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ON THREE INTERESTING SUBTERRANEAN AMPHIPODS (CRUSTACEA, AMPHIPODA) FROM BALKAN PENINSULA

(Contribution to the Knowledge of the Amphipoda 238)

A b s t r a c t

Three subterranean *Amphipoda* species from Slovenia and Crna Gora (Montenegro) are studied. The poorly known species *Niphargus stenopus* Sket 1960 is redescribed and figured based of typic material from Slovenia. New localities of the species *Niphargus longiflagellum* S. Kar. 1950 from caves in Slovenia are cited. The second locality of the species *Metohia carinata* Absolon 1927 in Crna Gora (Montenegro) is mentioned (Vresko Vrelo spring near Bandici village, Podgorica reg).

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O TRI INTERESANTNA PODZEMNA AMFIPODA (CRUSTACEA, AMPHIPODA) IZ BALKANSKOG POLUOSTRVA

(238. Prilog poznavanju Amphipoda)

Izvod

U radu su obrađene tri vrste podzemnih *Amphipoda* iz Slovenije i Crne Gore. Slabo poznata vrsta *Niphargus stenopus* Sket 1960 je opisana i nacrtana na osnovu tipičnog materijala iz Slovenije. Vrsta *Niphargus longiflagellum* S. Kar. 1950 je ustanovljena u nekoliko novih lokaliteta, uglavnom pećina, u Sloveniji. Vrsta *Metohia carinata* Absolon 1927, poznata u Crnoj Gori samo iz Obodske pećine, nađena je sada u Vreškom Vrelu kod sela Bandići (oblast Podgorice).

INTRODUCTION

The subterranean fauna of *Amphipoda* on Balkan peninsula is still only partially known, because of the very difficult collecting of these animals in the caves, springs or other subterranean waters. Often is necessary to visit the same cave several times, to collect all species of amphipods existing there, because the specimens are living deeply in the subterranean waters, coming only occasionally near the surface of the cave- lakes or streams where we can collect them.

By this way, it is not unusual that we established the presence of some amphipods in new localities, in some other caves from Slovenia, and in the spring on new locality in Crna Gora (Montenegro). The results of our study we presented in this work. The *Niphargus* species belonging to the subgenus *Orniphargus* S. Kar. 1950 are presented on western part of Balkan peninsula by numerous endemic species and subspecies, tertiary relicts, and the revision of this group is in process. We mentioned here two interesting taxa of this subgenus (*Niphargus stenopus* Sket 1960 and *Niphargus longiflagellum* S. Kar. 1950. Another rare subterranean species and tertiary relict, *Metohia carinata* Abs. 1927, is discovered in a springs of Vresko Vrelo, tributary of Zeta river near Podgorica.

ACKNOWLEDGEMENTS. I am indebted to Dr. **Fabio Stoch** from the Museum of Natural History in Trieste and Dr. **Boris Sket**

from the University of Ljubljana for the part of the material kindly left us at disposition for study.

NIPHARGUS STENOPUS Sket, 1960
Fig. 1-4

Niphargus (Orn.) stenopus Sket 1960: 75, fig. 6;

Niphargus stenopus G. Karaman 1972: 6; G. Karaman 1974a: 25; Barnard & Barnard 1983:695; G. Karaman 1984: 9; G. Karaman & Ruffo 1986: 531;

MATERIAL EXAMINED: SLOVENIA: Jama pri Luknji-cave near Novo Mesto, 2 spec. (paratype and holotype?), data? (leg. B. Sket);

-AMD/00639- Lukanjska Jama-cave or Vodna Jama-pod gradom Luknja (S. 575), Prečna, W. of Novo Mesto, July 12, 1994, 1 exp. (leg. F. Gasparo & F. Stoch);

-24713- Berlin Coll., Pozzo di S. Cipriano, August, 1934, 1 exp. damaged, over 20 mm long (leg. Kramer) (cf. *stenopus*);

DESCRIPTION. Male 15 mm from Jama pri Luknji: Body slender, with long and slender extremities. Mesosomal segments smooth; metasomal segments 1-3 along dorsoposterior margin with row of spines intermixed with single setae (fig. 1P). Urosomites 1-2 on each side with 4 spines, urosomite 3 smooth (fig. 3R). Urosomite 1 with ventroposterior spine near basis of peduncle of uropod 1 (fig. 3R).

