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Gordan S. KARAMAN¹

DISCOVERY OF THE MALE OF THE SUBTERRANEAN SPECIES NIPHARGUS OZIMECI KARAMAN, G., 2011 (FAM. NIPHARGIDAE) IN BOSNIA & HERZEGOVINA (CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 262)

SUMMARY

The species *Niphargus ozimeci* (Amphipoda, Niphargidae) has been described recently (Karaman, G., 2011) from the subterranean waters of cavespring Mokrinjska Miljacka near Pale, Bosnia & Herzegovina, based on one adult ovigerous female. Based on new material collected from the same locality, the male of this species is described and figured here, and the taxonomic relationship between this species and other known *Niphargus* species from Bosnia & Herzegovina is discussed.

Keywords: taxonomy, Amphipoda, Niphargidae, *Niphargus ozimeci*, male, Bosnia & Herzegovina.

INTRODUCTION

The fauna of Amphipoda (Crustacea, Malacostraca) in Bosnia and Herzegovina is still only partially studied despite the fact that various species of this group have been discovered and described [Absolon, 1913, 1927; Schäferna, 1922; Spandl, 1926; Karaman, S. 1931, 1932, 1943, 1950, 1952, 1960; Sket 1958, 2003; Fišer et al., 2006; Fišer et al., 2007; Karaman, G., 1972, 1974, 1977, 1984, 1985, 2010, 2011, etc.].

Last year (2011) Karaman, G. described one new subterranean species of Amphipoda from the spring-cave of Mokranjska Miljacka river in Bosnia (Sarajevo reg.), *Niphargus ozimeci*, sp. n., based on one adult ovigerous female. As the male of this species was unknown, the real status of this taxon within the genus *Niphargus* was not possible to recognize. Recently I received additional specimens of this species from the same locality, i.e. one adult male and one juv. specimen. We described and figured here the male of N. ozimeci and confirm the specific value of this species within the genus *Niphargus*, and existing differences regarding other known *Niphargus* species of Bosnia and Herzegovina.

MATERIAL AND METHODS

The samples were collected from the subterranean waters using small hand nets, preserved in 70% ethanol. Specimens were examined and dissected

¹ Gordan S. KARAMAN, Ph.D. (e-mail: karaman@t-com.me), Montenegrin Academy of Sciences and Arts, Podgorica, Crna Gora (Montenegro)

using a Wild M 20 stereomicroscope and drawn using a camera lucida attachment. The animal was temporarily mounted in the mixture of glycerin and water for dissection and drawings of body parts, and later transferred to liquid of Faure for final preservation. The body length of examined specimens was measured by tracing individual's mid-trunk lengths (tip of the rostrum to end of telson) using a camera lucida. All illustrations were inked manually.

TAXONOMICAL PART

Fam. Niphargidae

NIPHARGUS OZIMECI Karaman, G., 2011 Figs. 1-5

Niphargus ozimeci Karaman, G., 2011: 181, figs. 1-3.

MATERIAL EXAMINED: BOSNIA & HERZEGOVINA: Spring cave of Mokrinjska Miljacka river near Pale, 28.6.2008, 1 male, 1 juv. (leg. L. Lukić).

DIAGNOSIS OF THE SPECIES: Slender species, metasomal segments with scarce number of dorsoposterior marginal setae; urosomite 1 with single dorsolateral seta, urosomite 2 with dorsolateral spine on each side, urosomite 3 naked. Coxae 1-4 short. Epimeral plates 1-2 in female are angular, and epimeral plate 3 acute. Epimeral plates 1-3 in male distinctly subrounded.

Antenna 1 with peduncular articles 1-3 progressively shorter. Antenna 2 slender. Maxilla 1 inner plate with 2 setae, outer plate with 7 spines (6 spines with one lateral tooth each). Gnathopods 1-2 large, with propodits trapezoid, remarkably inclined, dactylus of gnathopods with row of several long setae along outer margin. Pereopods 3-7 moderately slender; basipodit of pereopods 5-7 narrow, without lobe, dactylus of pereopods 3-7 relatively slender and long, with one spine along inner margin. Pleopods with 2 retinacula each. Both rami of uropods 1-2 in female of equal length, in male inner ramus of uropods 1-2 distinctly longer than outer one. Uropod 3 elongated, scarcely setose; second article of outer ramus in female slightly shorter than half of first article, in male poorly shorter than first article. Telson deeply incised, as long as broad or hardly broader than long, each lobe with numerous distal and marginal spines. Coxal gills 1-4 long, exceeding ventral tip of corresponding basipodites.

