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ONE NEW SUBTERRANEAN SPECIES OF THE GENUS *NIPHARGUS* SCHIÖDTE, 1849 (FAMILY NIPHARGIDAE) FROM BOKA KOTORSKA IN CRNA GORA (MONTENEGRO), *NIPHARGUS ABAVUS*, SP. N.

(Contribution to the knowledge of the Amphipoda 253)

Abstract

One new subterranean species of the family Niphargidae G. Kar., 1962 (Amphipoda, Gammaridea), *Niphargus abavus*, sp. n., from the subterranean waters in Boka Kotorska (Markov Rt in Prčanj, Crna Gora) is collected and presented. This species belongs to the small interstitial amphipods, and appears on the surface during the intensive rains. *N. abavus* shows no any taxonomic affinities to other known species of the genus *Niphargus* Schiödte, 1849, known from Boka Kotorska region. *N. abavus* is descried and figured, and his relations to other *Niphargus* species known from Crna Gora (Montenegro) are discussed.

Key words: Amphipoda, Niphargidae, *Niphargus abavus*, Boka Kotorska, Crna Gora, taxonomy

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JEDNA NOVA PODZEMNA VRSTA RODA *NIPHARGUS* SCHIÖDTE, 1849 (FAMILIJA NIPHARGIDAE) IZ BOKE KOTORSKE U CRNOJ GORI (MONTENEGRO), *NIPHARGUS ABAVUS*, SP. N.

(253. Prilog poznavanju Amphipoda)

Sažetak

Jedna nova podzemna vrsta iz familije Niphargidae G. Kar. 1962, (Amphipoda, Gammaridea), *Niphargus abavus*, sp. n. sakupljena je i opisana iz podzemnih voda Boke Kotorske (Markov rt na Prčanju, Crna Gora). Ova vrsta pripada malim podzemnim vrstama amfipoda, i pojavljuje se na površini za vrijeme intenzivnih kiša. *N. abavus* ne pokazuje nikakav taksonomski afinitet prema drugim poznatim vrstama roda *Niphargus* Schiödte, 1849 iz regiona Boke Kotorske. *N. abavus* je opisan i nacrtan i analiziran je njegov odnos prema drugim poznatim vrstama roda *Niphargus*.

Ključne riječi: Amphipoda, Niphargidae, *Niphargus abavus*, Boka Kotorska, Crna Gora, taksonomija

INTRODUCTION

The subterranean fauna of Amphipoda in Boka Kotorska region (Crna Gora) has been only partially studied and several taxa of various families were by various scientists discovered and described, or mentioned, only [Karaman, G., 1983; Karaman, G. & Ruffo, 1986, etc.).

First subterranean species from region of Boka Kotorska was described by Schellenberg (1937), *Niphargus brevicuspis*, sp. n. from Gornja Pokljuka cave near Knezlaz, Risan reg., above Boka Kotorska.

Stanko Karaman (1950a, 1950b) described a new taxon *Niphargus* (*Orniphargus*) *orcinus kusceri* from spring Ljuta near Orahovac, Boka Kotorska. Later, this taxon was mentioned by other authors from the same locality [Karaman, G., 1967a; Karaman, G., 1974a; Karaman, G., 1984], as well as for the spring Škurda in Kotor (Karaman, G., 1967a, Karaman, G., 1974a; Karaman, G., 1984).

The subterranean species *Hadzia fragilis* Karaman, S. 1932 (Fam. Hadziidae S. Kar.) was cited from the waters of the Risanska pečina-cave and Sopot cave near Risan (Karaman, G., 2000).

Karaman, G. (1969) cited *Rhipidogammarus karamani* Stock, 1971 [sub name *Neogammarus rhipidiophorus* Catta) from various localities

in Boka Kotorska [Kotor, coast; spring Škurda in Kotor; Glavati springs; Verige; spring Ljuta near Orahovac; springs in Donji Morinj; springs near Njivice by Igalo]. Stock (1971) cited these localities, together with other localities of France and Greece sub new name, *Rhipidogammarus karamani*, sp. n.

Bogidiella dalmatina Karaman, S., 1953 (Fam. Bogidiellidae), was cited from Boka Kotorska in various papers (Karaman, G., 1973; Karaman, G., 1974a; Karaman, G., 1994) [Verige; "Various localities along the sea shore"].

The semisubterranean species *Synurella ambulans* (Müller, 1846) was mentioned from the spring St. Trojica above Kotor (Karaman, G., 1974).

The various epigean freshwater and marine species of Amphipoda have been cited from Boka Kotorska also: *Echinogammarus foxi* Schellenberg, 1928, *E. pungens*, etc. (Karaman, G., 1969a; Karaman, G., 1972, etc.), but they are not cited in this work.

REMARKS. This work was supported by a grant of the Montenegrin Academy of Sciences and Arts.

TAXONOMIC PART

NIPHARGUS ABAVUS, SP. N.

Figs. 1-7

MATERIAL EXAMINED: Boka Kotorska region, Crna Gora (Montenegro): S-6838= Subterranean waters in Markov Rt near Prčanj, 50 m from the sea (Boka Kotorska Bay), 12.2.2010, 13 specimens (leg. Gordan & Božana Karaman). Holotype [S-6838H) and paratype (S-6838P) are deposited in KARAMAN` s Collection in Podgorica, Crna Gora.

DESCRIPTION. MALE 8.1 mm (Holotype): Body slender, elongated, metasomal segments 1-3 with single short dorsoposterior marginal setae (fig. 5D). Epimeral plates 1-2 rounded, epimeral plate 3 distinctly angular, but with slightly convex posterior margin (fig. 5D); epimeral plates 2-3 with one ventral submarginal spine each (fig. 5D). Urosomites 1 and 2 with one dorsolateral seta on each side (fig. 1G); urosomite 3 smooth.