Head with poorly convex dorsal surface (in lateral projection), lateral cephalic lobes normal, subrounded (fig. 4K).

Antenna 1 reaching nearly 2/3 of body; peduncle elongated, peduncular segment 1 with 1 ventral spine; peduncular segment 2 slightly longer than 1, with single short spines and setae; segment 3 exceeding 2/3 of segment 2, with single small spines along ventral margin; main flagellum with up to 34 articles (most of them with 1 short aestehetasc each); accessory flagellum short, 2-segmented (fig. 1K,L).

Antenna 2 slender, peduncular segment 3 short, with 1 ventral spine; segment 4 slightly shorter and much stronger than segment 5, both segments with various number of short facial spines intermixed with single short setae; flagellum very slender and only slightly exceeding half of peduncular segment 5, consisting of 6 slender articles. Antennal gland cone short (fig. 1M).

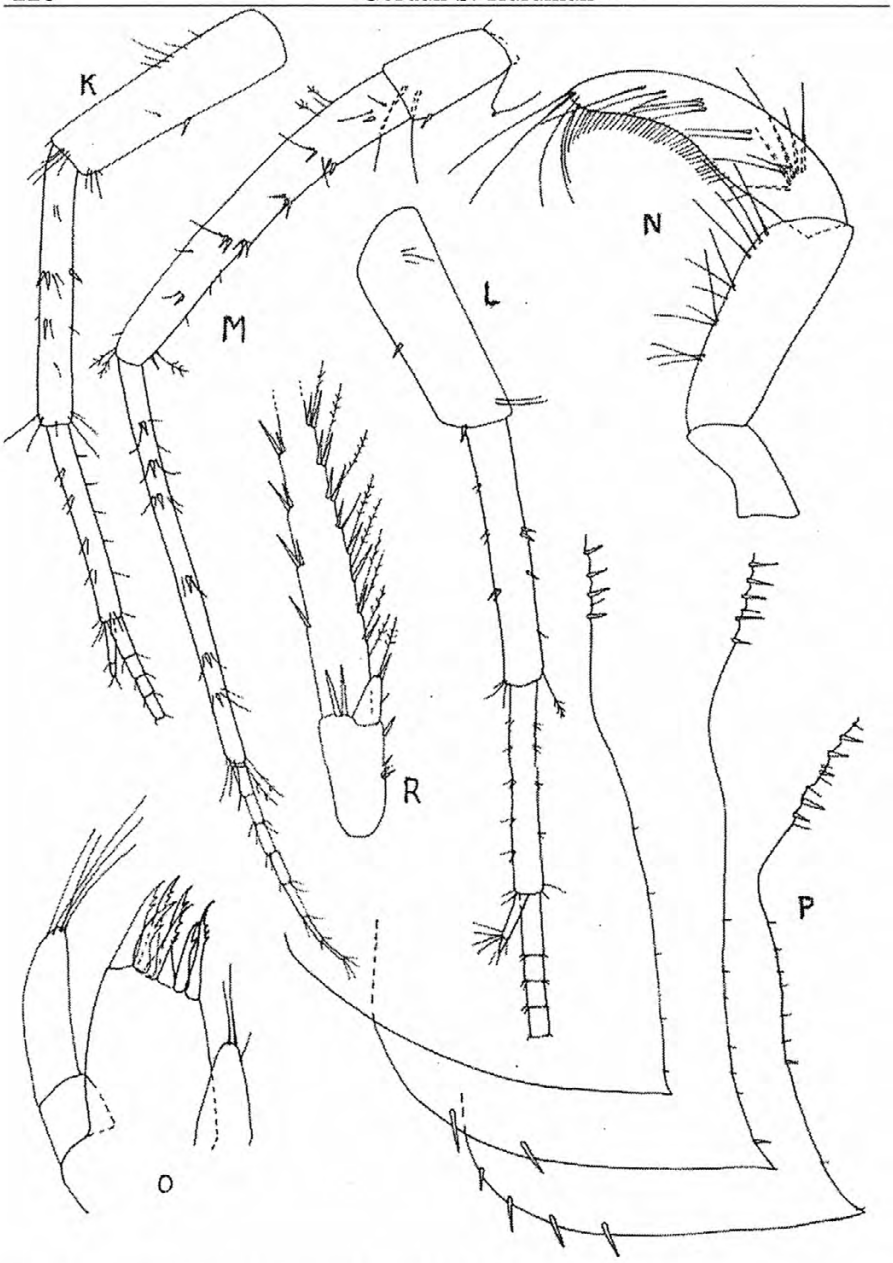

Fig. 1. *Niphargus stenopus* Sket 1960, Jama pri Luknji-cave, male 15 mm: K-L= antenna 1; M= antenna 2; N= mandibular palp; O= maxilla 1; P= epimeral plates 1-3 with metasomal margins; R= uropod 3.

Labrum entire, labium with inner lobes. Mandibular palp segment 1 short and smooth; palp segment 2 with 13 setae; palp segment 3 subfalciform, hardly longer than 2, with 1 group of A setae, 5 groups of B setae, nearly 35 D setae and 6 E setae (fig.1N).

Maxilla 1: inner plate with 3 setae, outer plate with 7 spines (2 spines with 1 lateral tooth, 4 spines with 2 lateral teeth, 1 spine with 3 teeth); palp short, not reaching tip of spines of outer plate, bearing 5 distal setae (fig. 1O).

