

ON TWO MEMBERS OF THE GENUS *NIPHARGUS* SCHIÖDTE, 1849  
(CRUSTACEA: NIPHARGIDAE) FROM THE BALKAN PENINSULA,  
*N. DEELEMANAE GREX* SSP. N. AND *N. JURINACI* S. KAR. 1950  
(CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 271)

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### Abstract

Two members of the genus *Niphargus* Schiödte, 1849 (Amphipoda: Gammaridea: Niphargidae) from the subterranean waters of the Balkan Peninsula are treated. *Niphargus deelemanae grex* ssp. n. is described and figured from Šarbanovac in E Serbia.

The species *Niphargus jurinaci* S. Karaman 1950, scantily described and figured from Crni Lug near Ogulin in Croatia, is redescribed and figured more in detail, based on the type material. The taxonomical position and relations of these two taxa within the genus *Niphargus* are discussed.

KEY WORDS: Amphipoda, taxonomy, *Niphargus deelemanae grex* ssp. n., *jurinaci*, redescription, Balkan Peninsula.

### Introduction

The subterranean genus *Niphargus* Schiödte, 1849 (Amphipoda: Gammaridea: Niphargidae) is widely distributed through Europe and the Near East with over 300 known species and subspecies presented in various types of subterranean waters (caves, springs, subterranean torrents, deep lakes, etc.). The oldest known fossil members of the genus *Niphargus* are from the Tertiary Period (Eocene), and settled in the freshwaters at various times (G. KARAMAN, 1984).

Recently a new fossil, an amphipod from the Triassic Period, was described in Nevada, USA, *Rosagammarus minichiellus* (MCMENAMIN *et al.*, 2013) altering our knowledge of fossil Amphipoda to the Mesozoic Period.

The modern composition of the genus *Niphargus*, still in the process of diversification and adaptation to various ecological niches in the subterranean waters, is rather rich, and various distinct populations are still in the process of forming distinct different taxa.

Our research, intended to recognize the distinct taxonomic categories, species and subspecies despite the large variability of many taxonomical characters of the body-parts of the genus *Niphargus*, is based on traditional use of the morphological characters of various populations,. Further studies based on the genetics, molecular biology, histology, etc., will enable future recognition of the taxonomical status of various described species and subspecies within the genus *Niphargus*.

On the other hand, many species and subspecies of the genus *Niphargus* were poorly and incompletely described many years ago, and accompanied by few figures of some body parts, often based on only one known sex (male or female). Accordingly the risk of description of new taxa belonging to already known, but poorly described species and subspecies remains.

Thus, we consider it very important to redescribe these poorly described taxa in as much detail as possible, based on original or topotype material, or other samples.

During many years of investigations of the subterranean Amphipoda in Serbia, we collected a sample of *Niphargus* from the subterranean waters near the Timok River, described and figured here as *Niphargus deelemanae grex* ssp. n. This taxon is rather similar to *N. deelemanae* G. Karaman, 1973 (G. KARAMAN, 1973b), described from caves near Pirot (Serbia), but with some distinct differences.

The species *Niphargus jurinaci* S. Karaman, 1950 was partially described and partially figured from Crni Lug (Croatia), and never redescribed. As various other new and similar taxa from the Balkans were later discovered and described, it became difficult to distinguish these new taxa from *N. jurinaci*. Consequently, we redescribed and figured this species based on original material, holotype and paratypes from Crni Lug, existing in KARAMAN's Collection in Podgorica (Montenegro).

## Material and Methods

The material was collected by the author in subterranean waters using a Bou-waterpump and preserved in 70% ethanol (*N. d. grex*). *N. jurinaci* was described based on holotype, paratypes and other samples existing in KARAMAN's Collection in Podgorica (Montenegro).

The specimens were dissected using a WILD M20 microscope and drawn using a camera lucida attachment. The body-length of examined specimens was measured by tracing the individual's mid-trunk length (from the tip of the head to the end of the telson) using a camera lucida. All appendages were temporarily submersed in a mixture of glycerine and water for study and drawing. Later all dissected appendages were transferred to Liquid of Faure on permanent slides. All illustrations were inked manually. Some morphological terminology and setal formulae follow G. KARAMAN's terminology (G. KARAMAN, 1969, 2012b).

## Results and Discussion

### Family Niphargidae

#### *Niphargus deelemanae* grex, ssp. n.

Figs. 1-7

#### Material examined

S-5012- Šarbanovac, Gornjakovići, pump in the bed of the Timok River on the road Zaječar- Paraćin, E. Serbia, 15 spec. (holotype and paratypes) (accompanied by *Niphargopsis casparyi* (Pratz, 1866), and *Asellids*, August 9, 1981 (leg. G. Karaman & M. Karaman).

#### Diagnosis

A relatively small animal, urosomite 1 on each dorsolateral side with one seta, urosomite 2 on each dorsolateral side with 1 strong spine; urosomite 3 naked. Epimeral plates 1-3 angular; coxae 1-4 relatively short. Inner plate of maxilla 1 usually with 1-2 setae, outer plate with 7 spines bearing 1-4 lateral teeth each (except inner spine with several teeth). Maxilliped with short both plates.

Propodus of gnathopods 1-2 longer than article 5 (carpus), of moderate size, almost quadrate, with palm inclined up to half of propodus-length, dactylus of gnathopods with one median seta at outer margin. Article 2 of pereopods 5-7 slightly dilated, with poorly marked ventroposterior lobe, dactylus along inner margin with one strong seta or spine. Pleopods with 3-5 retinacula each. Peduncle of uropod 1 with dorsoexternal and dorsointernal row of strong spines, both rami of equal length. Uropod 3 is not elongated, with relatively short second article of outer ramus, first article with bunches of spines along both margins. Telson short, deeply incised, with distal and lateral marginal spines.

#### Description

Female 6.0 mm (holotype), with setose oostegites: Body relatively slender, metasomal segments 1-3 with 4-5 short dorsoposterior marginal setae each (Fig. 1F).

Epimeral plates 1-3 angular, with marked ventroposterior corner and with straight or slightly convex posterior margin bearing several marginal setae each (Fig. 1F). Epimeral plate 1 with slightly concave ventral margin; epimeral plate 2 with slightly convex ventral margin provided with 2 subventral spines; epimeral plate 3 with convex ventral margin bearing 3 subventral spines (Fig. 1F).

Urosomite 1 with 1 seta on each dorsolateral side; urosomite 2 with 1 spine on each dorsolateral side; urosomite 3 naked (Fig. 1G).

One ventroposterior strong spine and seta are attached near basis of uropod 1 peduncle (Fig. 1G).

Head with short rostrum, lateral cephalic lobes short, subrounded, ventroanterior sinus developed (Fig. 1A).

Antenna 1 reaching or slightly exceeding half of body; peduncular articles 1-3 progressively shorter (ratio: 51: 45: 22), scarcely setose; first article with one strong distoventral spine; main flagellum with 22 articles (most of them with 1 aesthetasc reaching 1/3 to 1/2 of articles themselves). Accessory flagellum 2-articulated, shorter than peduncular article 3 (Fig. 1B).

Antenna 2: peduncular articles 3-5 of unequal length (ratio: 15: 52: 50); peduncular article 3 with distoventral bunch of setae; peduncular articles 4 and 5 with several bunches of setae (the longest setae are up to twice longer than diameter of articles themselves) (Fig. 1C). Flagellum slender, remarkably longer than last peduncular article (ratio: 72: 50), consisting of 11 articles. Antennal gland cone short (Fig. 1C).

Labrum entire, broader than long (Fig. 1D). Labium broader than long, outer lobes entire, inner lobes well developed (Fig. 1E).

Right mandible: molar with 1 long subdistal seta, incisor with 4 teeth, lacinia mobilis bifurcate, pluritoothed, accompanied by nearly 6 rakers. Left mandible: molar without long distal seta; incisor with 5 teeth, lacinia mobilis with 4 teeth, accompanied by 6 rakers. Palpus of both mandibles symmetric to each other, 3-articulate, palpus article 1 naked (Fig. 3B). Palpus article 2 with 7-9 short setae. Palpus article 3 falciform, longer than article 2 (ratio: 63: 50), on outer face with 1-2 groups of A-setae (5 setae totally), on inner face by 3-4 single B-setae, at margins with nearly 17 D-setae and 3 long distal E-setae (Fig. 3B).

Maxilla 1: inner plate with 1-2 setae; outer plate with 7 spines provided with single lateral teeth (5-2-3-2-3-1-1 or 7-2-4-1-1-3-2); palpus reaching tip of outer plate spines, provided with 4-5 distal and 2-3 lateral setae (Fig. 5 A-C).

Maxilla 2: both plates with marginal setae only (Fig. 3A).

Maxilliped: inner plate not reaching outer tip of first palpus article and provided with 2-3 distal smooth spines; outer plate reaching 3/5 to 2/3 of second palpus article (Fig. 3C), bearing a row of distolateral smooth spines; palpus article 3 along outer margin with distal setae only; palpus article 4 along outer margin with one median seta, along inner margin with one seta near basis of the nail (Fig. 3C).

Coxae 1-4 relatively short, with scarcely setose margins. Coxa 1 broader than long (ratio: 37: 30), with subrounded ventroanterior corner (Fig. 2A). Coxa 2 and coxa 4 are as long as broad (figs. 2D, 3F); Coxa 3 slightly longer than broad (ratio: 50: 45) (Fig. 3D). Coxa 4 without distinct ventroposterior lobe (Fig. 3F). Coxae 5-7 short, progressively smaller. Coxae 5 and 6 bilobed, with anterior lobe larger than posterior one (Fig. 4A, C); coxa 7 entire, not lobed (Fig. 4E).

Article 6 of gnathopods 1-2 is barely larger than corresponding coxae. Gnathopod 1 distinctly smaller than 2, with article 2 along both margins with long setae; article 3 with one bunch of setae along posterior margin (Fig. 2A); article 5 shorter than 6 (ratio: 67: 87). Article 6 poorly trapezoidal, hardly longer than broad (ratio: 80: 72) (Fig. 2B), with 5 transverse groups of posterior marginal setae; palm convex, inclined poorly less than half of article 6 length, defined on outer face by 1 strong corner S- spine accompanied laterally by 3 slender toothed L- spines (2 spines almost overlapping) and 3 facial M- setae, on inner face by 1 short subcorner R- spine (Fig. 2C); dactylus reaching posterior margin of article 6, with 1 median seta at outer margin and several short setae along inner margin (Fig. 2B).

Gnathopod 2: article 2 along both margins with long setae; article 3 along posterior margin with one group of setae (Fig. 2D). Article 5 shorter than 6 (ratio: 60: 90). Propodus (article 6) poorly trapezoidal, as long as

broad, with 6 transverse groups of posterior marginal setae (Fig. 2E). Palm inclined nearly half of article 6 length, slightly convex, defined on outer face by one strong corner S- spine accompanied laterally by 3 slender serrate L- spines and 2 facial L- setae (Fig. 2F), on inner face by one short subcorner R- spine (Fig. 2F). Dactylus reaching posterior margin of propodus, with one median strong seta at outer margin and with several short setae along inner margin (Fig. 2E).

Pereopods 3-4 relatively slender. Pereopod 3: article 2 along posterior margin with long setae (Fig. 3D); articles 4-6 of unequal length (ratio: 42: 26: 39); article 4 along both margins with setae; articles 5 and 6 along posterior margins with single short spines. Dactylus much shorter than half of article 6 (ratio: 10: 38), along inner margin with one strong seta near basis of the nail, and with one median plumose seta along outer margin (Fig. 3E); nail hardly shorter than pedestal (ratio: 28: 31).

Pereopod 4: pilosity like that of pereopod 3 but setae are rather shorter (Fig. 3F). Articles 4-6 of unequal length (ratio: 38: 25: 37). Dactylus like that of pereopod 3, with one strong seta along inner margin near basis of the nail, and with one median plumose seta at outer margin; nail barely shorter than pedestal (ratio: 26: 29) (Fig. 3G).

