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NEW DATA ON GAMMARIDEAN AMPHIPODS FROM MACEDONIA

(Contribution to the Knowledge of the Amphipoda 235)

A b s t r a c t

One new species of the subterranean genus Niphargus (*Amphipoda*, fam. *Niphargidae*), *Niphargus biljanae*, n. sp. is described from the subterranean waters in Zelenikovo village (S. of Skopje), Macedonia, and its taxonomic position is discussed. New localities of *Niphargus jovanovici* S. Kar., 1931 and *Orchestia cavimana* Heller, 1865 (fam. *Talitridae*) from Macedonia are discovered.

NOVI PODACI O GAMARIDNIM AMFIPODIMA IZ MAKEDONIJE

(235. Prilog poznavanju Amphipoda)

I z v o d

Iz podzemnih voda u selu Zelenikovo (juzno od Skoplja, Makedonija) opisana je nova vrsta iz podzemnog roda *Niphargus* (*Amphipoda*, fam.

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Niphargidae), *Niphargus biljanae*, n. sp., i razmatran je njen taksonomski položaj. Otkriveni su u Makedoniji novi lokaliteti vrsta: *Niphargus jovanovici* S. Kar. 1931 i *Orchestia cavimana* Heller 1865 (fam. *Talitridae*).

INTRODUCTION

The fauna of epigean and hypogean Amphipoda in Macedonia has been studied during almost seventy years, and over 50 taxa of this group are known from this country. The first data regarding the amphipods in Macedonia are given by SCHÄFERNA (1926) who described a new species *Echinogammarus ochridensis*, n. sp. (= *Gammarus ochridensis*) from Ohrid Lake. He mentioned in this paper also the taxa: *Gammarus balcanicus* Schferna 1922 (Kajmakcalan; Babuna; Gradsko near Bitolj; Perister Mt. ; Vardar river), *Gammarus spinicaudatus* Schferna 1922 (= *Gammarus balcanicus*) (Vardar river near Skopje), *Carinogammarus* sp. (= *Gammarus roeselii* f. *triacanthus* (Schf. 1922)) from Vardar river, and *Niphargus stygius* (Schiödte 1847) (=*Niphargus pancici* f. *peristerica* S. Karaman 1960). from Perister Mt.

Later, STANKO L. KARAMAN studied very intensively epigean and subterranean amphipods from Macedonia, describing numerous new species and genera (from 1929 to 1960) (*Niphargus skopljensis* S. Kar. 1929, *Synurella longidactylus* S. Kar. 1929, *Balcanella acherontis* S. Kar. 1933 (= *Ingolfiella acherontis*), *Hadzia gjorgjevici* S. Kar. 1932, *Niphargus serbicus* S. Kar. 1960, etc.).

SCHELLENBERG described (1943) *Gammarus (Rivulogammarus) ochridensis* f. *lychnidensis* n. f. (= *Gammarus lychnidensis*).

G. KARAMAN described also several new species of amphipods from Macedonia (*Gammarus albimanus* G. Kar. 1968, *Gammarus halilicae* G. Kar. 1969, *Gammarus stankokaramani* G. Kar. 1976, *Gammarus sketi* G. Kar. 1989, *Niphargus stankoi* G. Kar. 1974, etc.).

During our recent investigations of the amphipodous fauna of Macedonia, based on the our own material; as well as on the material collected by other scientists, we established several other taxa new for the science or for the Macedonia, among them three taxa mentioned here.

NIPHARGUS BILJANAE, N. SP.
Figs. I-IV

MATERIAL EXAMINED: MACEDONIA: S-6060= wells in Zelenikovo village S. of Skopje, Macedonia, May 5, 1978, 2 exp. (leg. T. Petkovski).

DESCRIPTION: FEMALE with setose oostegites, 3. 4 mm: Body slender, metasomal segments 1-3 with 3-4 dorsoposterior marginal setae each (fig. IV, 1). Epimeral plates 1-3 subrounded, with marked ventroposterior corner, epimeral plates 2-3 with one ventrofacial spine each (fig. IV, 9).

Urosomite 1 on each side with 1 seta, urosomite 2 on each side with 1 spine, urosomite 3 smooth (fig. IV, 6). Urosomite 1 near peduncle of uropod 1 with one short strong ventroposterior spine (fig. IV, 6).