Maxilla 2 with marginal setae on both plates only.

Maxilliped: inner plate short, not reaching outer tip of first palp segment, bearing 4 distal spines; outer plate reaching nearly half of second palp segment and bearing row of marginal smooth spines; palp normal, with nail shorter than pedestal (fig. 4L).

Coxa 1 quadrate, with almost subrounded ventroanterior corner (fig. 2K), coxae 2-4 slightly longer than broad, with marginal setae (fig. 2M; 4O); coxae 5-6 with short anterior lobe and subangular posterior lobe (fig. 3K,M); coxa 7 entire, unlobed.

Gnathopods 1-2 large, with segment 6 larger than corresponding coxae. Gnathopod 1 slightly smaller than 2, segment 4 with 2 posterior groups of setae; segment 6 slightly broader than long; palm inclinated over 2/3 of posterior margin of segment 6, defined on outer face by 1 strong spine accompanied laterally by 3 slender toothed spines, on inner face by 1 short subcorner spine (distinct facial setae absent); dactyl reaching posterior margin of segment 6, with several single setae at outer margin (fig. 2K,L).

Gnathopod 2: segment 3 with 1 group of posterior setae; segment 6 like that of gnathopod 1 but larger; palm defined on outer face by 1 very long strong corner spine accompanied by 3 short slender toothed spines sitting behind long corner spine, on inner face by 1 short subcorner spine (distinct facial setae absent); dactyl not reaching posterior margin of segment 6, with row of single setae along outer margin (fig. 2N).

Pereopods 3-4 long and slender; dactyl slender, nearly reaching half of segment 6, with 1 seta at inner margin, nail slightly shorter than pedestal (fig.4 M,N,P).