Pereopods 5-7 moderately slender, it seems that pereopod 6 is the longest one (Fig. 4C). Pereopod 5: article 2 (basipodit) dilated, longer than broad (ratio: 60: 43), along anterior convex margin with several spine-like setae, along posterior convex margin with 9-10 marginal setae, ventroposterior lobe barely marked (Fig. 4A). Articles 4-6 of unequal length (ratio: 43: 44: 55), along both margins with longer spine-like setae. Dactylus relatively slender, much shorter than article 6 (ratio: 20: 55), along inner margin with one spine near basis of the nail, and with one median plumose seta at outer margin (Fig. 4B); nail much shorter than pedestal (ratio: 26: 47).

Pereopod 6: article 2 dilated, remarkably longer than broad (ratio: 75: 45), along anterior convex margin with row of spine-like setae (Fig. 4C), along posterior almost straight margin with 9-10 short setae; ventroposterior lobe barely marked. Articles 4-6 of unequal length (ratio: 54: 67: 80), along both margins with row of long spine-like setae (Fig. 4E). Dactylus moderately slender, along inner margin with one strong spine near basis of the nail, and with one median plumose seta along outer margin (Fig. 4D); nail much shorter than pedestal (ratio: 32: 60).

Pereopod 7: article 2 much longer than broad (ratio: 76: 47), along anterior convex margin with a row of spine-like setae (Fig. 4E), along posterior convex margin with 8-9 short setae, ventroposterior lobe hardly marked. Articles 4-6 progressively longer (ratio: 48: 54: 68), along both margins with long slender spines. Dactylus moderately slender, much shorter than article 6 (ratio: 27: 70), along inner margin with one spine near basis of the nail, and along outer margin with one median plumose seta (Fig. 4F).

Pleopods 1-3 with 3-5 retinacula each (formula: 3-3-4, or 4-4-4 or 4-5-4). Peduncle of pleopod 1 with 3-4 anterior short setae (Fig. 3H), peduncle of pleopod 2 with 0-1 anterior short seta (Fig. 3 I); peduncle of pleopod 3 with 1 strong posterior seta (Fig. 3J) (always in lateral projection).

Uropod 1: peduncle with dorsoexternal and dorsointernal row of strong spines (Fig. 1G); rami subequal, with lateral and distal short spines (Fig. 1G).

Uropod 2: rami nearly equal, with strong lateral and distal spines (Fig. 1G).

Uropod 3 relatively short; peduncle twice longer than broad, with distal spines (Fig. 4G). Inner ramus short, scale-like, with 2 distal spines; outer ramus 2-articulated: first article of outer ramus with strong spines along both margins and tip, as well as with single short plumose setae along inner margin; second article much shorter than first article (ratio: 27: 120), bearing 3 distal setae (Fig. 4G).

Telson short, slightly longer than broad (ratio: 61: 55), deeply incised; each lobe with 3 distal long spines and 1 outer marginal spine (facial and inner marginal spines absent); a pair of short plumose setae appears near the middle of each lobe (Fig. 5D).

Coxal gills moderately short: gills on gnathopod 2 short, ovoid (Fig. 2D), gills on pereopods 3-4 longer, ovoid or elongated, but neither recurved nor reaching ventral tip of corresponding article 2 (Fig. 3D, F); gills on pereopods 5-6 short, ovoid (Fig. 4A, C).

Oostegites broad, with long distal setae (Fig. 3F).

Male up to 5.6 mm (paratype): Very similar to the female, including metasomal segments. Epimeral plates 1-3 like these in female, with well-marked ventroposterior corner and poorly convex posterior margin provided with single setae; epimeral plate 2 with 2 subventral spines, epimeral plate 3 with 3 subventral spines (Fig. 6H).

Urosomite 1 along each dorsolateral side with 1 seta (Fig. 5G), urosomite 2 along each dorsolateral side with 1 strong spine (Fig. 5G); urosomite 3 naked. Urosomite 1 on each ventroposterior margin with one spine near basis of uropod 1 peduncle (Fig. 5G).

Antenna 1 peduncle with progressively shorter articles [ratio: 72: 60: 30] scarcely setose; main flagellum consisting of 22-23 articles; accessory flagellum is slightly shorter than last peduncular article (ratio: 25: 30). Antenna 2 like that in female.

Mouthparts like those in female, but inner plate of maxilla 1 with 2-3 setae (Fig. 6A); outer plate with 7 spines (6 spines bearing 1-3 lateral teeth each and one inner spine bearing 5-7 teeth); palpus reaching distal tip of outer plate spines and provided with 6 setae.

Mandible palpus article 1 naked, palpus article 2 with 9 setae; palpus article 3 falciform, slightly longer than article 2 (ratio 86: 76), bearing on outer face 3+1 of 0+4 A-setae, on inner face by 4 single B-setae; along ventral margin appears a row of nearly 16 D setae and 3-4 distal long E-setae.

Maxilla 2 and maxilliped like those in female.

Coxae relatively short: coxa 1 broader than long (ratio: 46: 40) (Fig. 6B); coxa 2 longer than broad (ratio: 55: 50) (Fig. 6C); coxa 3 longer than broad (ratio: 60: 55) (Fig. 6D); coxa 4 nearly as long as broad, with slightly concave posterior margin (Fig. 6E). Coxae 5-7 like those in female.

Gnathopod 1: articles 2-5 like those in female. Article 6 (propodit) slightly trapezoidal, longer than broad (ratio: 72: 67), along posterior margin with 6 transverse rows of setae (Fig. 6F). Palm convex, inclined almost to half of propodus-length, defined on outer face by one strong corner S-spine accompanied laterally by 3 slender L-spines and 2 facial M-setae, on inner face by one short sub corner R-spine. Dactylus reaching posterior margin of article 6, with one median seta at outer margin (Fig. 6F).

Gnathopod 2: articles 2-5 like those in female. Article 6 (propodit) trapezoidal, with 7 transverse rows of setae along posterior margin (Fig. 6G). Palm convex, defined on outer face by one strong S- spine accompanied laterally by 3 slender L- spines and 2 facial M- setae (Fig. 6G), on inner face by one short subcorner R- spine; dactylus reaching posterior margin of article 6, with one median seta along outer margin and several short setae along inner margin.

Pereopods 3-4 like those in female. Pereopods 5-6 like those in female. Pereopod 7: basipodit remarkably longer than broad (ratio: 91: 58), along anterior margin with several spine-like setae, along posterior margin with 8-9 setae, ventroposterior lobe scarcely visible (Fig. 5E); dactylus moderately slender, with one slender spine at inner margin near basis of the nail, and with one median plumose seta at outer margin (Fig. 5F); nail much shorter than pedestal (ratio: 25: 55).

Pleopods 1-3 with 4 retinacula each.

Uropod 1: peduncle with dorsoexternal and dorsointernal row of strong spines (Fig. 5G); rami nearly equal, bearing short strong lateral and distal spines (Fig. 5G).

Uropod 2: peduncle with dorsal spines; rami of equal length, bearing lateral and distal short strong spines (Fig. 5G).

Uropod 3 relatively short, like that in female. Peduncle twice longer than broad (Fig. 5H), with distal spines. Inner ramus scale-like, short, with 2 distal spines. Outer ramus 2-articulated: first article along both margins with bunches of short spines and along inner margin with single short plumose setae (Fig. 5H); second article much shorter than first one (ratio: 30: 130), bearing 2 distal short setae (Fig. 5H).

Telson short, slightly longer than broad (ratio: 62: 57), deeply incised; each lobe with 3 distal strong spine and one spine along outer margin (Fig. 5 I); left lobe is provided along inner margin with one lateral spine also; a pair of short plumose setae appears near the middle of each lobe (Fig. 5 I).

Coxal gills relatively short, of rather variable shape (Fig. 6C-E).

#### Variability

Generally, the shape and partially the length of coxal gills are variable in males as well as in females, especially gills on pereopods 3 and 4.

Epimeral plates more or less angular, but never distinctly subrounded; often the epimeral plates in smaller specimens can be more angular than these in large specimens; no significant difference in the shape of the epimeral plates between males and females has been observed.

Mandibular palp article 3 is with elevated number of A-setae (3+1, or 4+1, or 5 setae), and 3-4 B setae.

Maxilla 1: inner plate with 1-2 setae, occasionally 3 setae (one of the maxilla 1 in one male); some of the spines of outer plate with relatively low number of lateral teeth each (4-1-2-2-2-1-1, 5-2-3-2-3-1-1; 7-1-3-1-2-1-1, etc.); palpus with 3-4 distal and 2-3 lateral setae (Fig. 5A).

Maxilliped: inner plate usually with 2-4 spines; often left and right plate of the same maxilliped can have different number of spines.

Peduncle of pleopods 1-3 with small number of setae only. Peduncle of pleopod 1 with 2-4 anterior short setae; that of pleopod 2 usually smooth, rarely with 1 anterior short seta; peduncle of pleopod 3 with 1, rarely 2 short posterior setae. Pleopods 1-3 with 3-4, rarely 5 retinacula each.

Lobes of telson with 3-4 distal spines and along outer margin with 1, rarely 2 spines (forming one bunch).

The stable character is the presence of dorsointernal row of strong spines on peduncle of uropod 1 in males and females; inner and outer ramus of uropod 1 are of the nearly same length.

Holotype

Female 6.0 mm. Holotype and paratypes are deposited in KARAMAN's Collection in Podgorica, Montenegro.

Distribution

Eastern Serbia.

Locus typicus

Šarbanovac, E Serbia. Pump in the bed of the river.

Derivatio nominis

The name "grex" is derived from latin name "grex"(flock, herd in english).

Remarks and affinities

The specimens from Šarbanovac (ssp. *grex*, n. ssp.) are very similar to the species *N. deelemanae* G. Kar. 1973b, known from caves south of Pirot (Držina pećina Cave and Zvonačka Banja) (pleopods, mouthparts, telson, uropod 3, etc.). But the specimens from Šarbanovac differ from *N. deelemanae* with shorter coxae in males and females (see G. KARAMAN, 1973b); a slightly broader and more inclined palm of propodus 6 of gnathopods 1-2 in the male; slightly shorter coxal gills (especially gills on pereopods 2-4 (mesosomal segments 2 and 4); stronger and slightly stouter dactylus of pereopods 5-7 provided with strong inner spine (only one seta in specimens of *N. deelemanae* from type-locality, short spine in these from Zvonačka Banja); and uropod 1 peduncle with dorsointernal row of spines. Based on all these differences, we described the specimens from Šarbanovac as a distinct subspecies *N. deelemanae grex*, ssp. n.

The specimens of *N. ivokaramani* G. Kar. 1994, known from Prekonoga near Svrlijig (E. Serbia near Niš), are very similar to ssp. *grex* in numerous characters: epimeral plates; antennae 1-2; mouthparts; coxae; urosomites; presence of dorsointernal row of spines on uropod 1-peduncle; uropod 3; presence of one median seta at outer margin of dactylus in gnathopods 1-2; etc. But *N. ivokaramani* differs distinctly from ssp. *grex* in the presence of only 2 retinacula on pleopods 1-3; unequal length of rami in uropod 1; narrowed propodus of gnathopods 1-2 with a remarkably less-inclined palm; slender dactylus of pereopods 3-7; etc. As *N. ivokaramani* is described based on adult females only, and as adult males are not known, many taxonomical characters of this species are still unknown.

*N. medvednicae* S. Kar. 1950 known from Croatia (loc. typ.: Medvednica Mt. N of Zagreb) is also similar to ssp. *grex*, n. ssp., but it differs in its long second article of uropod 3 in males and females (first article is without plumose setae); shorter third article of mandibular palpus provided with lower number of A and B-setae; lower number of lateral teeth on the spines of outer plate in maxilla 1; longer coxal gills (some of them recurved); absence of dorsointernal row of strong spines on peduncle of uropod 1; and lobes of telson with 1-2 lateral spines each.

*N. biljanae* G. Kar. 1998 known from Macedonia (loc. typ.: Zelenikovo village S. of Skopje) is provided also with a dorsointernal row of spines on peduncle of uropod 1, and one median seta along outer margin in dactylus of gnathopods 1-2, etc., but differs from ssp. *grex* in its elongated distal spines on telson, subrounded epimeral plates, presence of only 2 retinacula on pleopods, etc.

