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Gordan S. KARAMAN¹

TWO SPECIES OF GENUS *NIPHARGUS* Schiödte, 1849 (FAM. NIPHARGIDAE) NEW FOR FAUNA OF ALBANIA (CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 346)

SUMMARY

From the subterranean waters of Vjosa and Shushica Rivers in southern Albania, with its tributaries, two species of genus *Niphargus* (Crustacea, Amphipoda: Niphargidae) known in some adjacent regions, are discovered at the first time in Albania, *Niphargus* (*Orniphargus*) *lourensis lourensis* Fišer et al., 2006, and *Niphargus* (*Jvoniphargus*) *multipennatus* Sket, 1956. As specimens of both species were rather damaged and not adult, both species are here only partially redescribed and figured, to recognize and confirm existence of these species in Albania.

Keywords: Taxonomy, subterranean waters, *Amphipoda*, *Niphargus*, southern Albania.

INTRODUCTION

The subterranean fauna of Crustacea on Balkan is moderately studied, despite the presence of numerous various rivers, torrents, springs, caves, lakes, etc. The similar situation is also in Albania, where diversity of the subterranean fauna of Crustacea Amphipoda is only moderately known. The present knowledge of this fauna suggests the presence of various endemic taxa as well as presence of some taxa known in the adjacent countries (Greece, Northern Macedonia, Serbia, Crna Gora) or entire Balkan. The results of investigation of subterranean *Niphargus* species (Fam. *Niphargidae*) from southern Albania, presented in this work, support these suggestions, where two known *Niphargus* species (from Greece and Balkan) are discovered at the first time in Albania.

Thanks to Dr Griebler from the University of Wien (Austria), I had the possibility to study Amphipoda material collected in Albania in the years 2021 and 2023 during the realization of the APPEAR project VjoSusDev of the Austrian Development Cooperation implemented by the OeAD. A part of these studies is presented in this work.

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

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

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MATERIAL AND METHODS

The studied material was preserved in 70 percent ethanol. The specimens were dissected using a WILD M20 microscope. Dissected body-parts were submersed in a mixture of glycerin and water for study and drawing using a camera lucida. After study, body-parts were submerged in Liquid of Faure and covered by a thin cover glass creating definitive microscope slides. All illustrations were inked manually. The studied material was collected using various methods (Boxshall *et al.*, 2016).

Some morphological terminology and setal formulae follow G. Karaman's terminology (Karaman G., 1969, 2012) for mandibular palpus article 3 (A=A-setae on outer face of article; B=B-setae on inner face of article; D=short D-setae along lateral margin of article; E=long E-setae at distal part of article), as well as for distal corner of propodus of gnathopods 1 and 2 (S=corner palmar S-spine on outer face; L= slender serrate L-spines sitting near S-spine on outer face; M=row of long facial corner submarginal M-setae on outer face; R=subcorner R-spine on inner face).

Terms "setae" and "spines" are used based on its shape, not origin. The present study is based on morphological, ecological and zoogeographical data. In References are cited also number of figures as very important data in description of various taxa.

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 (ORNIPHARGUS) LOURENSIS LOURENSIS* Fišer,
Trontelj & Sket, 2006**

Figures 1-5H, 7

Niphargus lourensis Fišer, Trontelj & Sket, 2006: 2288, figs. 7, 16–19; Sarbu, Brad, Băncilă, & Ștefan, 2024: 6;

Niphargus lourensis lourensis G. Karaman, 2018: 20; G. Karaman, 2020: 20, figs. 1-7; Ntakís, A., Karaouzas, I., Fišer, C. & Stoch, F., 2020: 531.

LOCUS TYPICUS: Spring of Louros River, Vouliasta, Ionannina, Greece.

MATERIAL EXAMINED:

ALBANIA:

VJ 09 at the bank of the Vjosa River (not a tributary) = the site is near the village of Gjone; coordinates: 40.55689993797279, 19.636117233056243, 1 juv. (4.9.2023), 1 juv. (24.4.2023) (leg. Ch. Griebler).

VJ 14 at the Vjosa River near the village of Leshnje; coordinates: 40.39202490519476, 19.822210337422828, 1 exp (8.9.2023) (leg. Ch. Griebler).

DESCRIPTION:

FEMALE not quite adult, 6.5 mm (VJ 14): Body moderately slender, metasomal segments with 1-2 dorsoposterior marginal setae (Fig. 1D); urosomal segment 1 with 2 spines at each dorsolateral side, urosomal segment 2 with 3 spines at each dorsolateral side, urosomal segment 3 naked (Fig. 3E). Urosomal segment 1 on each ventroposterior corner with one spine near basis of uropod 1 peduncle (Fig. 3E).

Epimeral plates with acute ventroposterior corner progressively increasing towards epimeral plate 3, epimeral plate 2 with 1 ventral spine, epimeral plate 3 with 2 ventral spines and rather concave posterior margin bearing several setae (Fig. 1D).

Head with short rostrum and subrounded lateral cephalic lobes (Fig. 1A). Antenna 1 reaching nearly half of body; peduncular articles progressively shorter (ratio: 58:46:31) main flagellum consisting of 18 articles (some articles with poorly visible single short aesthetasc); accessory flagellum short, 2-articulated, reaching nearly half of peduncular article 3 (Fig. 1B).

Antenna 2: article 3 poorly longer than broad, with distoventral group of setae (the longest seta exceeding diameter of article itself). Article 4 at dorsal margin with several short setae, along ventral margin with several setae of different length (the longest seta exceeding diameter of article itself); article 5 nearly as long as article 4 but more slender, along dorsal margin with several single or paired setae, along ventral margin with 3 bunches of setae; flagellum nearly as long as last peduncular article but more slender than article 5, consisting of 7 articles (Fig. 1C), antennal gland cone short.

Mouthparts well developed. Labrum broader than long, convex distally (Fig. 5A). Labium broader than long, inner lobes well developed, narrowed, outer lobes convex distally (Fig. 5B).

Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth and 4 rakers. Right mandible: incisor with 4 teeth, lacinia serrate, accompanied by 5 rakers. Mandibular palpus 3-articulated: first article naked, second article with 10 setae; third article subfalciform, poorly longer than second one, provided with nearly 18 lateral D-setae and 5-6 distal long E-setae, on outer face appear one bunch of 3 A-setae (Fig. 1E), on inner face are attached 4 B-setae (Fig. 1F).

Maxilla 1: inner plate with 2 setae, outer plate with 7 spines bearing 1-4 lateral strong teeth each (Fig. 5D). Palpus 2-articulated: first article naked, second article not reaching distal tip of outer plate spines and bearing 3 distal setae (Fig. 5C).

Maxilla 2 longer than broad, both plates with numerous distal setae, inner plate with 3 distomesial setae (Fig. 1G).

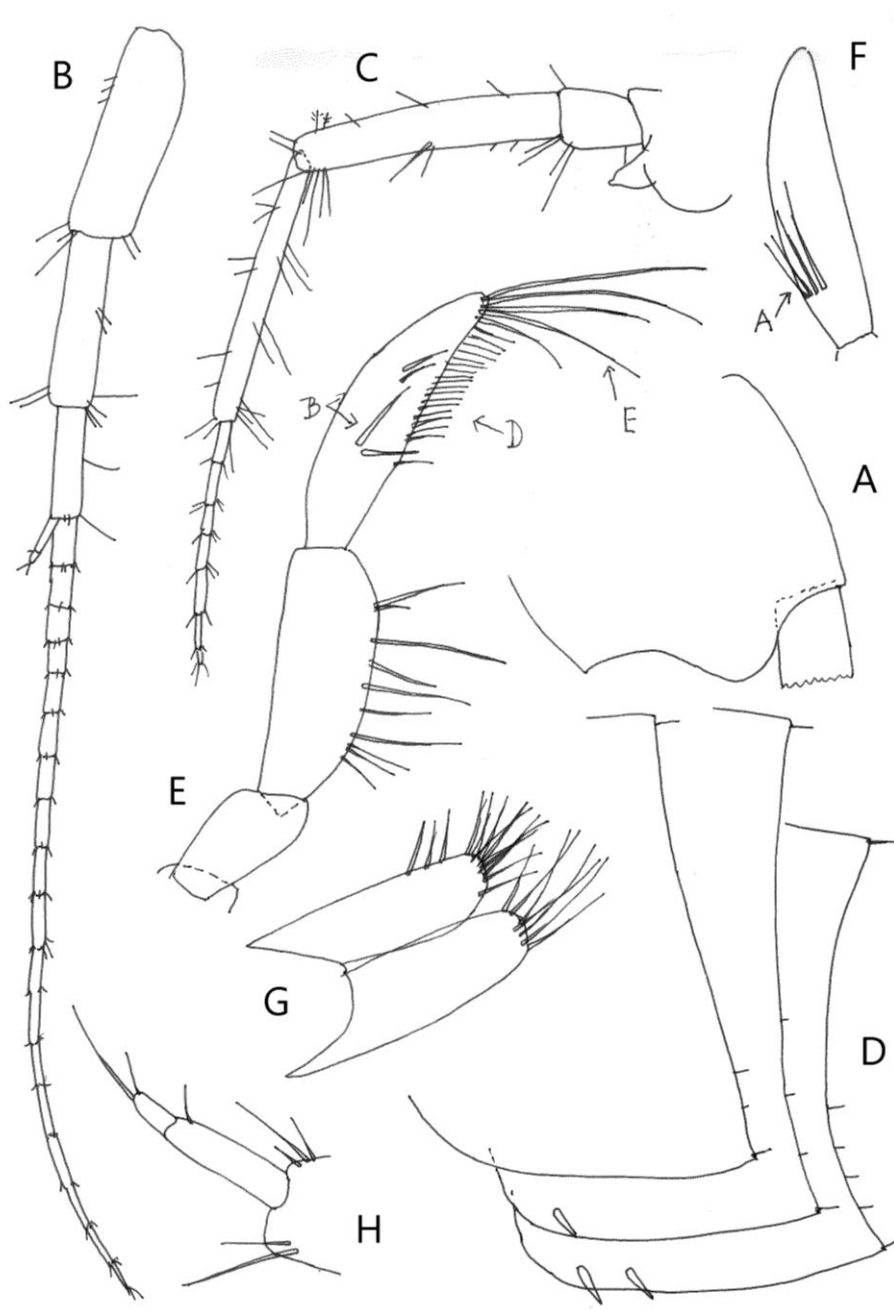


Fig. 1. *Niphargus lourensis lourensis* Fišer *et al.*, 2006, Albania, LK 7, VJ 552 [VJ 14 GWB], female juv. 6.5 mm.: A=head; B=Antenna 1; C=antenna 2; D=epimeral plates 1-3; E=palpus mandible inner face [D=marginal D-setae; E=distal E-setae; B=facial B-setae]; F=mandible palp distal article, outer face [A=facial A-setae]; G=maxilla 2; H=maxilliped palpus distal article.

Maxilliped well developed: inner plate short, with 4 distal spines mixed with single setae; outer plate reaching nearly to the half of palpus article 2, along mesial margin with row of 7-8 single spines and with several distal setae; palpus article 3 at outer margin with distal group of setae, along mesial margin with group of setae; article 4 at outer margin with one median seta, at mesial margin with one seta near basis of the nail, nail exceeding half of article 4 (Figs. 1H, 5E).

Coxae moderately short. Coxa 1 nearly as long as broad, with ventroanterior part subrounded, bearing 3 setae (Fig. 2A). Coxa 2 longer than broad (ratio: 70:45), with subrounded ventral margin bearing 5-6 setae (Fig. 2D).

Coxa 3 longer than broad (ratio: 65:42), with 5-6 setae along convex ventral margin (Fig. 3A). **Coxa 4 rather longer** than broad (ratio: 62:48), with 6 setae at ventral convex margin, posterior excavation shallow (Fig. 3C).

Coxae 5-7 much shorter; coxa 5 remarkably broader than long (ratio: 55:37), anterior lobe subrounded (Fig. 4A). Coxa 6 bilobed, broader than long (ratio: 48:33) (Fig. 4C). Coxa 7 entire, much broader than long (ratio: 50:24) (Fig. 4F).

