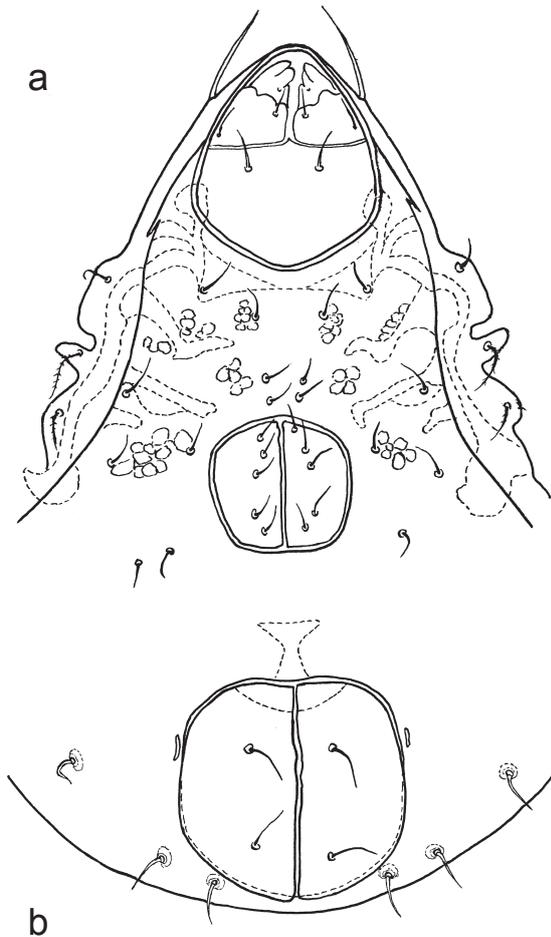


Fig. 17. *Neoribates sibiricus* sp.n.: a — anterior part of ventral side, b — posterior part of ventral side.

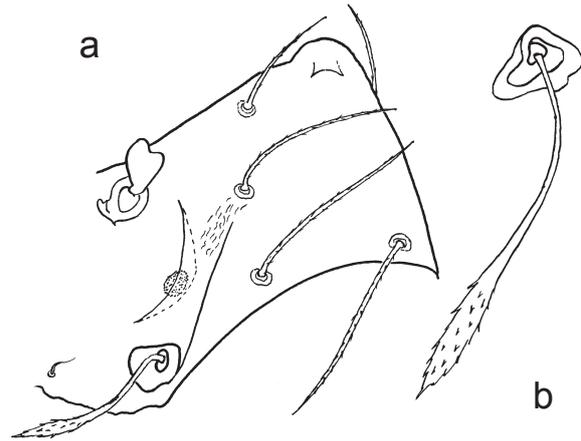


Fig. 15. *Neoribates sibiricus* sp.n.: a — prodorsum, b — sensilla.

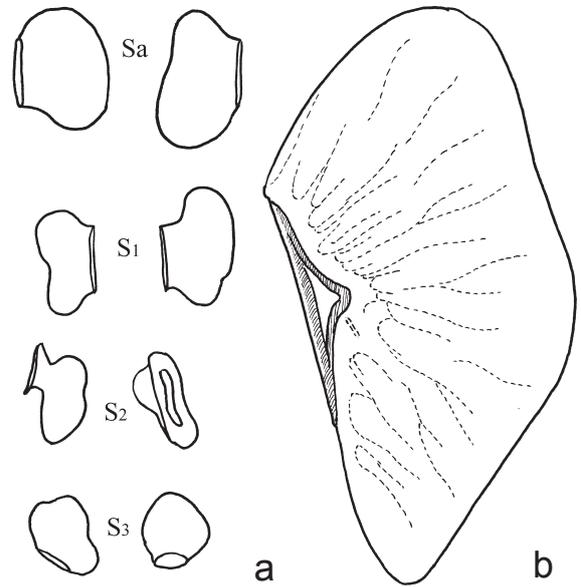


Fig. 16. *Neoribates sibiricus* sp.n.: a — saccules, b — pteromorph.