Some other species with only one outer marginal seta on dactylus in gnathopods 1 and 2 are rather similar to *N. deelemanae grex*: *N. kragujevensis kragujevensis* S. Kar. 1950 (loc. typ.: Kragujevac, Serbia), *N. kragujevensis remus* G. Kar. 1992 (loc. typ.: Svrlijig, Prekonoga, Serbia), *N. osogovensis* S. Kar. 1959 (loc. typ.: Osogovo Mt., Macedonia), *N. adbiptus* G. Kar. 1973c (loc. typ.: Ravanica Cave, Serbia), *N. carniolicus* Sket, 1960 (loc. typ.: "Jama pri gradu Cave near Novo Mesto, Slovenia), but the peduncle of uropod 1 in these species is provided with a dorsointernal row of setae.

### *Niphargus jurinaci* S. Karaman, 1950

Figs. 7-12

*Niphargus tauri jurinaci* S. Karaman, 1950: 88, figs. 1-10; S. KARAMAN (1959): 174, G. KARAMAN (1972): 6, G. KARAMAN (1974): 27, BARNARD & BARNARD (1983): 696, G. KARAMAN & RUFFO (1986): 533;

*Niphargus (tauri) jurinaci* SKET (1981): 89;

*Niphargus jurinaci* G. KARAMAN (2013): xx (in press).

#### Material examined

Croatia: Sp. 142.- Tomac Jarak, spring, Crni Lug (W. of Ogulin), June 16, 1948, 7 exp. (leg. Dragutin Rucner) (holotype and paratypes); Sp. 143, Spring near village Razlog, Crni Lug (W. of Ogulin), June 16, 1948, 3 spec. dried (leg. D. Rucner); Sp. 145, Spring of Bugarnica, Crni Lug (W. of Ogulin), June 14, 1948, 1 exp. dried (leg. D. Rucner); Sp. 174, Spring of Kupa, Biljevine, Razlog (Svrakovo), Sept. 28, 1948, 5 spec. dried (leg. D. Rucner).

#### Description (based on specimens from Tomac Jarak)

Female 4.9 mm, with setose oostegites [paratype]: Body relatively slender, metasomal segments 1-3 with 4 dorsoposterior marginal setae each (Fig. 9F). Epimeral plates 1-3 broadly subrounded, with marked ventroposterior corner spine-like seta (Fig. 9F); epimeral plates 2 and 3 with one submarginal spine each (Fig. 9F).

Urosomite 1 with 1 seta on each dorsolateral side, urosomite 2 with 1 spine on each dorsolateral side, urosomite 3 naked (Fig. 7G). Urosomite 1 at ventroposterior margin with 1 slender spine-like seta near basis of uropod 1 peduncle (Fig. 7G).

Head with short rostrum, lateral cephalic lobes short, subrounded, ventroanterior sinus developed, eyes absent.

Antenna 1 slightly exceeding half of body; peduncular articles 1-3 progressively shorter (ratio: 60: 42: 29), peduncular article 3 exceeding half of article 2. Main flagellum with up to 20 articles (most of them with 1 aesthetasc reaching or exceeding half of flagellar article itself); accessory flagellum 2-articulated, short (Fig. 10A).

Antenna 2 moderately slender, peduncle with longer ventral setae; peduncular article 4 slightly longer than article 5 (ratio: 54: 50); flagellum longer than last peduncular article and consisting of 8 articles; antennal gland cone short (Fig. 10B).

Labrum entire, broader than long. Labium with well-developed inner lobes, outer lobes entire.

Mandible with triturative molar; left mandible without long seta on molar, incisor with 5 teeth, lacinia mobilis with 4 teeth accompanied by 7-8 rakers. Right mandible: molar with subdistal seta, incisor with 4 teeth, lacinia mobilis bifurcate, pluritoothed, accompanied by 6 rakers (Fig. 10C). Mandibular palpus 3-articulated: first palpus article naked; second article with 5-6 setae; third palpus article slightly longer than second one (ratio: 79: 74), bearing 9-10 short lateral D-setae and 5 long distal E-setae; on outer face is attached 1 group of 3 setae, on inner face 2 single long B-setae (Fig. 10D).

Maxilla 1: inner plate narrow, with 1 seta; outer plate with 7 spines (6 spines with 1 lateral tooth, inner spine pluritoothed) (Fig. 10F); palpus nearly reaching tip of outer plate spines, provided with 6 setae (Fig. 10E).

Maxilla 2 normal, with marginal setae only.

Maxillied: inner plate short, with 3 distal smooth spines (Fig. 7A), outer plate not exceeding 2/3 of second palpus article and provided with a row of marginal smooth spines (Fig. 7A); palpus with 2 distal setae along inner margin near basis of the nail.

Coxae relatively short. Coxa 1 broader than long (ratio: 42: 34), with subrounded ventroanterior corner (Fig. 8A), coxae 2, 3 and 4 as long as broad (figs. 8D; 7C, E); coxa 4 without posterior lobe. Anterior lobe of coxa 5 poorly shorter than coxa 4 (Fig. 9A). Coxae 5-6 bilobed, with anterior lobe subrounded (Fig. 9A, C), coxa 7 entire (Fig. 9D).

Gnathopods 1-2 of moderate size, with article 6 nearly as large as corresponding coxae (Fig. 8A, D). Gnathopod 1: article 3 along posterior margin with one median bunch of setae (Fig. 8A); article 5 shorter than article 6 (ratio: 33: 40). Article 6 slightly trapezoidal, hardly longer than broad (ratio: 76: 70), bearing along posterior margin 3 transverse rows of setae (Fig. 8B); palm inclined over half of posterior margin of article 6, convex, broadly conversed into posterior margin of article 6, defined on outer face by 1 strong corner S-spine accompanied laterally by 2 slender toothed L- spines and 3 facial M- setae, on inner face by 1 short subcorner R- spine (Fig. 8C). Dactylus barely exceeding posterior margin of article 6, with 1 median seta at outer margin (Fig. 8B).

Gnathopod 2: article 3 along posterior margin with one median group of setae (Fig. 8D); article 5 shorter than article 6 (ratio: 37: 40). Propodus (article 6) trapezoidal, hardly broader than long (ratio: 88: 82), with 4 transverse groups of setae along posterior margin (Fig. 8E); palm inclined nearly half of propodus length, convex, broadly conversed into posterior margin of article 6 and defined on outer face by 1 strong corner S-

spine accompanied laterally by 2 slender toothed L- spines and 3 facial M- setae, on inner face by 1 short subcorner R- spine (Fig. 8F); dactylus like that in gnathopod 1 (Fig. 8E).

Pereopods 3-4 rather similar to each other, scarcely setose; single short spines appear in distal part of pereopods. Dactylus almost reaching half of article 6 (Fig. 7D, F), with 1 ventral seta along inner margin near basis of the nail, and 1 plumose seta at outer margin; nail remarkably longer than pedestal (ratio: 30: 23).

Pereopods 5-7 moderately slender. Pereopod 5: basipodit (article 2) longer than broad, dilated (ratio: 60: 40), along anterior margin with row of single spine-like setae, along posterior convex margin with row of nearly 6 setae (Fig. 9A), ventroposterior lobe poorly visible; articles 4-6 of unequal length (ratio: 45: 42: 53), along both margins with single short and long spines (Fig. 9A). Dactylus much shorter than propodus (ratio: 18: 54), along inner margin with one spine-like seta, along outer margin with one plumose seta (Fig. 9B), nail nearly as long as pedestal.

Pereopod 6 remarkably longer than pereopod 5, with basipodit (article 2) much longer than broad (ratio: 77: 45), with almost parallel lateral margins and poorly visible ventroposterior lobe (Fig. 9C); articles 4-6 with spines like these in pereopod 5. Dactylus missing.

Pereopod 7: basipodit much longer than broad (ratio: 83: 47), with poorly convex lateral margins and shallow ventroposterior indistinct lobe; anterior margin of article 2 with several strong spine-like setae, along posterior margin with 8-9 short setae (Fig. 9D). Dactylus much shorter than article 6 (ratio: 88: 35), along inner margin with one spine-like seta, along outer margin with one plumose median seta (Fig. 9E), nail shorter than pedestal (ratio: 33: 52).

Pleopods 1-3 with elevated number of retinacula [3-(2)3-3, 3-3-4, 3-4-4]. Peduncle of pleopod 1 along anterior margin (in lateral projection) with 1-2 median setae (Fig. 10G), peduncle of pleopod 2 smooth (Fig. 10H); peduncle of pleopod 3 with 1-2 median setae along posterior margin (Fig. 10 I).

Uropod 1: peduncle longer than rami (Fig. 7G), with dorsoexternal row of spines and dorsointernal row of 0-1 short median seta (except distal spine); inner ramus barely longer than outer one, both rami bearing lateral and distal strong spines, inner ramus with 2 facial setae also (Fig. 7G).

Uropod 2: inner ramus slightly longer than outer one (rarely rami equal), both rami with longer distal spines (Fig. 7G),

Uropod 3: peduncle relatively short, slightly longer than broad (ratio: 28: 17), bearing 3-4 distal spines (Fig. 8G); inner ramus short, with one distal spine. Outer ramus 2-articulated: first article much longer than second one (ratio: 83: 34), with bunches of spines along both margins (Fig. 8G); second article with distal bunch of longer setae.

Telson short, deeply incised, nearly as long as broad, obtuse distally; each lobe with 3-4 distal and 0-1 subdistolateral marginal spine (Fig. 7H); facial spines absent; a pair of short plumose setae appears near the middle of each lobe (Fig. 7H).

Coxal gills of moderate length, these on gnathopod 2 reaching or hardly exceeding tip of basipodit, recurved and narrow (Fig. 8D), coxal gill on pereopod 4 narrow and slightly exceeding corresponding basipodit (Fig. 7E); gills on pereopods 3, 5 and 6 shorter and relatively narrow (figs. 7C; 9A, C).

Oostegites broad, with several distal setae each (Fig. 8D).

Male Body-length up to 5 mm: mainly like females, Epimeral plates 1-3 subrounded, epimeral plates 2-3 with 2 slender subventral spines each (Fig. 10J).

Urosomite 1 with one seta on each dorsolateral side (Fig. 12 I) and with one ventroposterior spine- like seta near basis of uropod 1 peduncle (Fig. 12 I); urosomite 2 with one spine-like seta on each dorsolateral side; urosomite 3 naked.

Coxae 1-4 are relatively short. Coxa 1 broader than long (ratio: 50: 35), with subrounded ventroanterior corner (Fig. 11A). Coxa 2 as long as broad (Fig. 11B); coxa 3 nearly as long as broad (Fig. 11C); coxa 4 slightly broader than long (ratio: 53: 50) (Fig. 11D).

Gnathopods like these in female. Gnathopod 1: article 3 along posterior margin with 1 bunch of setae; propodus (article 6) trapezoidal, hardly longer than broad (ratio: 77: 74), along posterior margin with 3 transverse groups of setae (Fig. 11 I); palm inclined almost to the half of propodus length, convex, defined on outer face by one corner S- spine accompanied laterally by 2 slender L-spines and 2 facial M- setae, on inner face by one subcorner R- spine; dactyls along outer margin with one median seta (Fig. 11 I).

Gnathopod 2: article 3 along posterior margin with one bunch of setae; propodus trapezoidal, nearly as long as broad, along posterior margin with 4 transverse groups of setae (Fig. 11J); palm inclined nearly to the half of propodus-length, convex, with one S- and 2 L- spines, 2 facial M- setae and 1 subcorner R- spine; dactylus like that in gnathopod 1.

Pilosity and presence of spines on pereopods 3-4 like those in female. Pereopod 3 dactylus along inner margin with one short seta near basis of the nail and with one median plumose seta at outer margin; nail much longer than the pedestal (ratio: 25: 19 (Fig. 12A).

Pereopod 4 dactylus like that of pereopod 3, with nail longer than pedestal (Fig. 12B).