Gnathopods 1-2 moderately large. Gnathopod 1: article 2 with long setae in proximal part and rather shorter setae in distal part of both margins; article 3 with one distoposterior bunch of setae. Article 5 shorter than propodus (ratio: 35:55), along anterior margin with distal group of setae (Fig. 2A). Propodus rather smaller than corresponding coxa, trapezoid, nearly as long as broad, along posterior margin with 5 transverse groups of setae (Fig. 2B); palm poorly convex, inclined rather over half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines (Fig. 2C) and 2 unequal corner facial M-setae (Fig. 2B), on inner face by one R-spine. Dactylus reaching posterior margin of propodus, along outer margin with 2-3 median setae, along mesial margin with 4-5 short setae (Fig. 2B).

Gnathopod 2 distinctly larger than gnathopod 1; article 2 with longer proximal marginal setae and short setae in distal part; article 3 with distoposterior group of 3 short setae; article 5 rather shorter than propodus, with group of distoanterior marginal setae (Fig. 2D). Propodus trapezoid, nearly as long as broad, along posterior margin with 6 transverse groups of setae. Palm slightly convex, inclined remarkably over half of propodus-length (Fig. 2E), defined on outer face by corner S-spine accompanied by one L-spine sitting partially behind S-spine, accompanied by 2 unequal corner facial M-setae, on inner face by one R-spine (Fig. 2F). Dactylus with 4 short single median setae along outer margin, along mesial margin with several short setae (Fig. 2E).

Pereopods 3-4 moderately strong. Pereopod 3: article 2 with several long setae in proximal part. Articles 4-7 of different length (ratio: 50:30:35:14), scarcely setose (Fig. 3A), articles 4-5 at both margins with single short setae or spine-like setae; article 6 at anterior margin with single short setae, at posterior margin with 4 single or groups of setae or spine-like setae. Dactylus short and rather strong, with one slender spine-like seta or seta at inner margin near basis of the nail, at outer margin with one median short plumose seta, nail rather shorter than pedestal (Fig. 3B).

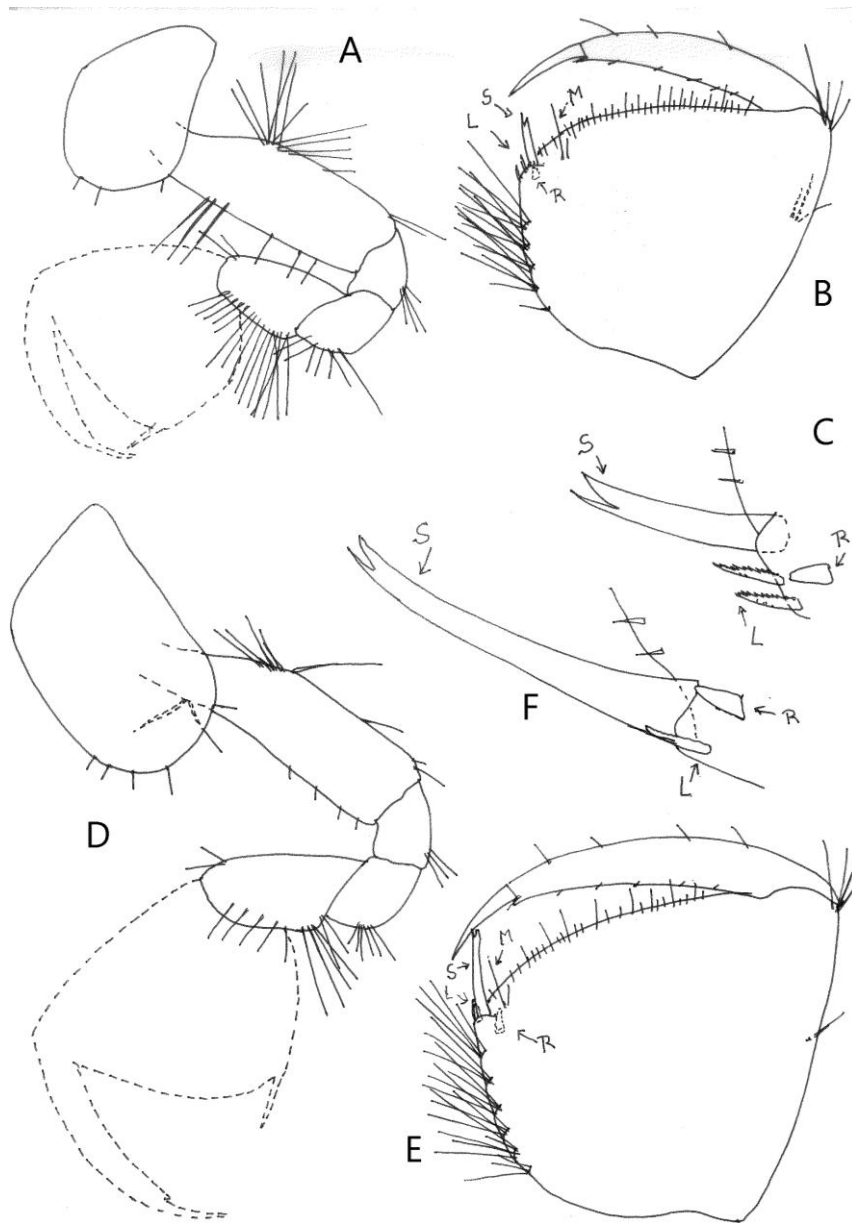


Fig. 2. *Niphargus lourensis lourensis* Fišer et al., 2006, Albania, LK 7, VJ 552 [VJ 14 GWB], female juv. 6.5 mm.: A-B=gnathopod 1, outer face [S=corner S-spine; L-lateral L-spines; M=corner facial M-setae; R=subcorner R-spine, inner face]; C=gnathopod 1 propodus, distal corner, inner face [S=corner S-spine; L-lateral L-spines; R=subcorner R-spine, inner face]; D-E=gnathopod 2, outer face [S=corner S-spine; L-lateral L-spines; M=corner facial M-setae; R=subcorner R-spine, inner face] F=gnathopod 2 propodus, distal corner, inner face [S-spine; L-lateral L-spines; R=subcorner R-spine, inner face].