Troitskoye village, birchwood, anthill, 10.07.1977, coll. L.G. Grishina; the Altay Mountains, Mayma village, the northern slope of birchwood, soil litter, 17.08.1965, the Altay Mountains, the Ust-Koksinskyi Region, Kastahta village, Chelrouyh mountain hollow, subalpic meadow, 2.08.1966, coll. L.G. Grishina; the Altay Mountains, Kebezen' villadge, flood-plain osier-bed, pine-birch and birch-aspen forest, June 2006, coll. N.V. Vladimirova; the Altay Mountains, Obogo cordon, taiga, June 2006, August 2007, coll. N.V. Vladimirova; the Altay Mountains, Mt. Archa (Altyn-Tu Ridge), subgolets sparse growth of trees, yernik tundra, August 2007, coll. N.V. Vladimirova; Taymyr, Gydansk peninsula, Nosok village, sedge cotton-grass tundra, 12.07.1977, coll. G. Dudareva; Taymyr, Ragosinka village,

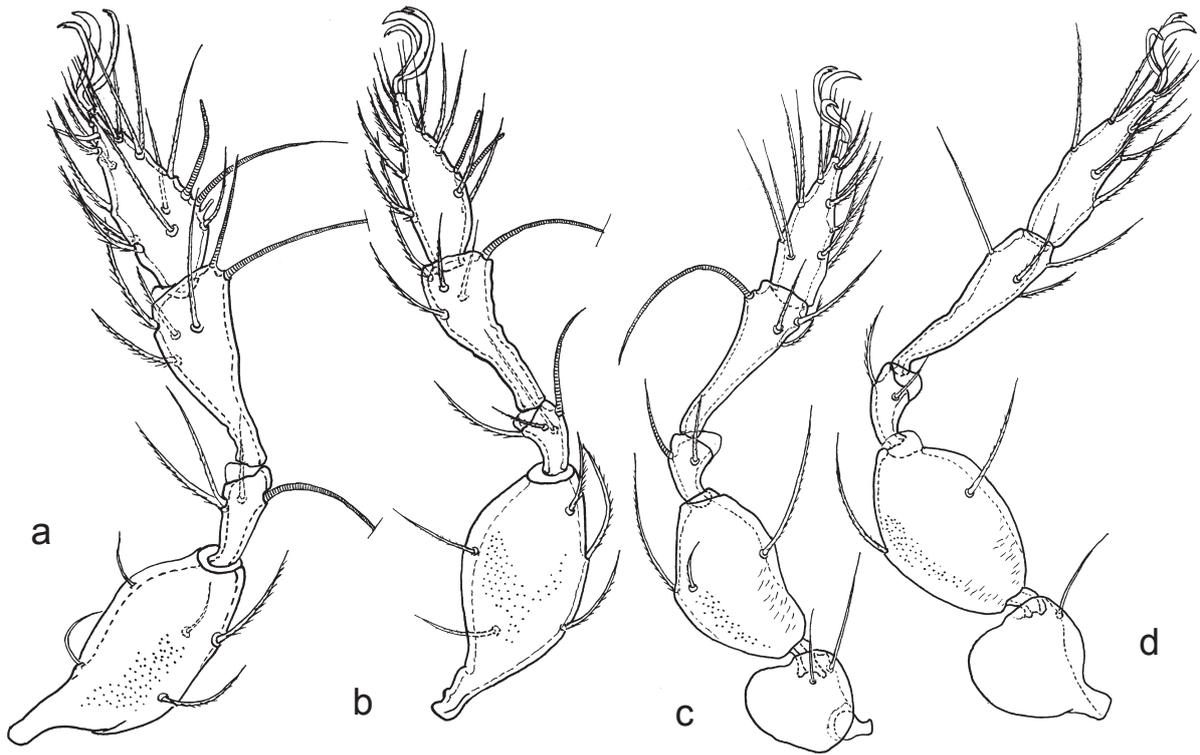


Fig. 18. *Neoribates sibiricus* sp.n.: a — leg I, b — leg II, c — leg III, d — leg IV.