Head with short rostrum and short subrounded lateral cephalic lobes (fig. I, 1); eyes absent, ventroanterior sinus present (fig. I, 1).

Antenna 1 reaching nearly half of body; peduncular segments 1-3 progressively shorter, peduncular segment 3 reaching half of segment 2 (fig. I, 2); main flagellum consisting of 14 articles (most of them with one aesthetasc shorter than article itself (fig. I, 3). Accessory flagellum shorter than last peduncular segment, 2-segmented (fig. I, 2).

Antenna 2 with subequal peduncular segments 4-5, flagellum slightly longer than last peduncular segment and consisting of 5 articles (fig. I, 4). Antennal gland cone short (fig. I, 4).

Labrum convex, broader than long (fig. IV, 1). Labium with small inner lobes, outer lobes entire (fig. IV, 2).

Mandibles with well developed triturative molar and 3-segmented palp: fist palp segment smooth, second segment with 4 marginal setae; third segment subfalciform, nearly as long as second one, with 11 D setae, 4 E setae, one A seta and 2 B setae (fig. IV, 3). Left mandible: incisor with 5 teeth and 8 rakers, lacinia mobilis with 4 teeth (fig. IV, 3). Right mandible: incisor with 4 teeth and 5 rakers, lacinia mobilis pluritoothed (fig. IV, 4).

Maxilla 1: inner plate with 1 seta; outer plate with 7 spines (one inner spine with 5 teeth, 5 spines with 1 lateral tooth, one spine with 2 lateral teeth; palp 2-segmented, with 3 setae (fig. IV, 5).

Maxilla 2: both lobes with marginal setae only.

Maxilliped: inner plate short, not reaching outer tip of first palp segment, bearing 2 distal smooth spines (fig. III, 4); outer plate reaching nearly half of second palp segment, with row of distomarginal smooth spines; palp 4-segmented, with nail shorter than pedestal (fig. III, 4).

Coxae 1 and 4 slightly broader than long (=high) (figs. I, 5; II, 5), coxa 2 hardly longer than broad (fig. I, 6), coxa 3 nearly as long as broad (fig. II, 3). Coxae 5-7 short, coxae 5-6 bilobe (fig. III, 1-3).

Gnathopods 1-2 of moderate size, nearly as large as or only slightly larger than corresponding coxae, nearly of subequal size (fig. I, 5, 6). Gnathopod 1: segment 3 with one group of posterior median setae; segment 5 slightly shorter than 6 (fig. I, 5); segment 6 hardly longer than broad, trapezoid, with palm inclined half of posterior margin of segment 6, with 3 groups of posterior marginal setae (fig. II, 1); strong corner

spine accompanied laterally on outer face by 2 slender toothed spines and 2 facial setae, on inner face by one short subcorner spine; dactyl reaching posterior margin of segment 6, with one median seta at outer margin (fig. II, 1).

Gnathopod 2: segment 3 with one posterior median seta, segment 5 almost reaching the length of segment 6 (fig. I, 6); segment 6 trapezoid, with palm inclined 2/5 of posterior margin of segment 6 and with 5 posterior marginal groups of setae (fig. II, 2); strong corner spine accompanied laterally on outer face by 2 slender toothed spines, on inner face with one short subcorner spine; dactyl like that in gnathopod 1 (fig. II, 2).

Pereopods 3-4 subequal, slender, dactyl hardly exceeding half of segment 6, with one seta at inner margin (fig. II, 4, 6), nail as long as outer margin of pedestal (fig. II, 4, 6).

Pereopods 5-7 with segments 4-6 bearing strong spines (fig. III, 1-3). Pereopod 5 remarkably shorter than pereopods 6-7, its segment 2 longer than broad, with shallow ventroposterior lobe and 5 posterior marginal setae; dactyl slightly exceeding half of segment 6, slender, with one seta at inner margin, nail shorter than pedestal (fig. III, 1).

Pereopod 6: segment 2 with 6 posterior setae and marked ventroposterior lobe; dactyl slightly shorter than half of segment 6, slender, with 1 seta at inner margin; nail shorter than pedestal (fig. III, 2).

Pereopod 7: segment 2 similar to that of pereopod 6 but slightly broader (fig. III, 3); dactyl much shorter than half of segment 6, with one seta at inner margin, nail much shorter than pedestal (fig. III, 3).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with 3 anterior setae (in lateral projection); peduncle of pleopod 2 smooth; peduncle of pleopod 3 with one posterior marginal seta (fig. II, 7-9).

