

Karaman, G. (2025). Further study of the subterranean genus *Niphargus* (Schiödte, 1949) (Fam. Niphargidae) in Albania (Contribution to the Knowledge of the Amphipoda 342) . Agriculture and Forestry, 71 (3): 25-45. <https://doi:10.17707/AgricultForest.71.3.02>

DOI: 10.17707/AgricultForest.71.3.02

¹Gordan S. KARAMAN

**FURTHER STUDY OF THE SUBTERRANEAN GENUS
NIPHARGUS (Schiödte, 1949) (Fam. NIPHARGIDAE)
IN ALBANIA (CONTRIBUTION TO THE KNOWLEDGE OF
THE AMPHIPODA 342)**

ABSTRACT

From the subterranean waters of the spring Benca, tributary of Vjosa River, southern Albania, new species of the family Niphargidae, *Niphargus bencaensis*, spec. nov. is described and figured, and its taxonomical position regarding some other species from adjacent regions is discussed. Some remarks on Amphipoda settlement are mentioned.

Keywords: Amphipoda, taxonomy, Benca spring, Albania, *Niphargus bencaensis*, new species.

INTRODUCTION

Amphipoda settled all kinds of the continental more or less clean waters over the World, epigeal (surface) and subterranean waters. Origin of Amphipoda is in the Sea, where we can find species with eyes as well as blind species.

Penetration of amphipods into the continental waters was by various ways (through the mouth of the rivers into the surface freshwaters, through the mouth of the rivers directly into the subterranean fresh waters, through the sea coastal beaches into coastal brackish waters (subterranean and epigeal), or by geological strong movements. This process of settlements of amphipods into fresh waters has been realized more times and it is present also today, and we can observe various species on different stages of this settlement.

By this way, present subterranean fauna of Amphipoda has various origins, from epigeal species penetrating into the subterranean waters or directly from the sea into the brackish and fresh subterranean waters. The adaptation to the subterranean life condition, request various, often very strong morphological, physiological and other body changes, observed very well within members of the family Niphargidae.

The presence of high number of various and different ecological niches in the subterranean waters, high possibility of geographical and physical isolation of various populations, lesser competition, better ecological condition etc., enabled existence today of so high number of known taxa within family Niphargidae.

¹ Gordan S. Karaman (corresponding author: karaman@t-com.me), Montenegrin Academy of Sciences and Arts, Podgorica, MONTENEGRO.

Notes: The author declares that he has no conflicts of interest. Authorship Form signed online

Received: 20/05/2025

Accepted: 05/07/2025

The family Niphargidae settled the subterranean waters of Europe and Near East till western Russia, Iran, Iraq, Israel and some adjacent regions, with recently known over 350 known species and subspecies. Based on very different body, ecological and other characteristics (shape of body, bending of the body in the ball, presence of yellow spots on the place of eyes in some species, etc.) indicated that penetrating into the subterranean waters was more times from various places, and that family Niphargidae is probably polyphyletic.

In so high amount of the species and subspecies, we can recognize various groups of taxa nominated as genera, subgenera or group of species, made to facilitate recognition of single taxa (*Chaetoniphargus* Karaman and Sket, 2019, *Karamaniella*, Sket 1962, *Orniphargus* S. Karaman, 1950, *Protoniphargopsis* Sket, 1957, *Phaenogammarus* Dudich, 1941, *Pontoniphargus* Dancau, 1970, etc.) and attempt of single authors to submerge all these taxa into *Niphargus* as synonyms, without detailed morphological, genetic, molecular and other analysis of all taxa is premature and request further studies.

Among so numerous known taxa, no any species of family Niphargidae is with eyes, although some species are probably in the attempt to come out of the subterranean into surface water (*N. valachicus* Dobreanu & Manolache, 1933, etc.).

Discovery and collecting of the subterranean species was always much more difficult and complicated than collecting of epigean species, and consequently fauna of subterranean amphipods is much less known than fauna of epigean (surface) amphipods in general. By this way, the subterranean fauna of Amphipoda in Albania is also much less known than epigean fauna, including subterranean family Niphargidae, presented now by 5 known species: *Niphargus ohridanus* S. Karaman, 1929, *N. tomori* G. Karaman, 2011, *N. griebleri* G. Karaman, 2023b, *N. lepushensis* G. Karaman, 2025 and *N. bencaensis*, sp. nov. from Vjosa River; some of them with rather similar taxa in the adjacent regions around Albania.

The Vjosa River with tributaries is one of the last free flowing rivers in Europe, and importance for preservation of this river with its natural biodiversity, ecology, etc., was mentioned already by various authors (Miho *et al.*, 2018). This is confirmed also by the recent investigations of the subterranean Amphipoda of this river, through discovery of various new or known genera and species of Amphipoda, many of them endemic for this River only. Finally, one of these new species is described in this work.

MATERIAL AND METHODS

The material of *Niphargus* was collected in the subterranean waters in one spring on tributary of Vjosa River in southern Albania during the realization of the APPEAR project VjoSusDev (2021, 2023, 2024), and sent me at disposition for study. APPEAR is a program of the Austrian Development Cooperation implemented by the OeAD. One part of this studied material is presented in this work.

The studied material was preserved in 70-95% ethanol. Specimens were dissected using a WILD M20 microscope and drawn using a camera lucida attachment. All appendages were temporarily submersed in a mixture of glycerin and water for study. All illustrations were inked manually. After the study, the dissected body-parts were fixed in Liquid of Faure as permanent slides.

Some setal formulae follow G. Karaman's terminology (Karaman, G., 1969, 1993) for the third mandibular palpus article [A= A-setae on outer face; B= B-setae on inner face; C= additional C-setae on outer face; D= lateral marginal D-setae; E= distal long E-setae], and for setae on propodus of gnathopods 1-2 (G. Karaman, 2012b) (S= corner S-spine; L= serrate corner lateral L-spines; M= corner facial M-setae; R= subcorner R-spines on inner face}.

The terms "setae" and "spines" are used based on their shape, not origin. The investigations are provided based on morphological, ecological and zoogeographical studies.

In References are mentioned the presence and number of figures in various papers, what is very important and helpful in taxonomical determination of this species.

TAXONOMICAL PART

Order AMPHIPODA Latreille, 1816

Suborder SENTICAUDATA Lowry & Myers, 2013

Family NIPHARGIDAE G. Karaman, 1962 (sensu Bousfield, 1977: 303; 1982: 267)

Genus *NIPHARGUS* (Schiödte, 1849)

***NIPHARGUS BENCAENSIS*, SP. NOV.**

Figures 1-9

MATERIAL EXAMINED

Benca-4= Spring Benca, tributary of Vjosa River, southern Albania, Adriatic Sea drainage system, 23.5.2024, 7 exp. (leg. Christian Griebler) (Fig. 9).

DIAGNOSIS

Metasomal segments with 2 dorsoposterior marginal setae, urosomal segment 1 with 1 seta, urosomal segment 2 with 1 spine, urosomal segment 3 naked.

Epimeral plates obtusely angular in male, angular in female. Mandible palpus article 1 naked or with one distolateral seta. Maxilla 1 inner plate with 2 setae, first article of palpus naked or with one distal seta. Maxilliped inner plate with 4-5 spines.

Coxae relatively short, coxa 4 without posterior lobe. Gnathopods moderately large, with propodus nearly as large as corresponding coxa, with palm inclined nearly to the half of propodus-length, dactylus with row of setae along outer margin. Dactylus of pereopods 3-7 with one spine at inner margin near basis of the nail, nail shorter than pedestal. Pereopods 5-7 with narrowed article 2

without ventroposterior lobe, in male article 2 of pereopod 7 up to more than twice as long as broad. Pleopods with 2 retinacula, peduncles scarcely setose or naked. Uropod 1 peduncle with dorsoexternal row of spines and dorsointernal row of setae, rami in male and female of nearly equal length. Uropod 3 elongated in male, with second article of outer ramus up to as long as first one, in females short. Telson strongly spinose, deeply incised, with distal, outer marginal and facial spines.

DESCRIPTION

MALE 9.5 mm (HOLOTYPE): Body moderately slender, metasomal segments with 2 dorsoposterior marginal setae each (Fig. 4F). Urosomal segment 1 with 1 seta on each dorsolateral side, urosomal segment 2 with 1 spine on each dorsolateral side, segment 3 naked. Urosomal segment 1 at each ventroposterior corner with one spine near peduncle of uropod 1 (Fig. 2G).

Epimeral plates 1–3 obtusely angular, at posterior poorly convex margin with several short setae; epimeral plates 2 and 3 with 3 subventral spines each (Fig. 4F).

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

Antenna 1 reaching nearly half of body-length; peduncular articles 1–3 progressively shorter (ratio: 59:45:25), very scarcely covered by single short setae (Fig. 1B); main flagellum slender, much longer than peduncle and consisting of 19+ articles scarcely setose (some of them with 1, rarely 2 short aesthetascs (Fig. 1C). Accessory flagellum short, 2-articulated, almost reaching half of last peduncular article (Fig. 1B).