Pereopods 5-7 rather similar to those in females. Pereopod 5: article 2 longer than broad (ratio: 68: 39), along anterior margin with several strong spine-like setae, along convex posterior margin with 7-8 longer setae, ventroposterior lobe shallow (Fig. 12C); dactylus moderately slender, along inner margin with one seta near basis of the nail (Fig. 12D), nail shorter than pedestal (ratio: 20: 25).

Pereopod 6: article 2 much longer than broad (ratio: 66: 49), with shallow ventroposterior lobe, and single strong spine-like setae along anterior margin, as well as with 7-8 longer setae along posterior margin (Fig. 12E); articles 4-6 of unequal length (ratio: 58: 63: 83), bearing longer spines along both margins. Dactylus much shorter than article 6 (ratio: 35: 83), along inner margin with one short seta (accompanied usually by one short lateral seta also) near basis of the nail (Fig.12F), along outer margin with one median plumose seta; nail shorter than pedestal (ratio: 36: 43).

Pereopod 7: article 2 much longer than broad (ratio: 88: 43), with shallow ventroposterior lobe (Fig. 12G), 4 longer strong spine-like setae are attached along anterior margin and 7-8 longer setae along posterior margin (Fig. 12G); dactylus moderately slender, with one short seta at inner margin (and one short lateral seta) near the basis of the nail, along outer margin with one median plumose seta (Fig. 12H); nail remarkably shorter than pedestal (ratio: 30: 60).

Pleopods 1-3 like those in females, with elevated number of retinacula.

Uropod 1: peduncle with dorsoexternal row of slender spines and dorsointernal row of setae (except distal spine); inner ramus barely longer than outer ramus, both rami with long lateral and distal spines (Fig. 12 I).

Uropod 2: rami of the same length, bearing long distal spines (Fig. 12 I).

Uropod 3 long (Fig. 11G); peduncle short, much longer than broad (ratio: 27: 12), bearing 2-3 distal spines; inner ramus scale-like, short, bearing several marginal and distal setae. outer ramus 2-articulated: first article slightly longer than second one (ratio: 115: 90), along margins with short single spines and simple setae; second article with single lateral and distal short setae (Fig. 11G).

Telson short, as long as broad, deeply incised, obtuse distally (Fig. 11H); each lobe with 4-5 distal long spines, facial spines absent; a pair of plumose setae is attached in the middle of outer margin of each lobe.

Coxal gills on gnathopod 2 and pereopods 3-4 long and narrow, reaching or exceeding the distal tip of the corresponding pereopods (Fig. 11B, C, D). Coxal gills on pereopods 5-6 short and ovoid (Fig. 11E, F).

#### Variability

Article 6 in gnathopods 1-2 with poorly variable shape, palm more or less inclined, provided with 2-4 facial M-setae.

Article 2 of pereopod 7 in smaller male (4.3 mm) remarkably longer than broad (ratio: 88: 49), with shallow ventroposterior lobe; 3 strong median spine-like setae are attached along anterior margin, and 7-8 setae along almost straight posterior margin (Fig. 12J).

Rami of uropod 1 are never paddle-shaped, dorsointernal margin of uropod 1 peduncle with 0-2 dorsointernal setae (except distal spine).

Uropod 2 with rami equal or the inner ramus is barely longer than outer one.

Lobes of telson with 4-5 spines sitting on the tip, and sometimes one spine can be attached at distoexternal margin of each lobe; facial spines absent.

The specimens of *N. jurinaci* from Biljevina (up to 6 mm long), have a slightly more narrowed article 2 of pereopods 5-7 having poorly distinct ventroposterior lobe; dactylus of pereopods 3-7 slightly more slender, with 1 seta along inner margin; propodus of gnathopods 1-2 slightly broader, provided with 4 facial M-setae each; pleopods with 3-3-3 or 4-4-4 retinacula each. But, as all specimens in this sample had been dried previously, no more detailed analysis is possible to provide.

#### Holotype

Male 5 mm [slide] is designated by Stanko KARAMAN as type. Holotype and paratypes are deposited in KARAMAN'S Collection in Podgorica, Montenegro.

#### Locus typicus

Spring in Crni Lug, W of Ogulin, Croatia.

## General distribution

Croatia.

## Remarks and affinities

*Niphargus jurinaci* belongs to the group of small species provided with one outer marginal seta on dactylus of gnathopods 1-2, elevated number of retinacula, elongated uropod 3 in males, relatively narrow basipodit of pereopods 5-7 and non-*kochianus* type of gnathopods 1-2. The members of this artificial group settled entire area of genus *Niphargus*. As many of these species are known based of one sex only, often the comparison and exact taxonomic position remain uncertain or temporary.

SHELLENBERG (1933) described a new taxon *Niphargus aquilex tauri*, ssp. n. from Taurus Mts. in Asia Minor, later redescribed and elevated to the specific rank (G. KARAMAN, 1973a). Later various new taxa with rather similar taxonomic characters have been described from Europe as subspecies of *Niphargus tauri*: *N. tauri kragujevensis* S. Karaman 1950 from Kragujevac, Serbia; *N. tauri jurinaci* S. Karaman 1950 from Crni Lug (Croatia), *N. tauri medvednicae* S. Karaman, 1950 from Medvednica Mt. (Croatia), *N. tauri osogovensis* S. Karaman, 1959 from Osogovo Mt. in Macedonia; *N. tauri pecarensis* S. Karaman & G. Karaman 1959 from Pečara Cave in Bulgaria, *Niphargus tauri carniolicus* Sket, 1960 from "Jama pri gradu" Cave near Novo Mesto, Slovenia, *N. tauri afioni* G. Karaman, 2012 from Afion (Province Afion, Turkey) etc. Later various authors considered these taxa as distinct species or subspecies (G. KARAMAN, 1974; G. KARAMAN & RUFFO, 1986).

*N. tauri tauri* Schellenberg 1933 differs remarkably from *N. jurinaci* by slightly dorsoventrally compressed rami of uropod 1, presence of lateral spines on telson, narrowed propodus of gnathopods 1-2, etc. (G. KARAMAN, 1973a).

*N. tauri afioni* G. Karaman 2012 (G. KARAMAN, 2012a) also has an elevated number of retinacula on pleopods 1-3, nearly subrounded epimeral plates, low number of lateral spines on outer plate spines of maxilla 1, etc., but differs from *N. jurinaci* by short distal spines on telson, more narrow propodus of gnathopods 1-2, strong spine at inner margin of dactylus in pereopods 3-7, etc.

*Niphargus osogovensis* S. Karaman 1959 is very similar to *N. jurinaci* (dactylus of gnathopods 1-2 with one seta along outer margin, elevated number of retinacula, uropod 3, telson, short coxae, etc.), but differs from *jurinaci* by dactylus of P3-P7 bearing strong spine along inner margin; gnathopods 1-2 in females with shorter and slightly less inclined propodus palm; broader article 2 in pereopod 7 in males; peduncle of pleopod 3 without posterior setae; lower number of D-setae on mandible palpus (5-8); etc. Further studies on new material from new localities of both species will show their real relationships.

*Niphargus romanicus* Dobreanu & Manolache 1942 (loc. typ.: Faget-Tirnavé, Romania) differs from *N. jurinaci* by less inclined palm of gnathopods 1-2 propodus, especially that in gnathopod 1; palm on propodus of gnathopods 1-2 has 3-4 slender corner L- spines (2 L- spines in *jurinaci*); the presence of outer marginal spines on telson; epimeral plates slightly more angular; urosomite 2 with 2-3 spines on each dorsolateral side; short uropod 3 in males and females, with short second article (article 2 reaching 1/5 of first article only); slightly broader basipodit of pereopod 7 (coxal gills unknown); etc.

## Conclusions

The subterranean fauna of Amphipoda, especially the family Niphargidae represented on the Balkan Peninsula by over 300 known species and subspecies, is only partially known, and numerous new taxa of this family have been discovered and described during the last 50 years. During our investigations of the genus *Niphargus* in the subterranean waters of Serbia, we collected and described here a new subspecies *Niphargus deelemanae grex*, ssp. n. from Šarbanovac (Timok River system), rather similar to the nominate taxon *N. deelemane deelemanae* G. Kar. 1973b known from Držina pećina Cave near Pirot (Serbia). The species *Niphargus jurinaci* S. Karaman 1950, known from Crni Lug near Ogulin in Croatia, is redescribed and figured in more detail, based on the paratype and holotype material. The relations between these two taxa and other taxa of the genus *Niphargus* are discussed. Our investigations are based on the morphological and ecological characters only.

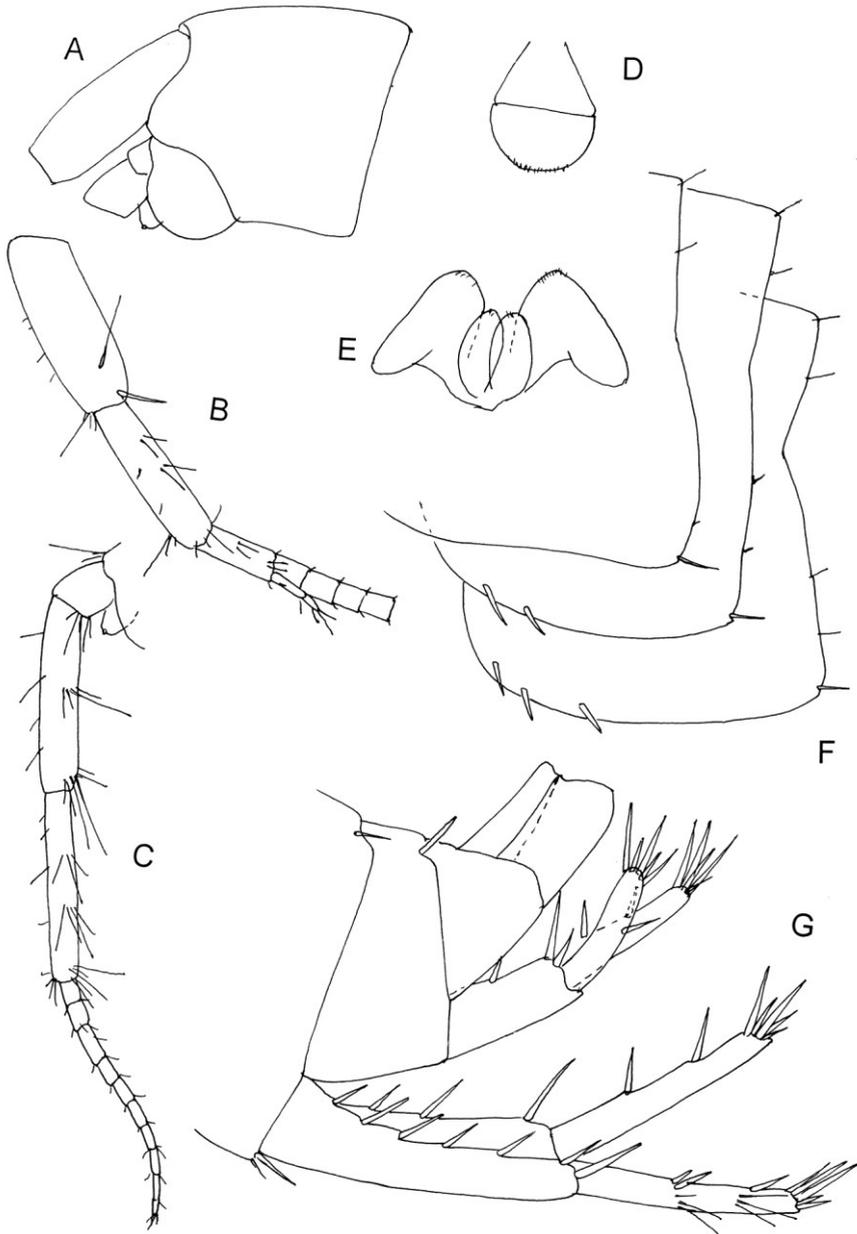


Figure 1. *Niphargus deelemanae grex* ssp. n., female 6.0 mm (holotype), S-5012-Šarbanovac: A = head; B = antenna 1; C = antenna 2; D = labrum; E = labium; F = epimeral plates 1-3; G = urosome and uropods 1-2.