Uropod 1: peduncle with dorsoexternal and dorsointernal row of strong spines (fig. IV, 6); inner ramus distinctly longer than outer one, both rami with lateral and distal short spines (fig. IV, 6).

Uropod 2: inner ramus remarkably longer than outer one, with lateral and distal spines; outer ramus with 5 distal spines only (fig. IV, 6).

Uropod 3 relatively short, inner ramus scale-like, short (fig. IV, 7); outer ramus 2-segmented, second segment short; first segment of outer ramus with 4 bunches of lateral strong spines on each side (fig. IV, 6).

Telson relatively short, slightly longer than broad, incised nearly 2/3 of telson length; each lobe with 3 long distal spines and with one median pair of short plumose setae (fig. IV, 8).

Coxal gills relatively short (figs. I, 6; II, 3, 5; III, 5). Oostegites very large, with 2-3 distal marginal setae each (figs. I, 6; II, 5).

MALE unknown.

VARIABILITY: unknown.

HOLOTYPE: female 3. 4 mm. Holotype and juv. paratype are deposited in KARAMAN's Collection in Podgorica (Crna Gora).

REMARKS AND AFFINITIES. Based on his taxonomic characters, *Niphargus biljanae*, n. sp. is rather close to the species *Niphargus osogovensis* S. Karaman 1959, known from the Osogovo Mt. in the eastern part of Macedonia (subrounded epimeral plates, shape of pereopods, urosomites, etc.), but our species differs from later by the spinose dorsointernal margin of uropod 1 – peduncle, by more inclined palm of gnathopods 1-2, by presence of only 2 retinacula on pleopods 1-3, etc.

Some other small *Niphargus* species are known from Macedonia also, but they are provided with 2 or more setae on outer margin of dactyl in gnathopods 1-2 (*N. parvus* S. Karaman 1943; known from Singjelicevo and Dusanovac, E. of Skoplje; *N. vodnensis* vodnensis S. Kar. 1943).

S. KARAMAN described (1943) a new subspecies *Niphargus vodnensis kosanini*, n. ssp. from Gradmanci village (25 km. E. of Skopje), one poorly described taxon. STANKO KARAMAN mentioned that this taxon is very similar to *Niphargus vodnensis*, including the shape of uropod 3 in female (second segment of outer ramus in uropod 3 of female reaching 2/3 of first segment) and that ssp. *kosanini* differs from ssp. *vodnensis* by hardly inclined palm of gnathopod 2, by narrowed segment 6 of gnathopod 2, by longer palp of maxilla 1, by ventroposterior corner of the epimeral plates more subrounded, by the broader segment 2 of the pereopods 5-7 and by less developed small spine at inner margin of the dactyls of the pereopods.

We examined the holotype of ssp. *kosanini* from KARAMANžs Collection. This specimens is really rather similar to *N. biljanae* by the shape of subrounded epimeral plates, but it differs from *N. biljanae* by slightly elongated second segment of uropod 3 in female, by shorter both rami of uropods 1-2, by subequal rami of uropod 1, by non inclined palm of segment 6 in gnathopod 2, etc.

Niphargus vodnensis banjanus S. Karaman 1943 has been described from the small cave near the village Banjani, nearly 10 km N. of Skopje (=Skoplje), Macedonia. This taxon was also very poorly figured (only telson). S. KARAMAN mentioned that this taxon (female of 4 mm with oostegites) differs from *N. vodnensis* by more subrounded epimeral plates, by presence of only 2 unequal distal spines on telson, by probably longer dactyls of the pereopods). We reexamined the type material of this taxon from KARAMAN's Collection, observing that *N. biljanae* differs from ssp. *banjanus* by the gnathopods 1-2 bearing on dactyl 2 outer marginal median setae, by distinctly acute epimeral plates 2-3 with concave posterior margin, by the subequal rami of uropod 1 (second segment of uropod 3 short).

All our attempts to collect the new material of these two subspecies was till now unsuccessful (cave in Banjani was later destroyed).

ETYMOLOGY: This species is dedicated to my sister Prof. Dr. **Biljana Karaman** from the University of Skopje (Macedonia) who helped me very much in the collecting of the material of *Amphipoda* in Macedonia.