Antenna 2 relatively slender, peduncular article 3 short, with distoventral bunch of setae; peduncular article 4 rather longer than article 5 (ratio: 68:57), both articles along dorsal margin with several single or groups of shorter setae, along ventral margin with several groups of longer setae (the longest setae exceeding diameter of articles themselves); flagellum slender, slightly shorter than peduncular articles 4–5 combined, consisting of 12 articles, scarcely setose (Fig. 1D); antennal gland cone short.

Mouthparts well developed. Labrum broader than long, poorly convex distally (Fig. 1E). Labium much broader than long, inner lobes well developed, outer lobes entire, convex distally (Fig. 1F).

Left mandible: incisor bearing 5 teeth, lacinia mobilis with 4 teeth accompanied by 6 rakers. Right mandible: incisor with 4 teeth, lacinia mobilis serrate, accompanied by 5 rakers (Fig. 2A). Palpus article 1 naked, article 2 with 14 setae (Fig. 2B), article 3 subfalciform, distinctly longer than article 2 (ratio: 83:67), bearing nearly 24 marginal D-setae and 6 distal long E-setae, on outer face with row of 8 A-setae (Fig. 2B), on inner face with 4 single B-setae (Fig. 2C). Maxilla 1: inner plate with 2 setae, outer plate with 7 spines (6 spines with one lateral tooth, inner spine with 3 lateral teeth (Fig. 2D), palpus 2-articulated, first article with 1 distomesial seta rather smaller than that in female; second

article short, not reaching distal tip of outer plate-spines, bearing 5 distal setae (Fig. 2D).

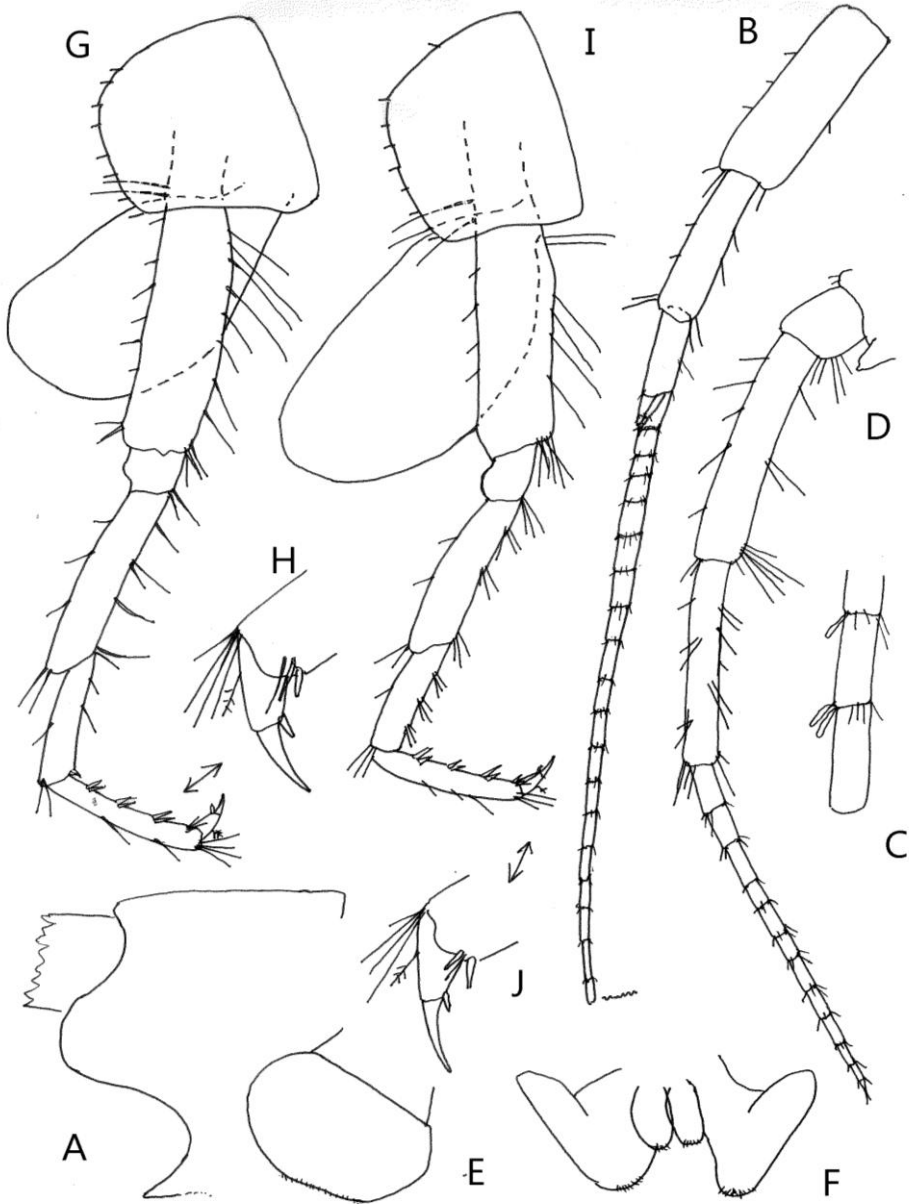


Figure 1. *Niphargus bencaensis* sp. nov., Benca spring, Shushica River, S. Albania, male 9.5 mm (holotype): A= head; B= antenna 1; C= aesthetascs; D= antenna 2; E= labrum; F= labium; G-H= pereopod 3; I-J= pereopod 4.

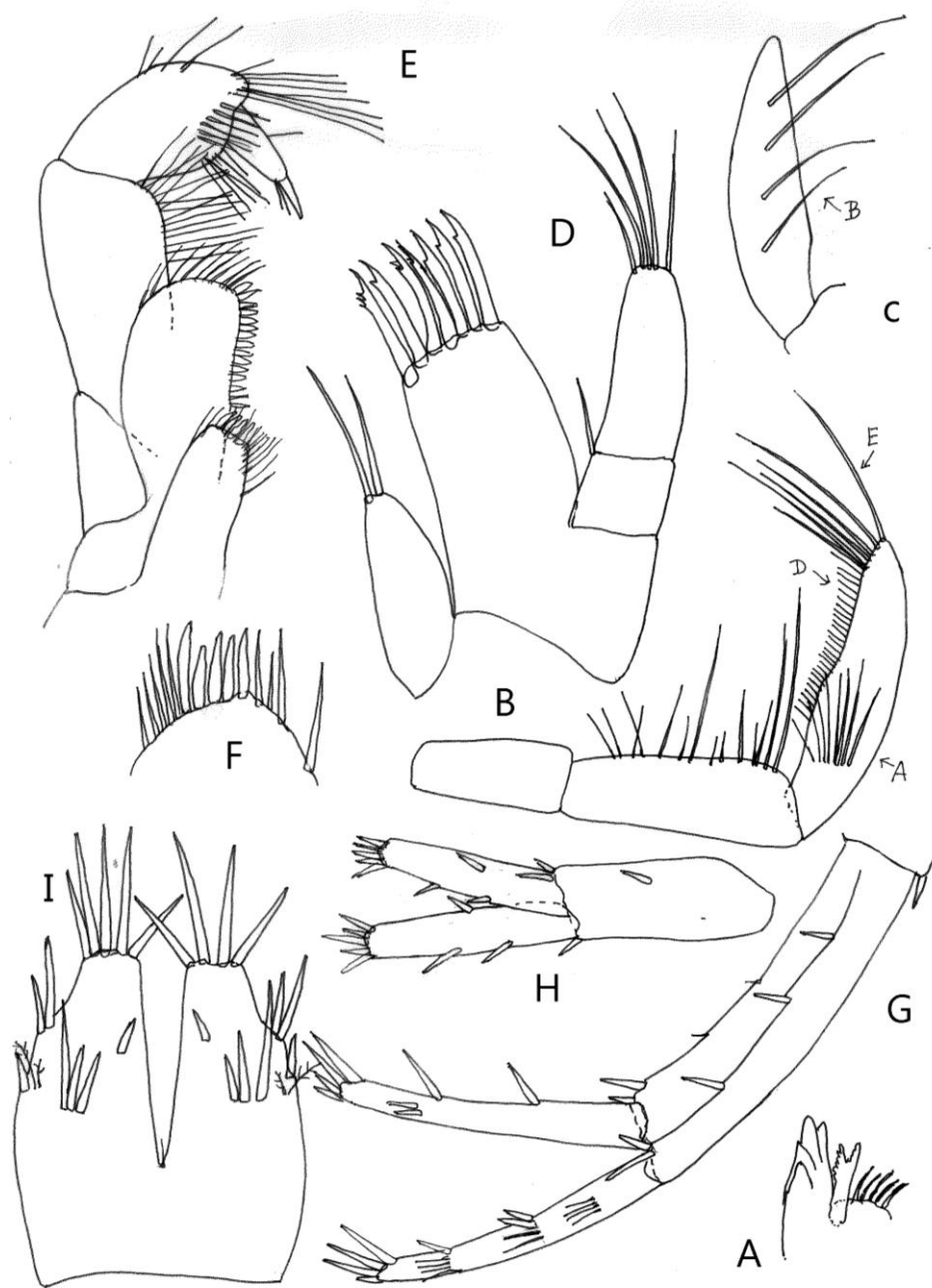


Figure 2. *Niphargus bencaensis* sp. nov., Benca spring, Shushica River, S. Albania, male 9.5 mm (holotype): A= tip of right mandible; B= mandibular palp, outer face [A= facial A-setae; D= marginal D-setae; E= distal E-setae]; C= distal article of mandible, inner face (B= B-setae); D= maxilla 1; E= maxilliped; F= inner plate of maxilliped; G= uropod 1; H= uropod 2; I= telson.