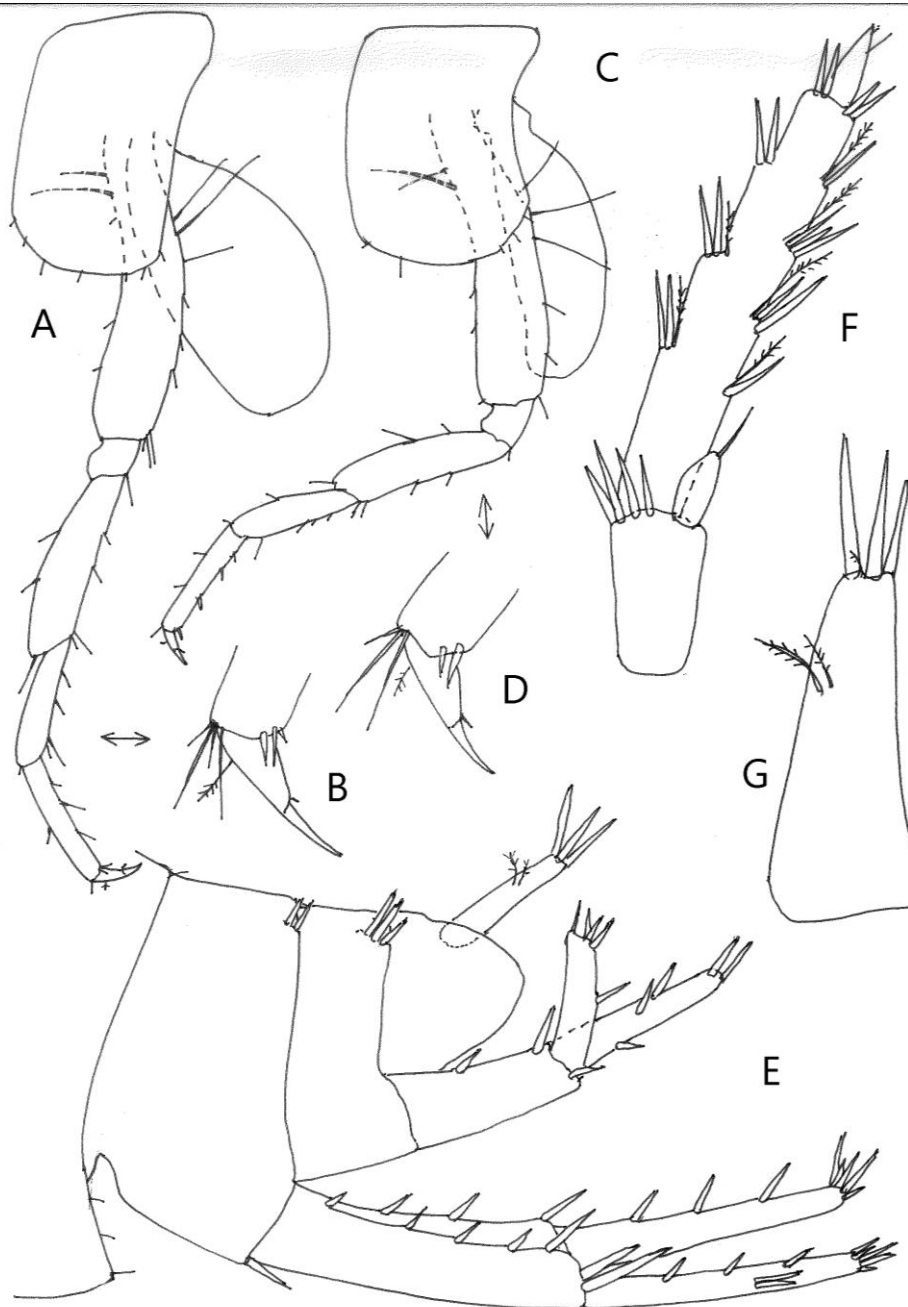


Fig. 3. *Niphargus lourensis lourensis* Fišer *et al.*, 2006, Albania, LK 7, VJ 552 [VJ 14 GWB], female juv. 6.5 mm.: A-B=pereopod 3; C-D=pereopod 4; E=urosome with uropods 1-2; F=uropod 3; G=telson.