Pereopods 5-7 with dilated ovoid segment 2 less than twice as long as broad; anterior margin strongly convex but unlobed, especially on that of pereopod 5; ventroposterior lobe absent on segment 2 of

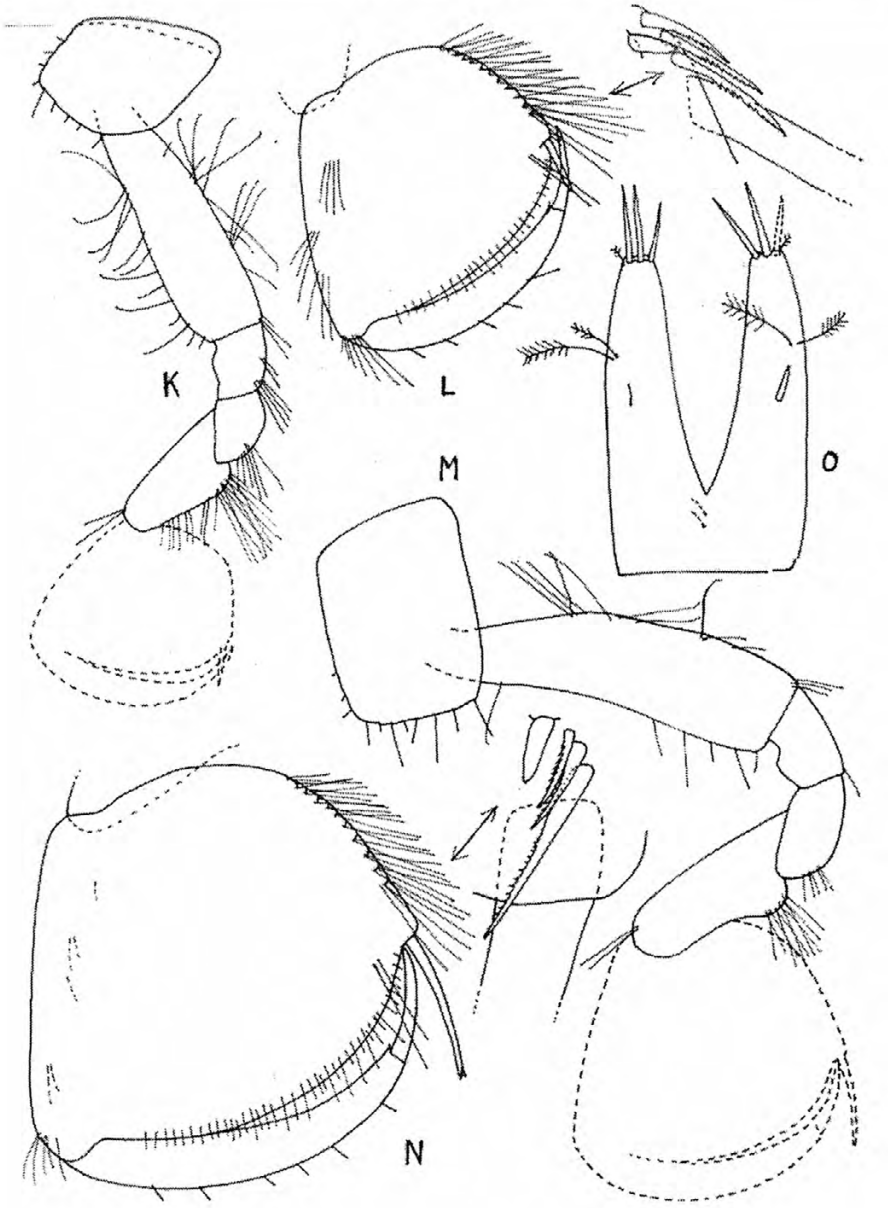

Fig. 2. *Niphargus stenopus* Sket 1960, Jama pri Luknji-cave, male 15 mm: K-L= gnathopod 1; M-N= gnathopod 2; O= telson.

pereopods 5-6, poorly marked on that of pereopod 7; segments 3-6 spiniferous along both margins; dactyls slender, much shorter than half of segment 6, with 1 slender spine at inner margin and with 1 plumose seta accompanied by 1- 2 short simple setae along outer margin; nail much shorter than pedestal (fig. 3K,L,M,N,O,P).

Epimeral plates 1-3 sharply pointed, plates 2-3 with single subventral spines each (fig. 1P).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 3 with 2 median setae along posterior margin (fig. 4R).