Maxilla 2: both plates with distal group of numerous setae, inner plate with several additional distomesial setae (Fig. 4A).

Maxilliped: inner plate short, with 4-5 distal pointed spines mixed with several setae (Fig. 2F), outer plate reaching nearly half of palpus article 2, bearing row of distomesial short spines, palpus article 3 along outer margin with 3 groups of 1-2 median setae and distal bunch of setae; palpus article 4 at inner margin with 2 setae near basis of the nail (Fig. 2E).

Coxae relatively short. Coxa 1 much broader than long (=high) (ratio: 50:35), with subrounded ventroanterior margin, bearing 9 short setae (Fig. 3A). Coxa 2 nearly as long as broad, at convex margin with 9 setae (Fig. 3D). Coxa 3 broader than long, (ratio: 58:50), along convex margin with 8 short setae (Fig. 1G). Coxa 4 broader than long (ratio: 61:47), along convex margin with 8 short setae, ventroposterior lobe absent (Fig. 1I).

Coxa 5 broader than long (ratio: 68:42) (Fig. 4B). Coxa 6 much broader than long (ratio: 58:32) (Fig. 4C). Coxa 7 shallow, entire, broader than long (ratio: 52:24), tapering posteriorly (Fig. 4D).

Gnathopod 1 rather smaller than gnathopod 2, both with propodus nearly as large as corresponding coxae. Gnathopod 1: article 2 along both margins with long setae; article 3 with 1 distoposterior bunch of setae; article 5 rather shorter than propodus, with distoanterior group of setae (Fig. 3A).

Propodus trapezoid, longer than broad (ratio: 85:75), along posterior margin with 9 transverse rows of setae (Fig. 3B). Palm only slightly convex, inclined nearly to the half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 5 corner facial M-setae, on inner face by 1 subcorner R-spine (Fig. 3C). Dactylus reaching posterior margin of propodus, along outer margin with 4-5 single median setae, along inner margin with several short setae (Fig. 3B).

Gnathopod 2: article 2 along anterior margin with row of shorter setae; along posterior margin setae are rather longer in proximal region; article 3 with 1 distoposterior bunch of setae; article 5 nearly as long as propodus, along anterior margin with 2 bunches of setae (Fig. 3D). Propodus trapezoid, only slightly longer than broad (ratio: 96:88), along posterior margin with 9 transverse rows of setae (Fig. 3E), palm slightly convex, inclined nearly to the half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 1 L-spine and 5 facial corner M-setae, on inner face by 1 subcorner R-spine (Fig. 3F). Dactylus along outer margin with 5 median single setae, along inner margin with several short submarginal setae (Fig. 3E). Pereopods 3-4 moderately slender. Pereopod 3: along anterior margin with row of short setae, along posterior margin with longer setae (Fig. 1G).

Articles 4-7 of different length (ratio: 55:36:45:15), article 4 at anterior margin with 4-5 single short setae, along posterior margin 4 single or groups of setae (the longest setae rather exceeding diameter of article itself); article 5 along both margins with single setae; article 6 along posterior margin with 4 groups of spines, along anterior margin with 3 groups of setae; dactylus at inner margin with one spine near basis of the nail, at outer margin with one median plumose seta (Fig. 1H), nail only slightly shorter than pedestal.

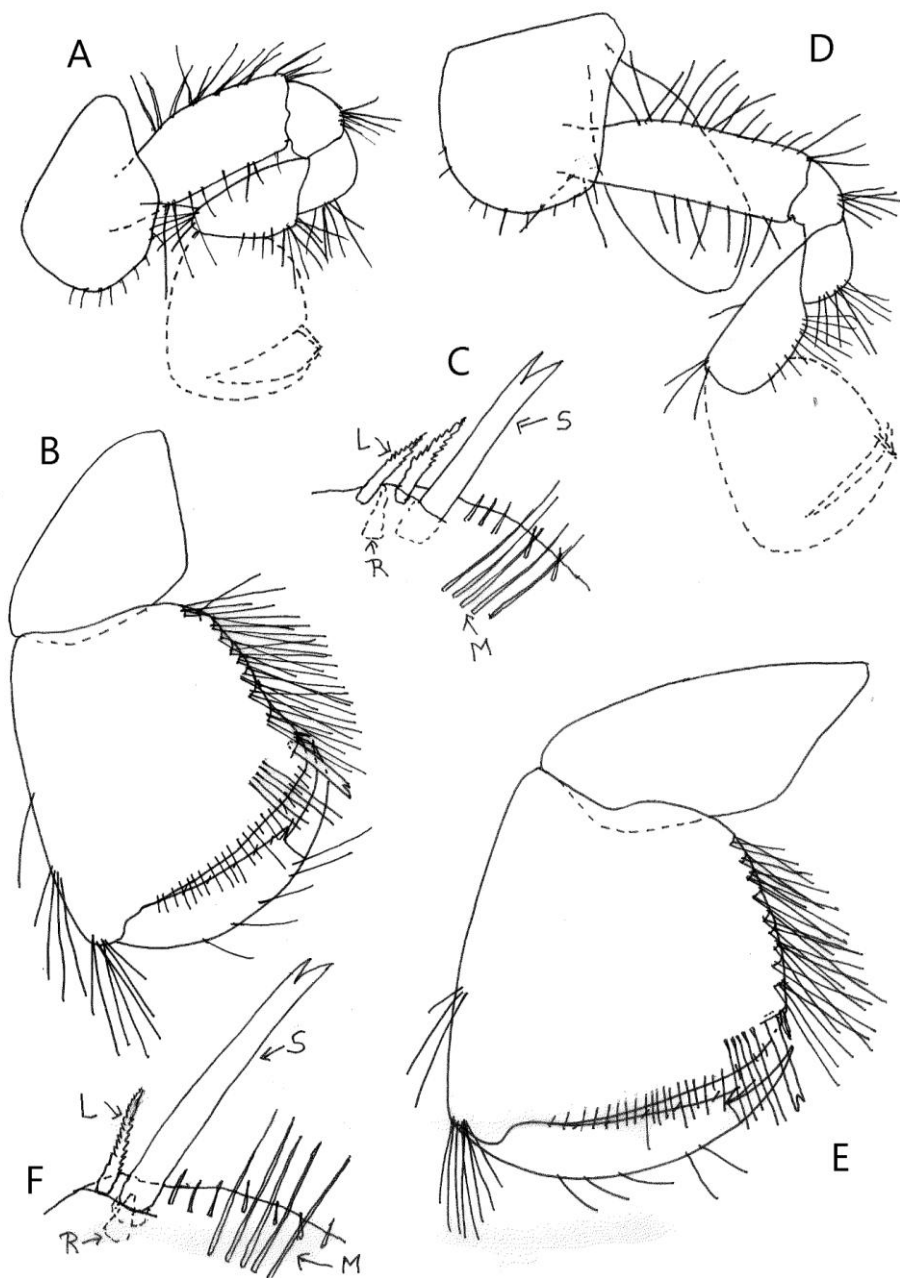


Fig. 3. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, male 9.5 mm (holotype): A-B= gnathopod 1, outer face; C= distal corner of gnathopod 1-propodus, outer face: S= corner S-spine; L= lateral L-spines; M= corner facial M-setae; R= subcorner R-spine, inner face); D-E= gnathopod 2, outer face: F= distal corner of gnathopod 2-propodus, outer face: S= corner S-spine; L= lateral L-spines; M= corner facial M-setae; R= subcorner R-spine, inner face).