DESCRIPTION OF MALE, 13.1 mm (paratype). Body slender, metasomal segments 1-3 with 4-5 dorsoposterior marginal short setae each (fig.1G). Urosome segment 1 on each dorsolateral side with one seta, and with one ventroposterior spine near basis of uropod 1-peduncle (fig.5G). Urosome segment 2 with one spine on each dorsolateral side (fig. 5G), urosome segment 3 naked.

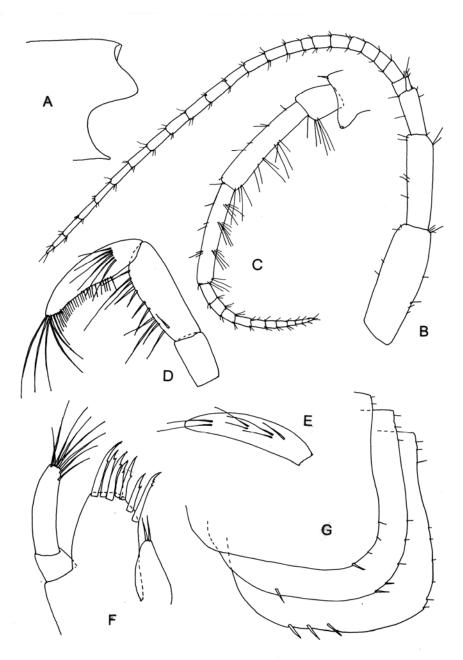


Fig. 1. *Niphargus ozimeci* Karaman, G., 2011, spring cave of Mokrinjska Miljacka, male 13.1 mm (paratype): A= head; B= antenna 1; C= antenna 2; D= palpus of mandible, outer face; E= tip of mandible palpus, inner face; F= maxilla 1; G= epimeral plates 1-3.

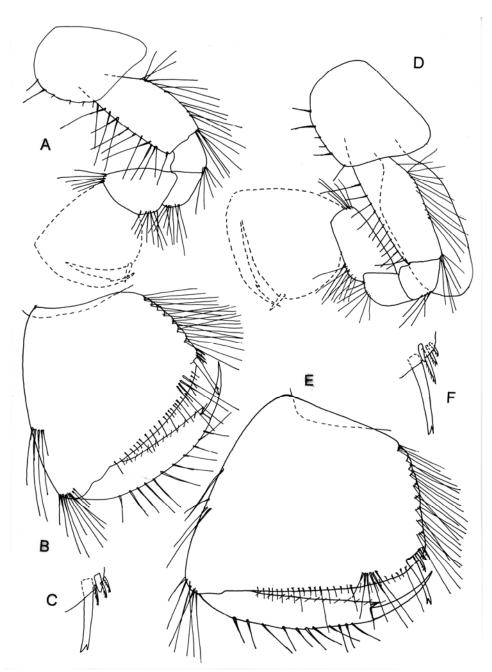


Fig. 2. *Niphargus ozimeci* Karaman, G., 2011, spring cave of Mokrinjska Miljacka, male 13.1 mm (paratype): A-B= gnathopod 1; C= tip of gnathopod 1-propodus, inner face; D-E= gnathopod 2; F= tip of gnathopod 2-propodus, inner face.