Head with short rostrum and short lateral cephalic lobe (fig. 1A), ventroanterior sinus well developed. Antenna 1 short, not reaching half of the body-length (ratio 3.1 : 8.1); peduncle segment 1 as long as peduncle segments 2 and 3 combined; peduncle segment 3 short (fig. 1B); main flagellum consisting of 19 articles [many of them with one short aesthetasc

each); accessory flagellum short, 2-segmented, not reaching the length of peduncle segment 3 (fig. 1B).

Antenna 2: Peduncle segment 4 only slightly longer than peduncle segment 5, both with several bunches of long straight setae longer than diameter of the articles themselves (fig. 1C); flagellum longer than last peduncle segment, and consisting of 9 articles. Antennal gland cone short.

Mouthparts well developed. Labrum with convex distal margin (fig. 4A). Labium with well developed inner lobes (fig. 4B), outer lobes entire.

Maxilla 1: Inner plate with 2 setae; outer plate with 7 distal spines: six spines with one lateral tooth each, one spine (inner spine) with 2 lateral teeth); palp 2-segmented, not reaching tip of spines of outer plate, and provided with 5 distal setae (fig. 5A).

Maxilla 2: Both plates with marginal setae only (fig. 5C).

Maxilliped: Inner plate short, with 3 distal slender spines and several setae; palp segment 4 with one median group of setae along outer margin (fig. 3A).

Mandibles: Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth (fig. 1E). Right mandible: incisor with 4 teeth, lacinia mobilis with many teeth (fig. 1D). Mandible palp of left and right mandible similar, 3-segmented; palp segment 2 provided with 9 setae. Palp segment 3 as long as palp segment 2, subfalciform, with 16 marginal D-setae and 6 distal long E-setae; on outer face appears one bunch of A-setae, on inner face appear 2 single B-setae (fig. 1 F), C-setae absent.

Coxae 1-4 slightly broader than long (high), bearing several marginal setae each (fig. 2 A, D; 3B, D). Coxa 1 with rounded ventroanterior corner (fig. 2A). Coxae 5-6 bilobed, coxa 5 shorter than 4 (fig. 4C, E, G).

Gnathopods 1-2 relatively small, nearly as large as the corresponding coxae, gnathopod 1 hardly smaller than 2 (fig. 2A, D).

Gnathopod 1: Segment 5 shorter than 6; segment 6 slightly longer than broad, trapezoid, with 4 groups of setae along posterior margin (fig. 2B); palm oblique almost to the half of the propodus-length, defined on outer face by one strong corner spine accompanied by 2 lateral serrate slender spines and 4 facial long setae (fig. 2B), on inner face by one short subcorner spine (fig. 2C). Dactyl reaching posterior margin of segment 6, and provided with a row of 5 long setae along outer margin (fig. 2B).

Gnathopod 2: Segment 5 poorly shorter than 6 (fig. 2D); segment 6 almost quadrate, with 6 groups of setae along posterior margin. Palm oblique less than that in gnathopod 1 (fig. 2E), defined on outer face by

one strong corner spine accompanied laterally by 2 slender serrate spines, and 5 facial long setae, on inner face by one short subcorner spine (fig. 2F); dactyl reaching posterior margin of segment 6, bearing a row of 5 long setae along outer margin.

Pereopods 3-4 short and stout, their segments 2-5 with long setae along posterior margin (fig. 3B, D); segment 6 along posterior margin with bunches of short spines and single short setae. Dactyl strong, nearly twice as long as the width of corresponding segment 6 and bearing one strong spine at inner margin, and one short plumose seta at outer margin; nail as long as pedestal (fig. 3C, E).

Pereopods 5-7 short and strong, progressively longer towards pereopod 7, their segment 2 less than twice as long as broad, with almost parallel lateral margins and marked ventroposterior dilatation, ventroposterior lobe is not developed; posterior margin of segment 2 with row of short setae each (fig. 4C, E, G); segments 3-6 along posterior margins with bunches of short spines; anterior margin of segments 3-5 with setae only (fig. 4 C, E, G). Dactyl strong, with one spine at inner and one plumose seta at outer margin, nail shorter than pedestal (fig. 4D, F, H).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with 2 strong setae at distoanterior margin (fig. 5F), that of pleopod 2 with one short distoanterior seta only (fig. 5G). Peduncle of pleopod 3 with 3 median setae along posterior margin (fig. 5H).

Urosomite 1 with slender ventroposterior spine near basis of uropod 1 peduncle (fig. 1G). Uropod 1: peduncle long, with dorsoexternal row of slender spine-like setae and dorsointernal row of slender spines; inner ramus elongated, as long as peduncle, bent, provided with bunches of lateral setae and distal short spines (fig. 1G); outer ramus reaching half of inner ramus, bearing lateral setae and single spines, as well as distal short spines (fig. 1G).

Uropod 2: peduncle with dorsal spines (fig. 1G); inner ramus slightly longer than outer one, both with single lateral spines and bunches of short distal spines (fig. 1G).

Uropod 3 long, peduncle short (fig. 3F); inner ramus elongated, but slightly shorter than peduncle, with lateral and distal short setae (fig. 3G). Outer ramus 2-segmented, both segments almost of the same length, provided with bunches of short setae along both margins (fig. 3F); segment 1 along inner margin with single plumose setae also (fig. 3F).