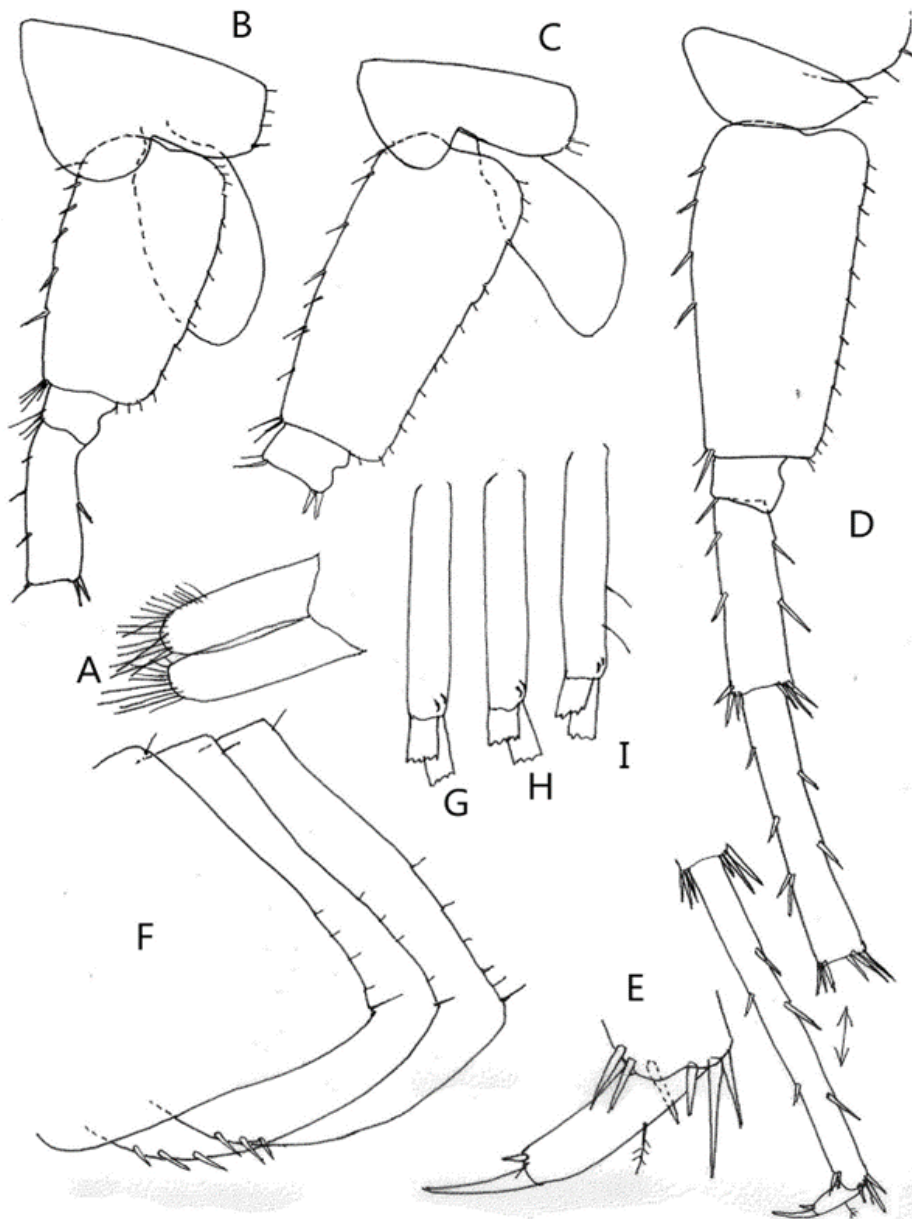


Fig. 4. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, male 9.5 mm (holotype): A= maxilla 2; B= pereopod 5; C= pereopod 6; D-E= pereopod 7; F= epimeral plates 1-3; G= pleopod 1-peduncle; H= pleopod 2-peduncle; I= pleopod 3-peduncle.

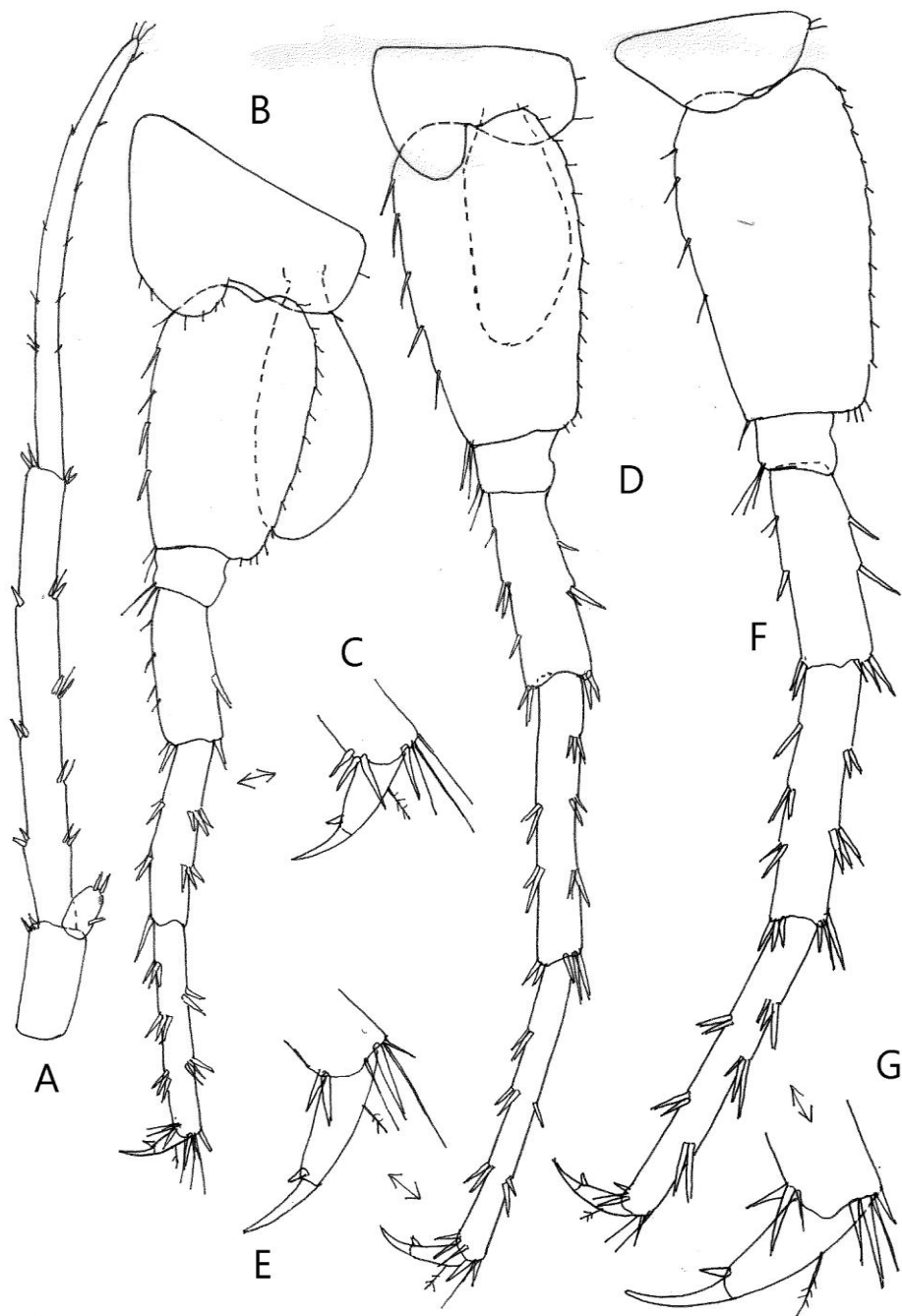


Fig. 5. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, male 9.5 mm (holotype): A= uropod 3. Female 7.5 mm: B-C= pereopod 5; D-E= pereopod 6; F-G= pereopod 7.

Pereopod 4 similar to pereopod 3, but posterior setae are rather shorter (Fig. 1 I). Dactylus at inner margin with one spine near basis of the nail, at outer margin with one median plumose seta, nail almost as long as pedestal (Fig. 1J).

Pereopod 5 distinctly shorter than pereopods 6 and 7; article 2 much longer than broad (ratio: 74:41), with poorly convex both margins, along anterior margin with 6 single spine-like setae (except distal group of setae), along posterior margin with row of 14-15 short setae, ventroposterior lobe absent (Fig. 4B). Article 4 with 2 groups of spines at posterior margin and 5 setae at anterior margin. Articles 5-7 missing.

Pereopod 6: article 2 elongated, much longer than broad (ratio: 90:40), with almost parallel lateral margins, without ventroposterior lobe; along anterior margin with 9 single spine-like setae, along posterior margin with 15 short setae; articles 4-7 missing (Fig. 4C).

Pereopod 7 rather elongated, article 2 almost linear, much longer than broad (ratio: 95:45), along anterior margin with nearly 6 spine-like single setae, along posterior margin with 13 short setae (Fig. 4D), ventroposterior lobe absent. Articles 4-7 of different length (ratio: 55:80:100:27), articles 4-6 along anterior and posterior margin with single or groups of spines. Dactylus short and strong, at inner margin with strong spine near basis of the nail, at outer margin with one median plumose seta, nail shorter than pedestal (Fig. 4E).