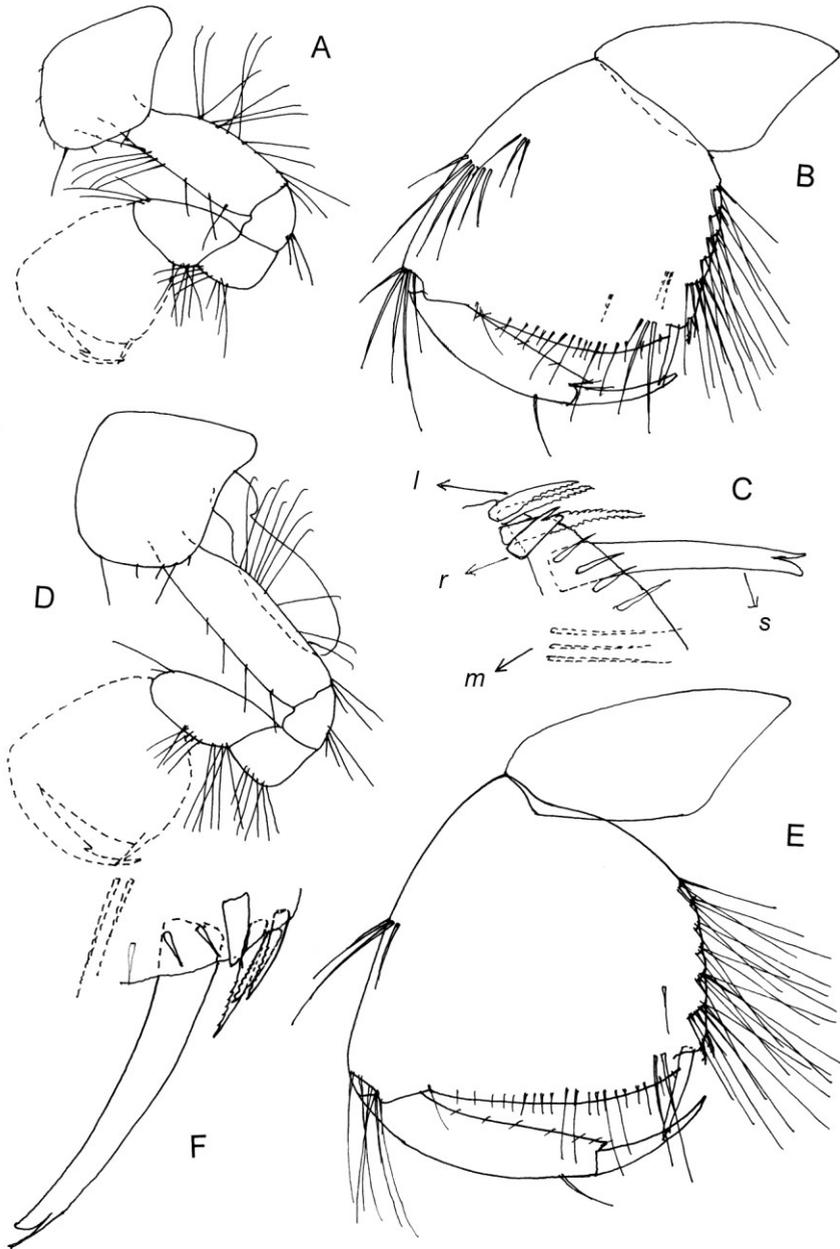


Figure 2. *Niphargus deelemanae grex* ssp. n., female 6.0 mm (holotype), S-5012-Šarbanovac: A-C = gnathopod 1; D-F = gnathopod 2, *l* - lateral spine, *r* - subcorner spine, *m* - facial setae, *s* - corner spine.

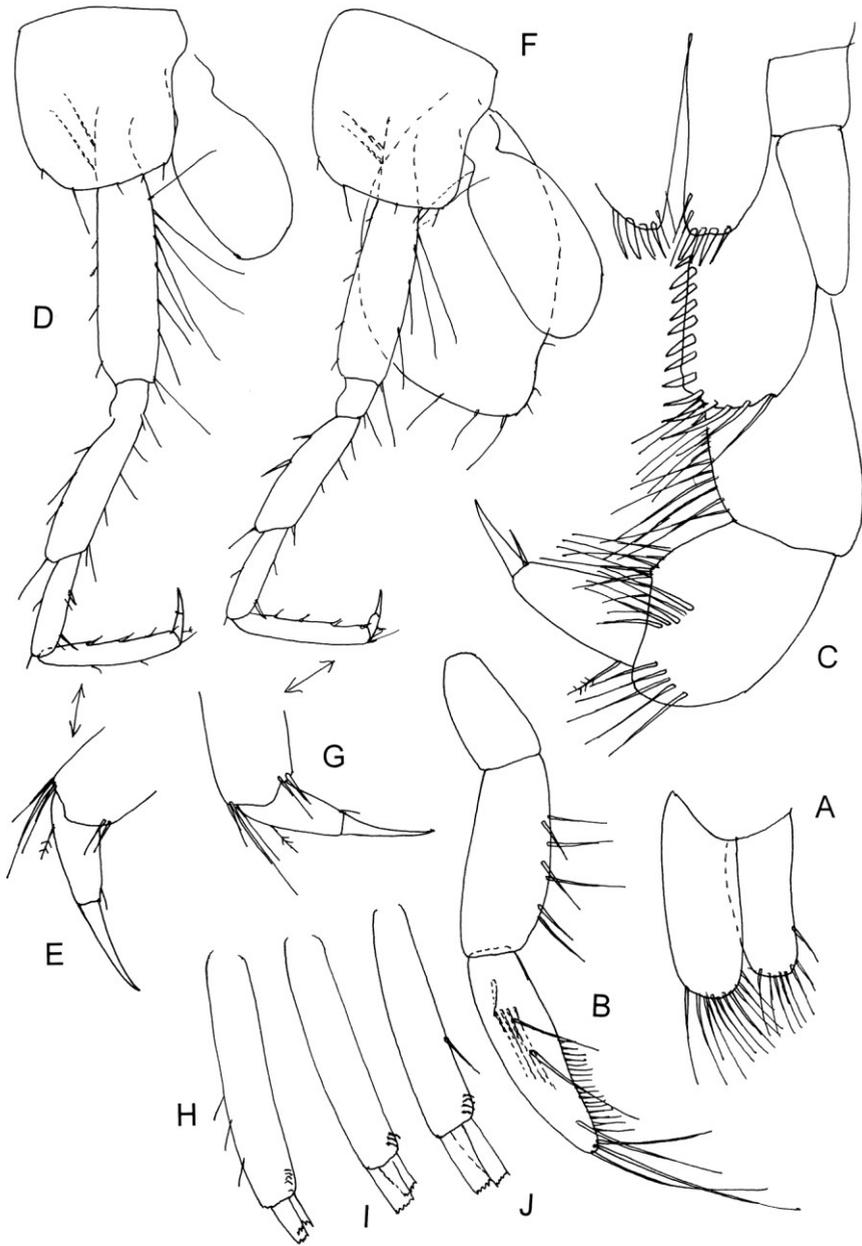


Figure 3. *Niphargus deelemanae grex* ssp. n., female 6.0 mm (holotype), S-5012-Šarbanovac: A = maxilla 2; B = mandible palp, inner face; C = maxilliped; D-E = pereopod 3; F-G = pereopod 4; H-J = peduncle of pleopods 1-3.

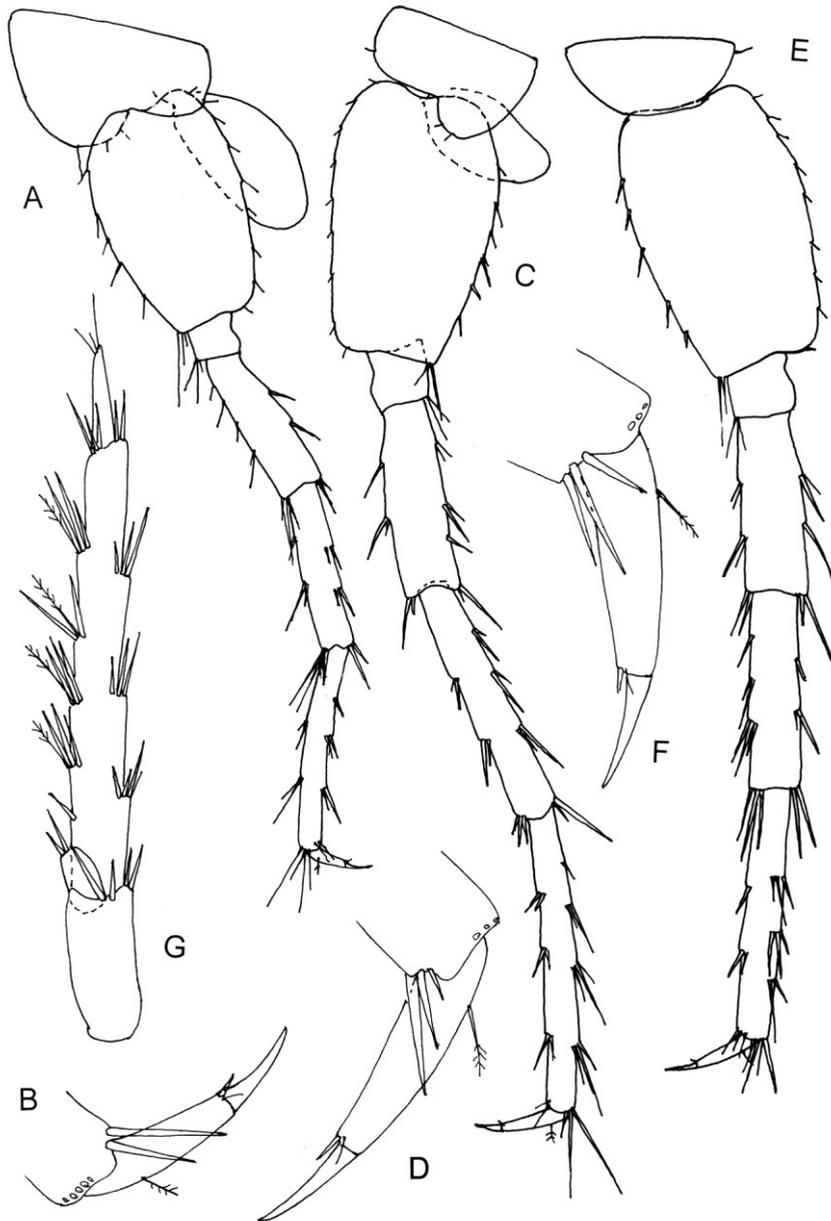


Figure 4. *Niphargus deelemanae grex* ssp. n., female 6.0 mm (holotype), S-5012-Šarbanovac: A-B = pereopod 5; C-D = pereopod 6; E-F = pereopod 7; G = uropod 3.