tundra, lemming “hay”, 10.07.1983, coll. A. Babenko; the Krasnoyarsk Territory, Emelyanovskiy District, Krutaya village, bottomland forest, fir tree soil litter, 1.07.1972, coll. L.G. Grishina; Tuva, Danilovka village, mixed wood and meadow, 8.06.1976, coll. L.G. Grishina; the Irkutsk Region, Listvenichnoe village, birch litter, 29.08.1962, coll. K. Gorodkov; Buryatiya, Babushkino, cedar-larch forest, soil litter, 30.08.1972, coll. I. Knor; the Amursk Region, pine forest, soil litter, 19.10.68, coll. K. Gorodkov; Kamchatka, Elizovo village, stoned birch wood with mountain pine, 3.09.1968, coll. K. Gorodkov.

Type specimens. Holotype from the Altay Mountains, Turochakskiy District, Yaylyu village, bird cherry tree soil litter, 19.06.1977, coll. L.G. Grishina. The holotype is deposited in the collections of the Zoological Institute, Russian Academy of Sciences, St. Petersburg. Ten paratypes are deposited in the collections of the Siberian Zoological Museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk.

Etymology. The species was given its name “*sibiricus*” according to its distribution pattern.

Differential diagnosis. *Neoribates sibiricus* sp.n. is similar to *N. borealis* sp.n. It has the following distinguishing features: larger body size, different shape of sensillae, sejugal fissure, form

of prodorsal setae, sacculi outlines and other features.

Key to species of the genus *Neoribates* distributed in Russia

The identification key below was developed for the species of the genus *Neoribates* known from Russia. Several morphological characters were not used, including the lengths of leg segment setae, and correlation between the lengths of solenidia and setae, despite the fact these are different for each species. The setal formula of legs is the same for all species, except for the number of setae on tarsi: one species has 20, the others 19. Some species have quite specific pteromorphs; the differences are in the outer longitudinal margin of pteromorph, the size of posterior angle and its curving pattern. All these characters are noted in the species descriptions.

We considered it possible to add the species *N. aurantiacus* (Oudemans, 1914) to the key. It is not certain that specimens in the Zoological Museum collection were identified correctly, because the second description by Oudemans (1917) was incomplete. This species, like *N. gracilis* Trave, 1972, is widespread in Russia (Grishina 2004). The Japanese specimens redescribed as *N. aurantiacus* by Aoki (1966) have some different features, and it is necessary to study them more completely.

1(2) Sensillae setiform. Saccules *Sa* broadly oval in shape and elongated parallel to pteromorph suture. Large (830–900 × 660–740) *N. bulanovae* Grishina sp.n. (Figs. 10–13)

2(1) Sensillae club-like or lanceolate. Saccules *Sa* have different shape 3

3(8) Saccules dark-colored, conspicuous against lighter-colored body. Saccules *Sa* sac-like, obliquely elongated into the body. Setae *ad*₃ close to the anterior part of anal valves 4

4(5) Epimeral setae *Ia* originate close to genital aperture and together with setae *2a*, *3a* form a line or cluster. All these setae quite long, strong and have small barbs. Measurements: 630–760 × 470–570 (according to Oudemans (1917): 518–710 × 314–485) *N. aurantiacus* (Oudemans, 1914)

5(4) Arrangement of epimeral setae is different ... 6

6(7) Sensillae directed posteriorly, lanceolate, apically with long spike. Distance between bases of lamellar and interlamellar setae equal. Adanal setae *ad*₁ and *ad*₂ long, significantly exceeding the distance between their bases. Measurements: 450–550 × 320–400 (according to Trave (1972), body length 480–600) *N. gracilis* Trave, 1972