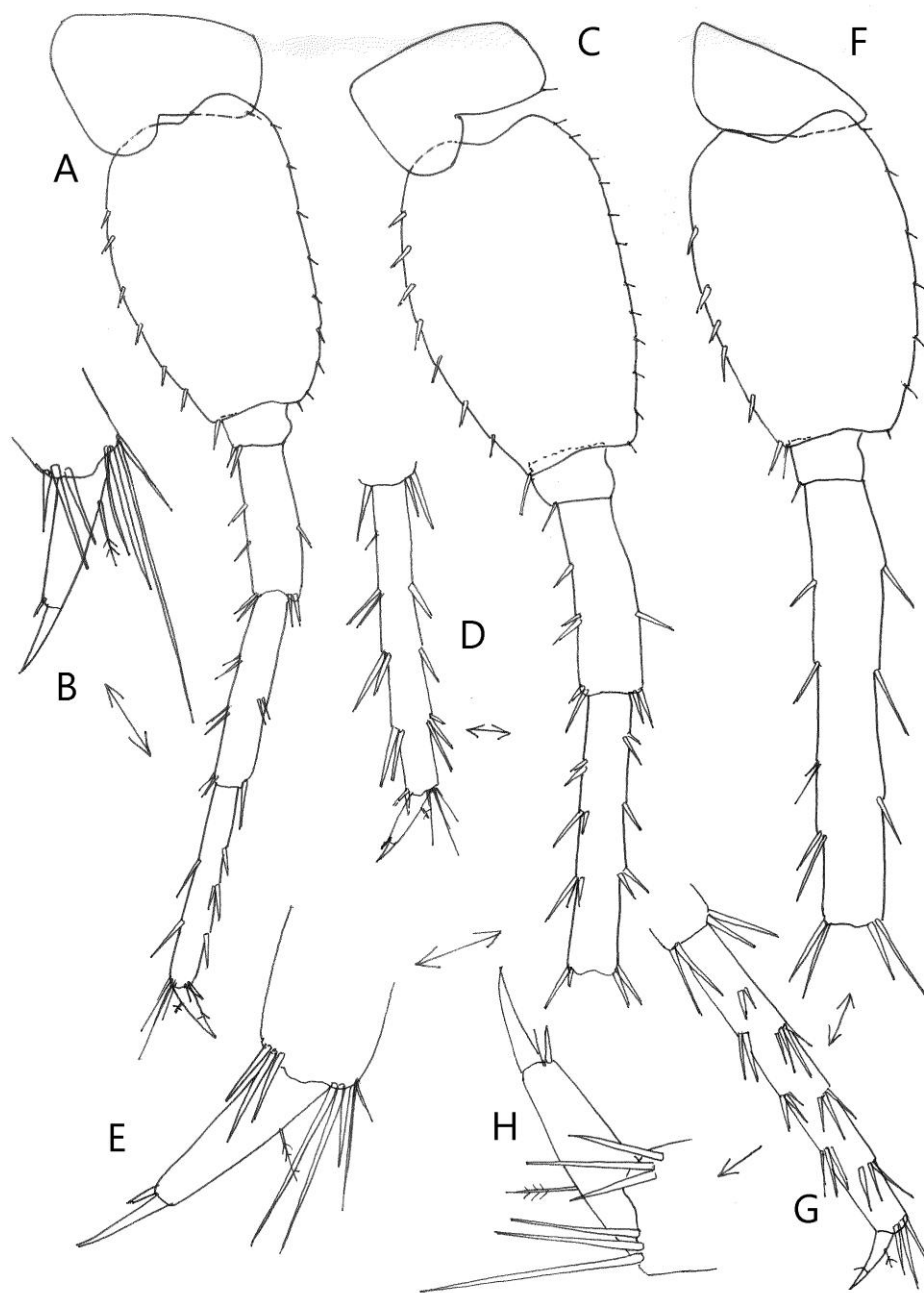


Fig. 4. *Niphargus lourensis lourensis* Fišer *et al.*, 2006, Albania, LK 7, VJ 552 [VJ 14 GWB], female juv. 6.5 mm.: A-B=pereopod 5; C-D-E=pereopod 6; F-G-H=pereopod 7.

Pereopod 4 very similar to pereopod 3, including its pilosity. Articles 4-7 of different length (ratio: 41:31:30:12), article 6 along posterior margin with 4 single slender spines (Fig. 3C). Dactylus short and strong, at inner margin with one spine-like seta, at outer margin with one median plumose seta, nail rather shorter than pedestal (Fig. 3D).

Pereopods 5-7 moderately strong. Pereopod 5 rather shorter than pereopods 6-7; article 2 dilated, longer than broad (ratio: 84:52), anterior margin remarkably convex, provided with 7-8 single short spines, along posterior less convex margin with 9 short setae, ventroposterior lobe not distinctly developed (Fig. 4A). Articles 4-7 of different length (ratio: 39:53:55:18), anterior margin of articles 4-5 with several spine-like setae or slender spines, along posterior margin with 2 groups of spines on each article; article 6 along both margins with several longer slender spines, at top with group of longer setae. Article 6 distinctly shorter than article 2. Dactylus with slender spine at inner margin near basis of the nail, and one media plumose seta at outer margin, nail shorter than pedestal (Fig. 4B).

Pereopod 6: article 2 longer than broad (ratio: 90:57), along anterior convex margin with 8 single spines, along posterior less convex margin with 12 short setae, ventroposterior dilatation not forming lobe (Fig. 4C, D). Articles 4-7 of different length (ratio: 51:75:83:24), articles 4-6 along both margins with single and groups of spines (the longest spines exceeding diameter of article itself). Article 2 only slightly longer than article 6. Dactylus at inner margin with one slender spine near basis of the nail, at outer margin with one median plumose seta, nail shorter than pedestal (Fig. 4E).

Pereopod 7: article 2 dilated, longer than broad (ratio: 85:56), anterior convex margin with 6-7 single spines, along convex posterior margin with 7 short setae, ventroposterior lobe absent (Fig. 4F, G). Articles 4-7 of different length (ratio: 50:68:95:22), articles 4-6 along both margins with single or groups of spines, the number of spines increasing towards article 6. Article 2 is shorter than article 6. Dactylus at inner margin with spine mixed with one lateral short seta, at outer margin with one median plumose seta; nail shorter than pedestal (Fig. 4H).

Pleopods with 2 retinacula. Peduncle of pleopod 1 with 3 single setae along anterior margin (Fig. 5F); peduncle of pleopod 2 with one median seta at posterior margin (Fig. 5G); peduncle of pleopod 3 with 2 single setae at posterior margin (Fig. 5H).

Uropod 1: peduncle with dorsoexternal and dorsointernal row of strong spines (Fig. 3E); inner and outer ramus of the same length, both provided with several lateral and 5 unequal distal spines.

Uropod 2: inner ramus only poorly longer than outer one, both rami with single lateral and group of distal spines (Fig. 3E).

Uropod 3 relatively short, strong, not produced; peduncle slightly longer than broad, with row of distal strong spines (Fig. 3F); inner ramus short, scale-like, with distal strong seta; outer ramus strong, at inner margin with 5 groups of strong spines mixed usually with one plumose seta; second article short, not exceeding diameter of first article, narrow, bearing one lateral and 1 subdistal short seta.