NIPHARGUS JOVANOVICI S. Karaman 1931

Niphargus jovanovici S. Karaman 1931: 93, figs. 1-2; S. Karaman 1932: 226; Sket 1957: 485; G. Karaman 1980: 17;

Niphargus jovanovici (part.) Carausu, Dobreanu, Manolache 1955: 262, figs. 243-245;

Niphargus jovanovici jovanovici S. Karaman 1943: 207, figs 43-62; Sket 1972: 10, fig. 107; G. Karaman 1974a: 19;

Niphargus (Jovoniphargus) jovanovici jovanovici S. Karaman 1960a: 86, fig. 5;

MATERIAL EXAMINED: MACEDONIA:

S-2518= Bosavica river (tributary of Vardar river) near Demirkapija, Sept. 16, 1974, 2 exp. (leg. G. & M. Karaman);

S-4845= spring Derebasž near village Stari Dojran, Oct. 5, 1972, 4 exp. (leg. G. Karaman);

S-5054= Krivogastani village, W. of Prilep, May 11, 1970, one exp. (leg. Atanasov).

REMARKS. The specimens of these three new localities from central and southern part of Macedonia agree with description and figures of *N. jovanovici* from type locality (wells in Skopje, Macedonia). This species seems to be much more widely distributed over Macedonia than previously it has been known.

Niphargus jovanovici is known now from the hypogean waters of the almost entire Macedonia (except the western part, poorly studied). To the north, in Serbia. this species is substituted with the similar another species, *Niphargus serbicus* S. Karaman 1960, settling the subterranean waters from Serbia till Austria (G. KARAMAN 1997, 1997a).

ORCHESTIA CAVIMANA Heller 1865

Orchestia cavimana Heller 1865: 979, pl. 17, fig. 1; Ruffo 1946: 52; Carausu, Dobreanu, Manolache 1955: 393, figs. 362-368; G. Karaman

1970: 27, pl. 8, figs. 58-68; G. Karaman 1974a: 30; G. Karaman 1993: 303, figs. 149, 150; G. Karaman, 1998a: 236.

Orchestia Bottae Ruffo 1937: 35, one fig. ;

Orchestia bottae Stammer 1932: 593.

MATERIAL EXAMINED: MACEDONIA:

S-5525= Dojran Lake, coast near village Sretenovo, June 30, 1997, 7 exp. (leg. G. Karaman & B. Karaman);

S-5526= Dojran Lake near village Sretenovo, Mrdaja, June 27, 1997. many spec. (leg. G. Karaman & B. Karaman);

S-6051= Sveti Naum, mouth of spring on the coast of Ohrid Lake below the walls of the monastery, Sept. 21, 1998, 11 exp. (leg. G. Karaman & B. Karaman).

I described and figured twice this species in detail (1965, 1993), and the specimens from Ohrid Lake agree with my previous descriptions and figures.

I was surprised discovering recently this species on the coasts of Ohrid Lake (under stones near the mouth of small torrent going into the Ohrid Lake near monastery Sveti Naum). My numerous previous collecting of various amphipods in whole area of Ohrid Lake basin provided during over 30 years, have been always negative regarding this species. I suppose that the areal of *O. cavimana* is now in the process of extension and maybe this species arrived here relatively recently. In any way, this is a new species for the Ohrid Lake fauna of amphipods. It is to expect the presence of *O. cavimana* in the Prespa Lake basin also, but for the moment, this species is not yet discovered there.

REMARKS. Our recent investigations indicated one very large distribution of this species on Balkan peninsula including the coasts of Dojran Lake (Sretenovo) (G. KARAMAN 1965, 1998a), coasts of Danube river in Serbia (Karatas; Mala Vrbica near Kladovo) (G. KARAMAN 1998), Croatia (G. KARAMAN 1970), Romania (CARAUSU et al. 1955), etc.

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CONCLUSIONS

Despite the intensive investigations of the fauna of epigean and subterranean amphipods in Macedonia during over 75 years, the fauna of *Amphipoda* in this region is not satisfactorily known. The present discovery of

new taxa of amphipods in Macedonia supports this our conclusion.

The present known fauna of Macedonia is consisting of nearly 50 taxa of epigean and subterranean taxa belonging to the 7 genera and 7 families, including numerous endemics, especially these in Ohrid Lake basin.