Pleopods 1-3 with 2 retinacula. Peduncle of pleopods 1-2 naked (Fig. 4G, H), peduncle of pleopod 3 along posterior margin with 2 median setae (Fig. 4 I).

Uropod 1: peduncle longer than rami, with dorsoexternal row of spines and dorsointernal single short setae (except distal spine) (Fig. 2G). Both rami of nearly equal length; outer ramus with 2 lateral groups of spines and 3 groups of short simple setae, at tip with 5 unequal spines; inner ramus with 4 lateral and 5 distal spines.

Uropod 2: peduncle nearly as long as rami, with one lateral and distal spine; rami nearly of equal length, inner ramus with 3 lateral and 5 distal spines (Fig. 2H), outer ramus with 4 lateral and 5 distal spines.

Uropod 3 long, peduncle twice as long as broad, inner ramus short, scale-like, bearing 1 lateral and 2 distal spines; outer ramus 2-articulated, both articles of equal length; first article along both margins with several groups of short spines, at inner margin mixed with single short seta (Fig. 5A); second article along both margins with single short simple setae and with distal group of short setae.

Telson rather longer than broad (ratio: 90:78), incised nearly 2/3 of telson-length; each lobe with 4-5 long distal spines (the longest spines are rather shorter than half of telson length), along outer margin with 2 groups of spines, as well as with 2 group of facial spines (Fig. 2 I), a pair of short plumose setae is attached near the middle of outer margin of lobes.

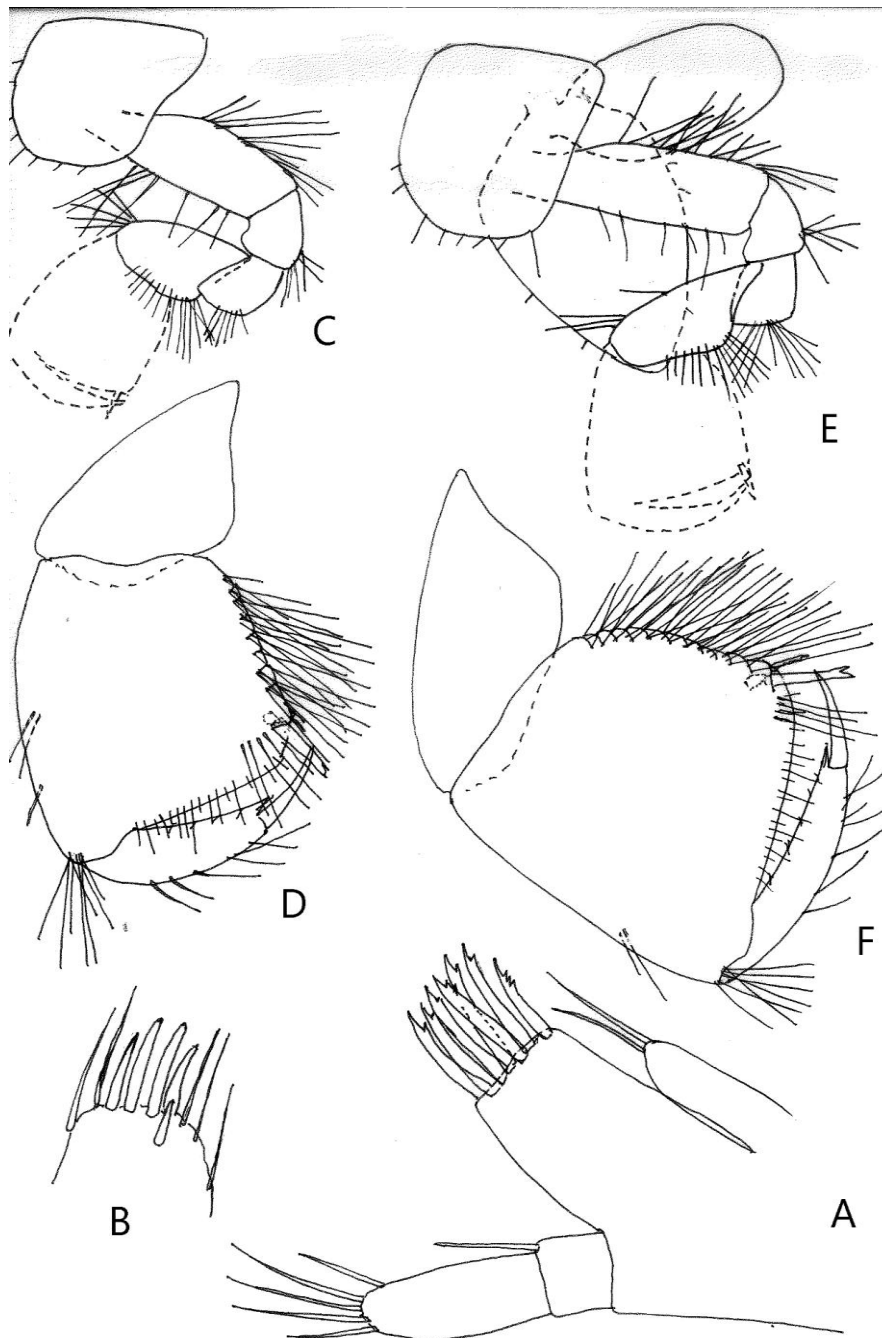


Fig. 6. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, female 7.5 mm (paratype): A= maxilla 1; B= inner plate of maxilliped; C-D= gnathopod 1, outer face; E-F= gnathopod 2.

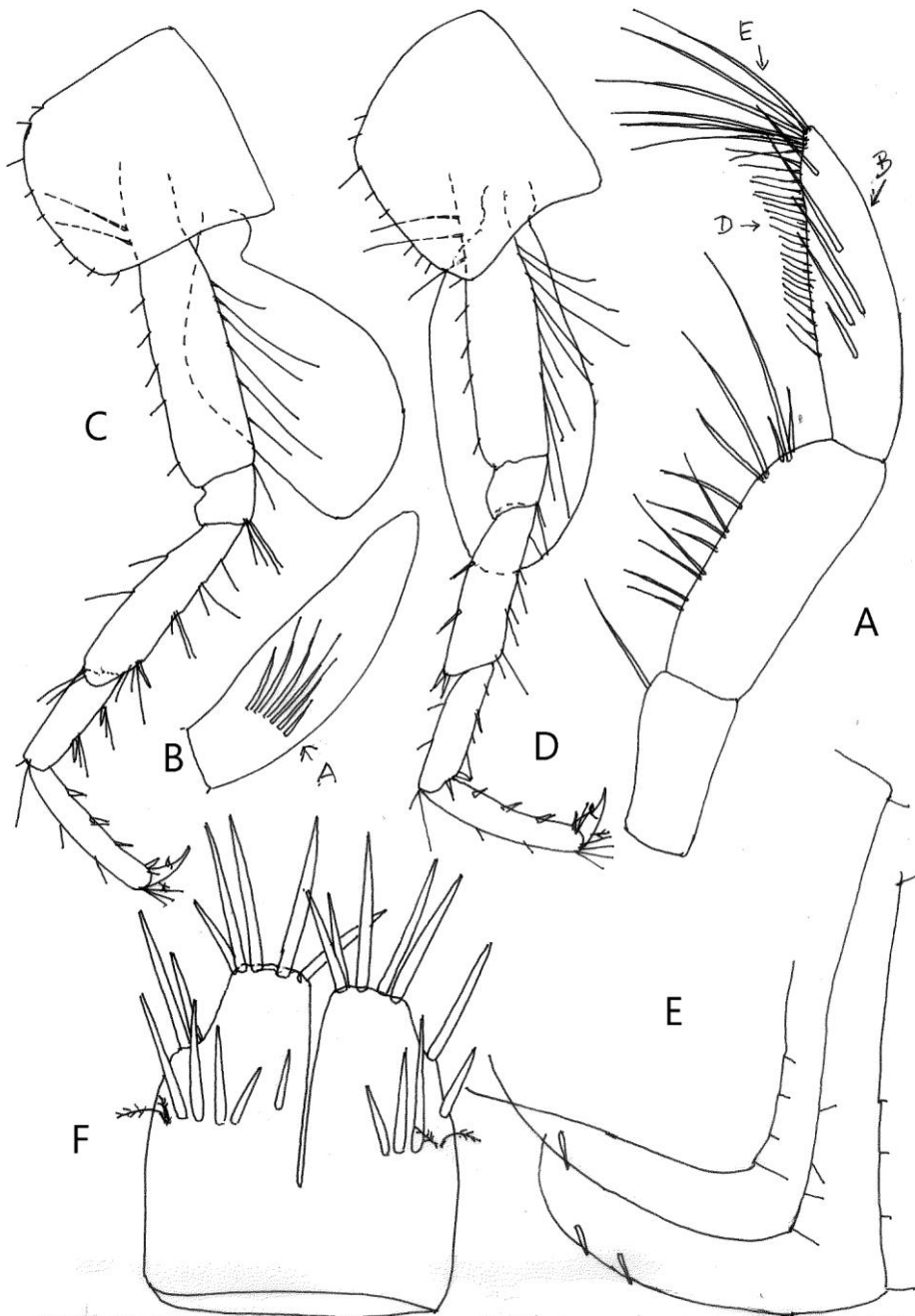


Fig. 7. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, female 7.5 mm (paratype): A= mandibular palpus, inner face [B= facial B-setae; D= marginal D-setae; E= distal E-setae]; B= last palpus article of mandible, outer face [A= facial A-setae]; C= pereopod 3; D= pereopod 4; E= epimeral plates 1-3; F= telson.