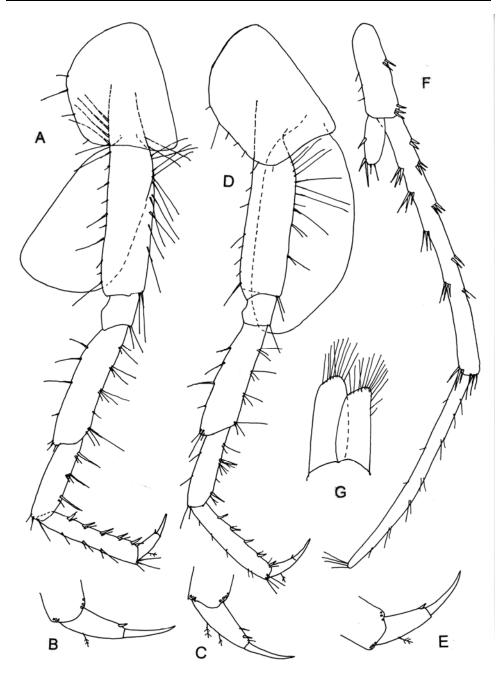


Fig. 3. *Niphargus ozimeci* Karaman, G., 2011, spring cave of Mokrinjska Miljacka, male 13.1 mm (paratype): A= pereopod 3; B-C= dactylus of pereopod 3; D= pereopod 4; E= dactylus of pereopod 4; F= uropod 3; G= maxilla 2.

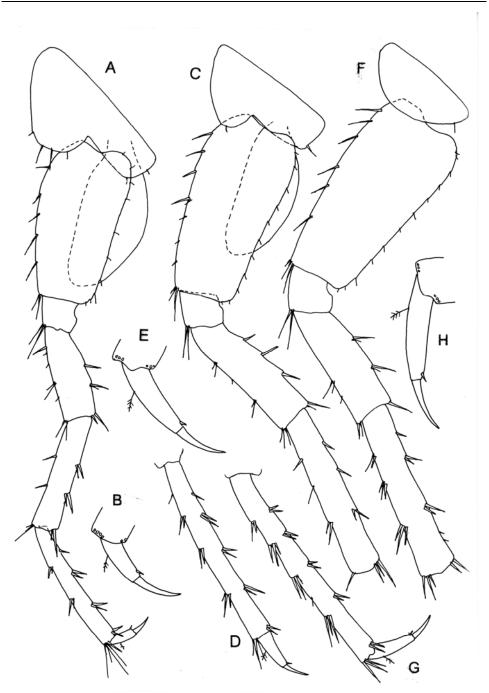


Fig. 4. *Niphargus ozimeci* Karaman, G., 2011, spring cave of Mokrinjska Miljacka, male 13.1 mm (paratype): A-B= pereopod 5; C-E= pereopod 6; F-H= pereopod 7.

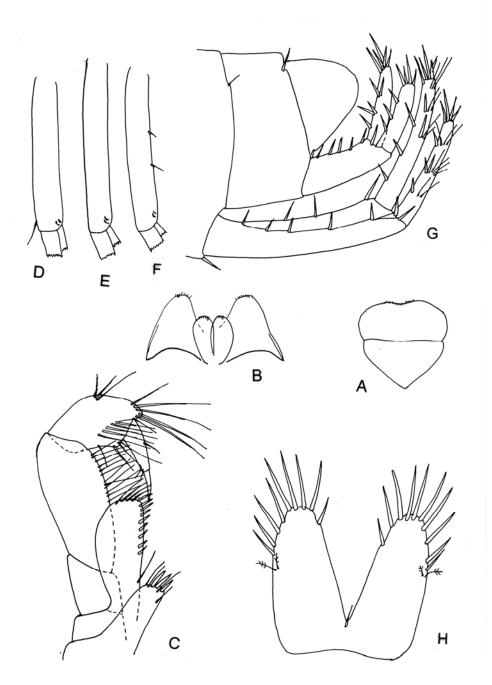


Fig. 5. *Niphargus ozimeci* Karaman, G., 2011, spring cave of Mokrinjska Miljacka, male 13.1 mm (paratype): A= labrum; B= labium; C= maxilliped; D= peduncle of pleopod 1; E= peduncle of pleopod 2; F= peduncle of pleopod 3; G= urosome with uropods 1-2; H= telson.

Epimeral plates 1-3 with subrounded ventroposterior corner and convex posterior margin bearing marked corner stronger seta and several short posterior marginal setae (fig. 1G). Epimeral plate 2 with one subventral spine, epimeral plate 3 with 3 subventral spines (fig. 1G).