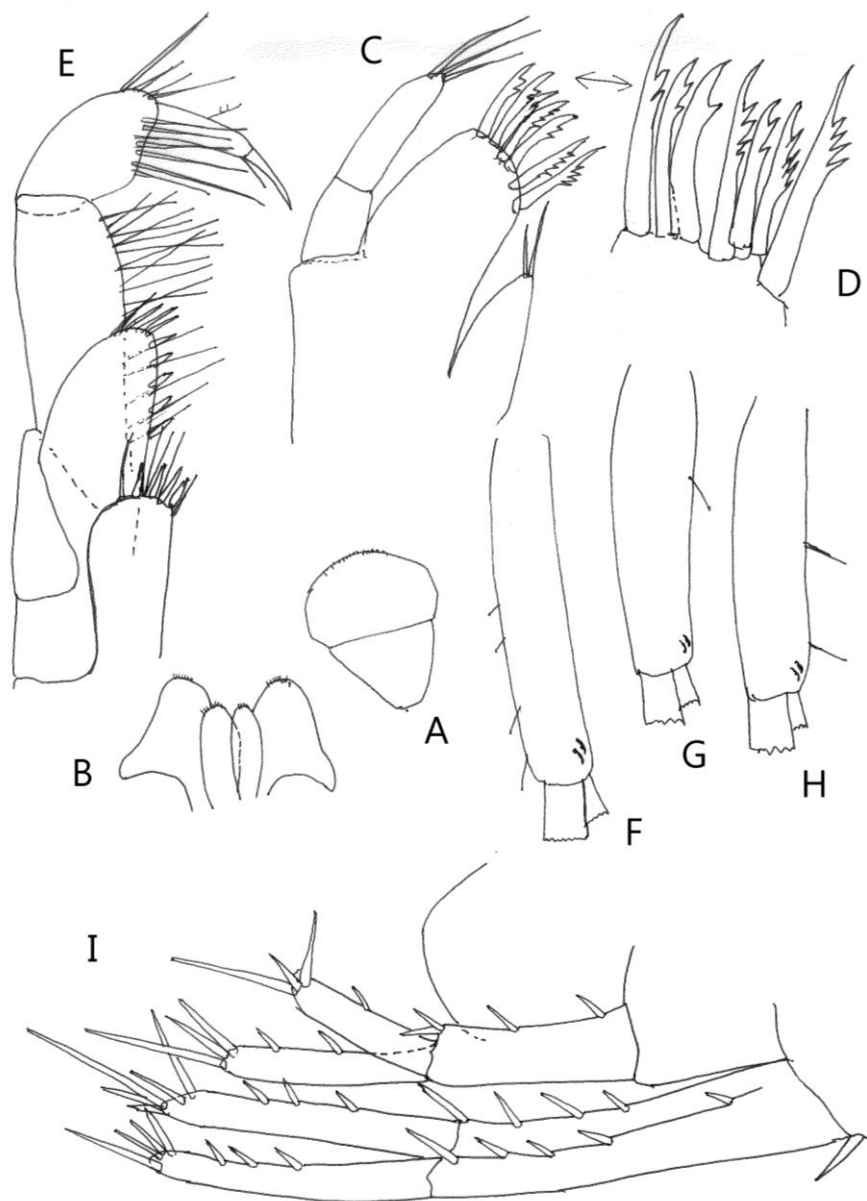


Fig. 5. *Niphargus lourensis lourensis* Fišer *et al.*, 2006, Albania, LK 7, VJ 552 [VJ 14 GWB], female juv. 6.5 mm.: A=labrum; B=labium; C-D=maxilla 1; E=maxilliped; F=peduncle of pleopod 1; G=peduncle of pleopod 2; H=peduncle of pleopod 3. *Niphargus multipennatus* Sket, 1956, Albania, AL 5 (Vjo 003-Shus 17): left bank of the Shushica River, juv. 3.3 mm: I=urosome with uropods 1-2.

Telson longer than broad, deeply incised, each lobe with 3 unequal distal spines, lateral and facial spines absent; a pair of short plumose setae sitting rather over half of outer margin of each lobe (Fig. 3G).

Coxal gills ovoid, not exceeding ventral tip of corresponding article 2 (Fig. 3A, C). Oostegites not fully developed, without lateral setae.

REMARKS AND AFFINITY

The single not fully developed female corresponds by its morphological characters to *Niphargus lourensis lourensis* Fišer *et al.*, 2006. To support this conclusion, we described specimen from Albania more in detail.

At the moment, *N. lourensis lourensis* was known as endemic from Greece only, in various localities mentioned by Fišer *et al.* (2006) and by G. Karaman (2020). G. Karaman (2018) recognized the various populations of *Niphargus* from Skiros Island (Greece) by several morphological differences as a distinct subspecies, *Niphargus lourensis skirosi* G. Karaman, 2018.

By this way, *Niphargus lourensis lourensis* is the new known species for fauna of Albania.

Sarbu *et al.* (2024) cited this species for Sulfur cave as hypogenic cave located in the Vromoner Canyon, on the border between Greece and Albania (40.0961 N, 20.6789 E). It has a small entrance that opens into the Sarandaporo River, a tributary of the Aaos/ Vjosa River.

Niphargus lourensis belongs to the well limited group of species, subgenus *Orniphargus* S. Karaman (1950) by all its characters (short uropod 3, large propodus of gnathopods 1-2 with several setae along outer margin, mouthparts, epimeral plates, uropod 1, telson). Some authors use a different name for it, as morphotypes (Fišer *et al.*, 2009), species-aggregate (Fišer *et al.*, 2006), complex of species (Ntakakis *et al.*, 2015), molecular phylogenies (Borko *et al.* 2019), etc.

NIPHARGUS (JOVONIPHARGUS) MULTIPENNATUS Sket, 1956

Figures 5 I, 6, 7

Niphargus giovanovici multipennatus Sket, 1956: 71, fig. 3; Sket, 1959: 105; Sket, 1972: 106, figs. 25-42; G. Karaman, 1972: 5; G. Karaman, 1974: 19; Barnard, J. & Barnard C., 1983: 692;

Niphargus (Jovaniphargus) giovanovici multipennatus S. Karaman, 1960: 77;

Niphargus multipennatus G. Karaman, 1980: 19; G. Karaman & Ruffo, 1986: 528; G. Karaman, 1988: 25; G. Karaman, 1994: 32; G. Karaman, 1997: 45; Kralj, 2001: 148. G. Karaman, 2021: 13-19, figs. 6-9.

