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Two new species of the "*Niphargus bzhidik*" ingroup (Amphipoda: Niphargidae: *Niphargus*) from the southwestern foothills of the Great Caucasian Ridge

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ABSTRACT. Two new species of the genus *Niphargus* Schiödte, 1849 (Amphipoda: Niphargidae), *Niphargus olkhovik* sp.n. and *Niphargus natukhai* sp.n., are described from the southwestern foothills of the Great Caucasian Ridge, Russia. Both species distinctly belong to the "*puteanus*" species group and are phylogenetically close related to the Caucasian *Niphargus bzhidik* Marin, Krylenko et Palatov, 2021. Together with *N. bzhidik* and two other undescribed species from Apsheronsk and Nebug, these newly discovered species form a district morphological and phylogenetically separated monophyletic clade (lineage), which we propose to name "*Niphargus bzhidik*" ingroup. The ingroup can be distinguished from other Caucasian species of the genus *Niphargus* by the presence of 2–3 hooks in the retinacules of the pleopods, different-sized rami of the uropod I both in ♂♂ and ♀♀, and relatively large inner ramus of the uropod III. Molecular dating suggests that this ingroup originated during the Late Miocene, at least 8 Mya, obviously somewhere within Euxinian basin of Paratethys.
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KEY WORDS: diversity, phylogeny, Crustacea, taxonomy, Caucasus.

Два новых вида подгруппы "*Niphargus bzhidik*" (Amphipoda: Niphargidae: *Niphargus*) из юго-западных предгорий Большого Кавказского хребта

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РЕЗЮМЕ. Два новых вида рода *Niphargus* Schiödte, 1849 (Amphipoda: Niphargidae), *Niphargus olkhovik* sp.n. and *Niphargus natukhai* sp.n., описаны из юго-западных предгорий Большого Кавказского хребта, Россия. Оба вида принадлежат к видовой группе "*puteanus*" и филогенетически тесно связаны с кавказским *Niphargus bzhidik* Marin, Krylenko et Palatov, 2021. Совместно с кавказским *N. bzhidik* и двумя другими неописанными видами из Апшеронска и Небуга, обнаруженные виды формируют морфологически и филогенетически четко определенную монофилетическую кладу (lineage), которую мы предлагаем назвать подгруппа "*Niphargus bzhidik*". Подгруппу можно отличить от других кавказских видов рода *Niphargus* по наличию 2–3 крючков

в ретинакуле плеопод, различным по длине ветвям уропод I как у ♂♂, так и у ♀♀, и относительно большой внутренней ветви уропод III. Молекулярное исследование показало, что эта группа возникла в позднем миоцене, по меньшей мере, 8 млн лет назад, очевидно, где-то в пределах Эвксинского бассейна Паратетиса.
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КЛЮЧЕВЫЕ СЛОВА: разнообразие, филогения, ракообразные, систематика, Кавказ.

Introduction

The diversity of stygobiotic fauna in the southwestern foothills of the Great Caucasian Ridge and the Crimean Peninsula, such as crangonyctid amphipods (Amphipoda: Crangonyctidae), amphipods of the genus *Niphargus* Schiödte, 1849 (Crustacea: Amphipoda: Niphargidae) and stygobiotic waterlouses of the genus *Proasellus* Dudich, 1925 (Isopoda: Asellidae), has historically received less attention than compared to other regions (e.g., Krever *et al*., 2001; Karaman, 2012). This area, encompassing Novorossiysk, Krymsk, Gelendzhik and Tuapse districts of the Krasnodar Krai, is relatively arid, receiving approximately 750–800 millimeters of precipitation per year, of which two thirds usually falling during the winter months (November–February) (see Marin *et al*., 2021b). Previously, it was thought that the main diversity of stygobiotic fauna was concentrated in more humid subtropical regions of the Russian Caucasus, like Sochi area, Abkhazia and western Georgia. At the same time, studying the foothills of the Greater Caucasus is crucial for understanding the phylogeny and phylogeography of underground fauna. The Crimean Peninsula and the Caucasus acted as intermediate "bridges" in the development of faunas in Transcaucasia and Iran (e.g., Fišer *et al*., 2009; Esmaeili-Rineh, Sari, 2013; Esmaeili-Rineh *et al*., 2015a, b, 2016; Marin, 2019; Bargrizaneh *et al*., 2021).

Recent studies in the southwestern foothills of the Great Caucasian Ridge have revealed a several phylogenetically distinct lineages of the genus *Niphargus,* including the relatively diverse "*Niphargus tauricus*" ingroup, which mainly inhabits subterranean karst habitats in the southwestern foothills (Marin *et al*., 2021b), epigean *Niphargus potamophilus* Birštein, 1954 and *N. hrabei* (S. Karaman, 1932 from the Kuban River delta (Palatov, Marin, 2021), *N. krasnodarus* G. Karaman, 2012, recently described *N. ciscaucasicus* Marin et Palatov, 2019 and *N. bzhidik* Marin, Krylenko et Palatov, 2021 inhabiting both subterranean and epigean environments (Karaman, 2012; Marin, Palatov, 2019, 2025; Marin *et al*., 2021a). Furthermore, there is a rich diversity of crangonyctid amphipods, like *Synurella* Wrześniowski, 1877 and *Lyurella* Derzhavin, 1939 (Amphipoda: Crangonyctidae) (Marin, Palatov, 2021, 2022). Stygobiotic isopods are also quite diverse, and have recently been represented by several endemic species of *Proasellus*, which are usually associated with the hyporheic habitats of major rivers (Palatov, Chertoprud, 2024; Marin, Sinelnikov, 2024). Molecular genetic data, which currently represents only the initial insights, revealed a large number of unique relict allopatric species with rather restricted distribution ranges within southwestern Caucasian foothills (Marin, Palatov, pers. data, unpublished). Despite this, the available data is still very fragmentary and limited, suggesting a lack of comprehensive knowledge about the true biodiversity of the region. Nevertheless, in terms of diversity it could potentially be rich and comparable to other areas that have been studied.

Since 2018, our research team has been exploring the diversity of hyporhean and stygobiotic fauna in the southwestern foothills of the Caucasus and along the norther Russian coastal regions of the Black Sea. In this article, we describe two new species of the genus *Niphargus*, which form a unique and genetically distinct clade that is endemic to this region.

Material and methods

Sampling. Amphipods were collected using a hand net in the hyporhean habitats of the mountainous rivers and springs in the southwestern foothills of the Great Caucasian Ridge (Fig. 1) since 2018.

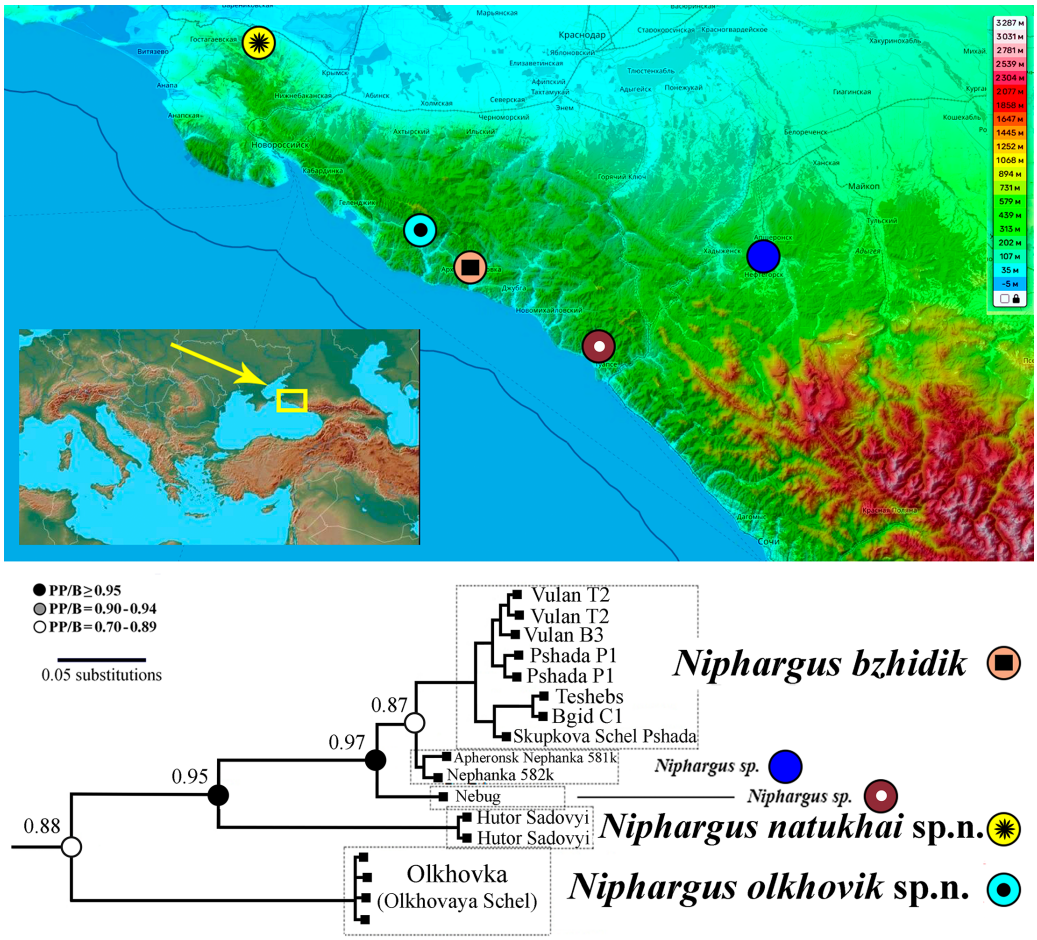

Fig. 1. The map of distribution and phylogenetic relationships within the "*Niphargus bzhidik*" ingroup in the southwestern foothills the Great Caucasian Ridge, Russia.
Рис. 1. Карта распространения и филогенетических взаимоотношений внутри подгруппы "*Niphargus bzhidik*" в юго-западных предгорьях Кавказа, Россия.

The hyporheic coastal river habitats, which include the bottom and coastal-bottom sediment layers, usually consisting of pebbles or sand, were excavated using a hand shovel. The animals that seeped into the formed depressions in these areas with the flow of groundwater were caught using a hand net with a fine net. All collected samples were preserved in 90% ethanol for further DNA analysis. The type material is deposited at the collection of the Zoological Museum of Moscow State University, Moscow (ZMMU); other (additional) material is deposited in personal authors' collection in the A.N. Severtsov Institute of Ecology and Evolution of RAS, Moscow, Russia (LEMMI).

Morphological study. For documenting the habitus and living coloration, freshly collected specimens were relaxed in water with a few drops of clove oil and then photographed using Canon G16 digital camera. Fixed specimens were dissected under the stereomicroscope and then mounted on slides for examination and illustration. The light microscopy photographs of the specimens were made with a digital camera Olympus ZX10 attached to the compound microscope Olympus CX21. The scanning electron microscopy (SEM) images were made at the Paleontological Museum of the Paleontological Institute of the Russian Academy of Sciences, Moscow, using Vega3 Tescan microscope. Amphipods were placed in 95% ethanol, cleaned in an ultrasonic cleaner then dehydrated with acetone, critical-point dried (CPD), fixed on specimen stubs with double-sided and coated with gold by sputtering using Polaron PS 100. The body length (bl., mm) was measured from the anterior margin of the cephalothorax to the posterior margin of the pleotelson. The description is based on the

standard species description for the representatives of the genus *Niphargus* (e.g., Marin *et al.*, 2021a, b; Stoch *et al.*, 2024).