Head with short rostrum and narrow lateral cephalic lobes (fig. 1A), ventroanterior excavation developed (fig. 1A). Antenna 1 slightly exceeding half of body-length [ration 6.0: 13.1], peduncular articles 1-3 progressively shorter [ratio: 65: 51: 26]; main flagellum consisting of23 articles scarcely setose, most of them with one short aesthetasc (fig. 1B). accessory flagellum short, 2-articulate (fig. 1B).

Antenna 2 slender, peduncular article 3 with one bunch of long distoventral setae (fig. 1C); peduncular article 4 slightly longer than article 5 [ratio: 60: 55], both with severeal bunches of long setae along ventral margin; flagellum slender, longer than last peduncular article, bearing 11 articles; antennal gland cone short (fig. 1C).

Coxae 1-4 remarkably broader than long (=high), bearing row of marginal long and short setae each (fig.2A,D; 3A,D). Coxa 1 with subrounded ventroanterior corner (fig. 2A). Coxa 4 without distinct ventroposterior lobe (fig. 3D). Anterior lobe of coxa 5 as long as coxa 4 (figs. 3D; 4A). Coxae 5-6 bilobed, with anterior lobe much longer than posterior one (fig. 4A,C). Coxa 7 entire, convex (fig. 4F).

Mouthparts basic. Labrum broader than long, slightly concave distally (fig.5A). Labium broader than long, outer lobes entire, convex distally, inner lobes small, but well developed (fig. 5B).

Mandibles: body triturative. Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth. Right mandible: incisor with 4 teeth, lacinia mobilis narrow, with serrate margin. Mandible palpus 3-articulate: first article naked (fig. 1D); article 2 with 12 strong articles (fig. 1D); palpus article 3 falciform, hardly longer than article 2, bearing nearly 24 marginal D-setae and 7 distal E-setae; on the outer face is attached one bunch of 6 A setae (fig. 1D), on inner face are attached 7 B-setae in 4 bunches; C-setae absent (fig. 1E).

Maxilla 1: inner plate with 2 setae (fig. 1F); outer plate with 7 spines[6 spines with one lateral tooth, one spine with 2-3 lateral teeth]; palpus 2-articulated, not reaching distal tip of spines of outer plate, and provided with 8 distal setae (fig. 1F).

Maxilla 2: both lobes with marginal setae only (fig. 3G).

Maxilliped: inner plate short, with 3 distal smooth spines accompanied by several setae (fig. 5C); outer plate reaching nearly half of palpus article 2, bearing row of marginal lateral and distal spines; palpus 4-articulated, palpus article 3 along outer margin with one medial and one distal bunch of long setae (fig. 5C); palpus article 4 with one median seta along outer margin, nail shorter than pedestal (fig. 5C).

Gnathopods 1-2 relatively large (fig. 2A, D), its propodus nearly as large as the corresponding coxae. Gnathopod 1: basipodit with long setae along both

margins, articles 3-4 with one posterior bunch of setae each; article 5 shorter than propodus (fig. 2A). Propodus hardly longer than broad [ratio: 10.0: 9.2), trapezoid, with 7 transverse groups of setae along posterior margin (fig. 2B). Palm slightly convex, inclined nearly 2/3 of propodus-length, defined on outer face by one strong corner spine accompanied laterally by 3 slender serrate spines and 4 facial long setae (fig. 2B), on inner face by one short subcorner spine (fig. 2C). Dactylus distinctly reaching posterior margin of propodus, bearing 10 long single setae along outer margin, and a row of short setae along inner margin (fig. 2B).

Gnathopod 2: article 2 with long setae along anterior and posterior margin (fig. 2D); articles 3-4 with one bunch of setae along posterior margin; article 5 shorter than propodus (fig. 2D). Propodus, larger than that of gnathopod 1, trapezoid, nearly as long as broad, with 8-9 transverse group of setae along posterior margin (fig. 2E); palm inclined nearly half of propodus-length, slightly convex, defined on outer face by one strong corner spine accompanied laterally by 3 short serrate spines and 5 long facial setae (fig. 2E), on inner face by one short subcorner spine (fig. 2F). Dactylus distinctly reaching posterior margin of propodus, bearing11 long single setae along outer margin, and a row of short setae along inner margin (fig. 2 E).