Uropod 1: peduncle with dorsoexternal and dorsointernal row of spines; rami subequal, with short lateral and distal spines (fig. 3R).

Uropod 2: inner ramus distinctly longer than outer one (fig. 3R). Uropod 3 relatively short, second segment short (fig. 1R).

Telson long, deeply broadly incised, each lobe with 3 distal and 0-1 facial spine; a pair of short plumose setae appears in upper third of each lobe (fig. 2O).

Coxal gills ovoid, occur on mesosomal segments 2-6.

VARIABILITY: Posterior margin of epimeral plates 2-3 sometimes with single spines among setae. dactyl of pereopod 6 sometimes with one bunch of 2 outer marginal simple setae.

The smaller male of 12.3 mm has lower number of spines on epimeral plates 2-3, antennae 1-2 and urosomites. Antenna 1 reaching nearly 3/4 of the body; main flagellum of antenna 1 with 39 articles. Flagellum of antenna 2 with 9 slender articles and reaching nearly 3/4 of last peduncular segment. Dactyl of pereopods 5-7 along outer margin with one plumose and one simple seta.

The single specimen of 10.5 mm from Lukanjska Jama-cave is with flagellum of antenna 2 remarkably shorter than last peduncular segment and consisting of 7-8 slender articles.

LOC. TYP.: Jama pri Luknji-cave near Novo Mesto, Slovenia.

HOLOTYPE: Male 15 mm.

LOCALITIES CITED: Jama pri Luknji, Slovenia (SKET, 1960); Lukanjska Jama or Vodna Jama pod gradom Luknja (S. 575) (new) (? maybe the same cave).

DISTRIBUTION: Slovenia.

ECOLOGY: *Niphargus stenopus* was found In the caves, accompanied by *Niphargus pachytelson* Sket and *Niphargus carniolicus* Sket.