Molecular-genetic analysis. To unravel the cryptic diversity within the studied amphipods a fragment of cytochrome oxidase C subunit I (COI mtDNA) was used (Avise, 1994; Hebert *et al*., 2003). Total genomic DNA was extracted from muscle tissue using the innuPREP DNA Micro Kit (AnalitikJena, Germany). The gene marker was amplified by using the universal primers LCO1490 (5'–GGTCAACAAATCATAAAGATATTGG–3') and HC02198 (5'–TAAACTTCAGGGTGACCAAAAAATCA–3') under the standard protocol conditions (Folmer *et al.*, 1994). PCR products were then sequenced using Genetic Analyzer ABI 3500 (Applied Biosystems, USA) and BigDye 3.1 (Applied Biosystems, USA) with forward and reverse primers. Consensus dataset of aligned sequences, about 646 base pairs in length was obtained with MEGA 7.0. The best evolutionary substitution model was determined using MEGA 7.0 (Kumar *et al*., 2016) and jModeltest2.1.141 (Diego Darriba, Universidade da Coruña as part of the Computer Architecture Group (GAC), Coruña, Spain) on XSEDE via the CIPRES (Cyber Infrastructure for Phylogenetic Research) Science Gateway V. 3.3 (http://www.phylo.org/, accessed on 30 December 2024). A phylogenetic analysis performed using PhyML 3.0 (Guindon *et al*., 2010) and MrBayes 3.2 (Ronquist, Huelsenbeck, 2003) showed congruent results. The general dataset of sequences was used to establish the phylogenetic relationships of the described species, and is not visualized in the article.

Uncorrected pairwise genetic distances (*p*-distances±SE) were calculated based on available sequences using MEGA 7.0 with the Kimura 2-Parameter (K2P) model of evolution (Kimura, 1980).

The divergence time was calculated as min. (5.16% per Mya^{-1}) and max. (as 0.77% per Mya^{-1}), with the average divergence time (as 2.5% per Mya^{-1}) (Guy-Haim *et al*., 2018) and 1.773% per Mya^{-1} (Copilaş-Ciocianu *et al*. (2019).

Results

Phylogenetic approach. All phylogenetic reconstructions (trees) obtained as a result of the analysis (both ML and BIC approached) showed a congruent result, separating the species under consideration into a well-separated phylogenetic monophyletic lineage (Bayesian–PP=1.00; ML–BS=99%). Currently this group of species includes *Niphargus bzhidik* Marin, Krylenko et Palatov, 2021, two newly described species from Olkhovka (Olkhovaya Schel) and Hutor Sadovyi (Sadovyi) (see below) and two undescribed species from Apsheronsk and Nebug (see Fig. 1), which we propose to call "*Niphargus bzhidik*" ingroup (clade).

Morphologically, the newly discovered species (see below) distinctly belongs to the "*Niphargus puteanus*" species group (selected and discussed by Karaman (2016)), revealing such morphological similarities with other species from the Western Europe, Romania, Turkey and the Caucasus as 1) the presence of 2 hooks in retinacules on pleopods; 2) different rami of uropod I in ♂♂ and ♀♀, and 3) relatively large inner ramus of uropod III (see above; Marin, Palatov, 2019; Marin *et al.,* 2021). This group is related other Caucasian species, namely *Niphargus abchasicus* Martynov, 1932, *N. iniochus* Birštein, 1941, *N. eugeniae* Derzhavin, 1945, *N. otharicus* Birštein 1952 and *N. derzhavini* Birštein 1952, reported in the Caucasus by Martynov (1932) and Birštein (1952), but can be easily distinguished by the absence of a characteristic spoon-shaped process on uropod I, different rami of uropod I and the presence of only 1 ventral inner spine of dactyli of ambulatory pereopods and produced shape of the posteroventral angle of epimeral plates I–III. For the difference from other Caucasian and the Eastern Asian species of the genus *Niphargus*, known from the territory of the former USSR, see key is presented by Marin *et al*. (2021a).

The estimated genetic divergence of the ingroup from the closely related congeners is about 0.216±0.017 substitutions per 100 nucleotides (21.6%). The estimated divergence time of the ingroup from the congeners vary from 28.05 (max) to 4.18 Mya (min), with the average divergence time for about 8.6 Mya (after Guy-Haim *et al*. (2018)), and can be calculated as 12.23 Mya (according to Copilaş-Ciocianu *et al*. (2019)). According to this data, the origin of the "*bzhidik*" ingroup appeared during the Late Miocene, at least 8 Mya, obviously somewhere within Euxinian basin of Paratethys (Popov *et al*., 2004, 2006).

The interspecific genetic divergence for COI mtDNA gene marker between the species within the "*Niphargus bzhidik*" ingroup showed the high level of differentiation between the newly described species and *N. bzhidik* (see Table 1). The newly described species distinctly genetically divergence from *N. bzhidik* and undescribed species for 13–17%, showing a distinct species-specific genetic divergence and long-time isola-

Table 1. Uncorrected pairwise genetic (COI mtDNA) distances (*p*-distances±SE) (substitutions per 100 nucleotides) with the "*Niphargus bzhidik*" ingroup.
Таблица 1. Нескорректированные парные генетические расстояния (COI мтДНК) (*p*-distances±SE) (замены на 100 нуклеотидов) в подгруппе "*Niphargus bzhidik*".

Niphargus bzhidik (n=10)				
Niphargus sp. Apsheronsk (n=1)	0.036±0.007			
Niphargus sp. Nebug (n=2)	0.067±0.011	0.041±0.009		
Niphargus natukhai sp.n. (n=4)	0.131±0.015	0.133±0.015	0.145±0.016	
Niphargus olkhovik sp.n. (n=4)	0.177±0.020	0.174±0.019	0.174±0.019	0.175±0.017

tion. However, for the undescribed species from Apsheronsk and Nebug, the genetic difference (*p*-distances) with *N. bzhidik* is not very large, not exceeding 4–6%, which we attribute to a limited sample for these species, which needs to be increased to clarify the taxonomic status.

Taxonomic account

Phylum Arthropoda von Siebold, 1848
Class Malacostraca Latreille, 1802
Order Amphipoda Latreille, 1816
Family Niphargidae Bousfield, 1977
Genus *Niphargus* Schiödte, 1849
***Niphargus olkhovik* sp.n.**
Figs 2–7.

Material examined. HOLOTYPE, ♂ (bl. 10.0 mm) (ZMMU Mb-1301), Russian Federation, Krasnodar Kray, Gelendzhik Urban Okrug, a small spring (helocrene) in the valley of Olkhovka (Olkhovaya Schel) River, 44°31′14.6″N 38°19′26.2″E, about 103 m asl, coll. I. Marin & D. Palatov, 6 June 2021.

PARATYPE, ♀ (bl. 7.5 mm) (ZMMU Mb-1302), 4♀♀ (bl. 6.0–7.0 mm) (ZMMU Mb-1303), same data and locality as holotype.

ADDITIONAL MATERIAL: 7♀♀ (LEMMI), same data and locality as holotype; 12♀♀ (LEMMI), Russia, Krasnodar Kray, Gelendzhik Urban Okrug, a small spring (helocrene) in the valley of Olkhovka (Olkhovaya Schel) River, 44°31′18.0″N 38°19′27.0″E, about 105 m asl, coll. I. Marin & D. Palatov, 6 June 2021; 7♀♀ (LEMMI), Russia, Krasnodar Kray, Gelendzhik Urban Okrug, a small spring (helocrene) in the valley of Olkhovka (Olkhovaya Schel) River, 44°31′33.9″N 38°19′50.1″E, about 115 m asl, coll. I. Marin & D. Palatov, 6 June 2021.

Etymology. The species is named after the Olkhovka (Olkhovaya Schel) River, where it was discovered. The ending "*-ik*" is added to indicate "living here", which is a common and characteristic feature in the Russian language in that region.

Diagnosis. *Head* with yellow pigmented spots on anterior lobe. Posteroventral corners of *epimeral plates I–III* rounded. *Urosomite I* with 1 slender seta; *urosomite II* with 1 spine + 0–1 additional seta on each side. Dactyli of *pereopods III–VII* with a small ventral inner spine. Rami of *uropod I* unequal in size: outer ramus about 1.8 times larger than inner one in ♂♂ and slightly larger than inner one in ♀♀. *Pleopods* with 2 hooks in retinacules. *Telson* with usually 3 relatively long distal spines on each lobe, with medium lateral spines, accompanied by 1–2 plumose setae on each side; dorsal surface with 1 large dorsal submarginal spine on each side, accompanied by 1–2 plumose setae, and 1–2 simple short dorsal spines in proximal part of telson.

Description. BODY: moderately slender, stygomorphic (Fig. 2*a, c*).

HEAD: large, without rostrum, with well-marked pigmented yellow spots on anterior lobe (Fig. 2*b, d*); with subrounded lateral cephalic lobes and excavated anteroventral sinus (Fig. 7*a*).

MESOSOMA: mesosomal segments smooth.

METASOMA: metasomal segments I–III with several short marginal setae on each posterodorsal margin.

EPIMERAL PLATES (Figs 6*a–c*; 7*c*): epimeral plates I–III with rounded posteroventral corners. Epimeral plate I (Fig. 6*a*) with almost straight ventral margin, without ventrofacial setae; posterior margin convex, bearing 5 short marginal setae; posteroventral corner subrounded, with 1 strong seta. Epimeral plate II (Fig. 6*b*) with strongly convex ventral margin, with 2 ventrofacial setae; posterior margin convex, with 5 short marginal setae; posteroventral corner bluntly rounded, with 1 strong seta. Epimeral plate III (Fig. 6*c*) with convex ventral margin, with 3 ventrofacial setae; posterior margin convex, with 7 short marginal setae; posteroventral corner rounded, with 1 strong seta.

UROSOMITES (Fig. 7*b*): Urosomite I with 1 slender seta on each dorsolateral side; urosomite II with 1 simple strong spine and 0–1 additional seta on each dorsolateral side; urosomite III unarmed.