Telson short, hardly broader than long (high), broadly incised nearly to 2/3 of telson-length (fig. 5E); each lobe with 3 distal short spines, and 1-2 lateral marginal setae, as well as with one slender facial spine (fig. 5E). A pair of short plumose setae appears near the middle of each lobe.

Coxal gills appear on pereopods 2-6, ovoid (figs. 2B; 3B, D; 4C, E).

FEMALE 6.1 mm, with setose oostegites (paratype): Body mainly similar to the males, but slightly smaller. Epimeral plates 1-2 rounded, epimeral plate 3 distinctly angular, with nearly straight posterior margin; epimeral plates 2-3 with 2 subventral spines each (fig. 5 I) urosomite 1 with one dorsolateral seta on each side (fig. 6H); urosomite 2 on each dorsolateral side with one spine and one short seta; urosomite 3 smooth.

Antenna 1 slightly shorter than that in males; main flagellum consisting of 16 articles bearing often one short aesthetasc each.

Antenna 2: peduncle like that in males, flagellum consisting of 9 articles. Mouthparts mainly similar to these in males. Inner plate of maxilla 1 with one seta. Distal segment of mandible palp with 12 D-setae, 6 long distal E-setae (fig. 7A); on outer face appears one bunch of A-setae, on inner face are 3 single B-setae (fig. 7A).

Coxa 1 broader than long (fig. 7B), coxae 2-3 longer than broad (fig. 7C, D); coxa 4 nearly as long as broad (fig. 7E), all these coxae with row of short marginal setae each.

Gnathopods 1-2 similar to these in males, gnathopod 1 is only slightly smaller than 2 (fig. 6A, C), palm of both gnathopods defined by one strong corner spine accompanied on outer face with 2 lateral serrate spines and 4 facial long setae, on inner face by one short subcorner spine (fig. 6B, D), dactyl like these in males (fig. 6A, C).

Pereopods 3-4 strong, similar to these in males (fig. 7D, E), dactyl like that in males, provided with one strong spine at inner margin. Pereopods 5-7 strong, similar to these in males, their segment 2 less than twice as long as broad, with ventroposterior dilatation but not lobed (fig. 6E, F. G), dactyl strong, with one spine at inner margin (fig. 6G), nail shorter than pedestal.

Pleopods 1-3 similar to these in males, bearing 2 retinacula each. Peduncle of pleopod 1 with 2 strong ventroanterior setae (fig. 5 F), that of pleopod 2 with one distoanterior seta (fig. 5 G). Peduncle of pleopod 3 with 3 posterior median setae (fig. 5H).

Urosomite 1 with ventroposterior spine (fig. 6H). Uropod 1: peduncle with dorsointernal row of setae and dorsoexternal row of spines (fig. 6H); inner ramus is only slightly longer than outer one, both rami with median group of setae and single spines, as well as with bunch of distal short spines (fig. 6H).

Uropod 3 shorter than that in males: peduncle short; inner ramus much shorter than peduncle, with 2 distal spines (fig. 7 I); outer ramus 2-segmented: first segment with bunches of spines along both margins, accompanied by 2 plumose setae along inner margin (fig. 7 I); second segment of outer ramus slightly elongated, reaching half of first segment only, bearing simple setae along both margins and tip (fig. 7 I).

Telson short, broader than long, each lobe with 3 distal and one inner marginal long spine (fig. 5J), facial spines absent. A pair of short plumose setae appears near the middle of each lobe (fig. 5J).

Coxal gills ovoid (fig. 6E, F; 7C, D), that on pereopod 4 slightly elongated (fig. 7E). Oostegites very large, with setose margins (fig. 7C, D, E).

VARIABILITY. Inner plate of maxilla 1 with 1-2 setae. Distal article of mandible palp with 2-3 B-setae, 3-5 A-setae, and 12-18 D-setae. The stable characters are the angular epimeral plate 3 in males and females, strongly elongated inner ramus of uropod 1 in males, and only slightly elongated in females; absence of dorsolateral spine on urosomite 2 in males, poorly setose peduncle of pleopods 1-3, strong but not obtuse dactyl of pereopods 3-7 provided with one strong spine at inner margin.

LOCUS TYPICUS: Markov Rt near Prčanj, Boka Kotorska, Crna Gora.

DERIVATIO NOMINIS: The specific name *abavus* is from the Latin meaning great-grandfather.

REMARKS AND AFFINITIES

Niphargus abavus, sp. n. has no closer affinities to other species of the genus *Niphargus* (Fam. Niphargidae) known from Boka Kotorska and other parts of Crna Gora. Similar small slender species is known from the subterranean waters of Bar, *Niphargus pulevici* Karaman, G., 1967a, but this species differs from *N. abavus* by subequal long rami of uropod 1 in males and females, sharply pointed epimeral plates 3 in males and females, etc.

From the small springs in Vranjina on Skadar Lake is known *Niphargus vranjinae* Karaman, G., 1967, species with similar shape

of epimeral plates, gnathopods, presence of setae on urosomites 1-2 in males, etc. But, this species differs remarkably from *N. abavus* by outer ramus of uropod 1 longer than inner one, etc.

Karaman, S. described (1950) one small species from small spring near Vjetrenica cave in Popovo Polje in Herzegovina, *Niphargus cvijici*, n. sp. This species is rather similar to *N. abavus*, and provided with elongated uropod 3, dactyl of pereopods 3-7 is provided with one strong spine, inner plate of maxilla 1 is with 1-2 setae, inner ramus of uropod 1 is strongly elongated, pleopods with 2 retinacula, etc. But, *N. cvijici* differs from *N. abavus* by distinctly rounded epimeral plates 1-3, by broader telson provided with strong facial spines, by narrower segment 2 of pereopods 5-7, etc.