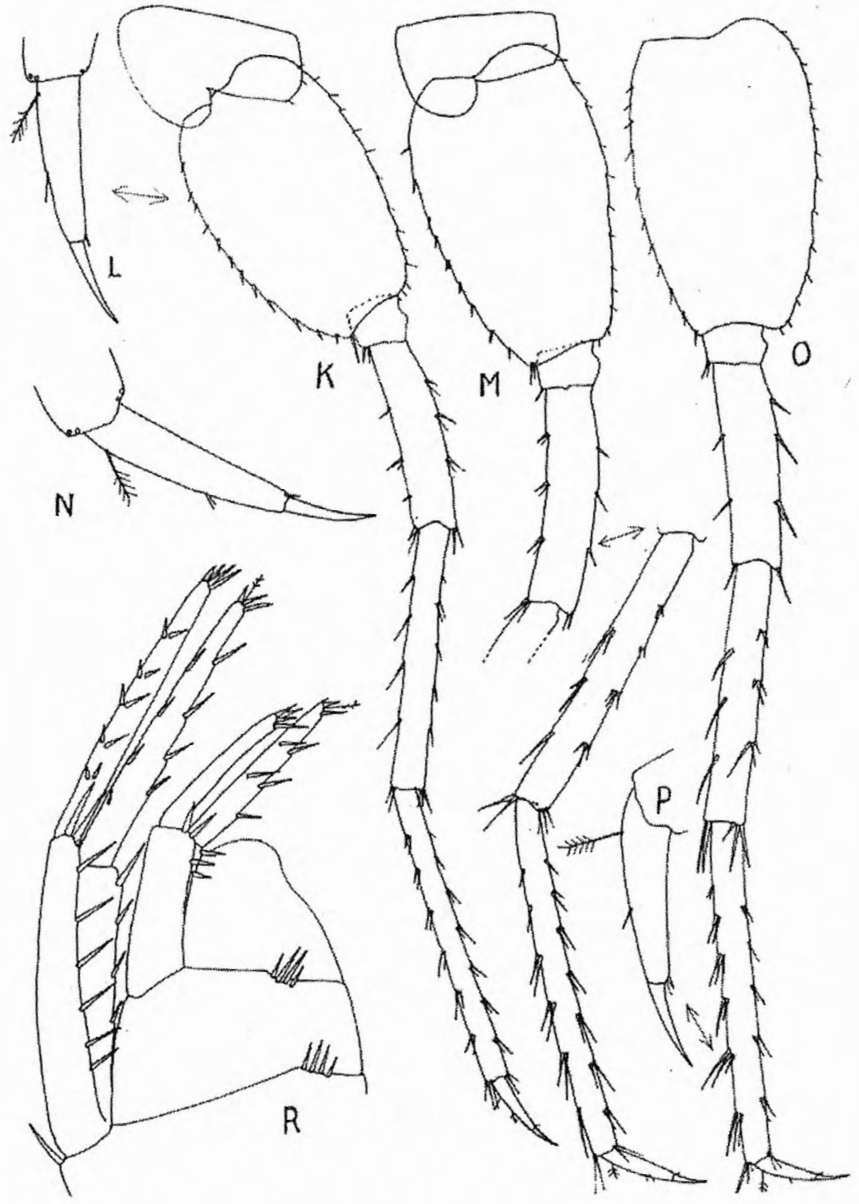

Fig. 3. *Niphargus stenopus* Sket 1960, Jama pri Luknji-cave, male 15 mm: K-L= pereopod 5; M-N= pereopod 6; O-P= pereopod 7; R= urosome with uropods 1-2.

REMARKS. This species is characterized by slender elongated body and all extremities, gaping telson, elongated peduncular segments 2 and 3 of antenna 1, and by short and very slender flagellum of antenna 2.

The damaged single specimen from well in S. Cipriano (Istria?) seems to belong to the same species.

NIPHARGUS LONGIFLAGELLUM S. Karaman 1950

Niphargus (Orniphargus) orcinus longiflagellum S. Karaman 1950: 131, figs. 47-51;

Niphargus orcinus longiflagellum G. Karaman 1972: 5; G. Karaman 1974a: 21; Barnard & Barnard 1983:693;

Niphargus longiflagellum G. Karaman 1984: 16, figs. V, VI, VII, 1-6; G. Karaman & Ruffo 1986: 528;

MATERIAL EXAMINED: SLOVENIA: AMD/00337- Zeljnske Jame-cave (S. 12), Zeljne near Kočevje, May 11, 1993, 6 exp. intermixed with *Synurella ambulans ambulans* (F. Muller) and *Niphargus stygius podpecanus* S. Kar. (leg. F. Gasparo);

-AMD/00339- Podpeška Jama-cave (S. 17), Podpec, Doberpolje, SE. of Ljubljana, several exp. intermixed with *Niphargus jalzici* and *Niphargus* sp. (leg. F. Gasparo);

-AMD/ 00643- Podpeška Jama cave, left ramus, Podpec, Doberpolje, Suha Krajina, July 16, 1994, 11 exp. intermixed with *Niphargus* sp. (leg. F. Gasparo & F. Stoch);

-AMD/00644- Podpeška Jama-cave (S. 17), right channel, July 16, 1994, 4 exp. intermixed with *Niphargus* sp. (leg. F. Gasparo & F. Stoch);

-AMD/00641- Tatrca (S. 96), Potiskavec, Dobrepolje, Suha Krajina, July 16, 1994, 1 exp. intermixed with *Niphargus* sp. (leg. F. Gasparo & F. Stoch);

REMARKS. The specimens from Zeljnske Jame are with all characters of this taxon. Metasomal segments 1-3 with posterior row of spines and setae. Dorsal surface of the head is only poorly convex (in lateral projection).