COXAE: coxae I–IV moderately large, with short ventromarginal setae: coxa I (Fig. 3*f*, *h*) nearly as long

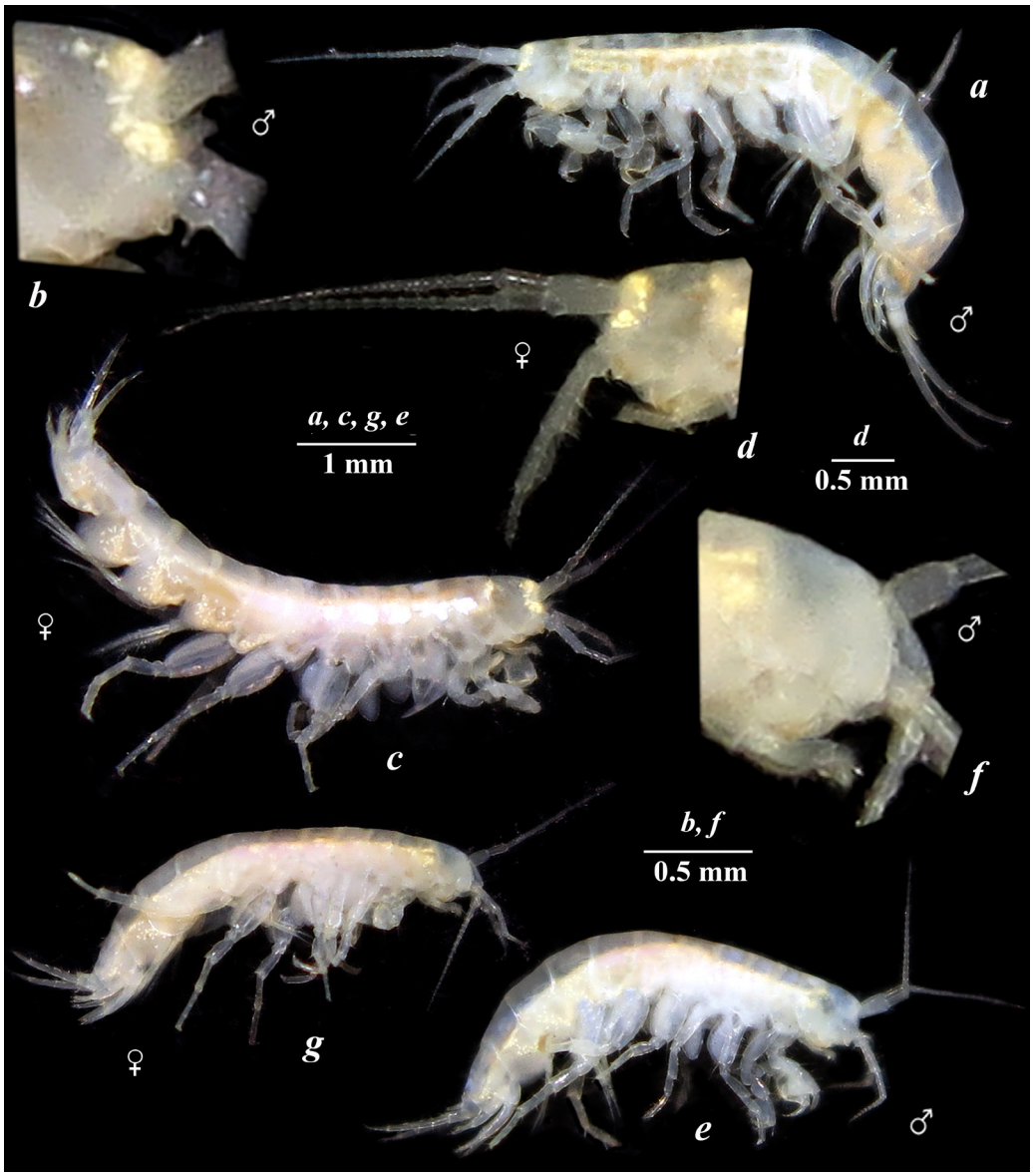

Fig. 2. Living coloration and habitus of *Niphargus olkhovik* sp.n. (*a–d*) and undescribed blind *Niphargus* sp. (*e–g*) coexisting with the new species in the the hyporhean habitats of the Olkhovka (Olkhovaya Schel) River.
Рис. 2. Прижизненная окраска *Niphargus olkhovik* sp.n. (*a–d*) и неописанный слепой N*iphargus* sp. (*e–g*) живущий совместно с новым видом в гипорейных местообитаний реки Ольховка (Ольховая щель).

as broad, with subrounded anteroventral corner; coxa II (Fig. 3*i*, *k*) nearly as long as broad, with rounded anteroventral corner; coxae III–IV (Fig. 5) as short as broad; coxae V–VII (Fig. 5) shorter than coxa IV; coxa V (Fig. 5*e*) with 5 setae on anterior and 3 setae at posterior lobes; coxa VI (Fig. 5*g*) without setae on anterior and 2 setae at posterior lobes; coxa VII (Fig. 5*i*) with 3 anteroventral setae and 2 setae at posterior lobe.

COXAL GILLS: present on pereopods II–VI, ovoid, relatively large; gills/bases pereopod length ratio about 0.7/1; 0.9/1; 0.9/1; 1/1 and 0.7/1, respectively. Oostegites occur on pereopods II–V.

ANTENNA I (Fig. 3*a*, *c*): with relatively stout peduncular articles, with ratio about 1/0.7/0.3; main flagellum consisting of about 20 articles, most of them

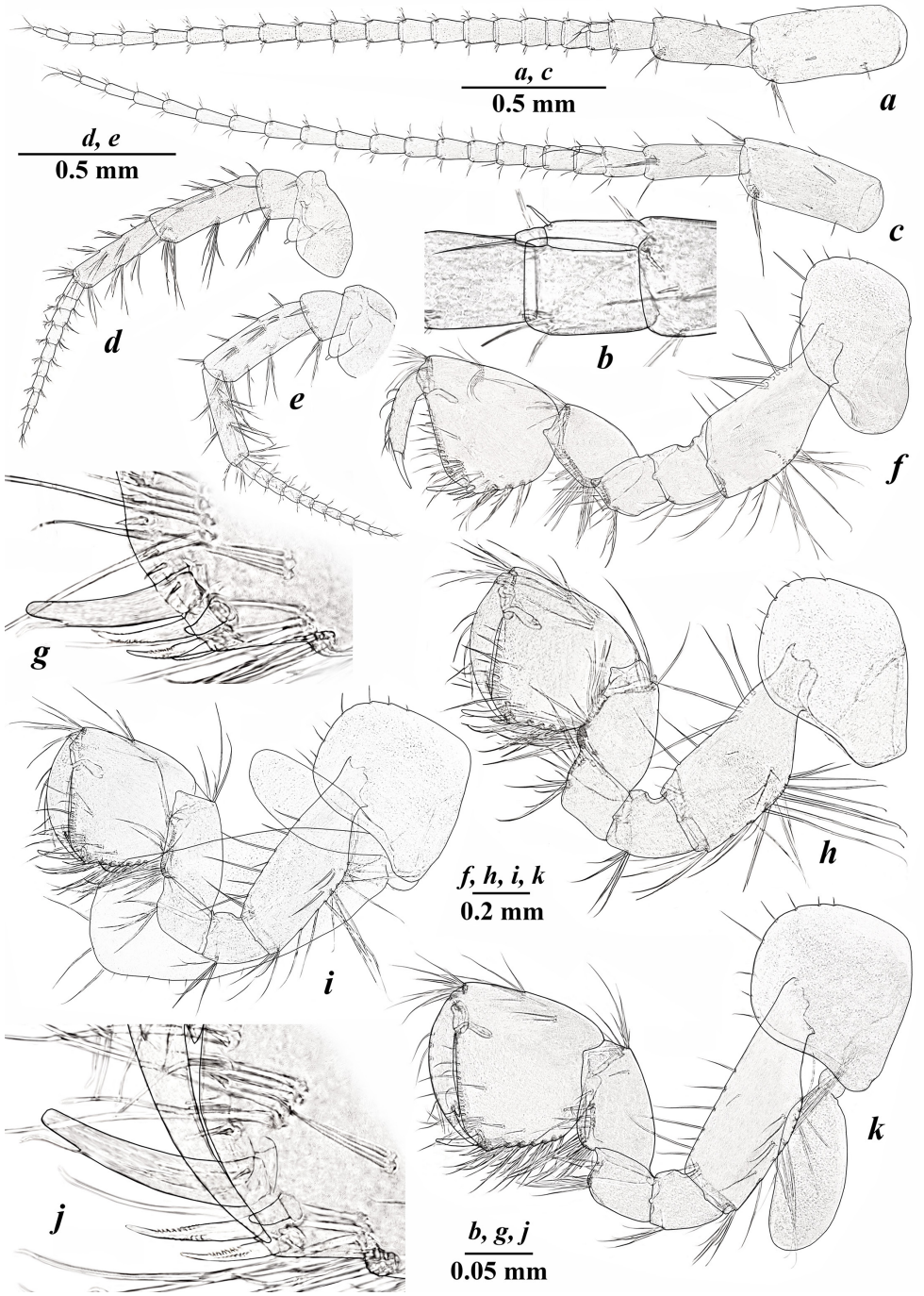

Fig. 3. *Niphargus olkhovik* sp.n., ♂ (*a*, *b*, *d*, *f*, *g*, *j*, *k*) and ♀ (*c*, *e*, *h*, *i*): *a*, *c* — antenna I; *b* — accessory flagellum of antenna I; *d*, *e* — antenna II; *f*, *h* — gnathopod I; *g* — palmar margin of chela of gnathopod I; *i*, *k* — gnathopod II; *j* — palmar margin of chela of gnathopod II.

Рис. 3. *Niphargus olkhovik* sp.n., ♂ (*a*, *b*, *d*, *f*, *g*, *j*, *k*) и ♀ (*c*, *e*, *h*, *i*): *a*, *c* — антенна I; b — добавочный жгутик антенны II; *d*, *e* — антенна II; *f*, *h* — гнатопода I; *g* — пальмарный край гнатопод I; *i*, *k* — гнатопода II; *j* — пальмарный край гнатопод II.