7(6) Sensillae clavate with rounded tip. Distance between lamellar bases exceeds the distance between interlamellar setae. Adanal setae *ad*₁ and *ad*₂ short; their length is less than the distance between their bases. Measurements: 740–880 × 550–610 *N. krivolutskyi* Grishina sp.n. (Figs. 1–5)

8(3) Saccules light-colored, of different shape. All adanal setae posterior to anal valves, aligned parallel to curved margin of ventral shield, *ad*₃ distant from *ad*₁ and *ad*₂ 9

9(10) Distance between lamellar setae exceeds the distance between interlamellar ones. Sejugal furrow is trapezoid in shape. Sensillae clavae, with conspicuous head. Only alveoli of setae present on notogaster. Length of adanal setae *ad*₁ and *ad*₂ less than distance between their bases. Measurements: 430–530 × 280–390 *N. borealis* Vladimirova sp.n. (Figs. 6–9)

10(9) Distance between lamellar setae hardly exceeds that between interlamellar setae. Sejugal furrow broadly curved. Stalk of sensilla gets broader distally and gradually transforms into a

head having a sharp tip. Microsetae present on notogaster. The lengths of adanal setae *ad*₁ and *ad*₂ equal to distance between their bases. Measurements: 570–650 × 390–490 *N. sibiricus* Vladimirova sp.n. (Figs. 14–18)

REFERENCES

- Aoki, J. 1966. The large-winged mites of Japan (Acari: Cryptostigmata). *Bulletin of the National Science Museum*, 9 (3): 257–275.
- Byzova, Yu.B., Uvarov, A.V., Gubina, V.G. et al. 1986. *Pochvennye bespozvonochnye belomorskikh ostrovov Kandalakshskogo zapovednika* [Soil Invertebrates of the White Sea Isles of the Kandalakshsky Reserve]. Nauka Publ., Moscow, 312 pp. [In Russian]
- Grishina, L.G. 2004. [Oribatid mites of the family *Parakalummidae* Grandjean, 1936 (Sarcoptiformes, Oribatei) of the fauna of Russia]. *Materialy VIII rossiyskogo akarologicheskogo soveshchaniyag*, St. Petersburg, p. 31–33. [In Russian]
- Grishina, L.G. and Sergiyenko, G.D. 1978. [Winged oribatid mites (Oribatei, Galumnoidea) of Ukraine]. *Vestnik Zoologii*, 3: 48–52. [In Russian]
- Grishina, L.G. and Makhmudova, L.I. 1989. [On the fauna of oribatid mites of the forest-steppe zone of West Siberia]. *Fauna, ekologiya i zoogeografiya pozvonochnykh i chlenistonogikh*. Mezhuniversity sbornik nauchnykh rabot, Novosibirsk, p.150–154. [In Russian]
- Grishina, L.G., Babenko, A.B. and Chernov, Yu.I. 1998. [Oribatid mites (Sarcoptiformes, Oribatei) of the western coast of the Taimyr Peninsula]. *Vestnik Zoologii*, 32 (1): 116–118. [In Russian]
- Pantsirnye kleshchi. Morfologiya, razvitie, filogeniya, ekologiya, metody issledovaniya, kharakteristika modelnogo vida Nothrus palustris* [Oribatid Mites. Morphology, Development, Phylogeny, Ecology, Methods of Research, Characteristics of the Model Species *Nothrus palustris* C.L. Koch, 1839]. 1995. D.A. Krivolutsky (Ed.). Nauka Publ., Moscow, 221 pp. [In Russian]
- Oudemans, A.C. 1917. Notizen über Acari Reihe (Oribatoidea) 26. *Archiv für Naturgeschichte*, 4: 1–84.
- Suzuki K. 1978. A new species of the genus *Neoribates* (Berlese, 1914), *Neoribates rimosus* n. sp. *Acta Arachnologica*, 28 (1): 19–29.
- Trave J. 1972. *Neoribates gracilis* n. sp. (Parakalumniidae, Oribatei). *Acarologia*, 13 (2): 410–427.