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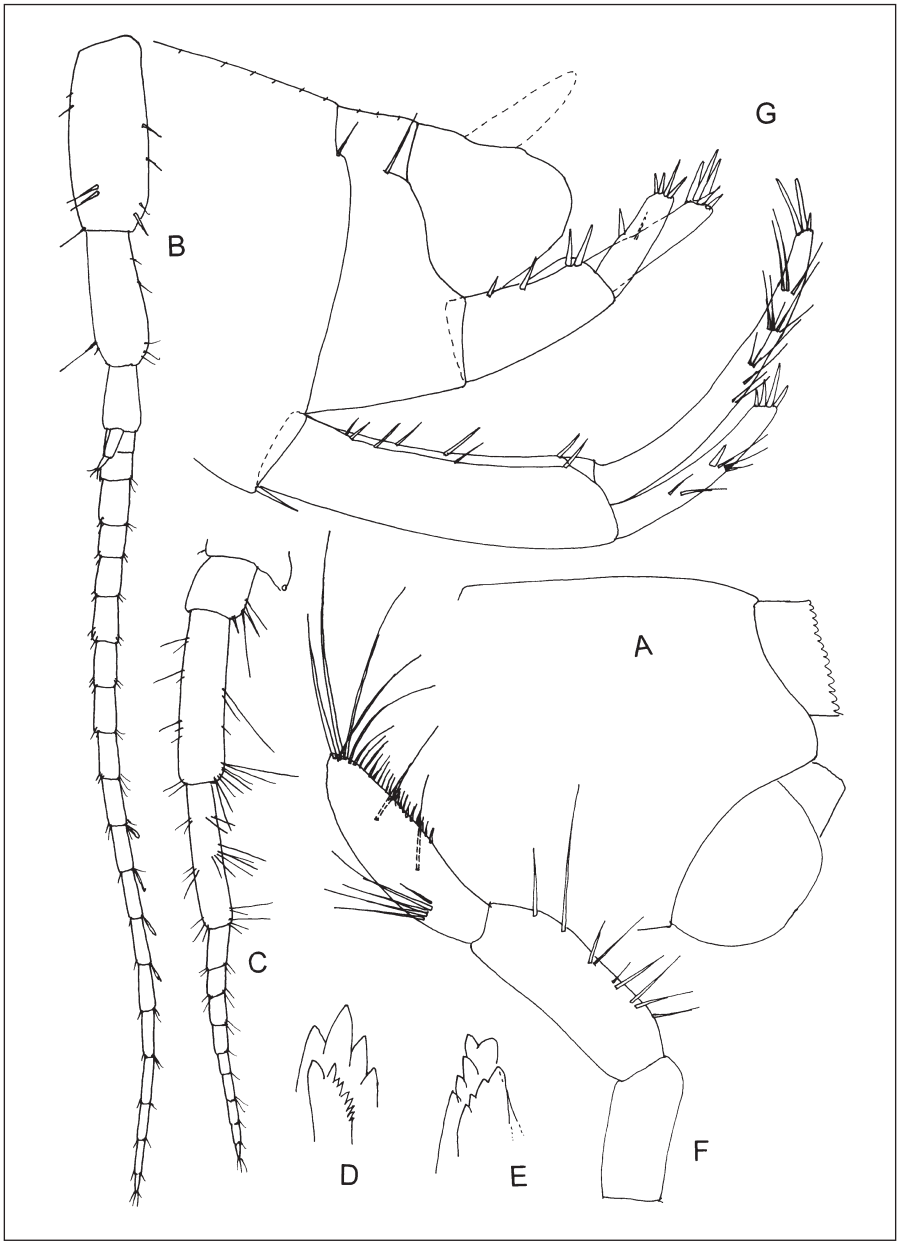

Fig. 1. *Niphargus abavus*, sp. n., male 8.1 mm (holotype), Markov Rt: A= head; B= antenna 1; C= antenna 2; D= right incisor and lacinia; E= left incisor and lacinia; F= mandibular palp, outer face.