The specimens from Podpeška Jama-cave (female up to 17 mm): urosomite 1 with 3-5 spines on each side; urosomite 2 with 3-4 spines

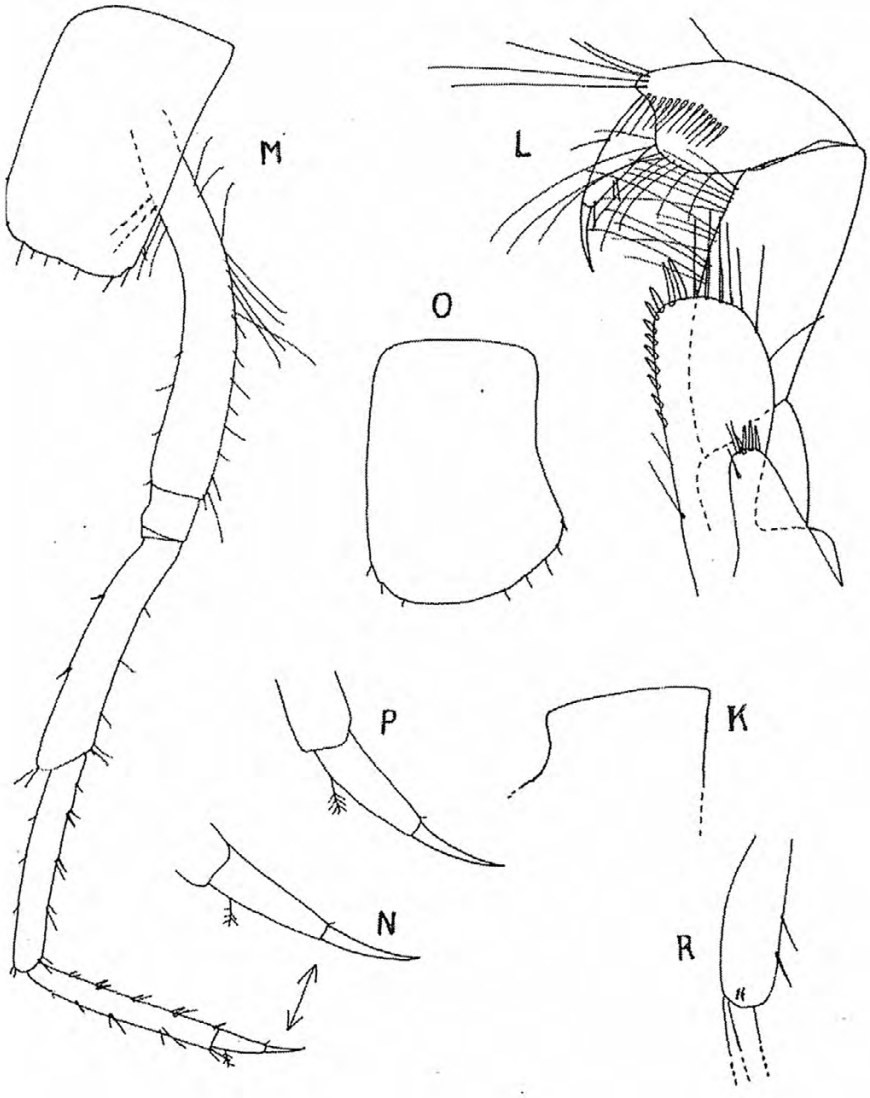

Fig. 4. *Niphargus stenopus* Sket 1960, Jama pri Luknji-cave, male 15 mm: K= dorsal margin of head; L= maxilliped; M-N= pereopod 3; O= coxa 4; P= dactyl of pereopod 4; R= pleopod 3.

on each side. Metasomal segment 1 with dorsoposterior row of setae, metasomal segments 2-3 with setae intermixed with spines. Lobes of telson with 3 distal and 0-1 facial spine.

LOC. TYP.: Podpeška Jama-cave in Slovenia.

LOCALITIES CITED: SLOVENIA: Podpeška Jama-cave; Dacarica cave (S. KARAMAN, 1950; G. KARAMAN 1984);

ECOLOGY: N. longiflagellum was found in the caves, sometimes associated by various other *Niphargus* species (*N. stygius podpecanus, N. jalzici,* etc).