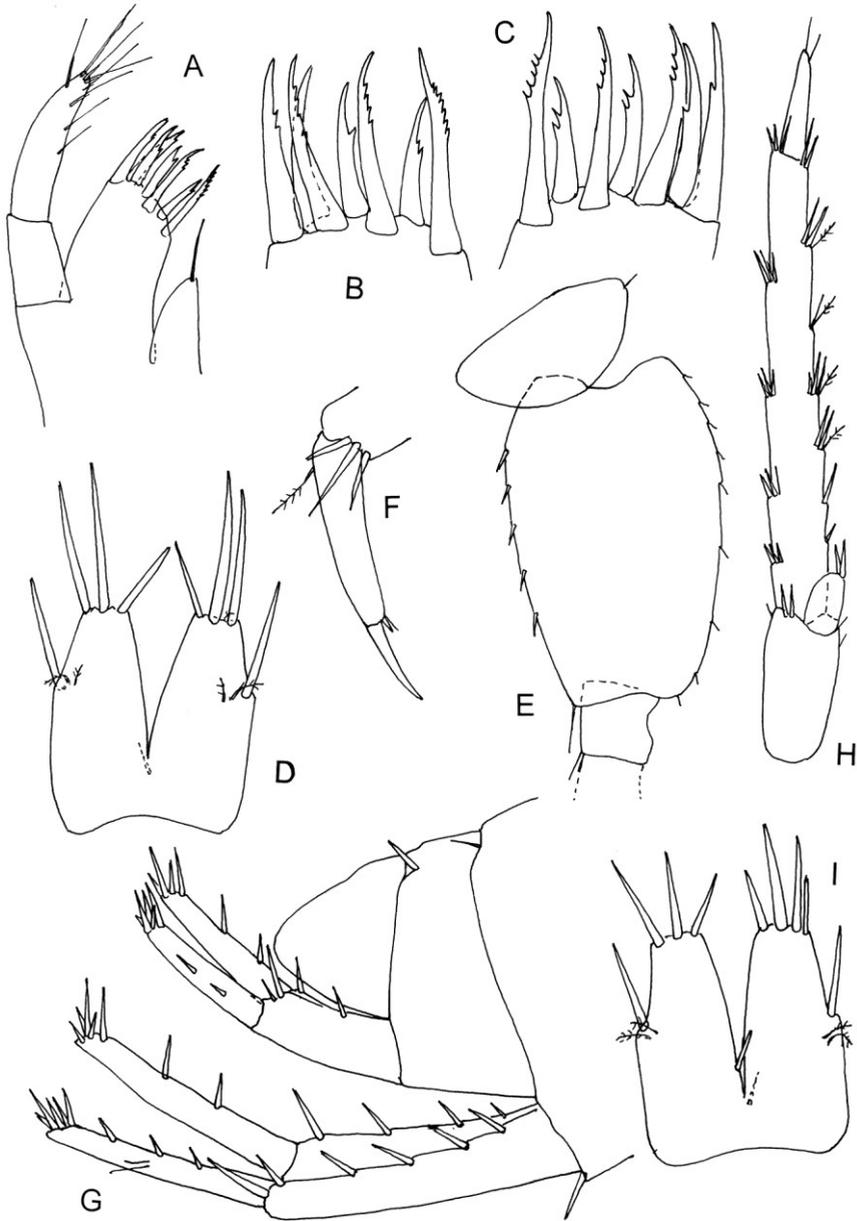


Figure 5. *Niphargus deelemanaе grex* ssp. n., female 6.0 mm (holotype), S-5012-Šarbanovac; A-B = left maxilla 1; C = right maxilla 1, outer plate; D = telson; male 5.6 mm (paratype); E = pereopod 7, basipodit; F = pereopod 7, dactylus; G = urosome with uropods 1-2; H = uropod 3; I = telson.

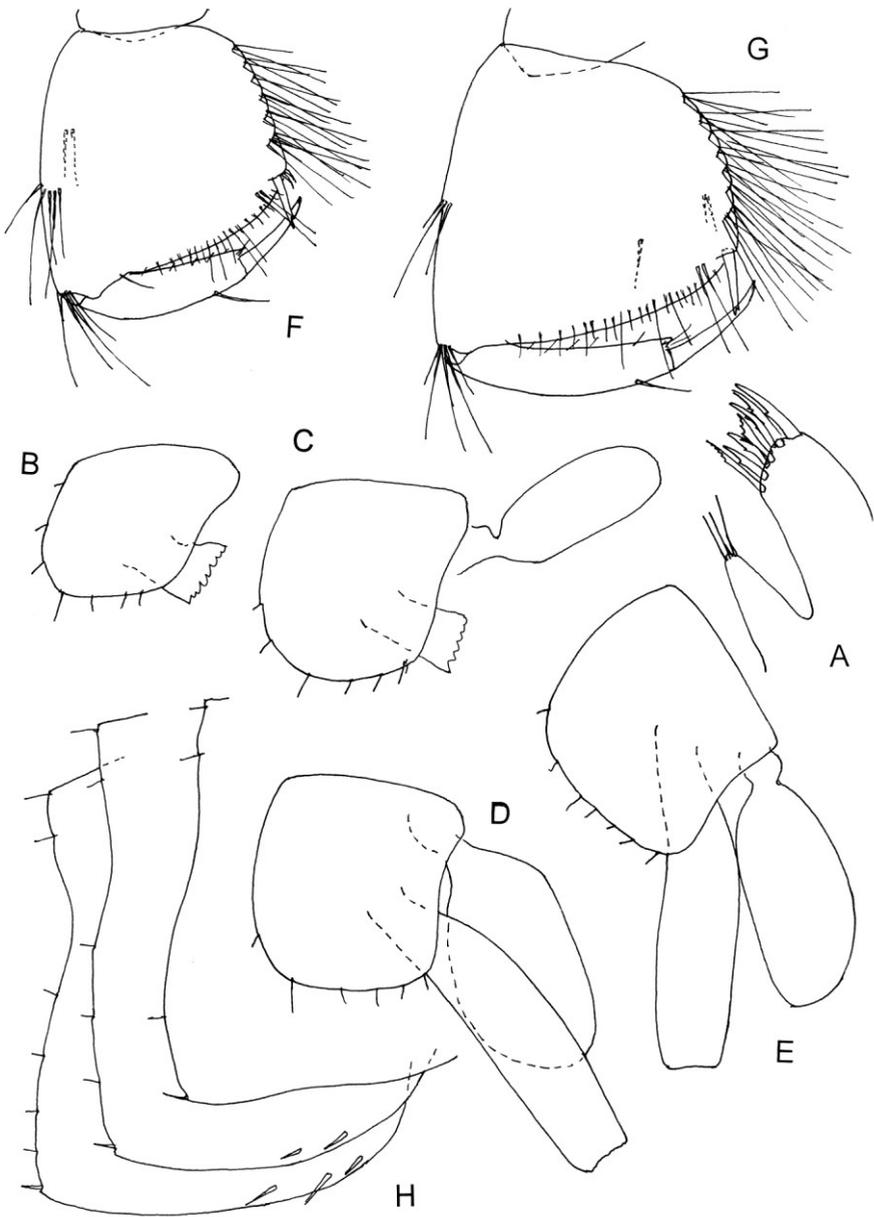


Figure 6. *Niphargus deelemanae grex* ssp. n., male 5.6 mm (paratype), S-5012-Šarbanovac: A = maxilla 1; B = coxa 1; C = coxa 2; D = coxa 3; E = coxa 4; F = propodus of gnathopod 1; G = propodus of gnathopod 2; H = epimeral plates 1-3.

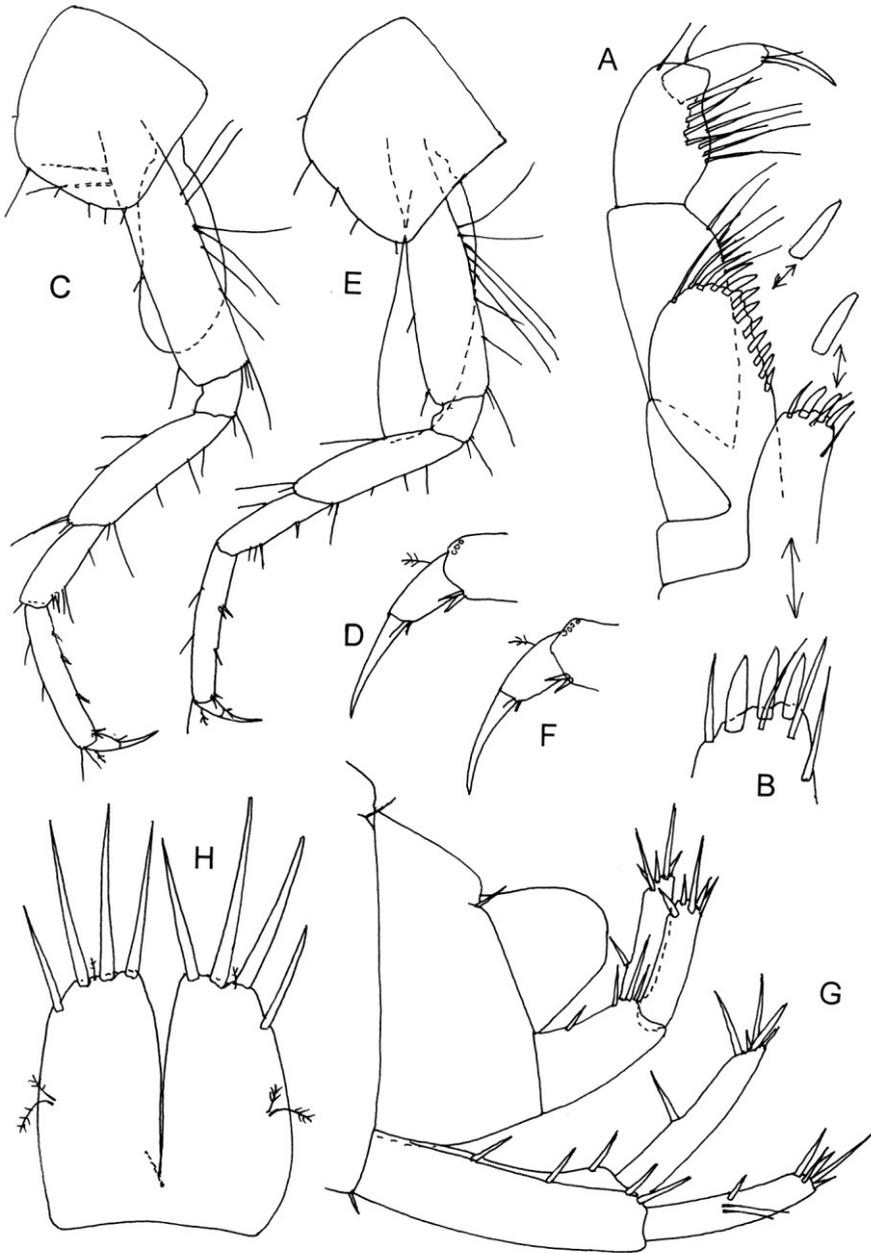


Figure 7. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, female 4.9 mm (paratype): A-B = maxilliped; C-D = pereopod 3; E-F = pereopod 4; G = urosome with uropods 1-2; H = telson.

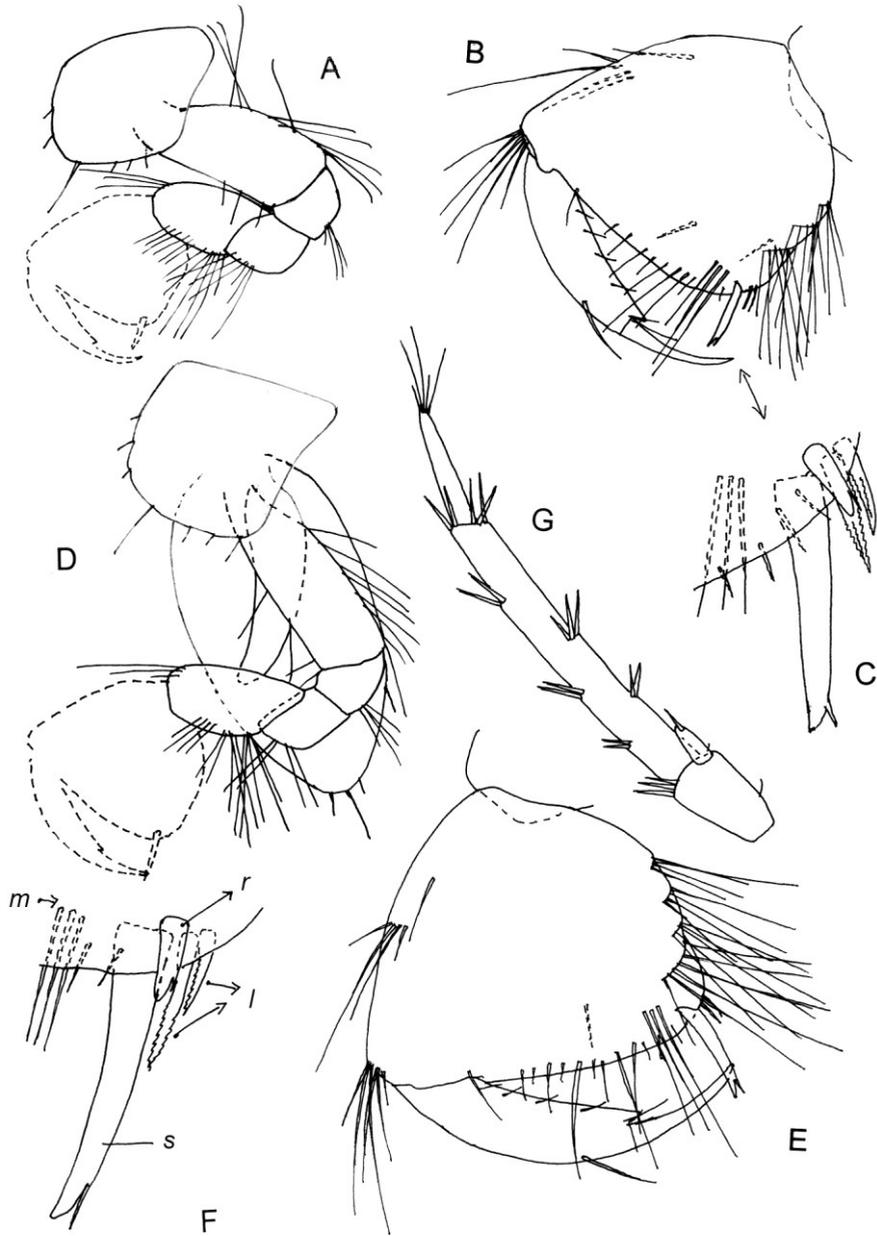


Figure 8. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, female 4.9 mm (paratype): A-C = gnathopod 1; D-F = gnathopod 2; G = uropod 3, *l* - lateral spine, *r* - subcorner spine, *m* - facial setae, *s* - corner spine.