Pereopods 3-4 moderately slender, nearly equal (fig. 3A,D), their articles 3-4 with setae along both margins; articles 5-6 along posterior margin with bunches of short setae and single spines; article 6 is longer than article 5 (fig. 3A, D). Dactylus of pereopod 3 relatively slender, along inner margin with 1-2 spines , along outer margin with 1-2 median plumose setae (fig. 3B,C), nail slender, shorter than pedestal.

Pereopod 4 bearing setae and spine like these of pereopod 3 (fig. 3D); dactylus relatively slender, with one spine at inner margin and one median plumose setae at outer margin (fig. 3E); nail shorter than pedestal.

Pereopods 5-7 relatively long and slender. with narrow, unlobed ventroposterior corner (fig. 4A, C, F). Pereopod 5 is shorter than pereopods 6-7, with basipodit narrow, almost twice longer than broad, [ratio 8.4: 4.5], with linear posterior margin bearing nearly 10 short setae (fig. 4A); anterior margin of basipodit with long marginal setae (fig. 4A); articles 4-6 along margins with spines and single setae. Article 5 is slightly shorter than article 6. [ratio: 6.3: 7]; dactylus slender, with one spine at inner margin and one median plumose seta at outer margin, nail slightly shorter than pedestal [measured always along outer margin] (fig.4B).

Pereopod 6: basipodit linear, nearly twice as long as broad [ratio: 10: 5], with weakly concave posterior margin bearing several short setae (fig. 4C), along anterior margin with long proximal setae. Articles 4-6 along margins with spines and single short setae only (fig. 4C, D). Article 6 distinctly longer than article 5 [ratio: 10.3: 9.0]; dactylus slender, with one spine at inner margin and one plumose median seta at outer margin, nail shorter than pedestal (fig.4E).

Pereopod 7: basipodit narrow, twice longer than broad [ratio: 10.4: 5.0], with straight posterior margin bearing a row of short setae; along anterior margin appears a row of longer strong setae (fig. 4F); articles 4-6 with numerous spines intermixed with short setae (fig. 4E, G]. Article 6 is longer than article 5 [ratio: 11.8: 9.2]. Dactylus slender, with one spine along inner margin and one median plumose seta along outer margin, nail shorter than pedestal (fig. 4H).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with one distoanterior strong seta (in lateral projection) (fig.5D); peduncle of pleopod 2 naked (fig. 5E); peduncle of pleopod 3 with 2 strong setae along posterior margin (fig. 5F).

Uropod 1: peduncle with dorsoexternal row of spines and dorsointernal row of slender spine-like setae (fig. 5G); inner ramus remarkably longer than outer one [ratio: 7: 6], both rami with lateral and distal spines and with bunches of simple setae 9FIG. 5G].

Uropod 2: peduncle with dorsal spines; inner ramus distinctly longer than outer one [ratio: 4.0: 3.6].

Uropod 3 long and slender (fig.3F). Peduncle almost three times longer than broad [ratio: 5.0: 1.7], Inner ramus scale like, twice longer than broad, with single lateral and distal spines and setae (fig. 3F). Outer ramus 2-articulated,: first article narrow, along both margins with munches of spines; second article only slightly shorter than first article [ratio: 120: 14.0], bearing simple short setae along both margins and tip (fig. 3F).

Telson nearly as long as broad, deeply incised (fig. 5H). Each lobe with 8-10 distomarginal spines. A pair of short plumose setae appearsat medioexternal margin of each lobe (fig. 5H).

Coxal gills ovoid, large, these on gnathopod 2 and pereopod 4 exceeding ventral tip of corresponding basipodit (figs. 2D; 3D); gills on pereopod 3 and pereopods 5-6 are shorter (fig.3A; 4A, C).

LOCUS TYPICUS: spring-cave of Mokrinjska Miljacka near Pale, Bosnia & Herzegovina.