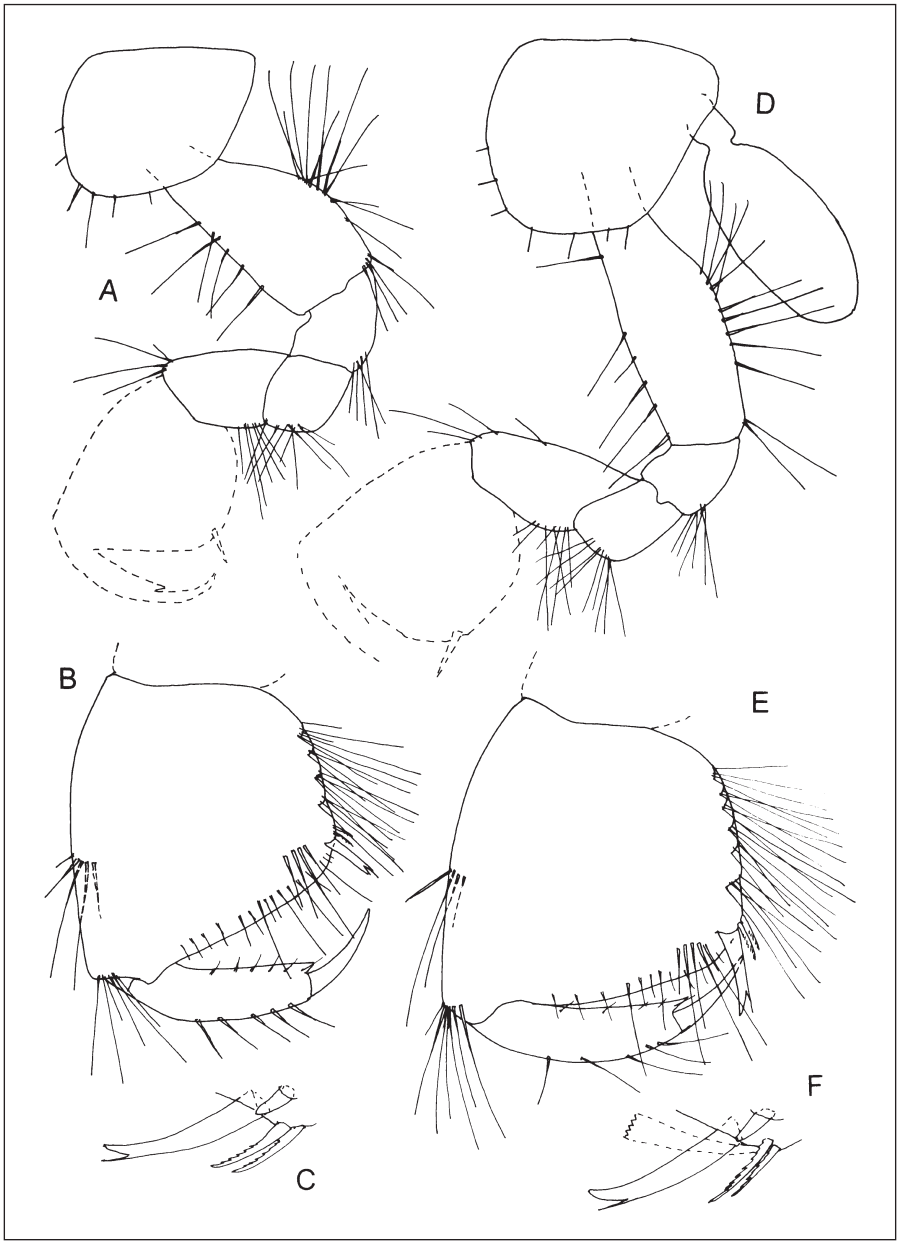

Fig. 2. *Niphargus abavus*, sp. n., male 8.1 mm (holotype), Markov Rt: A-C= gnathopod 1; D-F= gnathopod 2.

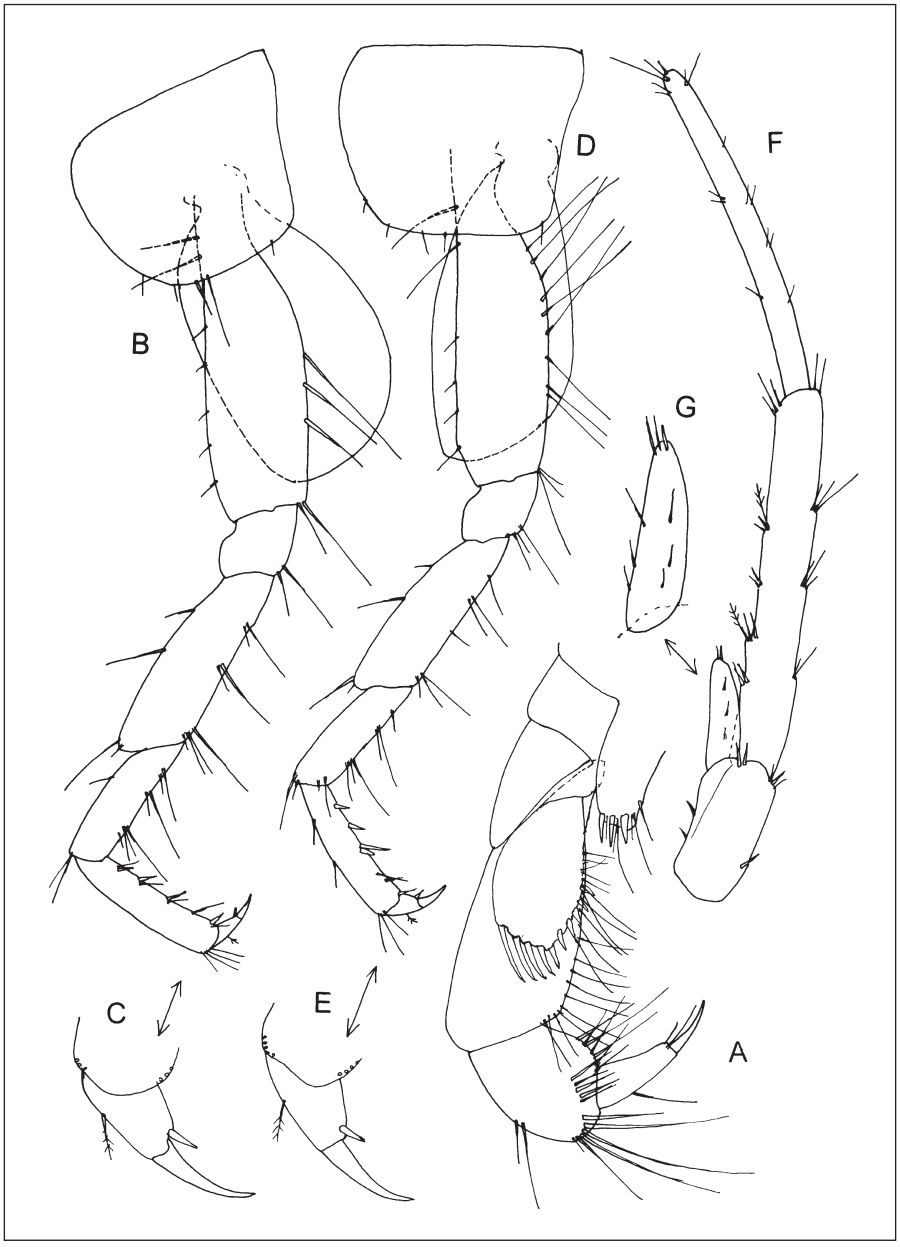

Fig. 3. *Niphargus abavus*, sp. n., male 8.1 mm (holotype), Markov Rt: A= maxilliped; B-C= pereopod 3; D-E= pereopod 4; F-G= uropod 3.