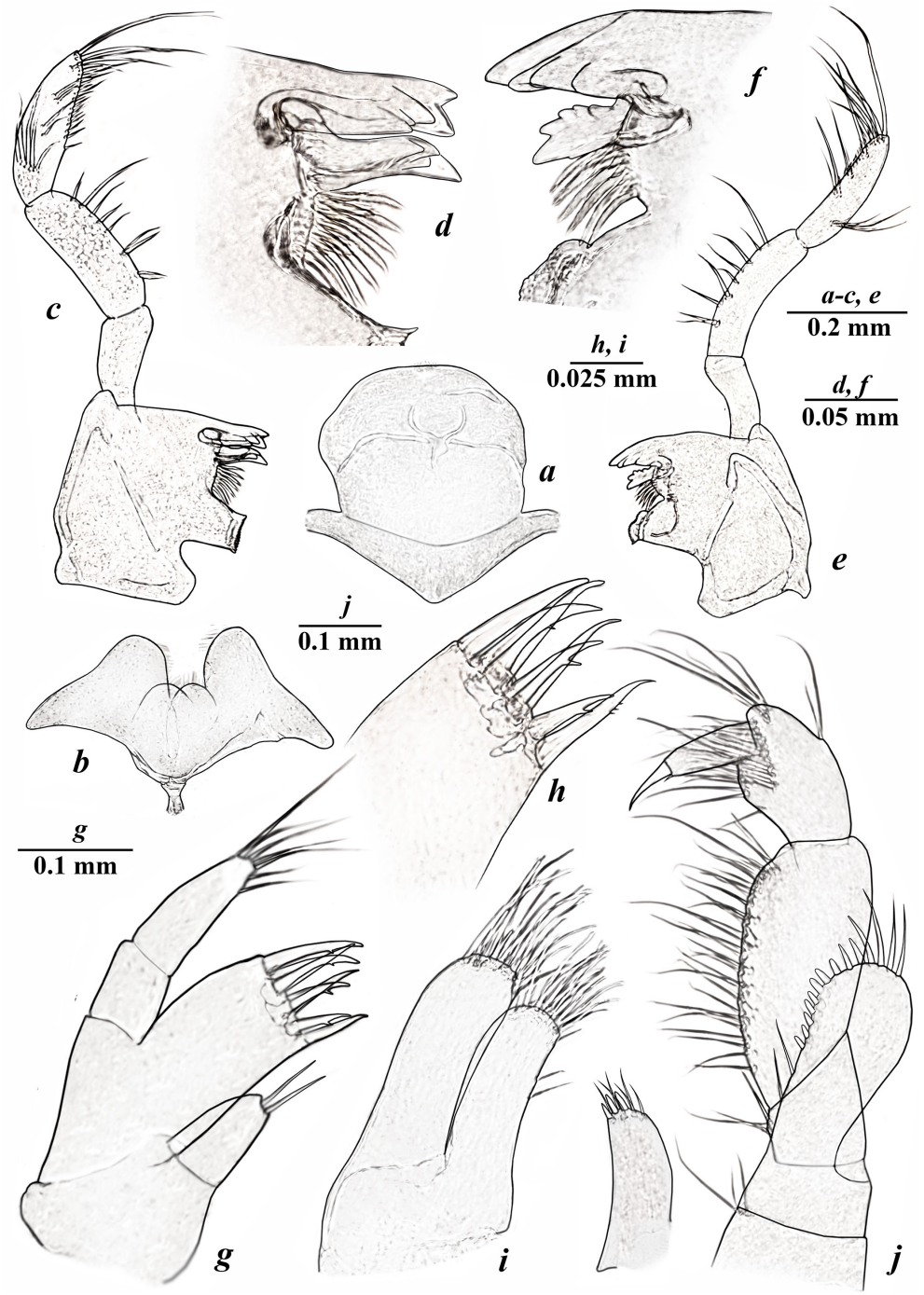

Fig. 4. *Niphargus olkhovik* sp.n., ♂: *a* — upper lip; *b* — lower lip; *c*, *e* — mandibles; *d*, *f* — incisor process and *pars incisiva*; *g* — maxilla I; *h* — distal margin of upper lobe of maxilla I; *i* — maxilla II; *j* — maxilliped.
Рис. 4. *Niphargus olkhovik* sp.n., ♂: *a* — верхняя губа; *b* — нижняя губа; *c*, *e* — мандибулы; *d*, *f* — резцовый отросток и верхняя часть *pars incisiva*; *g* — максилла I; *h* — дистальный край верхней доли максиллы I; *i* — максилла II; *j* — максиддипеда.

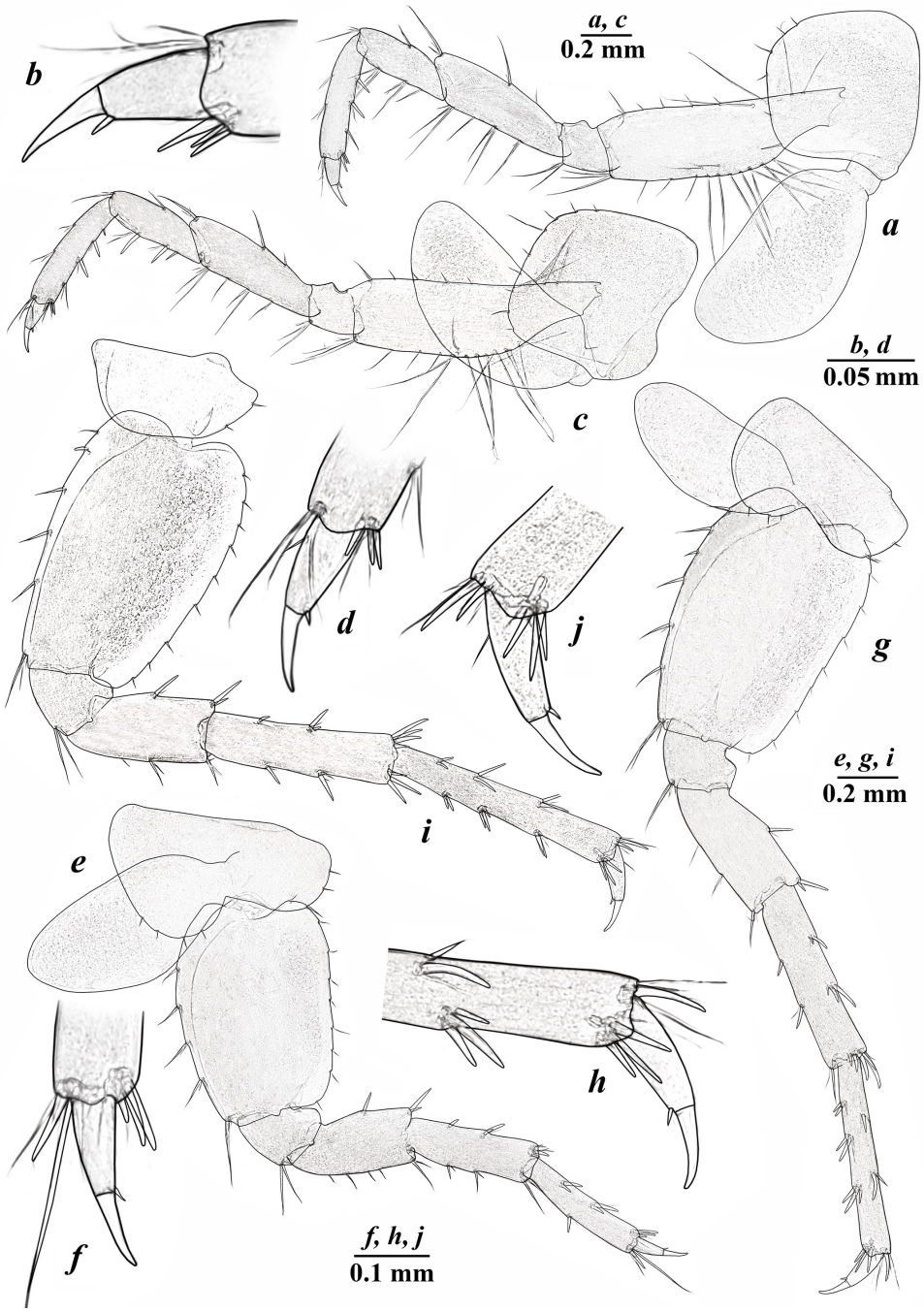

Fig. 5. *Niphargus olkhovik* sp.n., ♂: *a* — pereopod III; *b* — dactylus of PIII; *c* — pereopod IV; *d* — dactylus of PI; *e* — pereopod V; *f* — dactylus of PV; *g* — pereopod VI; *h* — dactylus of PVI; *i* — pereopod VII; *j* — dactylus of PVII.

Рис. 5. *Niphargus olkhovik* sp.n., ♂: *a* — переопода III; *b* — дактилус PIII; *c* — переопода IV; *d* — дактилус PI; *e* — переопода V; *f* — дактилус PV; *g* — переопода VI; *h* — дактилус PVI; *i* — переопода VII.; *j* — дактилус PVII.

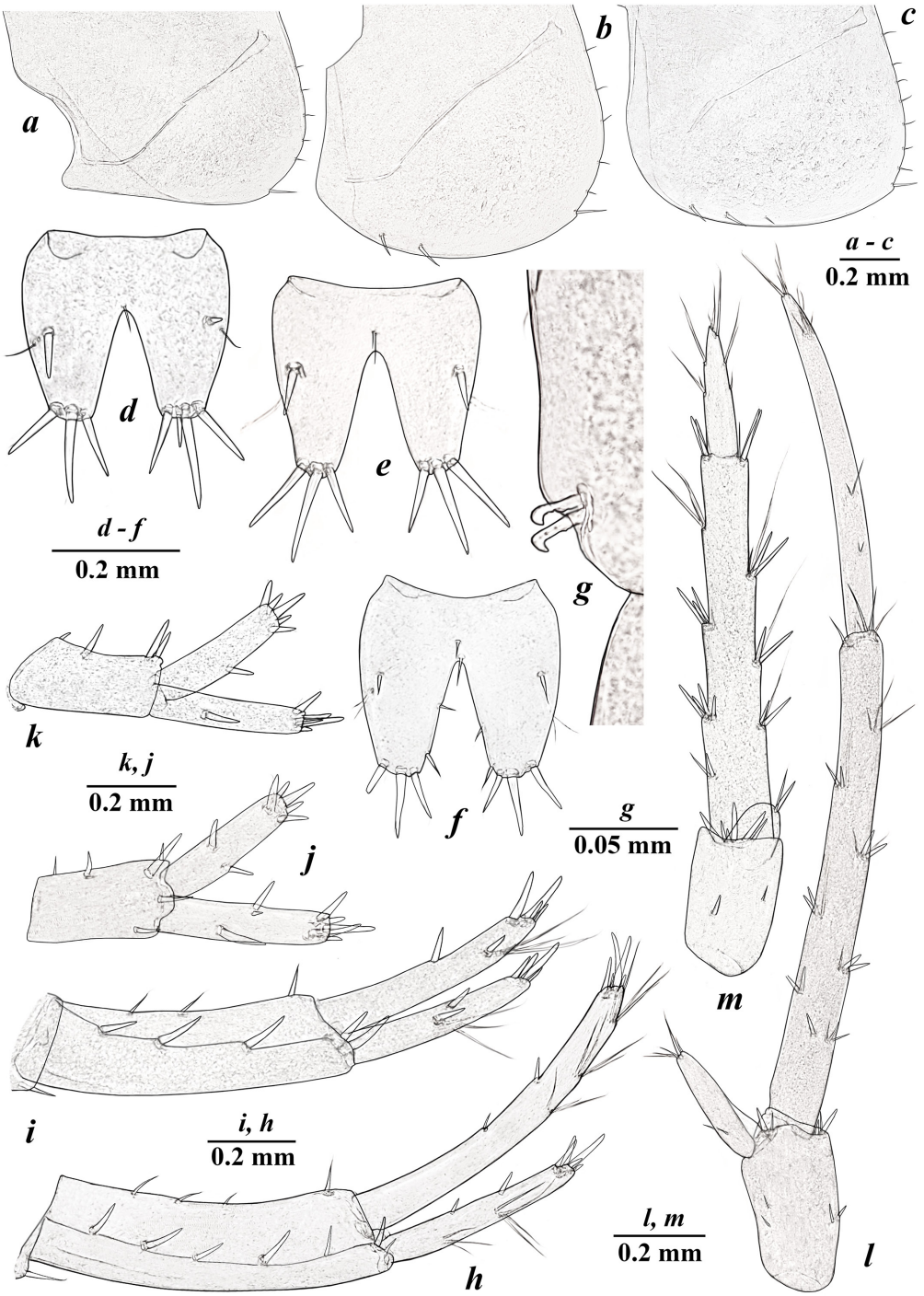

Fig. 6. *Niphargus olkhovik* sp.n., ♂ (*a*–*c*, *f*–*h*, *j*, *l*) and ♀ (*d*, *e*, *i*, *k*, *m*): *a*–*c* — epimeral plates I–III; *d*–*f* — telson; *g* — retinacule of pleopod II; *h*, *i* — uropod I; *j*, *k* — uropod II; *l*, *m* — uropod III.
Рис. 6. *Niphargus olkhovik* sp.n., ♂ (*a*–*c*, *f*–*h*, *j*, *l*) и ♀ (*d*, *e*, *i*, *k*, *m*): *a*–*c* — эпимеральные пластинки I–III; *d*–*f* — тельсон; *g* — ретинакула плеоподы II; *h*, *i* — уропода I; *j*, *k* — уропода II; *l*, *m* — уропода III.