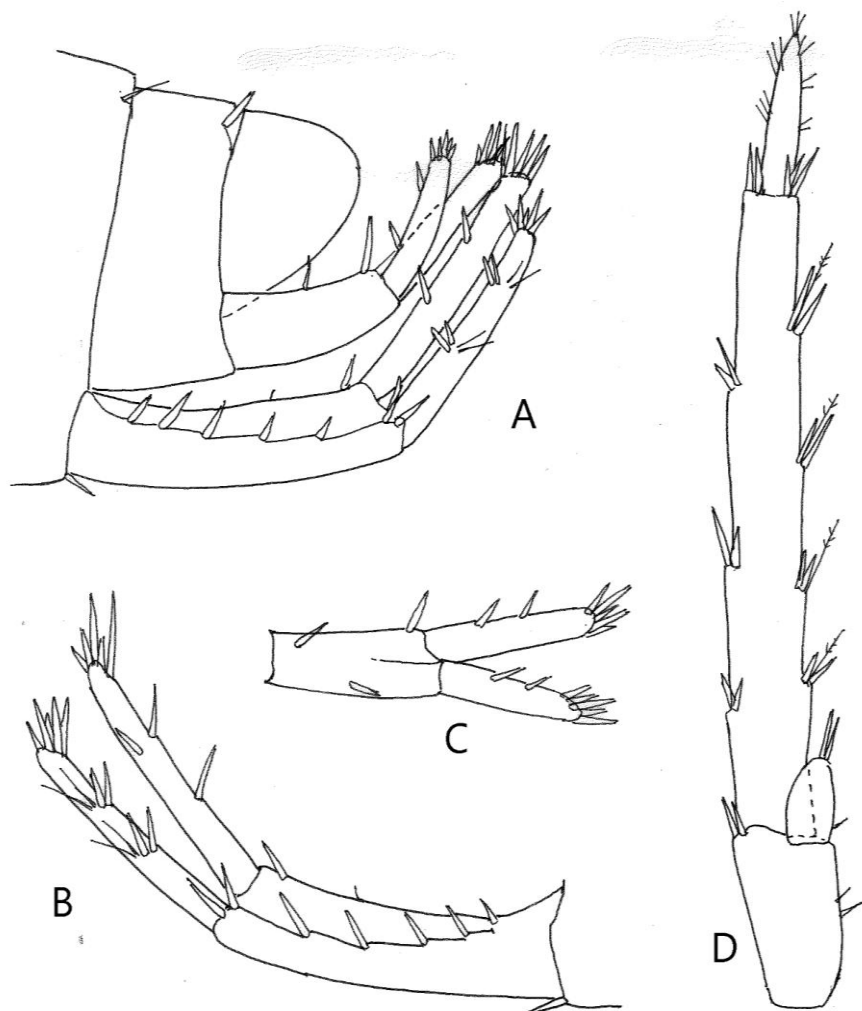


Fig. 8. *Niphargus bencaensis*, sp. nov., Benca spring, Shushica River, S. Albania, female 7.5 mm (paratype): A= urosome with uropods 1-2; B= uropod 1; C= uropod 2; D= uropod 3.

Coxal gills on gnathopod 2 and pereopods 3-4 ovoid and long (Figs. 1G, I; 3D), these of pereopods 5-6 shorter (Fig. 4B, C), the longest is the gill of pereopod 4, exceeding ventral tip of corresponding article 2 (Fig. 1 I).

FEMALE 7.5 mm with oostegites bearing short setae: Body moderately slender, metasomal segments with 2 dorsoposterior marginal setae each (Fig. 7E). Urosomal segment 1 with 1 seta on each dorsolateral side, urosomal segment 2 with 1 spine on each dorsolateral side, urosomal segment 3 naked (Fig. 8A). Urosomal segment 1 at each ventroposterior corner with one spine near peduncle of uropod 1 (Fig. 8A).

Epimeral plates 1-2 obtusely angular, along posterior slightly convex margin with several single short setae; epimeral plate 3 distinctly angular, posterior margin poorly concave, with several marginal short setae; epimeral plate 2 with 1-2 subventral spines, plate 3 with 2 subventral spines (fig, 7E).

Antenna 1 like that in male, main flagellum consisting of 19 articles bearing usually 1 short aesthetasc each; accessory flagellum short, 2-articulated, nearly reaching half of last peduncular article.

Antenna 2 like that in male, flagellum consisting of 11 articles scarcely setose, antennal gland cone short.

Mouthparts mainly like that in male. Mandibular palpus 3-articulated, first article with 1 strong seta on left and right mandible, article 2 with 13 setae (Fig. 7A); article 3 subfalciform, with nearly 22 marginal D-setae and 6 distal long E-setae, on inner face by 5 facial B-setae (Fig. 7A), on outer face with 6 A-setae (Fig. 7B).

Maxilla 1: inner plate with 2 setae, outer plate with 7 spines [5 spines with one lateral tooth, 1 spine with 2 teeth, one spine with 3 teeth), palpus 2-articulated, first article of left and right maxilla 1 with 1 distoinferior seta, article 2 not reaching distal tip of outer plate-spines and provided with 5 setae (Fig. 6A).

Maxilla 2: both plates with distal numerous setae, inner plate with several distolateral setae, like these in male.

Maxilliped: inner plate short, with 4 distal pointed spines mixed with several setae (Fig. 6B), palpus article 4 at inner margin with 1 seta near basis of the nail.

Coxae relatively short. Coxa 1 rather broader than long (ratio: 47:40), along subrounded margin with 8 setae (Fig. 6C). Coxa 2 scarcely longer than broad (ratio: 49:47), at convex margin with 7-8 setae (Fig. 6E). Coxa 3 nearly as long as broad, at convex margin with 9 setae (Fig. 7C). Coxa 4 poorly broader than long (ratio: 59:54), at margin with 9 setae, ventroposterior lobe absent (Fig. 7D).

Coxa 5 remarkably broader than long (ratio: 70:42) (Fig. 5B). Coxa 6 smaller than 5, broader than long (ratio: 54:36) (Fig. 5D). Coxa 7 shallow, entire, much broader than long (ratio: 52:25) (Fig. 5F).

Gnathopods 1-2 with propodus nearly as large as corresponding coxa. Gnathopod 1: rather smaller than gnathopod 2, with article 2 along both margins with long setae; article 3 with 1 distoposterior bunch of setae. Article 5 almost as long as propodus, with distoanterior bunch of setae (Fig. 6C). Propodus trapezoid, rather longer than broad (ratio: 79:70), at posterior margin with 8 transverse rows of setae. Palm slightly convex, inclined rather less than half of propodus-length (Fig. 6D), defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 4 corner facial M-setae, on inner face by 1 subcorner R-spine. Dactylus along outer margin with 6 median single setae, at inner margin with several short setae.

Gnathopod 2: article 2 with shorter setae along anterior margin and numerous longer setae along posterior margin; article 3 with 1 distoposterior

group of setae; article 5 nearly as long as propodus, with 2 groups of setae along anterior margin (Fig. 6E). Propodus trapezoid, scarcely longer than broad (ratio: 86:83), or almost equally long, along posterior margin with 11-12 transverse rows of setae (Fig. 6F); palm slightly convex, inclined nearly half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 1 strong L-spine and 4 corner facial M-setae, on inner face by 1 subcorner R-spine. Dactylus with 7 median setae along outer margin and several short setae at inner margin.

Pereopods 3-4 moderately slender, similar to these in male. Pereopod 3: article 2 along anterior margin with row of short setae (except 2 proximal long setae) and row of long setae along posterior margin (fig. 7C); articles 4-7 of different length (ratio: 55:34:43:18), article 4 with setae along both margins; article 5 at posterior margin with 2 groups of spine-like setae; article 6 along posterior margin with 4 single spines, along anterior margin with setae; dactylus with one spine at inner margin near basis of the nail, and one median plumose seta at outer margin, nail shorter than pedestal.

Pereopod 4: pilosity like that of pereopod 3 but setae are rather shorter (Fig. 7D). Articles 4-7 of different length (ratio: 45:34:44:17); dactylus with one spine at inner margin near basis of the nail, at outer margin with one median plumose seta; nail shorter than pedestal.