MATERIAL EXAMINED:

ALBANIA:

AL 5 (Vjo 003-Shus 17): left bank of the Shushica River between the new and old bridge of Gjorm (Ura e Gjormit), 2.5 km north of the city of Gjorm, June 2021 (Latitude 40.3384000249207, Longitude 19.6387849655002}, one damaged

juv. female mixed with *Fingerhadzia zorae* G. Karaman, 2024 (leg.: C. Karwautz, G. Rasch & C. Griebler).

LOCUS TYPICUS: Stožice near Ljubljana, Slovenia.

DISTRIBUTION: Slovenia, Croatia, Bosnia & Herzegovina, Serbia (Kosovo & Metohia), Albania (new) (Fig. 9).

REMARKS.

Despite the single specimen from Albania was very juvenile of 3.3 mm and damaged, based on its existing morphological characters we recognize that this specimen belongs to the species *Niphargus multipennatus* Sket, 1956.

Head with short rostrum and subrounded lateral cephalic lobes (Fig. 6A), metasomal segment 3 with 1 dorsoposterior marginal seta, epimeral plate 3 strongly angular (Fig. 6E). Urosomal segment 1 on both ventroposterior corners with one strong spine near basis of the uropod 1-peduncle (Fig. 5 I).

Articles of main flagellum in antenna 1 moderately long (Fig. 6B), some of them with one longer aesthetasc rather shorter than article itself (Fig. 6B). Mandibular palpus article 1 naked, article 2 with 2 setae, article 3 subfalciform, with 4 distal E-setae 2 D-setae and 1 A-seta (Fig. 6C) [reduced number of setae because very juv.].

Maxilliped: inner plate with 3-4 distal spines, mesial margin of outer plate with row of short spines, palpus article 4 with one seta at ventral margin near basis of the nail and one median seta at outer margin (Fig. 6D).

Gnathopods 1-2 with propodus large, almost ovoid, of nearly subequal size, with one median seta on outer margin of its dactylus, and strongly inclined palm.

Gnathopod 2-propodus strongly inclined, defined on outer face by corner S-spine accompanied by one spine-like L-spine and by 2 corner facial M-setae (Fig. 6F), on inner face by 1 subcorner R-spine; dactylus rather exceeding diameter of propodus, along outer margin with one short median seta, along inner margin with several short setae.

Pleopods 1-3 with 2 retinacula, peduncles scarcely setose or naked.

Uropod 1: peduncle longer than rami, provided with dorsoexternal and dorsointernal row of strong spines (Fig. 5 I); rami of the same length, bearing 2-3 lateral strong spines and 5 unequal strong distal spine each (the longest distal spine on inner ramus slightly exceeding half of ramus-length).

Uropod 2: peduncle with 1-2 lateral and distal spines; inner ramus with 2 lateral and 4-5 distal unequal strong spines (the longest spine on inner ramus reaching 2/3 of ramus length) (Fig. 5 I); outer ramus rather shorter than outer one, with one lateral and 3-4 unequal distal spines (the longest spine poorly shorter than ramus itself).

Uropod 3 missing.