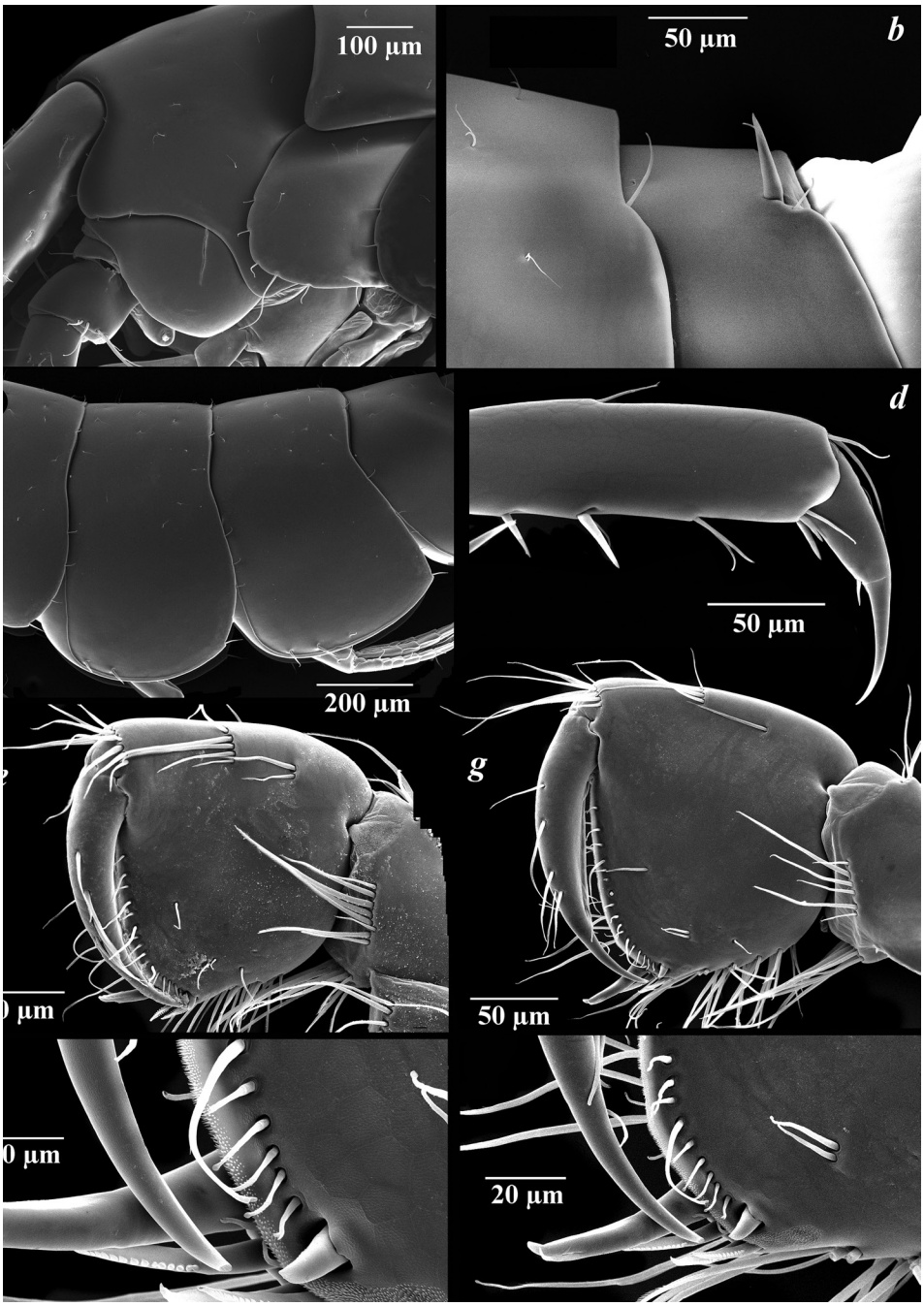

Fig. 7. *Niphargus olkhovik* sp.n., ♀: *a* — head; *b* — dorsal part of urosomal segments; *c* — epimeral plates II–III; *d* — dactylus of pereopod III; *e* — propodus (palm) of gnathopod I; *f* — palmar margin of chela of gnathopod I; *g* — propodus (palm) of gnathopod II; *h* — palmar margin of chela of gnathopod II.
Рис. 7. *Niphargus olkhovik* sp.n., ♀: *a* — голова; *b* — дорсальная часть уросомальных сегментов II–III; *c* — эпимеральные пластинки II–III; *d* — дактилус переопод III; *e* — проподус (клешня) гнатопод I; *f* — пальмарный выступ клешни гнатопод I; *g* — проподус (клешня) гнатопод II; *h* — пальмарный выступ клешни гнатопод II.

with 2 short aesthetascs each; accessory flagellum short, 2-articulated (Fig. 3*b*).

ANTENNA II (Fig. 3*d*, *e*): stout, peduncular article III short, slightly broadened than wide; peduncular article V shorter than article IV, with several long setae along ventral margin, dorsal setae shorter than inner ones; flagellum is about 0.9X of peduncular articles IV+V, relatively short, consisting of about 10–11 articles with relatively short setae. Antennal gland cone blunt, not exceeding peduncular article III.

LABRUM (upper lip) (Fig. 4*a*): typical, entire, subrounded.

LABIUM (lower lip) (Fig. 4*b*): entire, broader than long, with entire outer lobes and developed inner lobes, not exceeding the 1/3 of the length of outer lobes.

MANDIBLES (Fig. 4*c, e*): incisor process and *pars incisiva* similar to other *Niphargus* species (Fig. 4*d, f*). Incisor of left mandible with 5 teeth, *lacinia mobilis* with 4 teeth and row of 8 arcuate setae with lateral projections; incisor of right mandible with 4 teeth, *lacinia mobilis* bifurcate, pluritoothed and row of 7 arcuate setae with lateral projections; mandibular palp 3-articulated, with article ratio about 1.0/1.7/1.6 and represent 22%, 39% and 38% of total length of palp, respectively; article I smooth with slightly pronounced neck; article II with 9–10 setae, palp article III subfalciform, equal to article II, with 15 marginal D-setae and 5 long distal E-setae; on the outer face with 1 group of 4–5 A-setae, on the inner face with 3 groups of B-setae, without C-setae (Fig. 4*c*).

MAXILLA I (Fig. 4*g*): inner plate with 2 distal setae, outer plate with 7 robust spines (4 spines with 1 strong lateral tooth each, inner spine with 3 tiny lateral teeth (0–0–1–1–1–1–3)) (Fig. 4*h*); palp 2-articulated, distal article with 6–7 simple setae distally.

MAXILLA II (Fig. 4*i*): with smooth well-developed plate armed with distolateral setae only.

MAXILLIPED (Fig. 4*j*): inner plate short, with 3 strong distal spines intermixed with 5–6 distal simple setae, outer plate reaching half of palpus article II and bearing a row of 13–14 distolateral spines and distal setae; palpus article III with 1 distal bunch of setae at outer margin; palpus article IV with 1 median seta at outer margin; nail shorter than pedestal, with seta near basis.

GNATHOPOD I (Figs 3*f*, *h*; 7*e*): with basis robust, expanded distally, about twice longer than wide, with long simple setae along posterior and posterodistal margins; ischium almost quadrate, as long as wide, similar to merus, with posterior apical group of setae; merus quadrate, about as long as wide, with a row of setae along posterior margin; carpus trapezoid in shape; propodus large, nearly as long as broad, trapezoid, with 4 groups of posterior marginal setae, with poorly convex and slightly serrated palmar margin, covered with row of medium simple setae; defined on outer face by corner S-spine accompanied laterally by 3 serrate L-spines and 4 facial corner long M-setae, on inner face by 1 short subcorner R-spine (Figs 3*g*; 7*f*); dactylus strong and sharp, reaching the posterior margin of article VI, with a row of long simple setae along dorsal margin.

GNATHOPOD II (Figs 3*i*, *k*; 7*g*): slightly larger than gnathopod I; basis about 2.7X as long as wide, with long simple setae along posterior and posterodistal margins; ischium quadrate, with 1 median group of setae along posterior margin; merus rectangular, about 1.6X as long as wide, with a row of setae along posteromedian margin; carpus subtrapezoid in shape, significantly shorter than article propodus; propodus large, subtrapezoid, nearly as long as broad, with 6 groups of posterior marginal setae; palmar margin almost straight, with row of medium simple setae; provided on outer face by 1 corner strong robust S-spine accompanied laterally by 2 smaller serrate L-spines and 4 corner long M-setae, on inner face by 1 short subcorner R-spine (Figs 3*j*; 7*h*); dactylus strong and sharp, reaching the posterior margin of article VI, with a row of long simple setae along dorsal margin.

PEREOPODS III–IV (Fig. 5*a*, *c*): almost similar in size and shape, with robust articles; basis about 3.4–3.5X as long as wide, with posterior margin bearing long marginal setae; ischium short, about as long as wide; merus about 3.0–3.5X as long as wide, with slender simple setae along dorsal and ventral margins; carpus noticeably shorter than propodus, about 2.8–3.0X as long as wide; propodus about 4.6–5.5X as long as wide, with bunches of spines along ventral margin; dactylus (Fig. 5*b*, *d*) robust, relatively stout, curved, sharp distally, with 1 small ventral inner spine and 1 median short plumose seta at outer margin, with nail slightly shorter than pedestal.

PEREOPOD V (Fig. 5*e*): with basis almost rectangular, with feebly marked posteroventral lobe, posterior margin almost straight, with a row of 9 slender marginal setae, anterior margin convex, with row of 4 slender marginal setae that distinctly longer than posterior and bunch of setae in the distal part; ischium subquadrate, as long as wide; merus about 1.7X as long as wide, with bunches of slender spines along dorsal and ventral margins; carpus slender, about 3.2X as long as wide, slightly shorter than propodus; propodus slender, about 4.7X as long as wide, with bunches of short spines; dactylus (Fig. 5*f*) short, with 1 small ventral inner spine and 1 median short plumose seta at outer margin.

PEREOPOD VI (Fig. 5*g*): moderately slender, basis wide, about 1.5X as long as broad; with a feeble posteroventral lobe and almost straight posterior margin with row of 11 short marginal setae; anterior margin convex, with a row of 6 longer marginal setae; ischium short, as long as wide; merus about 1.6X as long as wide, with bunches of short spines along dorsal and ventral margins; carpus slender, about 4.4X as long as wide, slightly shorter than propodus, with bunches of spines intermixed with single short setae; propodus slender, about 7.5–7.8X as long as

wide, with several bunches of short spines; dactylus (Fig. 5*i*) slender, with 1 small ventral inner spine and 1 short median plumose seta at outer margin, with nail much shorter than pedestal.