METOHIA CARINATA Absolon 1927

Metohia carinata Absolon 1927: 5: fig. 3; S. Karaman 1935: 63; G. Karaman 1974: 44, figs. I-V; G. Karaman 1974a: 14; Barnard & Barnard 1983: 505;

Gammarus (Metohia) carinatus S. Karaman 1953: 154, fig. 28-38.

MATERIAL EXAMINED:

S-6177= Vreško Vrelo spring near Bandići village, NW of Podgorica, on road towards Zagarač (Zeta river drainage system), 27.2. 2000, 1 exp.(was mixed with *Niph. podgoricensis* S. Kar.) (leg. G. Karaman & Božana Karaman).

REMARKS. This species is known from several localities in Herzegovina. We mentioned it from Obodska pećina cave near Rijeka Crnojevica (G. KARAMAN 1974; G. KARAMAN 1974a). The Vreško Vrelo-spring is the second locality of this species known from Crna Gora (Montenegro)

LOC. TYP.:Subterranean waters of Mušnica river near Gacko (Herzegovina).

DISTRIBUTION: Herzegovina and Crna Gora (Montenegro).

CONCLUSION

The species *Niphargus stenopus* Sket 1960 and *Niphargus longiflagellum* S. Kar. 1950 (fam. *Niphargidae*) based on their taxonomical characters belong to the subgenus *Orniphargus* S. Kar. 1950.

Niphargus stenopus Sket 1960 was very poorly described and it was not possible to establish its real taxonomical characters and position

within the genus *Niphargus*. Our redescription and figures of this species show that this taxon is a good species remarkably differing from all other taxa within the subgenus *Orniphargus* S. Kar. 1950 by short and slender flagellum of antenna 2.

Niphargus longiflagellum S. Kar. 1950, known from only 2 localities (caves) in Slovenia, now is established for another two localities i.e. caves (Tatrca and Zeljnska Jama), often intermixed with some other *Niphargus* species or another amphipodous genera.

Metohia carinata Absolon 1927 (fam. *Gammaridae*), known from several localities in Herzegovina and from only one locality in Crna Gora (Montenegro) (Obodska pećina-cave near Rijeka Crnojevića), was found now in the spring of Vreško Vrelo near Bandići village (Podgorica region in Crna Gora) (Montenegro).

All three mentioned subterranean species are tertiary relicts and endemities.

REZIME

U okviru roda *Niphargus (Amphipoda,* fam. *Niphargidae)* u zapadnom dijelu Balkana se javlja pored ostalih i podrod *Orniphargus* S. Kar. 1950 sa nizom vrsta i podvrsta, tercijernih relikata i endema. U ovom radu smo obradili dvije vrste ovog podroda.

Vrstu *Niphargus stenopus* Sket 1960, poznatu iz jedne pećine u Sloveniji, a koja je bila veoma oskudno opisana tako da su nam bili nepoznati mnogi njeni taksonomski karakteri, opisali smo i nacrtali detaljno na osnovu tipičnog materijala iz pećina Slovenije. Na osnovu toga se pokazalo da je to jedna dobra vrsta sa karakteristikama koje jasno razlikuju tu vrstu od svih ostalih vrsta i podvrsta podroda *Orniphargus.*

Drugu vrstu, *Niphargus longiflagellum* S. Kar. 1950, poznatu iz dvije pećine u Sloveniji, sada smo citirali iz nekih drugih pećina Slovenije, gdje je bila nađena zajedno sa nekim drugim vrstama istog roda.

Podzemni relikt, vrstu *Metohia carinata* Absolon 1927, koja je veoma rijetka i do sada poznata iz nekoliko pećina i izvora u Hercegovini, kao i iz Obodske pećine kod Rijeke Crnojevića u Crnoj Gori, sakupili smo iz jednog izvora kod sela Bandići u oblasti Podgorice (zajedno sa vrstom *Niphargus podgoricensis* S. Kar.), čime smo poznati areal ove vrste znatno proširili na sjeveroistok.

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