Pereopod 5 shorter than pereopods 6 and 7, with article 2 longer than broad (ratio: 70:43), slightly tapering ventrally, along anterior slightly convex margin with 6-7 spine-like setae, along posterior slightly convex margin with 15 short setae, ventroposterior lobe absent (Fig. 5B). Articles 4-7 of different length (ratio: 40:50:56:22); article 4 with short setae at anterior margin and 2 single spines at posterior margin; articles 5-6 along both margins with single or groups of spines. Dactylus strong, at inner margin with spine near basis of the nail, at outer margin with one median plumose seta (Fig. 5C), nail shorter than pedestal.

Pereopod 6: article 2 longer than broad (ratio: 85:47), along anterior slightly convex margin with row of 7 single or group of spine-like setae, poorly convex posterior margin with 16 short setae, ventroposterior lobe absent (Fig. 5D). Articles 4-7 of different length (ratio: 52:75:83:28), articles 4-6 at both margins with single or groups of spines. Dactylus with one spine at inner margin near basis of the nail, at outer margin with one median plumose seta; nail shorter than pedestal (Fig. 5E).

Pereopod 7: rather similar to pereopod 6, article 2 much longer than broad (ratio: 90: 50), with 5-6 spine-like setae along anterior margin and 14 short setae along posterior margin, ventroposterior lobe absent (Fig. 5F). Articles 4-7 of rather different length (ratio: 53:68:100:28); articles 3-6 with spines and setae like these in pereopod 6. Dactylus with strong spine at inner margin near basis of the nail, and median plumose seta at outer margin, nail shorter than pedestal (Fig. 5G).

Pleopods like these in male, with 2 retacula, peduncle of pleopods 1-2 naked, that of pleopod 3 with 2 posterior strong setae.

Uropod 1: peduncle longer than rami, with dorsoexternal row of spines and dorsointernal 1 short seta and distal spine; rami almost of equal length or inner ramus scarcely longer. Outer ramus with 2 lateral groups of setae mixed with 2 pairs of simple setae, and with 5 distal unequal spines; inner ramus with 2 lateral groups of setae and distal 5 unequal spines. When uropod 1 and uropod 2 are with rather curved rami upwards, it seems that inner ramus is rather longer than outer one (Fig. 8A, B).

Uropod 2: peduncle with 2 lateral and 1 distal spine; inner ramus minutely longer than outer one, with 2 lateral and 5 distal unequal spines (Fig. 8C), outer ramus with 2 lateral and 5 distal unequal spines.

Uropod 3 rather elongated; peduncle rather less than twice as long as broad, with several laterals short setae and distal 2-3 spines. Inner ramus scale-like, with one short lateral seta and 2 distal spines. Outer ramus 2-articulated; first article strong, along outer ramus with 4 groups of spines, along inner (mesial) margin with 5 groups of spines, most of them mixed with one longer plumose seta (Fig. 8D); second article narrowed, much shorter than first article (ratio: 40:160), at both margins and top with groups of short simple setae.

Telson nearly as long as broad, incised less than 2/3 of telson-length; each lobe with 5 strong distal spines (the longest spines reaching half of telson-length), along outer margin with 1-2 groups of spines, and with 3-5 facial spines (Fig. 7F); a pair of short plumose setae is attached near the middle on outer margin of lobes.

Coxal gills moderately large, more or less ovoid, the longest gill on pereopods 3 and 4 remarkably exceeding ventral tip of corresponding article 2 (Fig. 7C, D), gills on gnathopod 2 and pereopods 5-6 are shorter (Figs. 5B, D; 6D).

Oostegites broad, with shorter marginal setae (Fig. 6E).

VARIABILITY

Male 7.7 mm: without additional seta on first article of mandibular palpus and without additional seta on first article of maxilla 1-palpus. Dactylus of pereopods 6 and 7 at inner margin with 1 spine near basis of the nail, like these in female. Urosomal segment 1 with 1 seta at each dorsolateral side; urosomal segment 2 with 1 spine on each dorsolateral side.

Uropod 1 and uropod 2 with inner ramus very scarcely longer than outer one in male; both articles of outer ramus in uropod 3 in male of the equal length.

Pleopod 3 peduncle with 2 setae at posterior margin. Epimeral plates are obtusely angular to almost subrounded at posterior margin; epimeral plate 2 with 1 ventral spine, epimeral plate 3 with 2 ventral spines.

LOCUS TYPICUS: Spring Benca, tributary of Vjosa River, southern Albania.

Holotype male 9.5 mm and **paratype** female 7.5 mm are deposited in the Museum of Natural History in Wien, Austria.

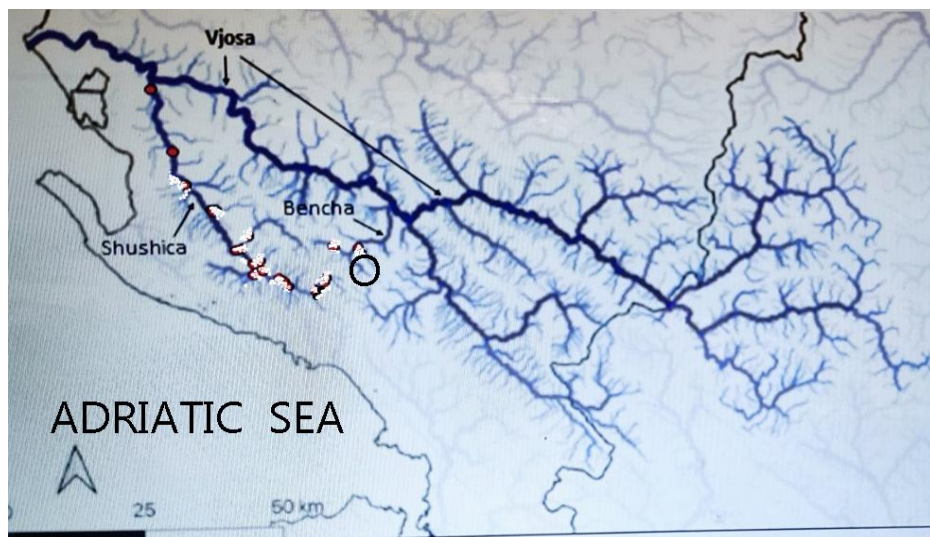


Figure 9. Map of locality Benca Spring (=O) of *Niphargus bencaensis*, sp. nov., Vjosa River, southern Albania.

REMARKS AND AFFINITIES

The new species, *Niphargus bencaensis* belongs to the *Niphargus* group with several setae on outer margin of dactylus of gnathopods 1-2, with one spine at inner margin of dactylus on pereopods 3-7, but this species is very characteristic by often presence of additional seta on first article of maxilla 1-palpus and on first article of mandibular palpus. The presence of distal seta on first palpus article of maxilla 1 is observed probably at the first time in genus *Niphargus* (at least I have never observed or cited this character), but this character is not present in all specimens of the sample from Benca Spring.

The second character, presence of distal seta on first article of mandibular palpus, was observed already by several known *Niphargus* species (*Niphargus timavi* S. Karaman, 1954, *N. religiosus* G. Karaman, 2012a, *Niphargus turcicus* Andreev & Kenderov, 2012, *N. beroni* G. Karaman, 2023a), but always as stable character, where all specimens are provided with this character. It is surprising that this character is not stable character within the population of *N. bencaensis*, because not all specimens from Benca are with this seta.

Regarding other morphological characters, *N. bencaensis* is rather similar to *N. lepushensis* G. Karaman, 2025 [loc. typ.: Lepusha spring at Shushica River, southern Albania) by uropods 1-2, pleopods, gnathopods, but distinctly differs from *N. lepushensis* by strongly spinose telson, often presence of additional seta on first palpus article of maxilla 1 and mandible, absence of posterior marginal spines on article 2 of pereopod 7.

The second species from Albania, *Niphargus tomori* G. Karaman, 2011 (loc. typ.: Tomor region, Albania) is rather more different; characterized by elongated inner ramus of uropod 1 and subrounded epimeral plates in male,

broader article 2 of pereopods 5-7, less spinose inner plate of maxilliped, less spinose telson, etc.

The specimens from Benca Spring are similar to two species known from Ohrid Lake basin, *N. sanctinaumi* S. Karaman, 1943 [loc. typ.: spring near Monastery St Naum, Northern Macedonia) and *N. petkovskii* G. Karaman, 1963 (loc. typ.: Biljanini izvori-Spring (=Studenčište) in Ohrid Town, Northern Macedonia).

Spring near Monastery St Naum is the spring of Drim River at coast of Ohrid Lake itself, and *N. sanctinaumi* is rather similar to *N. bencaensis* by spinose telson, narrowed article 2 of pereopods 5-7, pleopods, uropods 1-3, but specimens from Benca spring differ from these of *N. sanctinaumi* by shape of epimeral plates, maxilla 1, mandibular palpus, shape of gnathopod 2, lower number of L-spines of gnathopod 2, etc.