PEREOPOD VII (Fig. 5*i*): moderately slender, basis stout, nearly twice as long as broad, with distinct posteroventral lobe, and with a convex posterior margin bearing a row of 10 short marginal setae; anterior margin convex, with a row of 5 longer marginal setae; ischium short, as long as wide; merus about 1.8X as long as wide, with bunches of short spines along dorsal and ventral margins; carpus slender, about 3.8X as long as wide, slightly shorter than propodus, with bunches of spines intermixed with single short setae; propodus slender, about 6.5X as long as wide, with several bunches of short spines; dactylus (Fig. 4*j*) slender, with 1 median spine and 1 seta at inner margin, and 1 short median plumose seta at outer margin, with nail much shorter than pedestal.

PLEOPODS: basal segment (peduncle) of pleopods covered with numerous plumose setae, with 2 hooks in retinacules (Fig. 6*g*).

UROPOD I (Fig. 6*h*, *i*): protopodite (peduncle) much longer than wide, about 3.8X as long as wide, slightly shorter or almost equal to outer ramus, with dorsoexternal row of 3–5 spines + 1–2 basal spine and spiniform setae, and dorso-internal row of 3–4 spiniform setae; rami unequal in length, outer ramus shorter in ♂♂ (Fig. 6*h*) than in ♀♀ (Fig. 6*i*); inner ramus more than 1.5X longer than inner one, not paddle-like in ♂♂ (Fig. 6*h*) and about 0.9X in ♀♀ (Fig. 6*i*), with lateral and distal relatively robust spiniform setae.

UROPOD II (Fig. 6*j*, *k*): protopodite (peduncle) nearly 2.0–2.3 X longer than wide, slightly shorter than rami, outer ramus slightly longer than inner one, both rami with lateral and distal slender spines.

UROPOD III (Fig. 6*l*, *m*): different in ♂♂ and ♀♀; with protopodite about 1.5–2.0X as long as wide, rami unequal, inner ramus (endopod) short, nearly 8.5X shorter than outer (exopod) ramus in ♀♀ (Fig. 6*m*) and nearly 6.8X in ♂♂ (Fig. 6*l*), bearing several small distal and lateral spines; outer ramus long, proximal article about 6.5X as long as wide in ♀♀ (Fig. 6*m*) and 9.5X in ♂♂ (Fig. 6*m*); distal article about 0.7X of length of proximal article, with 2 groups of short thin-flexible setae along each margin and group of simple setae apically in ♂♂ (Fig. 6*m*) and about 0.3X of length of proximal article, with 1–2 groups of long flexible setae along each margin and group of simple setae apically in ♀♀ (Fig. 6*l*).

TELSON (Fig. 6*d–f*): relatively stout, subquadrate, variable in shape, from about as long as broad (Fig. 6*d*, *f*) to remarkably broader than wide (Fig. 6*e*), ca 65% incised, lobes obtuse and sloping distally; with variable armature bearing usually 3 slender distal spines, reaching 0.3–0.5X of telson length, with several separate smaller lateral spines; dorsal surface of telson with 1 large dorsal submarginal spine on each side, accompanying by 2 plumose setae and usually 2 simple short dorsal spines in proximal part of telson.

Coloration. Body coloration (Fig. 2) of living animals varies from completely white to pinky or light orange; head with bright yellow spots.

Body size. The largest collected ♀ has bl. 7.5 mm; the largest collected ♂ has bl. 10.0 mm.

GenBank numbers. PV494981–PV494984.

Taxonomic remarks. *Niphargus olkhovik* sp.n. is mostly morphologically similar to *N.bzhidik* Marin, Krylenko et Palatov, 2021, which was described from the valley of several neighboring mountainous rivers, Skupkova Shel, a small tributary of Pshada River, and basins of Vulan and Tesebs rivers (Marin *et al*., 2021). The new species can be easily separated from *N. bzhidik* (after Marin *et al*., 2021) by 1) stouter peduncular segments of antenna I; 2) the presence of well-marked additional ventral spinules of distal spines of maxilla I (vs. small and invisible); 3) less bloated palpus article IV of maxilliped; 4) the presence of 2 spine-like setae on ventral margin of epimeral plate II (vs. 3 spine-like setae); 5) bluntly rounded posteroventral corner and only 3 spine-like setae along ventral margin of epimeral plate III (distinctly posteriorly produced posteroventral corner and 4 spine-like setae long ventral margin); 6) more produced lobes of telson, which about 2.5X longer than wide (vs. about 2.0X); and 7) relatively shorter distal exopodal segment of uropod III, which about 7X as long as wide (vs. 9X).

For the difference from other species of the ingroup see below.

Habitat and ecology. The newly discovered species belongs to the "*puteanus*" species group, which includes many epigean species. In terms of ecology, it is closely related to the previously described *N. bzhidik* (see Marin *et al*., 2021). The new species was also discovered in various groundwater seepage points in several mountainous river valleys, including those of the Olkhovka (Olkhovaya Schel) River, as a pat of drainage basin of large mountainous Doguab River, the right tributary of Pshada River. It was found in small surface streams, often under the fallen leaves of beech trees (*Fagus* sp.) and hornbeam trees (*Carpinus* sp.), or under rocks. Some specimens were collected in small puddles, about 10 centimeters deep, which form only during periods of high humidity, with an earthen bottom covered in a layer of fallen leaves.

Distribution. *Niphargus olkhovik* sp.n. shows a local distribution and is currently discovered in a drainage basin of the Olkhovka (Olkhovaya Schel) River; it could probably be found in the drainage valleys (basins) of the Doguab River and its tributaries.

Niphargus natukhai sp.n.

Figs 8, 9.

Material examined. HOLOTYPE, ♂ (bl. 10.0 mm) (ZMMU Mb-1304), Russian Federation, Kras-

nodar Kray, Krymsky District, a captured spring by road near the village of Sadovyi (Hutor Sadovyi), 45°00′54.95″N 37°45′46.98″E, about 155 m asl, coll. I. Marin & D. Palatov, 10 May 2018.

PARATYPE, ♀ (bl. 8.0 mm) (ZMMU Mb–1305); 1♂, 3♀♀ (bl. 7.0–8.0 mm) (ZMMU Mb-1306), same data and locality as holotype.

ADDITIONAL MATERIAL: 2♂♂, 28♀♀ (LEMMI), same data and locality as holotype.

Etymology. The species is named after Natukhai people, the ethnographic group (subethnos) of the Adygs (Circassians), which previously lived in the historical and geographical region of Natukhai, once one of the most densely populated regions of Cherkessia, occupying foothills of the Caucasus from the mouth of the Kuban River (in the north) up to the modern territory of the Tuapse region (in the south). Currently, historical Natukhai people live in the village of Natukai (Adygea) and are dispersed in various settlements of the Republic of Adygea, as well as beyond its borders, including outside Russian Federation. Currently, a significant number of Natukhai people live in Turkey.

Diagnosis. *Head* with feebly marked yellow pigmented spots on anterior lobe. Posteroventral corners of *epimeral plates I–III* rounded. *Urosomite I* with 1 slender seta; *urosomite II* with 1 spine + 0–1 additional seta on each side. Dactyli of *pereopods III–VII* with a small ventral inner spine. Rami of *uropod I* unequal in size: outer ramus about 1.4 times larger than inner one in ♂♂ and slightly larger than inner one in ♀♀. *Pleopods* with 3 hooks in retinacules. *Telson* with 3 relatively long distal spines on each lobe, with medium lateral spines, accompanied by 1–2 plumose setae on each side; dorsal surface with 1 large dorsal submarginal spine on each side, accompanied by 1–2 plumose setae, and 1–2 simple short dorsal spines in proximal part of telson.

Description. BODY: moderately slender, stygomorphic.

HEAD: without rostrum, with feebly pigmented yellow spots on anterior lobe, with subrounded lateral cephalic lobes and excavated anteroventral sinus (Fig. 9*a*).

MESOSOMA: mesosomal segments smooth.

METASOMA: metasomal segments I–III with several short marginal setae on each posterodorsal margin.

EPIMERAL PLATES (Fig. 8*a–c*): epimeral plates I–III with rounded posteroventral corners. Epimeral plate I (Fig. 8*a*) ventral margin distinctly concave, without ventrofacial setae; posterior margin convex bearing 5–6 short marginal setae, posteroventral corner subrounded with 1 strong seta. Epimeral plate II (Fig. 7*b*) with convex ventral margin, with 2 well marked + 1 tiny ventrofacial setae, with distinctly convex posterior margin bearing 5 short marginal setae; posteroventral corner subrounded, with 1 strong seta. Epimeral plate III (Fig. 8*c*) with convex ventral margin, with 3 well marked + 1 tiny ventrofacial setae, with distinctly convex posterior margin bearing 9 short marginal setae; posteroventral corner subrounded, with 1 strong seta.

UROSOMITES (Fig. 9*b*, *c*): Urosomite I with 1 slender seta on each dorsolateral side; urosomite II with 1 simple strong spine and 0–1 additional seta on each dorsolateral side; urosomite III unarmed.

COXAE: coxae I–IV moderately large, with short ventromarginal setae. Coxa I nearly as long as broad, with subrounded anteroventral corner bearing 10 setae; coxa II nearly as long as broad, with bluntly produced anteroventral corner bearing 9 setae; coxae III–IV as short as broad; coxae V–VII shorter than coxa IV; coxa V with 4 setae on anterior, and 2 setae at posterior lobe; coxa VI with 2 setae on anterior and 1 seta at posterior lobe; coxa VII with 1 seta at posterior lobe.

COXAL GILLS: present on pereopods II–VI, ovoid, relatively large; of gills/bases pereopod length ratio about 0.8/1; 0.85/1; 1.1/1; 1.04/1 and 0.8/1, respectively. Oostegites occur on pereopods II–V.

ANTENNA I (Fig. 8*d*): relatively stout; peduncular articles moderately stout, ratio about 1/0.7/0.32; main flagellum consisting of about 21 articles, most of them with 2 short aesthetascs each; accessory flagellum short, 2-articulated.

ANTENNA II (Fig. 8*e*): stout, peduncular article III short, slightly broadened than wide; peduncular article V shorter than article IV, with several long setae along ventral margin, dorsal setae shorter than inner ones; flagellum is about 0.6X of peduncular articles 4+5, relatively short, consisting of about 9 articles with relatively short setae. Antennal gland cone blunt, not exceeding peduncular article III.

LABRUM (upper lip): typical, entire, subrounded.

LABIUM (lower lip): entire, broader than long, with entire outer lobes and developed inner lobes, not exceeding the 1/3 of the length of outer lobes.

MANDIBLES: incisor of left mandible with 5 teeth, *lacinia mobilis* with 4 teeth and row of 10 arcuate setae with lateral projections; incisor of right mandible with 4 teeth, *lacinia mobilis* bifurcate, pluritoothed and row of 8 arcuate setae with lateral projections; mandibular palp 3-articulated, with article ratio about 1.0/1.8/1.8 and represent 21%, 39% and 39% of total length of palp, respectively; article I smooth with pronounced neck; article II with 9–11 setae, palp article III subfalciform, barely longer than article II, with 19–20 marginal D-setae and 5 long distal E-setae; on the outer face with 1 group of 5 A-setae, on the inner face with 3 groups of B-setae, without C-setae (Fig. 9*d*).

MAXILLA I: inner plate with 2 distal setae, outer plate with 7 robust spines with tiny additional spinules, inner spine with 3 small lateral teeth (1–0–1–1–1–1–3)); palp 2-articulated, distal article with 7–8 simple setae distally.