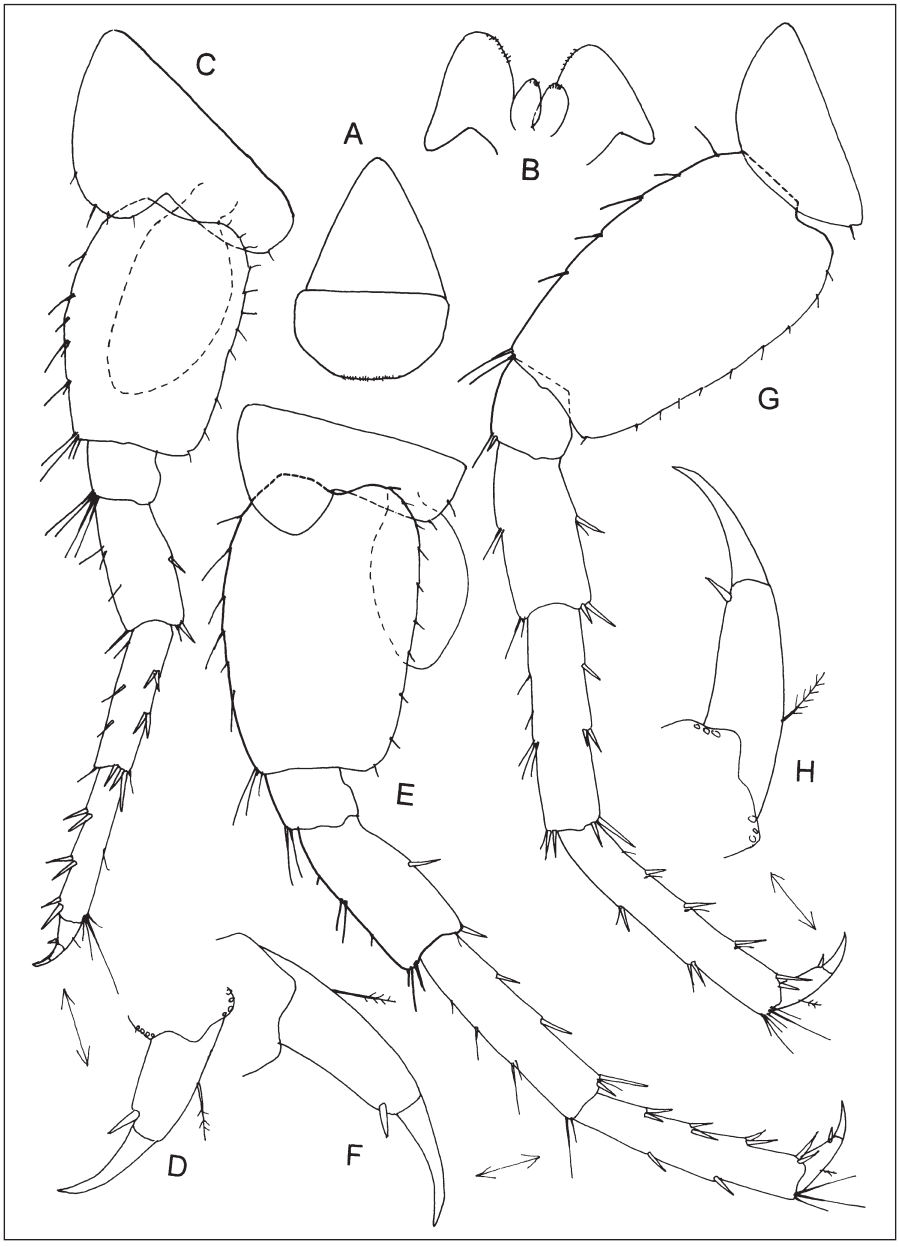

Fig. 4. *Niphargus abavus*, sp. n., male 8.1 mm (holotype), Markov Rt:
A= labrum; B= labium; C-D= pereopod 5; E-F= pereopod 6; G-H= pereopod 7.