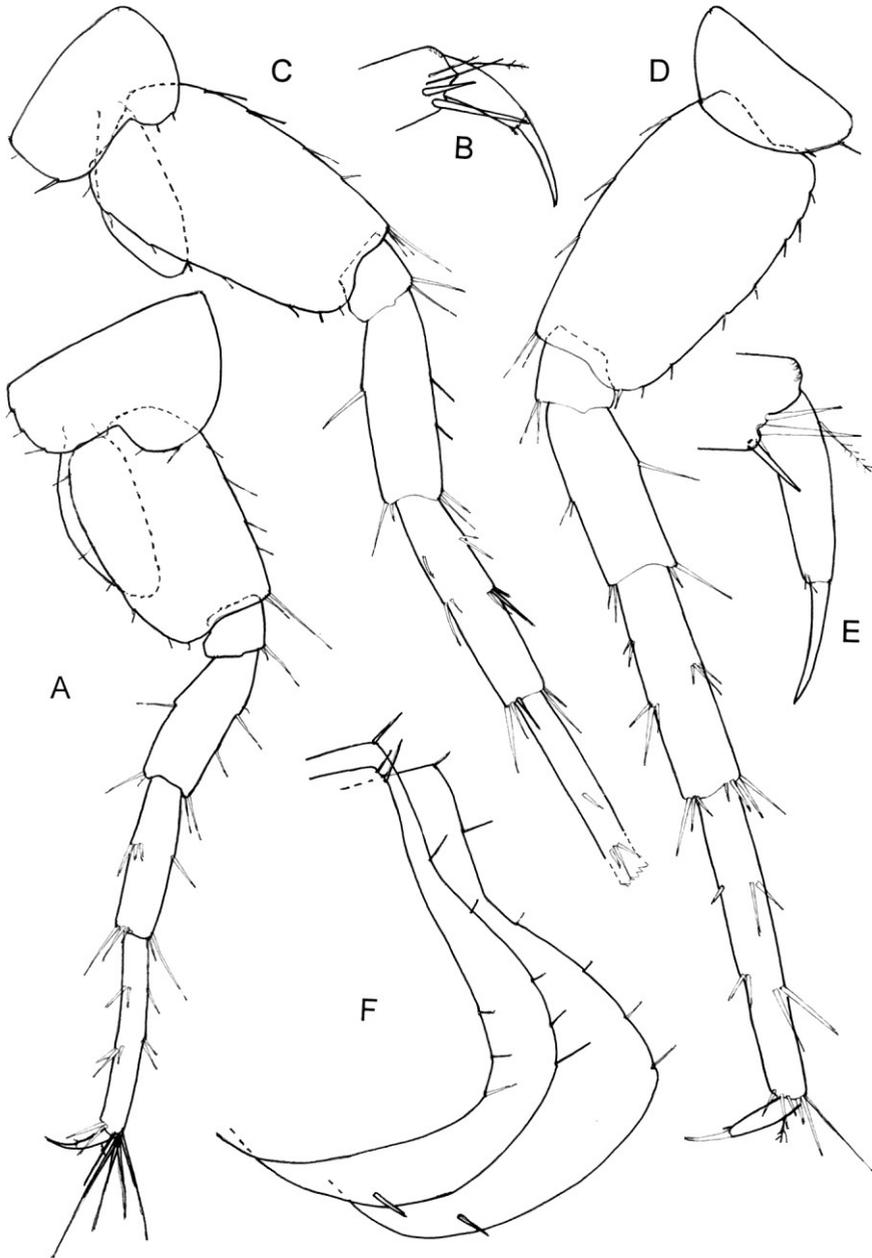


Figure 9. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, female 4.9 mm (paratype): A-B = pereopod 5; C = pereopod 6; D-E = pereopod 7; F = epimeral plates 1-3.

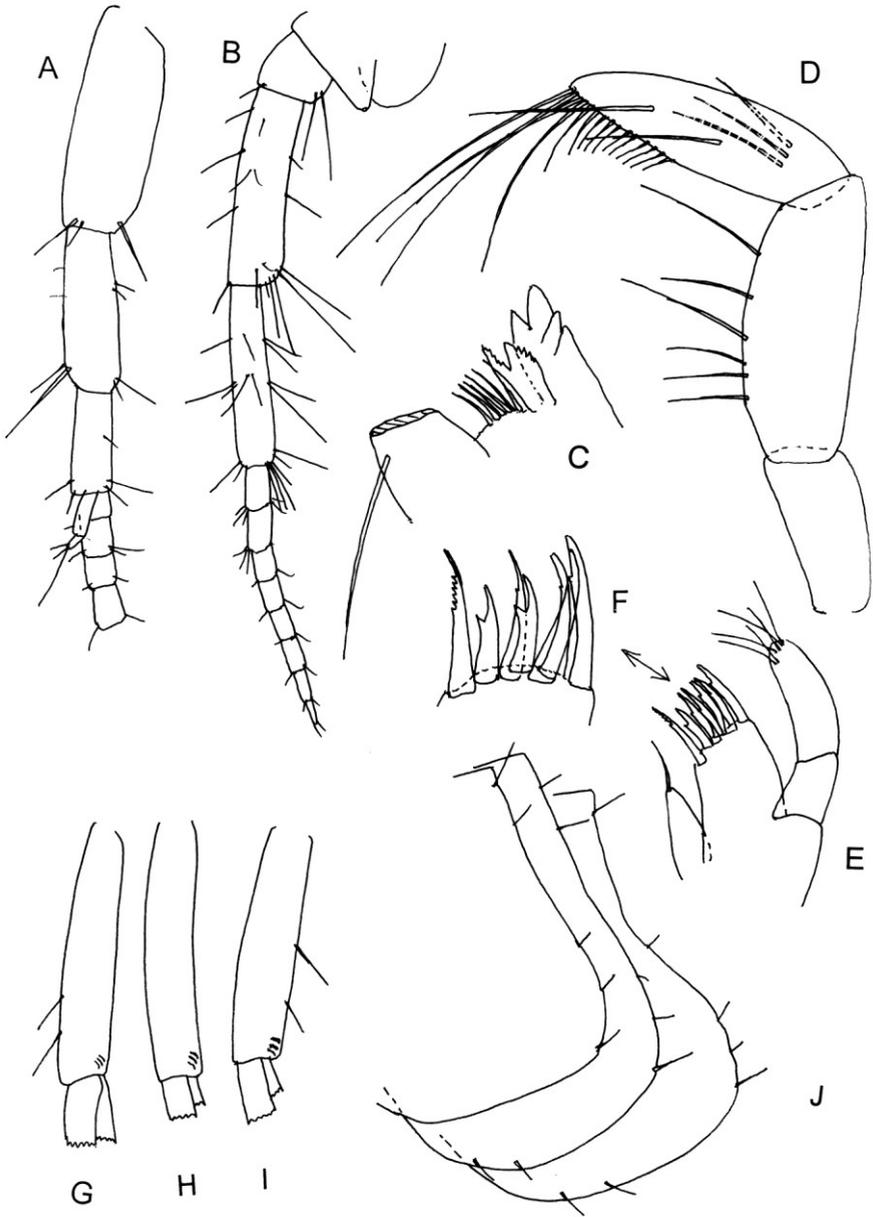


Figure 10. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, female 4.9 mm (paratype): A = antenna 1; B = antenna 2; C = distal part of right mandible; D = mandibular palp; E-F = maxilla 1; G-I = peduncle of pleopods 1-3; J = male 5.0 mm, epimeral plates 1-3.

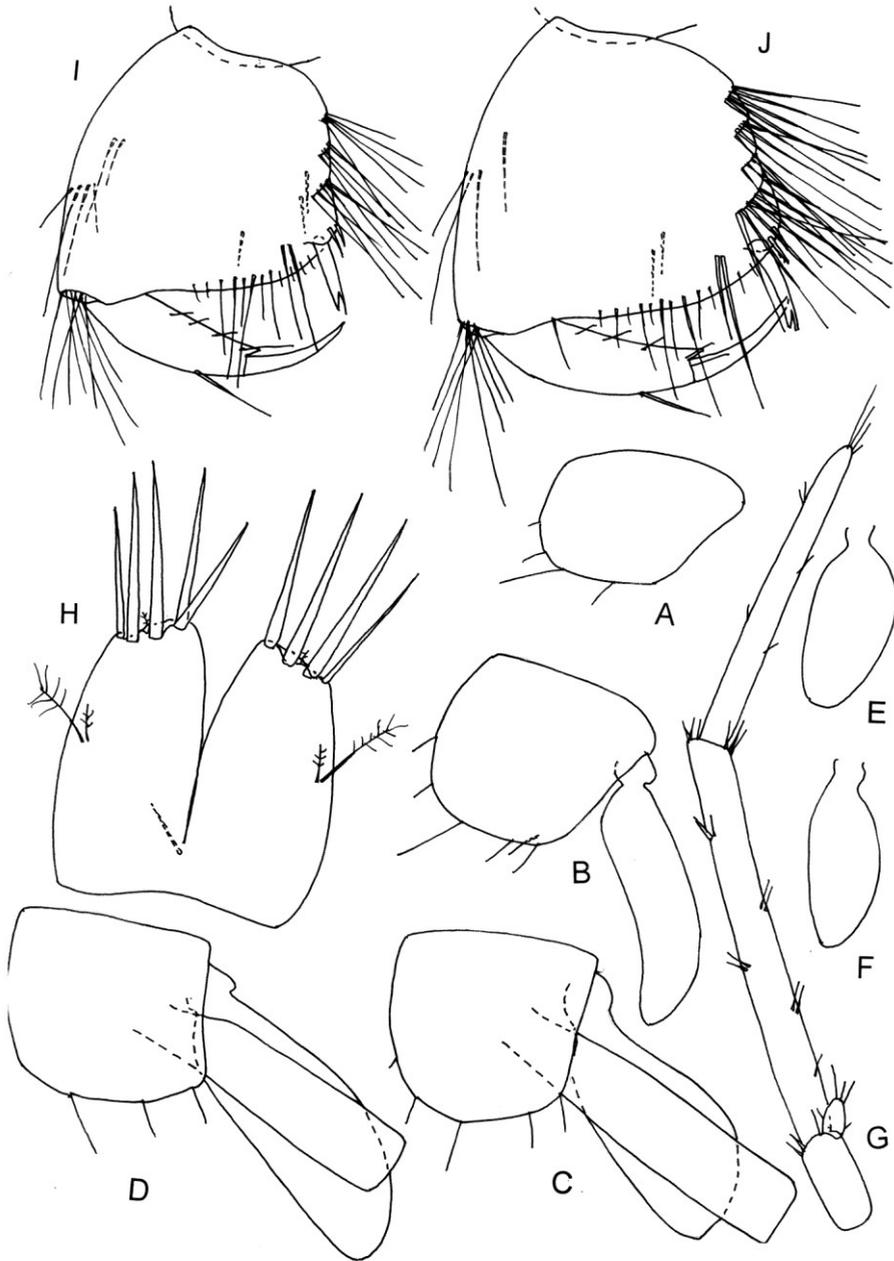


Figure 11. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, male 5.0 mm (holotype): A-D = coxae 1-4 with coxal gills; E = coxal gill of pereopod 6; F = coxal gill of pereopod 6; G = uropod 3; H = telson; I-J = male 4.3 mm, gnathopods 1-2.