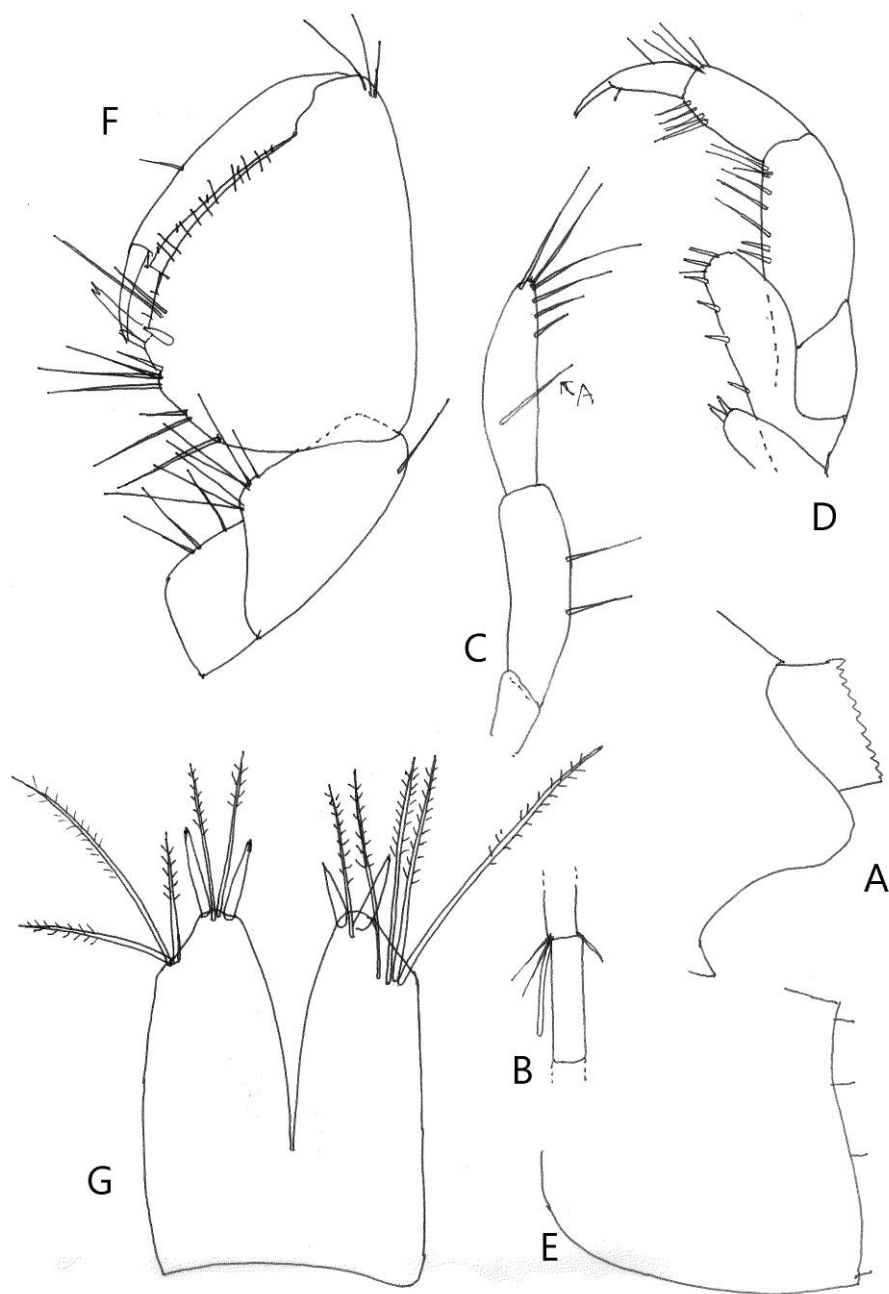


Fig. 6. *Niphargus multipennatus* Sket ,1956, Albania, AL 5 (Vjo 003-Shus 17): left bank of the Shushica River, juv. 3.3 mm: A=head; B=aesthetasc on antenna 1 main flagellum; C=mandibular palp, outer face; D=maxilliped; E=epimeral plate 3; F=gnathopod 2 propodus, inner face; G=telson.

Telson is the most characteristic of this species: longer than broad (ratio: 95:75), incised almost 2/3, each lobe tapering distally, bearing 2 distal spines and 5 very long plumose setae (Fig. 6G).

Discovery of additional specimens from this locality will probably support our determination.

We used the term Subgenus *Jovaniphargus* S. Karaman, 1960 for that group of morphologically similar taxa named often by various authors as *N. jovanovici* Group of species, species aggregate, etc.

The recent authors usually ignore subgeneric level of some morphologically well-defined subgenera ("the obsolete subgenus *Phaenogammarus* Dudich, 1941, etc. (Copilaş-Ciocianu, 2017), etc. (G. Karaman, 2025b).

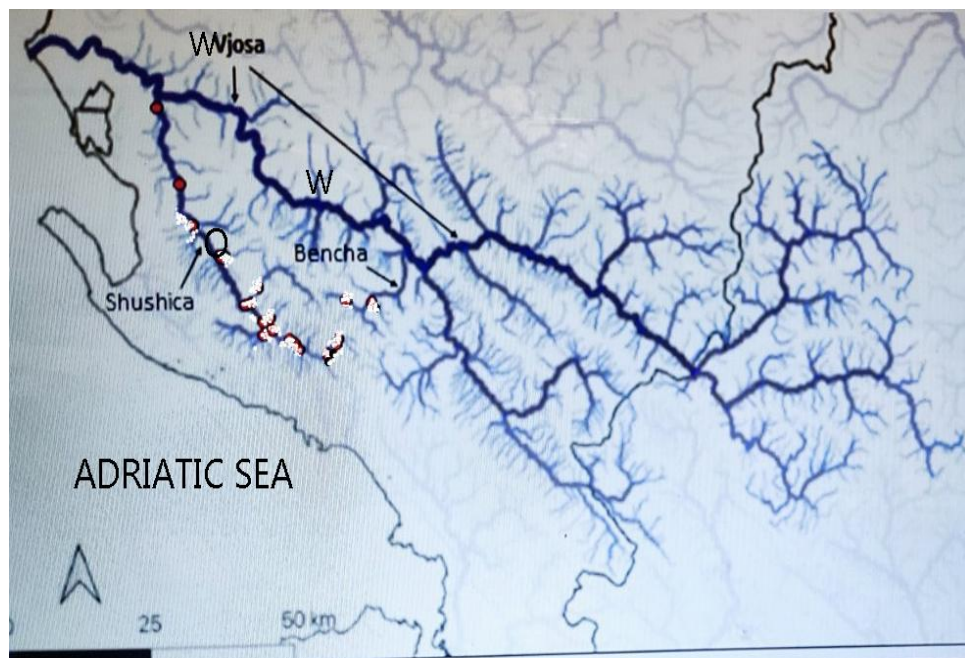


Fig. 7. Localities of two *Niphargus* species in Albania:
 O=*Niphargus multipennatus* Sket 1956
 W=*Niphargus lourensis lourensis* Fišer et al. 2006

KEY TO THE SPECIES OF *NIPHARGUS* IN ALBANIA:

1. Dactylus of gnathopods 1-2 with one median external marginal seta.....2
- Dactylus of gnathopods 1-2 with 3 or more median external marginal setae 3

2. Telson with 5-6 distal plumose long setae on each lobus..... **MULTIPENNATUS** Sket 1956
- Telson with 2 short lateral plumose setae on each lobus..... **GRIEBLERI** G. Karaman 2023

3. Telson with distal spines only.....4
- Telson with distal, lateral and facial spines..... 5

4. Spines on maxilla 1 outer plate with several teeth each. Uropod 1 peduncle with dorsointernal row of spines. Urosomal segment 1 with 2 spines on each dorsolateral side
.....**LOURENSIS LOURENSIS** Fišer et al. 2006
- Spines on maxilla 1 outer plate with 1 lateral tooth; Uropod 1 peduncle with dorsointernal row of setae (except distal spine); urosomal segment 1 with 1 seta on each dorsolateral side
.....**LEPUSHENSIS** G. Karaman 2025a

- 5.-Uropod 1 in male with inner ramus distinctly longer than outer ramus...**TOMORI** G. Karaman 2011
- Uropod 1 both rami in male nearly of equal length.....6

6. Epimeral plate 3 strongly produced, plates 2-3 with subventral setae. Pereopods 5-7 stouter
.....**OHRIDANUS** S. Karaman 1929
- Epimeral plate 3 obtusely angular, plates 2-3 with subventral spines, pereopods 5-7 more slender
.....**BENCAENSIS** G. Karaman 2025b

ACKNOWLEDGEMENTS.

Thank very much to **Prof. Dr. Christian Griebler** from the University of Wien (Austria) for collecting and providing me with the opportunity to examine the material of subterranean Amphipoda collected in Albania in 2021-2025 used in this study. I am thankful also to the samplers C. Karwautz, and G. Rasch for collecting of part of these samples. Samples were collected in the frame of the APPEAR project VjoSusDev., 2021-2024. APPEAR is a program of the Austrian Development Cooperation implemented by the OeAD.

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