MAXILLA II: with smooth well-developed plate armed with distolateral setae only.

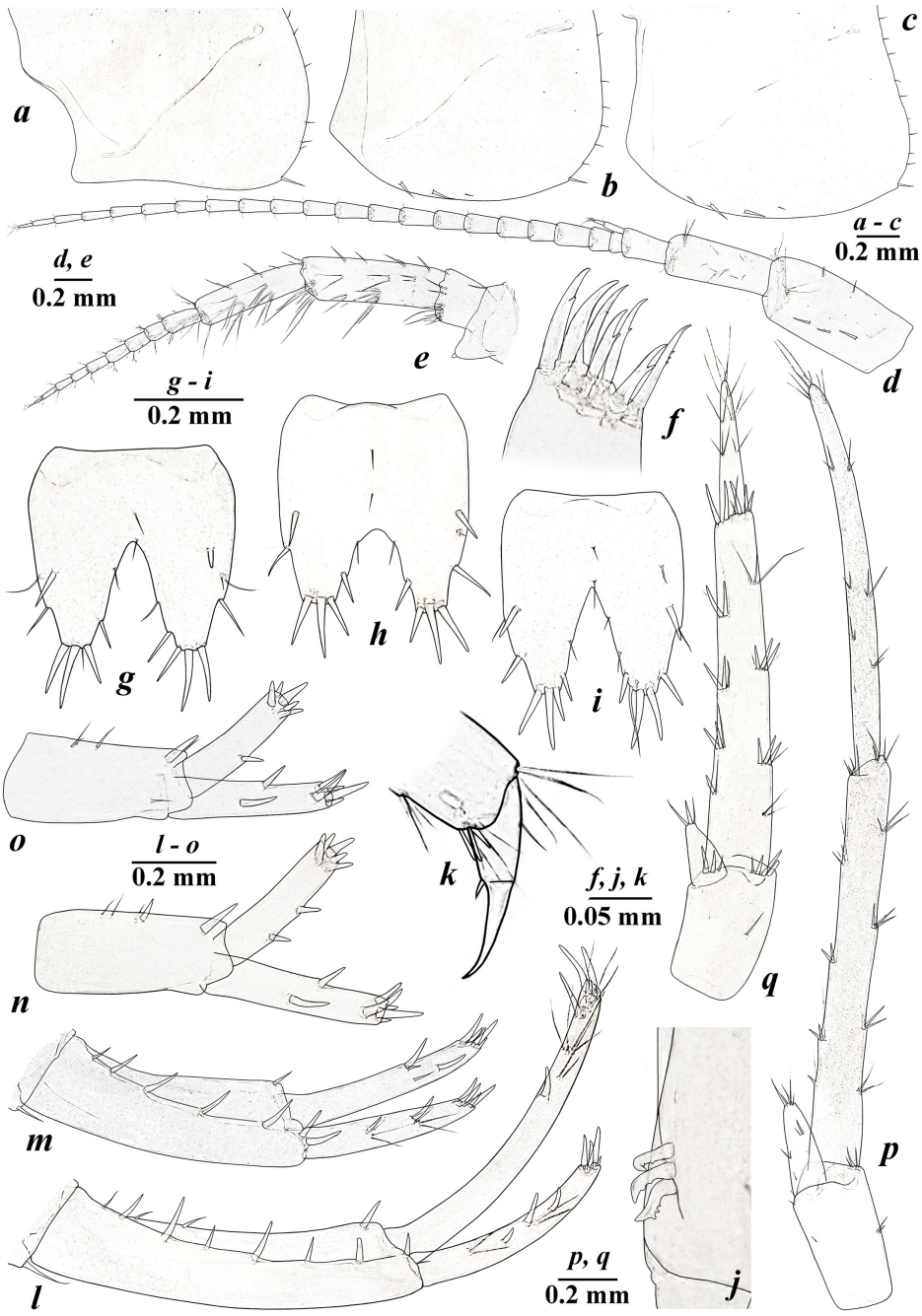

Fig. 8. *Niphargus natukhai* sp.n., ♂ (*a–h*, *k–l*, *n*, *p*) and ♀ (*i*, *m*, *o*, *q*): *a–c* — epimeral plates I–III; *d* — antenna I; *e* — antenna II; *f* — distal teeth of outer lobe of maxilla I; *g–i* — telson; *k* — dactylus of pereopod III; *j* — retinacule of pleopod I; *l*, *m* — uropod I; *n*, *o* — uropod II; *p*, *q* — uropod III.

Рис. 8. *Niphargus natukhai* sp.n., ♂ (*a–h*, *k–l*, *n*, *p*) и ♀ (*i*, *m*, *o*, *q*): *a–c* — эпимеральные пластинки I–III; *d* — антенна I; *e* — антенна II; *f* — дистальные зубцы наружной доли максиллы I; *g–i* — тельсон; *k* — дактилус переоподы III; *j* — ретинакула плеоподы I; *l*, *m* — уропода I; *n*, *o* — уропода II; *p*, *q* — уропода III.

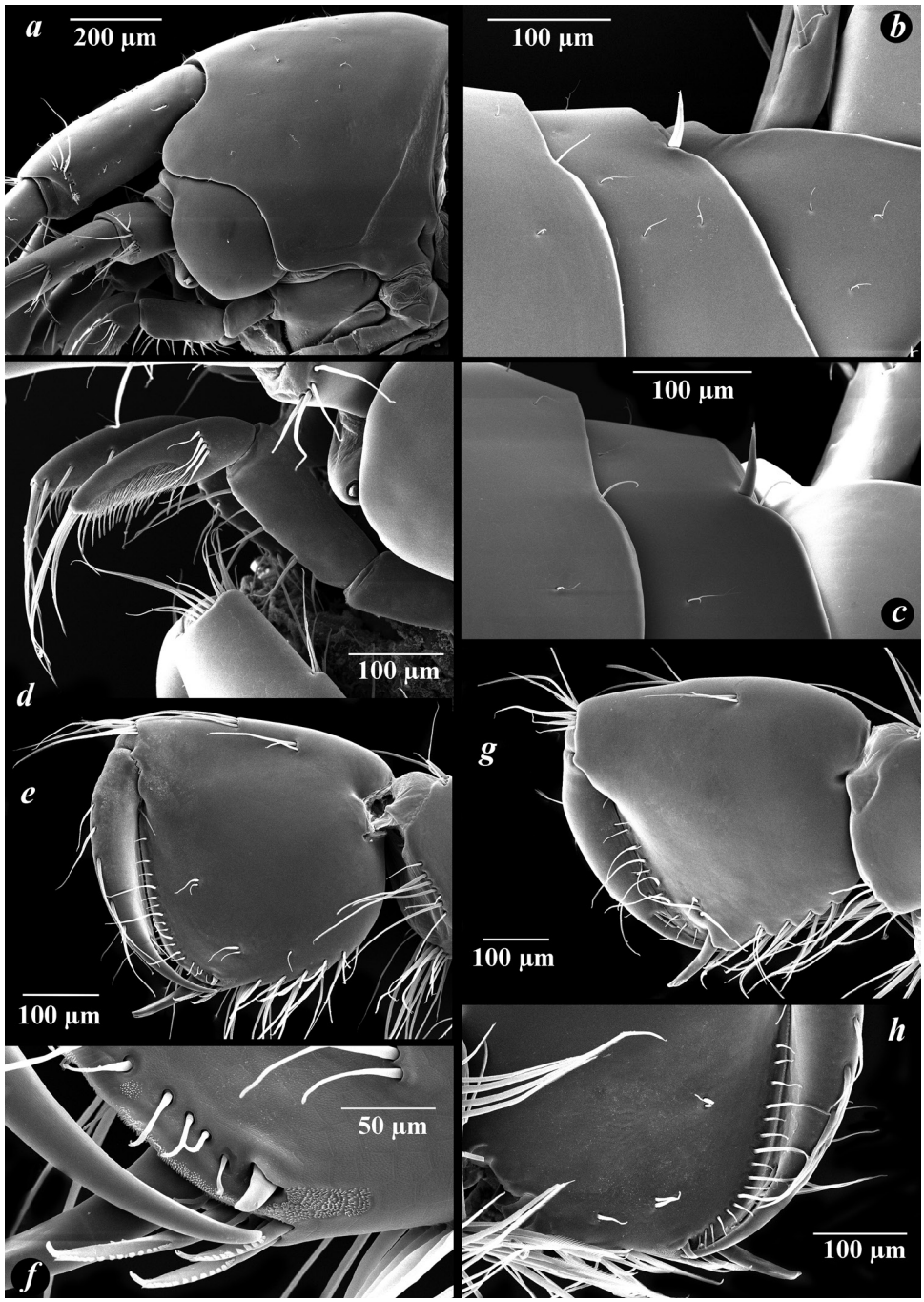

Fig. 9. *Niphargus natukhai* sp.n., ♀: *a* — head; *b*, *c* — dorsal part of urosomal segments II–III; *d* — distal segments of mandibular palm; *e* — propodus of gnathopod I; *f* — palmar margin of chela of gnathopod I; *g* — propodus (palm) of gnathopod II; *h* — palmar margin of chela of gnathopod II.

Рис. 9. *Niphargus natukhai* sp.n., ♀: *a* — голова; *b*, *c* — дорсальная часть сегментов уросомы II–III; *d* — дистальные сегменты мандибулярного щупика; *e* — проподус (клешня) гнатопод I; *f* — пальмарный выступ клешни гнатопод I; *g* — проподус (клешня) GnII; *h* — пальмарный выступ клешни гнатопод II.

MAXILLIPED: inner plate short, with 4 distal spines intermixed with 4–5 distal simple setae, outer plate reaching half of palpus article II and bearing a row of 18–19 distolateral spines and distal setae; palpus article III with 1 median and 1 distal bunch of setae at outer margin; palpus article IV with 1 median seta at outer margin; nail shorter than pedestal, with seta near basis.

GNATHOPOD I: with basis robust, expanded distally, about twice longer than wide, with long simple setae along posterior and posterodistal margins; ischium almost quadrate, as long as wide, similar to merus, with posterior apical group of setae; merus quadrate, about as long as wide, with a row of setae along posterior margin; carpus trapezoid in shape; propodus (Fig. 9*e*, *f*) large, nearly as long as broad, trapezoid, with 5 groups of posterior marginal setae, with poorly convex and slightly serrated palmar margin, covered with medium simple setae; defined on outer face by a single corner S-spine accompanied laterally by 3 serrate L-spines and 4 facial corner long M-setae, on inner face by one short subcorner R-spine; dactylus strong and sharp, reaching the posterior margin of article 6, with a row of small numerous simple setae along dorsal margin.

GNATHOPOD II: slightly larger than gnathopod I; basis about 3X as long as wide, with long simple setae along posterior and posterodistal margins; ischium quadrate, with 1 median group of setae along posterior margin; merus rectangular, about 1.6X as long as wide, with a row of setae along posteromedian margin; carpus subtrapezoid in shape, significantly shorter than propodus; propodus (Fig. 9*g*) large, subtrapezoid, nearly as long as broad, with 6 groups of posterior marginal setae; palmar margin (Fig. 9*h*) poorly convex, with row of medium simple setae; provided on outer face by a single corner strong robust S-spine accompanied laterally by 2 smaller serrate L-spines and 4 corner long M-setae, on inner face by 1 short subcorner R-spine; dactylus strong and sharp, reaching the posterior margin of article 6, with a row of small numerous simple setae along dorsal margin.