N. petkovskii from Biljanini izvori Spring (=Studenčište) is characterized also by equal rami of uropod 1 and long uropod 3 in males, spinose telson, narrowed article 2 of pereopods 5-7, but *N. bencaensis* differs from it by different maxilla 1, mandibular palpus, shape of gnathopods, number of L and R-spines., coxae.

Third species from Ohrid basin with spinose telson, angular epimeral plates, narrowed article 2 of pereopod 7, *Niphargus maximus* S. Karaman, 1929 {loc. typ.: Šum Spring at opposite coast of Ohrid Lake near Struga), differs from *N. bencaensis* by distinctly elongated inner ramus of uropod 1 in males.

Ntakias *et al.* (2015) described from NW Greece *Niphargus koukourasi* [loc. typ.: Springs of Louros River, Vouliasta, Ioannina, Greece), species very similar to our specimens from Benca spring (Vjosa River tributary) by numerous morphological characters: equal rami of uropod 1 in males and females, strongly spinose telson with lateral and facial spines, shape of epimeral plates. But *N. bencaensis* differs from *N. koukourasi* by longer and remarkably more narrowed article 2 (basipodit) of pereopods 5-7 in males, by longer distal article of uropod 3 outer ramus in male, by presence of 1 dorsolateral spine on both sides of urosomal segment 2 in male and female, lower number of setae on maxilla 1 inner plate and palpus, by shorter and broader coxa 4 in males and females, lower number of L-spines on propodus of gnathopods 1-2; palm of propodus in gnathopods 1-2 rather more inclined, peduncle of pleopod 3 with 2 median single setae at posterior margin in male and female; by presence of distal spine on first article of maxilla 1 palpus and distal seta on first article of mandible palpus in several specimens of the sample.

Based on these differences and scarce number of known localities, it was not possible morphologically to consider specimens from Benca spring identic with any of previously mentioned species, and we consider specimens from Benca spring as a distinct new species, *Niphargus bencaensis*, spec. nov. Further discovery of new specimens and samples, as well as further molecular and genetic research of specimens from Ohrid Lake basin, Albania and Greece,

together with our morphological study, will help to recognize real taxonomical relation and status of all these taxa.

DERIVATIO NOMINIS: The name “*bencaensis*” is connected with the name “spring Benca”, locality where this species was collected.

ACKNOWLEDGEMENTS.

I thanks the Prof. Dr. Christian Griebler from Wien, Austria, for collecting this material and left me at disposition for study. Samples were collected in the frame of the APPEAR project VjoSusDev. APPEAR is a program of the Austrian Development Cooperation implemented by the OeAD, in year 2024.

REFERENCES

- Andreev, S. & Kenderov, Lj. 2012. Sur une nouvelle espèce du genre *Niphargus* de la Turquie *Niphargus turcicus* n. sp. (Amphipoda, Niphargidae).- *Historia naturalis bulgarica*, 20: 47-56, 5 figs.
- Bousfield, E.L. 1977. A new look at the systematics of gammaridean amphipods of the world.- *Crustaceana Supplement*, 4, 282–316.
- Bousfield, E.L. 1982. An updated phyletic classification and palaeohistory of the Amphipoda. In F.R. Schram (Ed.), *Crustacean phylogeny* (pp. 257–277). San Diego Museum of Natural History. USA. [on p. 267 fam. Niphargidae G. Karaman, 1962].
- Dancau, D. 1970. Sur un nouvel amphipode souterrain de Roumanie, *Pontoniphargus racovitzaei*, n. g., n. sp. -*Livre de centenaire Emile Racovitza 1868-1968*, Acad. Rep. Soc. Roumanie, pp. 275-285, fig.
- Dobreanu, E. & Manolache, C. 1933. Beitrag zur Kenntnis der Amphipodenfauna Rumäniens. -*Notationes Biologicae*, Bucarest, 1 (3): 103-108, figs. 2-4.
- Dudich, E. 1941. *Niphargus mediodanubialis* sp. nov., die am weitestem verbreitete Niphargus-Art des mittleren Donaubeckens.- *Fragmenta Faunistica Hungarica*, 4(3): 61-73, fig.
- Karaman, G. 1962. Beitrag zur Kenntnis der Niphargiden (Amphipoda) Jugoslawiens.- *Annales Zoologici*, Warszawa, 20 (6): 39-45, 11 figs.
- Karaman, G. 1963. Über die Niphargiden des Ohridsees und seiner Umgebung.- *Fragmenta Balcanica*, Musei Macedonici Scientiarum Naturalium, Skopje, 4 (26/110): 197-207, 16 figs.
- 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, 51 figs.
- Karaman, G. 1993. Crustacea Amphipoda di acqua dolce. - *Fauna d'Italia*, vol. XXXI: 1-337, 154 figs., Edizione Calderini Bologna, Italia.
- Karaman, G. 2011. One new subterranean species of the genus *Niphargus* Schiödte, 1849 (Crustacea, Amphipoda, Niphargidae) from Albania, *N. tomori*, sp. n. (Contribution to the Knowledge of the Amphipoda 254).- *Glasnik Republičkog zavoda za zaštitu prirode*, Podgorica, 31/32: 101-114, 5 figs.

- Karaman, G. 2012a. New species *Niphargus religiosus*, sp. n. (Fam. Niphargidae), with remarks to *Amathillina cristata* G.O. Sars, 1894 (Fam. Gammaridae) in Turkey. (Contribution to the Knowledge of the Amphipoda 257). - Agriculture & Forestry, Podgorica, 53 (07) (1-4): 49-76, 11 figs.
- 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, 7 figs.
- Karaman, G. & Sket, B. 2019. New genus and species of the family Niphargidae (Crustacea: Amphipoda: Senticaudata), *Chaetoniphargus lubuskensis* gen. nov., sp. nov. from Croatia.- Zootaxa 4545 (2): 249–263, figs. 1-8.
- Karaman, G. 2023a Further discoveries of the subterranean genus *Niphargus* Schiödte, 1849 (Fam. Niphargidae) in Greece (Contribution to the Knowledge of the Amphipoda 331).- Agricultura and Forestry 69 (3): 61-79, figs. 1-7.
- Karaman, G. 2023b. New member of Family Niphargidae {Crustacea: Senticaudata} from Albania (Contribution to the Knowledge of the Amphipoda 335).- Naš krš, Sarajevo, XLIII (56): 35–52, figs. 1-7.
- Karaman, G. 2025. New data on the Family Niphargidae from Albania. *Niphargus lepushensis* sp. nov. (Amphipoda Gammaridea) (Contribution to the Knowledge of the Amphipoda 340).- Biologia Serbica, Novi Sad ,47: xx., 8 figs. DOI: 10.5281/zenodo.15869640
- Karaman, S. 1929. Beiträge zur Kenntnis der Amphipoden Jugoslawiens. - Zoologischer Anzeiger, 85 (9-10): 218-225, 4 figs.
- Karaman, S. 1943. Die unterirdischen Amphipoden Südserbiens.- Srpska Kraljevska Akademija, Posebna izdanja, knj. 135, Prirodnjački i matematički spisi, knj. 34, Ohridski Zbornik, 4, 159-312, Beograd, 4: 1-312, figs. 1-215.
- Karaman, S. 1950. Podrod *Orniphargus* u Jugoslaviji. I. Deo.-[Das Subgenus *Orniphargus* in Jugoslawien].-- Srpska Akademija Nauka, Posebna Izdanja knj.158, Odeljenje Prirodno-matematičkih nauka, Beograd, 2: 119-136, 145-156, 160-167, figs. 1-61.
- Karaman, S. 1954. Die Niphargiden des slovenischen Karstes, Istriens sowie des benachb. Italiens.- Acta, Musei Macedonici Sceintiarum Naturalium, Skopje, 2 (8): 159-180, figs. 1-48.
- Miho, A., Beqiraj, S., Graf, W. & Schiemer, F. 2018. The Vjosa river system in Albania: a summary of actual challenges and agendas.- Acta ZooBot Austria 155: 377–385, figs.1-2.
- Ntakias, A., Anastasiadou, C, Zakšek, V. & Fišer, C. 2015. Phylogeny and biogeography of three new species of *Niphargus* Crustacea: Amphipoda) from Greece. - Zoologischer Anzeiger, 255: 32–46, 16 figs.
- Sket, B. 1957. Über Zoogeographie und Phylogenie der Niphargen. - Verh. der Deutsch. Zool. Gess. Graz, pp. 484-486.
- Sket, B. 1962. *Karamaniella pupetta*, n. g., n. sp., ein neuer Amphipode aus Slovenien. - Izdanija, Zavod za Ribarstvo Makedonije, 3 (2): 27-32, Skopje (1960).