DISTRIBUTION: Known from the type-locality only.

VARIABILITY: Unknown. The known female of N. *ozimeci* differs from the male by longer coxae 1-4, by shorter uropod 3, by presence of 4 distal spines on inner plate of maxilliped, by angular epimeral plates 1-2 and acute epimeral plate 3, by equal rami of uropod 1 and uropod 2, by less number of distolateral spines on lobes of telson, slightly narrower article 2 of pereopods 5-7, etc.

The presence of one additional spine on inner margin of dactylus of left pereopod 3 and presence of 2 plumose setae along outer margin of dactylus of left pereopod 3 in males, seems to be one aberration only, because all other known specimens are with normal number of setae and spines. The similar observations he have found in one specimen of *Niphargus microcerberus* Sket, 1972 from Bergamo [Karaman, G., 1993: 230).

REMARKS AND AFFINITIES.

Based on its taxonomical characteristics, *N. ozimeci* is very similar to the *Niphargus stygius*-complex [elongated uropod 3 in males, elongated inner ramus of uropod 1 in males, acute to subrounded epimeral plates in males/females, large gnathopods bearing row of setae along outer margin of its dactylus, mouthparts, etc., presence of 2 retinacula on pleopods, etc.

Karaman, S. described *N. stygius bosniacus* (1943) from Mračna špiljacave in Bosnia (= *N. bosniacus*), species with subrounded epimeral plates, trapezoid propodus of gnathopods 1-2 bearing a row of setae along dactylus, elongated uropod 3 in males, etc., but differing from *N. ozimeci* by presence of 3 setae on inner plate of maxilla 1, by presence of low number of spines on telson, etc.

The specimens of *Niphargus boskovici* Karaman, S., 1952, described from Vjetrenica cave in Herzegovina, are provided with 2 setae on inner plate of maxilla 1 also, dactylus of gnathopods 1-2 with row of setae along outer margin, elongated uropod 3, etc., but this species differs from *N. ozimeci* by equal rami of uropods 1-2 in males, by presence of small number of spines on telson, broader basipodites of pereopods 5-7, etc.

The species *Niphargus cvijici* Karaman, S., 1950a, described from one spring near Vjetrenica cave in Herzegovina, and *Niphargus zavalanus* Karaman, S., 1950a, described from the subterranean waters of Lukavac torrent near Vjetrenica cave in Herzegovina, differ distinctly from *N. ozimeci* by broader basipodit of pereopods 5-7, different shape and lower number of spines on telson, etc.

Fišer et al., described (2006) *Niphargus polymorphus* from spring in Bileća, Herzegovina, but this species differs distinctly from *N. ozimeci* by remarkably longer coxae 1-4, less inclined propodus of gnathopods 1-2, short uropod 3, etc.

Probably the further discoveries of other members of the genus *Niphargus* in Bosnia and Herzegovina will help to understand the real relationships of *N. ozimeci* and other species of this genus in the subterranean waters of this region.

ACKNOWLEDGEMENTS

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Gordan S. KARAMAN

OTKRIĆE MUŽJAKA PODZEMNE VRSTE NIPHARGUS OZIMECI, KARAMAN, G., 2011 (FAM. NIPHARGIDAE) U BOSNI I HERCEGOVINI (262. PRILOG POZNAVANJU AMPHIPODA)

SAŽETAK

Vrsta *Niphargus ozimeci* Karaman, G., 2011 (Amphipoda, Niphargidae) bila je nedavno opisana (Karaman, G., 2011) iz podzemnih voda špilje-izvora Mokrinjske Miljacke kod Pala, Bosna i Hercegovina, na osnovu jedne odrasle ženke. Na osnovu novog materijala sakupljenog iz istog lokaliteta, sada je mužjak ove vrste opisan i nacrtan, i taksonomski odnos te vrste prema drugim poznatim *Niphargus* vrstama iz Bosne i Hercegovine je analiziran.

Ključne riječi: taksonomija, Amphipoda, Niphargidae, *Niphargus ozimeci*, mužjak, Bosna i Hercegovina