PEREOPODS III–IV: almost similar in size and shape, with robust articles; basis about 3.5–3.7X as long as wide, with posterior margin bearing long marginal setae; ischium short, about as long as wide; merus about 3.2–3.9X as long as wide, with slender simple setae along dorsal and ventral margins; carpus noticeably shorter than propodus, about 2.8–2.9X as long as wide; propodus about 4.0X as long as wide, with bunches of spines along ventral margin; dactylus robust, relatively stout, curved, sharp distally, with 1 small ventral inner spine and 1 median short plumose seta at outer margin, with nail slightly shorter than pedestal.

PEREOPOD V: with basis almost rectangular, with feebly marked posteroventral lobe, posterior margin almost straight, with a row of 9 slender marginal setae, anterior margin convex, with row of 4 slender marginal setae that distinctly longer than posterior and bunch of setae in the distal part; ischium subquadrate, as long as wide; merus about 2.2X as long as wide, with bunches of slender spines along dorsal and ventral margins; carpus slender, about 3.7X as long as wide, subequal to propodus; propodus slender, about 5.0X as long as wide, with bunches of short spines; dactylus short, with 1 small ventral inner spine and 1 median short plumose seta at outer margin.

PEREOPOD VI: moderately slender, basis wide, about 1.5X as long as broad; with a feeble posteroventral lobe and almost straight posterior margin with row of 10 short marginal setae; anterior margin convex, with a row of 5 longer marginal setae; ischium short, as long as wide; merus about 2.4X as long as wide, with bunches of short spines along dorsal and ventral margins; carpus slender, about 4.0X as long as wide, slightly shorter than propodus, with bunches of spines intermixed with single short setae; propodus slender, about 6.0–6.2X as long as wide, with several bunches of short spines; dactylus slender, with 1 small ventral inner spine and 1 short median plumose seta at outer margin, with nail much shorter than pedestal.

PEREOPOD VII: moderately slender, basis stout, nearly twice as long as broad; with distinct posteroventral lobe, and with a convex posterior margin bearing a row of 11 short marginal setae; anterior margin convex, with a row of 5 longer marginal setae; ischium short, as long as wide; merus about 2.2X as long as wide, with bunches of short spines along dorsal and ventral margins; carpus slender, about 3.6X as long as wide, slightly shorter than propodus, with bunches of spines intermixed with single short setae; propodus slender, about 6.0X as long as wide, with several bunches of short spines; dactylus slender, with 1 median spine and 1 seta at inner margin, and 1 short median plumose seta at outer margin, with nail much shorter than pedestal.

PLEOPODS: basal segment (peduncle) covered with numerous plumose setae, with 3 hooks in retinacula on pleopod I (Fig. 8*j*) and with 2 hooks in retinacules on pleopod II–III.

UROPOD I (Fig. 8*l*, *m*): protopodite (peduncle) about 5.0X longer than wide, about twice longer that inner ramus and almost equal to outer ramus in ♂♂ (Fig. 8*l*) and mostly equal to rami in ♀♀ (Fig. 8*m*), with dorsoexternal row of 6–8 spines + 2 basal spiniform setae, and dorso-internal row of 1–3 spiniform setae; rami unequal in length in ♂♂ (Fig. 7*l*) and ♀♀ (Fig. 8*m*); inner ramus about 1.6X longer than outer ramus in ♂♂ (Fig. 8*l*) and equal in ♀♀ (Fig. 8*m*), not paddle-like, with lateral and distal relatively robust spiniform setae.

UROPOD II (Fig. 8*n*, *o*): protopodite (peduncle) nearly 2.3–2.5X longer than wide, about as long as both rami in ♂♂ (Fig. 7*n*) and ♀♀ (Fig. 8*o*); outer ramus slightly longer than inner one, both rami with lateral and distal slender spines.

UROPOD III (Fig. 8*p*, *q*): different in ♂♂ and ♀♀; with protopodite about 1.6–1.9X as long as wide; rami unequal, inner ramus (endopod) short, nearly 7.7X shorter than outer (exopod) ramus in ♀♀ (Fig. 8*q*) and nearly 9.0X in ♂♂ (Fig. 8*p*), bearing several small distal and lateral spines; outer ramus long, proximal article about 5.7X as long as wide in ♀♀ (Fig. 8*q*) and 9.2X in ♂♂ (Fig. 8*p*); distal article mostly equal to proximal article, with 3 groups of short thin-flexible setae along each margin and group of simple setae apically in ♂♂ (Fig. 8*p*) and about 0.38–0.40X of length of proximal article, with 3 groups of long flexible setae along each margin and group of simple setae apically in ♀♀ (Fig. 8*q*).

TELSON (Fig. 8*g*–*i*): stout, subquadrate, slightly longer than wide, ca 43–56% incised, lobes obtuse and sloping distally; with variable armature bearing usually 3 slender distal spines, reaching 0.32–0.35X of telson length, with several separate smaller lateral spines; dorsal surface of telson with 1 large dorsal submarginal spine on each side, accompanying by 2 plumose setae, with 2–4 simple short dorsal spines in proximal part of telson.

Coloration. Body coloration of alive animals varies from completely white to yellowish; head with small yellow spots.

Body size. The largest collected ♀ has bl. 10.0 mm; the largest collected ♂ has bl. 8.0 mm.

GenBank numbers. PV494979, PV494980.

Taxonomic remarks. *Niphargus natukhai* sp.n. is closely related to already described *Niphargus bzhidik* Marin, Krylenko et Palatov, 2021 and *Niphargus olkhovik* sp.n. (see above), forming small local Caucasian "*bzhidik*" ingroup, referring to the European "*puteanus*" species group.

The new species most morphologically similar to *N. bzhidik* (see Marin *et al*., 2021) and could be distinctly separated only by 1) ventral margin of epimeral plate I distinctly concave (vs. almost straight); and 2) bluntly rounded and non-produced posteroventral corner and only 3 well marked spine-like + 1 tiny setae along ventral margin of epimeral plate III (vs. distinctly posteriorly produced and 4 well marked spine-like setae long ventral margin of epimeral plate III).

At the same time, it could be separated from *N. olkhovik* sp.n. (see above) by 1) relatively slender stouter peduncular segments of antenna I; 2) additional spinules on distal spines on outer plate of maxilla I smaller and sometimes invisible (vs. well-marked); 3) distinctly bloated palpus article IV of maxilliped; 4) ventral margin of epimeral plate I distinctly concave (vs. almost straight); 5) the presence of 3 spine-like setae on ventral margin of epimeral plate II (vs. 2 spine-like setae); 6) pleopod I with 3 hooks in retinacules (vs. 2 hooks); 7) relatively slender distal exopodal segment of uropod III, which about 9X as long as wide (vs. about 7X); and 8) stouter lobes of telson, which about 2.0X longer than wide (vs. about 2.5X).

Habitat and ecology. All known specimens of this species were found in a single small spring in the southwestern foothills of the Caucasus, within the boundaries of the Sadovyi (Hutor Sadovyi) (45°00′53.8″N 37°45′46.7″E). There is almost no pronounced mountainous relief in this area and currently only one stygobiotic species of the genus *Niphargus*, *N. utrishensis* Marin et Palatov, 2021, has been discovered in the hyporhean habitats of local mountainous rivers, wells and springs (see Marin *et al*., 2021). The later species was not found in the spring where *N. natukhai* sp.n. was collected.

Also, stygobiotic *Proasellus*, *P. abini* Marin et Sinelnikov, 2024 (Isopoda: Asellidae) have been recently described from the hyporhean habitats of Adygoi–Abin river basin (Marin, Sinelnikov, 2024).

Distribution. *Niphargus natukhai* sp.n. is obviously a local endemic, currently known only from its type locality (45°00′54.95″N 37°45′46.98″E), a small spring located in the southwestern foothills of the Caucasus (see Fig. 1).

Discussion

Species of the "*Niphargus bzhidik*" ingroup are currently found on both sides of the Caucasian Ridge (see Fig. 1), which indicates their long-standing appearance in this territory and probably a high but still unexplored diversity. Currently, we know five species of this ingroup, two of which remain undescribed as only a few small specimens have been captured. At the same time, due to long-term genetic isolation, it is currently impossible to accurately identify closely related species within the "*puteanus*" species group using only the COI mtDNA gene marker, as different studies have shown different results. Among the suggested phylogenetically related congeners "*Niphargus bzhidik*" ingroup (clade) are representatives of the Caucasian "*abchasicus*" and "*inopinatus*" species groups, *Niphargus hrabei* S. Karaman, 1932, as well as the European and Balkan species, such as *N. molnari* Méhely, 1927, *N. schellenbergi* S. Karaman, 1932, *N. inopinatus* Schellenberg, 1932, *N. aquilex* Schiödte, 1855, *N. gallicus* Schellenberg, 1935, *N. murimali* Fišer, Konec, Alther, Švara et Altermatt, 2017 and *N. caspary* (Pratz, 1866). We believe that it is currently impossible to accurately identify the closest related species for this ingroup, as more serious genetic studies with a large number of genetic markers are required.

Some species of this ingroup is also characterized by an exceptionally unexpected wide distribution and epigean ecology for the representatives of the genus. For example, early *N. brzidik* Marin, Krylenko et Palatov, 2021was found in various sources of groundwater seepage in the valley of the neighboring Pshada River, namely Skupkova Schel, Vulan (with a tributary of the Tekos River), Teshebs and Bzhid, flowing into the Black Sea, and was quite numerous in springs and wells, as well as in riverbeds. under fallen leaves or under rocks in places with a weak current. The newly discovered *Niphargus olkhovik* sp.n. was also found in various groundwater seepage sites in the valleys of several mountain rivers, including in the valleys of the Olkhovka River (Olkhovaya Schel), which is part of the catchment area of the large mountainous Doguab River, a right tributary of the Pshada River, where it was found in small surface streams or in small puddles about 10 centimeters deep, which They form only during periods of high humidity, with an earthen bottom covered with a layer of fallen leaves. However, *Niphargus natukhai* sp.n. and two other undescribed species were found in typically underground habitats, in the place where water flows out of a pipe (probably a captive spring), as well as several wells. These species can be very narrowly endemic, and there are probably species with different ecologies within the same ingroup.

For most species of the genus *Niphargus*, nutrition is still poorly understood due to their small size and cryptic lifestyle, which did not allow such observations. At the same time, nutrition is an important part of animal ecology and its study would bring a lot of new data. Nevertheless, using stable isotopes of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$), it was possible to obtain data indicating a strong differentiation of nutrition within the genus. The analysis of stable isotopes ($\delta^{13}C/\delta^{15}N$) has shown that *N. bzhidik* is carnivorous (Marin *et al.*, 2021a). We suppose that all species within the ingroup are carnivorous (C2), in contrast to other stygobiotic herbivorous (C1) *Niphargus* species, which have been studied in the area (e.g., "*Niphargus taurcius*" ingroup).

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Conflicts of Interest: The authors declare no conflict of interest.

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