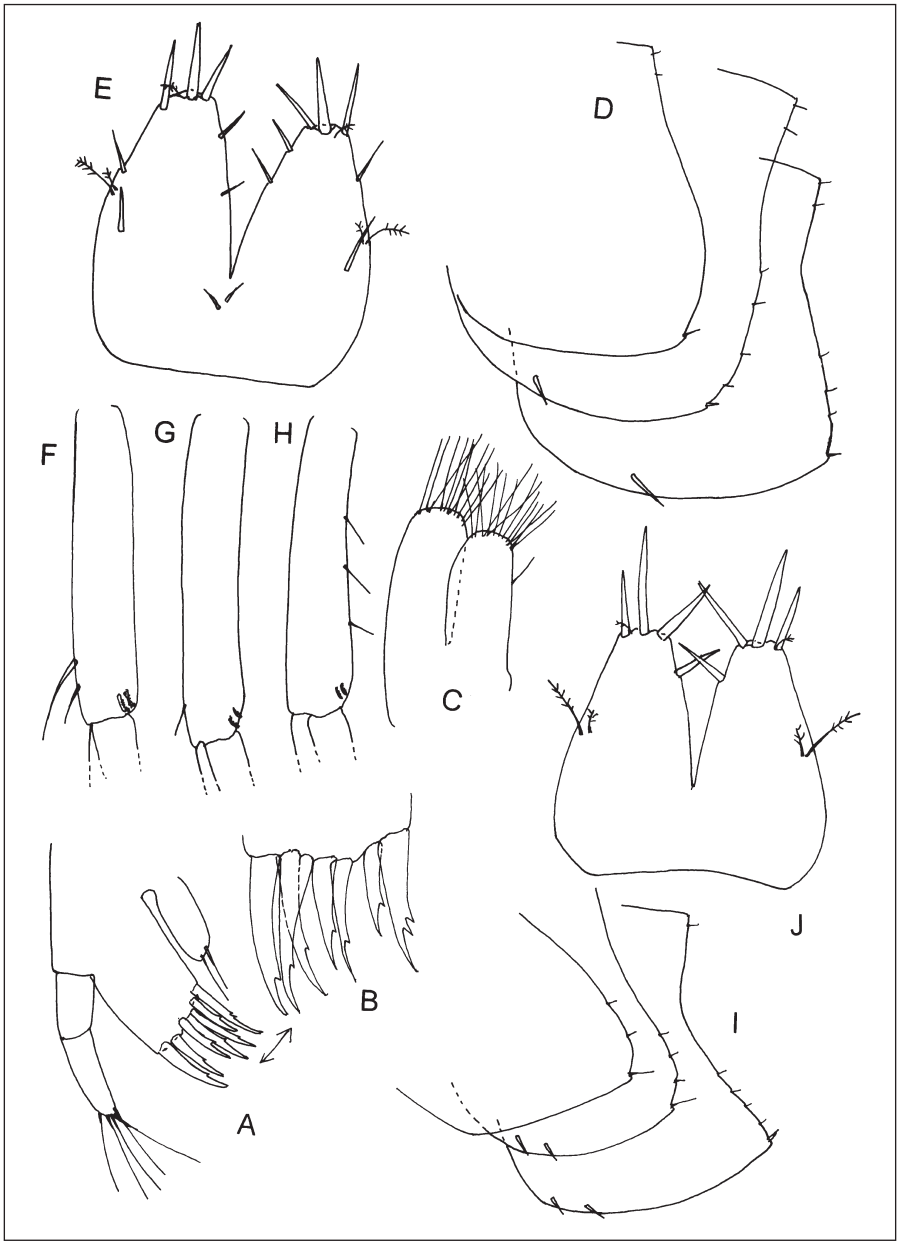

Fig. 5. *Niphargus abavus*, sp. n., male 8.1 mm (holotype), Markov Rt: A-B= maxilla 1; C= maxilla 2; D= epimeral plates 1-3; E= telson; F= pleopod 1; G= pleopod 2; H= pleopod 3; Female, 6.1 mm (paratype): I= epimeral plates 1-3; J= telson.