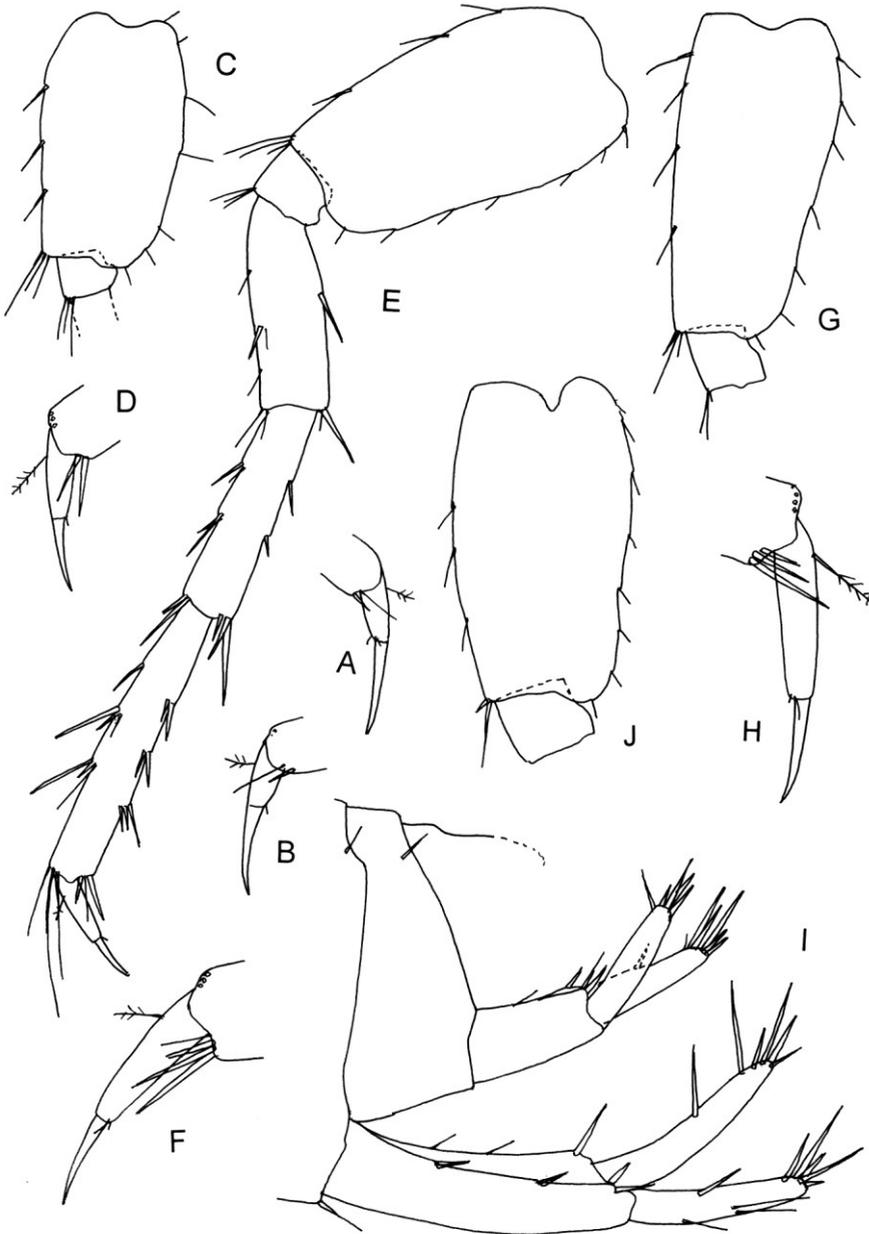


Figure 12. *Niphargus jurinaci* S. Karaman 1950, Tomac Jarak, Crni Lug, male 5.0 mm (holotype): A = dactylus of pereopod 3; B = dactylus of pereopod 4; C-D = pereopod 5; E-F = pereopod 6; G-H = pereopod 7; I = urosome with uropods 1-2; J = male 4.3 mm, basipodit of pereopod 7.

## References

- BARNARD, J.L. & BARNARD, C.M., 1983. Freshwater amphipods of the World. I. Evolutionary patterns. II. Handbook and bibliography. Hayfield Associates: Mt. Vernon, Virginia, 1983, pp. XIX +849 pages, 50 figs., 7 graphs, 98 maps, 12 tables.
- DOBREANU, E. & MANOLACHE, C., 1942. V. Nouvelles contributions a l'etude des Amphipodes de Roumanie. Bull. sec. Sci. Acad. Romania, 25(5): 1-12 (293-304).
- KARAMAN, G., 1969. XXVII. Beitrag zur Kenntnis der Amphipoden. Arten der Genera *Echinogammarus* Stebb. und *Chaetogammarus* Mart. an der jugoslawischer Adriaküste. Glasnik Republičkog zavoda za zaštitu prirode i Prirodnjačke zbirke u Titogradu, 2: 59-84.
- KARAMAN, G., 1972. Le probleme du genre *Niphargus* en Yougoslavie. - Actes du Ier Colloque International sur le genre *Niphargus*-Verona, 15-19 Aprile 1969, Museo Civico di Storia Naturale, Verona, Memorie fuori serie, 5: 1-10.
- KARAMAN, G. 1973a. XXXIV. Beitrag zur Kenntnis der Amphipoden. Neubeschreibung der Art *Niphargus tauri* Schellenberg 1933 (Gammaridae) aus dem Taurus Gebirge, Klein Asien. Crustaceana, 24(3): 275-282.
- KARAMAN, G., 1973b. Two new species of family Gammaridae from Yugoslavia, *Niphargus deelemanae* n. sp. and *Typhlogammarus algor*, n. sp. (XLVIII. Contribution to the Knowledge of the Amphipoda). Archiv für Hydrobiologie, Stuttgart, 72(4): 490-500.
- KARAMAN, G., 1973c. XLIX. Contribution to the Knowledge of the Amphipoda. On three *Niphargus* species (Fam. Gammaridae) from the Balkans. International Journal of Speleologie, 5: 143-152.
- KARAMAN, G., 1974. Catalogus Faunae Jugoslaviae, Crustacea Amphipoda (Contribution to the Knowledge of the Amphipoda 60). Consilium Academicum Scientiarum Rei Publicae Socialisticae Foederativae Jugoslaviae, Academia Scientiarum et Artium Slovenica, Ljubljana, 3(3): 1-44.
- KARAMAN, G., 1984. Critical remarks to the fossil Amphipoda with description of some new taxa (Contribution to the Knowledge of the Amphipoda 137). Poljoprivreda i šumarstvo, Titograd, 30(4): 87-104.
- KARAMAN, G. & RUFFO, S., 1986. Amphipoda: *Niphargus*-Group (*Niphargidae* sensu Bousfield, 1982). In: Botosaneanu, L. (ed.): Stygofauna Mundi, a faunistic, distributional, and ecological synthesis of the world fauna inhabiting subterranean waters (including the marine interstitial), Leiden, E. J. Brill/ Dr. W. Backhuys, pp.: 514-534.
- KARAMAN, G., 1992. Two subterranean taxa of the family Niphargidae, *Niphargus kragujevensis* S. Kar. 1950 and *N. k. remus*, new subspecies (Contribution to the Knowledge of the Amphipoda, 209). Poljoprivreda i šumarstvo, Podgorica, 38(3-4): 13-29.
- KARAMAN, G., 1994. Further studies on genus *Niphargus* Schiödte from Europe, *N. ivokaramani*, n. sp. and *N. danielopoli*, n. sp. (Contribution to the Knowledge of the Amphipoda, 210). Glasnik Odjeljenja prirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica, 10: 113-133.
- KARAMAN, G., 1998. New data on Gammaridean Amphipods from Macedonia (Contribution to the Knowledge of the Amphipoda, 235). Glasnik Odjeljenja prirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica, 12: 23-38.
- KARAMAN, G., 2012a. Further studies on genus *Niphargus* Schiödte, 1849 (Fam. Niphargidae) from the Near East (Contribution to the Knowledge of the Amphipoda, 260). Agriculture & Forestry, Podgorica, 55(9)(1-4): 49-74.
- KARAMAN, G., 2012b. Further investigations of the subterranean genus *Niphargus* Schiödte, 1849 (fam. Niphargidae) in Serbia. (Contribution to the Knowledge of the Amphipoda, 264). Agriculture and Forestry, Podgorica, 58(2): 45-64.
- KARAMAN, G., 2013. On two poorly known subterranean species of the family Niphargidae from Croatia (Contribution to the Knowledge of the Amphipoda, 268). Glasnik Odjeljenja prirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica (in press)

- KARAMAN, S., 1950. Über die kleinen *Niphargus*-Arten Jugoslaviens. Srpska akademija nauka, Posebna Izdanja knj. 158, Odeljenje Prirodno-matematičkih nauka, Beograd, 2: 87-99. [in Serbian, with German title]
- KARAMAN, S. 1959. Über eine neue Unterart von *Niphargus tauri* (Schellenberg), n. ssp. *osogovensis* aus Jugoslawien. Hidrobiologi, Istanbul Universitesi Fen Fakültesi, Seri B, 4(4): 170-175.
- KARAMAN, S. & KARAMAN, G., 1959. Beitrag zur Kenntnis der Niphargiden Bulgariens. Acta, Musei Macedonici Scientiarum Naturalium, Skopje, 7/59: 143-162.
- MCMENAMIN, M.A.S., ZAPATA, L.P. & HUSSEY, M.C., 2013. A Triassic giant amphipod from Nevada, USA. Journal of Crustacean Biology, 33(6): 751-759.
- SCELLENBERG, A., 1933. Weitere deutsche und ausländische Niphargiden. Zoologischer Anzeiger, 102(1-2): 21-33.
- SKET, B., 1960. Einige neue Formen der Malacostraca aus Jugoslawien III. Bulletin Scientifique, 5(3): 73-75.
- SKET, B., 1981. Distribution, ecological character and phylogenetic importance of *Niphargus valachicus* (Amphipoda, Gammaridae s. l.). Biološki Vestnik, Ljubljana, 29 (1): 87-103.

О ДВА ПРЕДСТАВНИКА РОДА *NIPHARGUS* SCHIÖDTE, 1849  
(CRUSTACEA: NIPHARGIDAE) БАЛКАНА,  
*N. DEELEMANAE* GREX SSP. N. И *N. JURINACI* S. KAR. 1950  
(271. ПРИЛОГ ПОЗНАВАЊУ AMPHIPODA)

ГОРДАН С. КАРАМАН

Извод

Радом су обухваћена два представника рода *Niphargus* Schiödte, 1849 (Amphipoda: Gammaridea: Niphargidae) из подземних вода Балкана. *Niphargus deelemanae grex*, ssp. n. је описан и илустрован на основу примерака из околине Шарбановаца у источној Србији. Врста *Niphargus jurinaci* S. Karaman, 1950 која је била доста оскудно описана и илустрована из места Црни Луг код Огулина у Хрватској, детаљно је описана и илустрована на бази типског материјала. Разматрани су таксономски положај и односи ова два таксона унутар рода *Niphargus*.

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