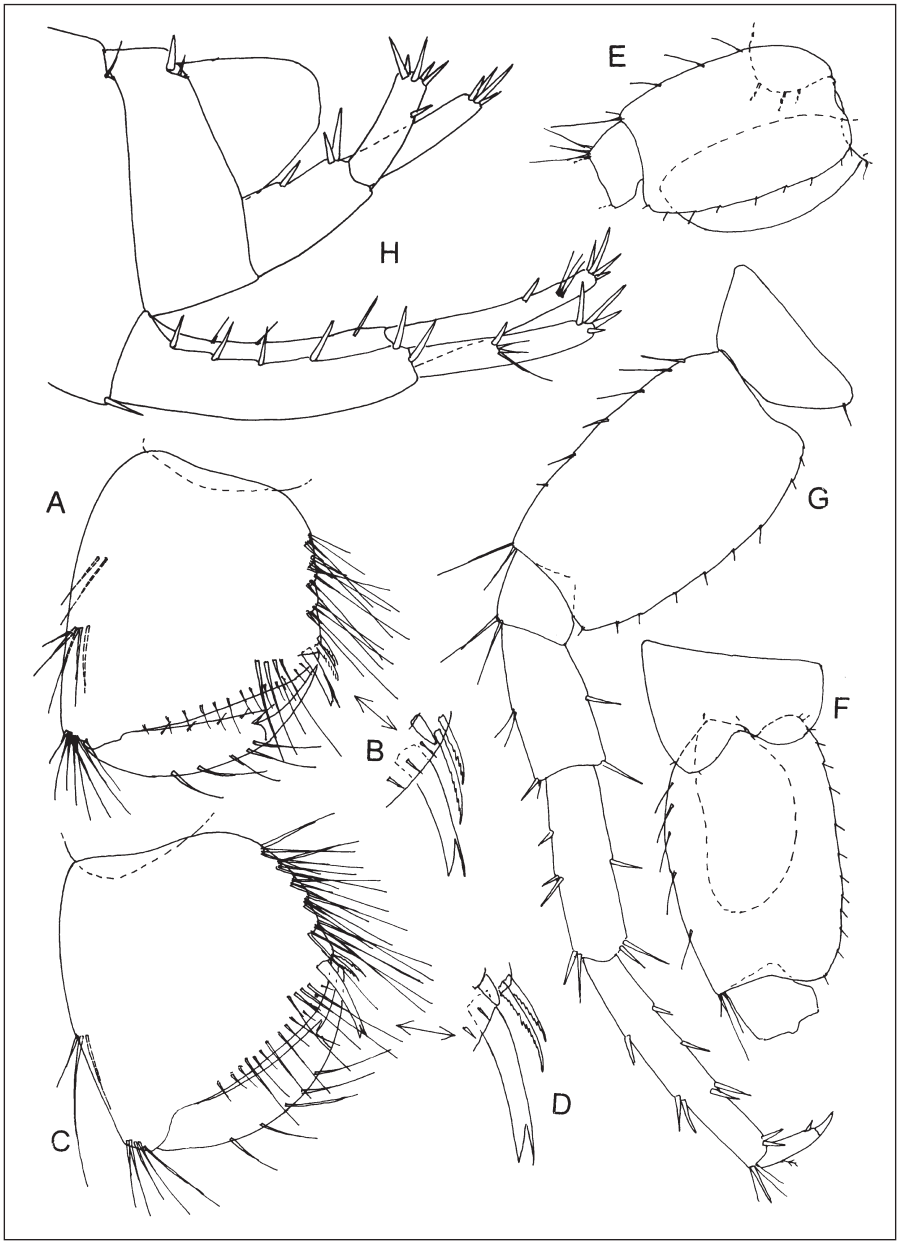

Fig. 6. *Niphargus abavus*, sp. n., female 6.1 mm (paratype), Markov Rt: A-B= gnathopod 1; C-D= gnathopod 2; E= pereopod 5; F= pereopod 6; G= pereopod 7; H= urosome with uropods 1-2.

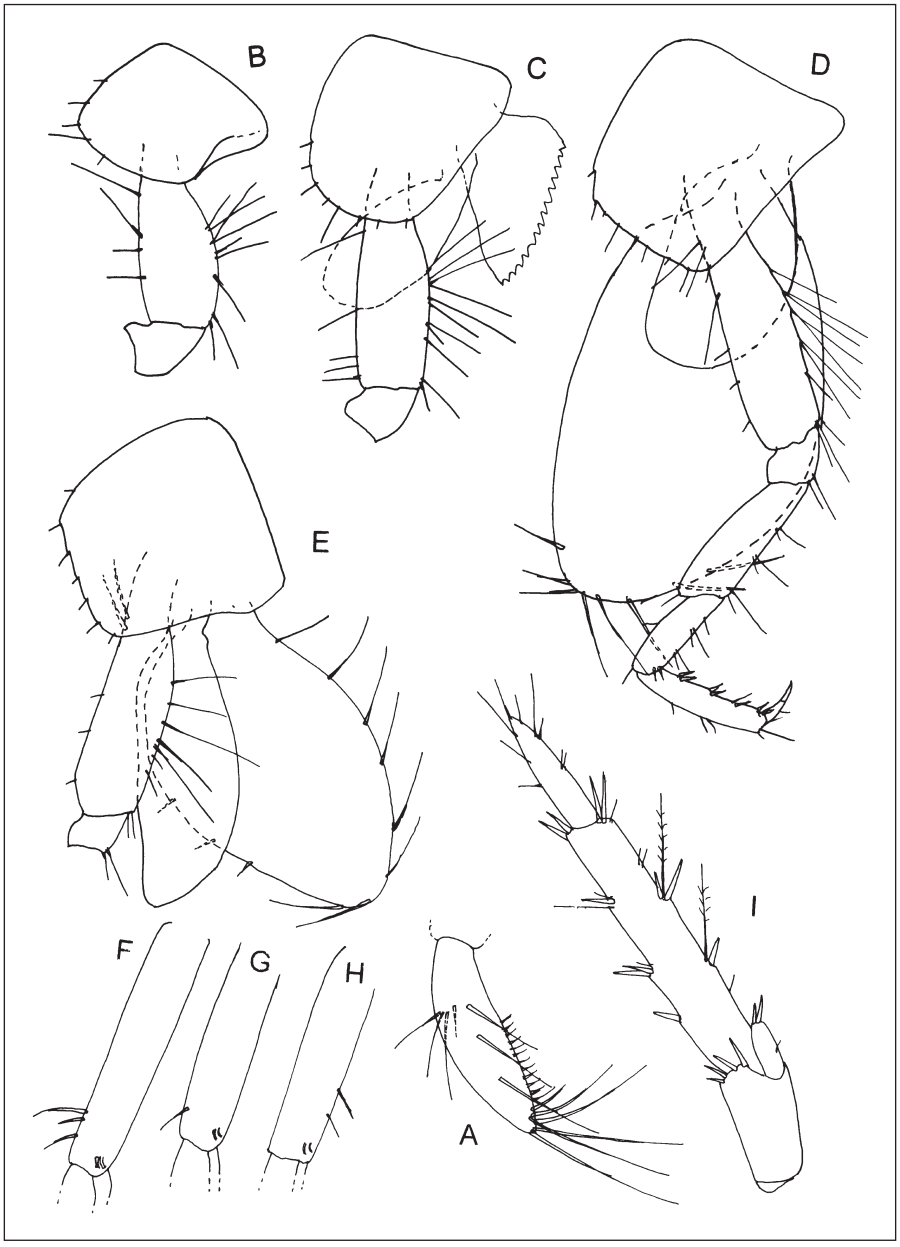

Fig. 7. *Niphargus abavus*, sp. n., female 6.1 mm (paratype), Markov Rt: A= mandibular palp, inner face; B= coxa 1; C= coxa 2; D= pereopod 3; E= pereopod 4; F= pleopod 1; G= pleopod 2; H= pleopod 3; I= uropod 3.