Niphargus biljanae, n. sp. is rather close to the taxa *Niphargus osogovensis* S. Kar. 1959 known from Osogovo Mt. and *Niphargus vodnensis kosanini* S. Kar. 1943 known from the Gradmanci village (nearly 25 km E. of Skopje), but our species differs from both these taxa by several distinct taxonomic characters.

Discovery of *Orchestia cavimana* Heller 1865, in Ohrid Lake basin indicated that this taxon is now in the process of extension of his areal, and we suppose that this species settled also the basin of Prespa Lake, but for the moment we have no proofs for it.

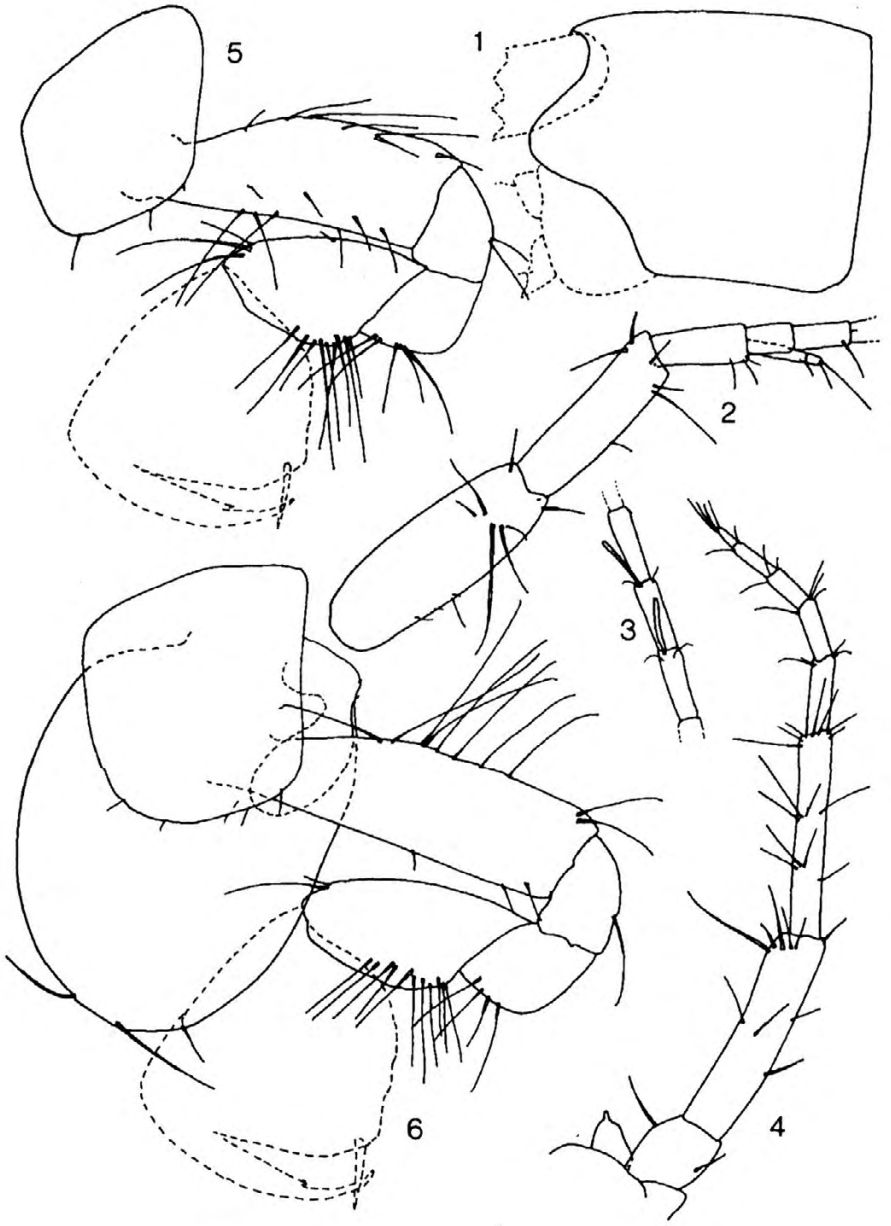

Fig. I. *Niphargus biljanae*, n. sp., Zelenikovo, female 3. 4 mm: 1 = head; 2 = antenna 1; 3 = distal part of antenna 1; 4 = antenna 2; 5 = gnathopod 1; 6 = gnathopod 2.

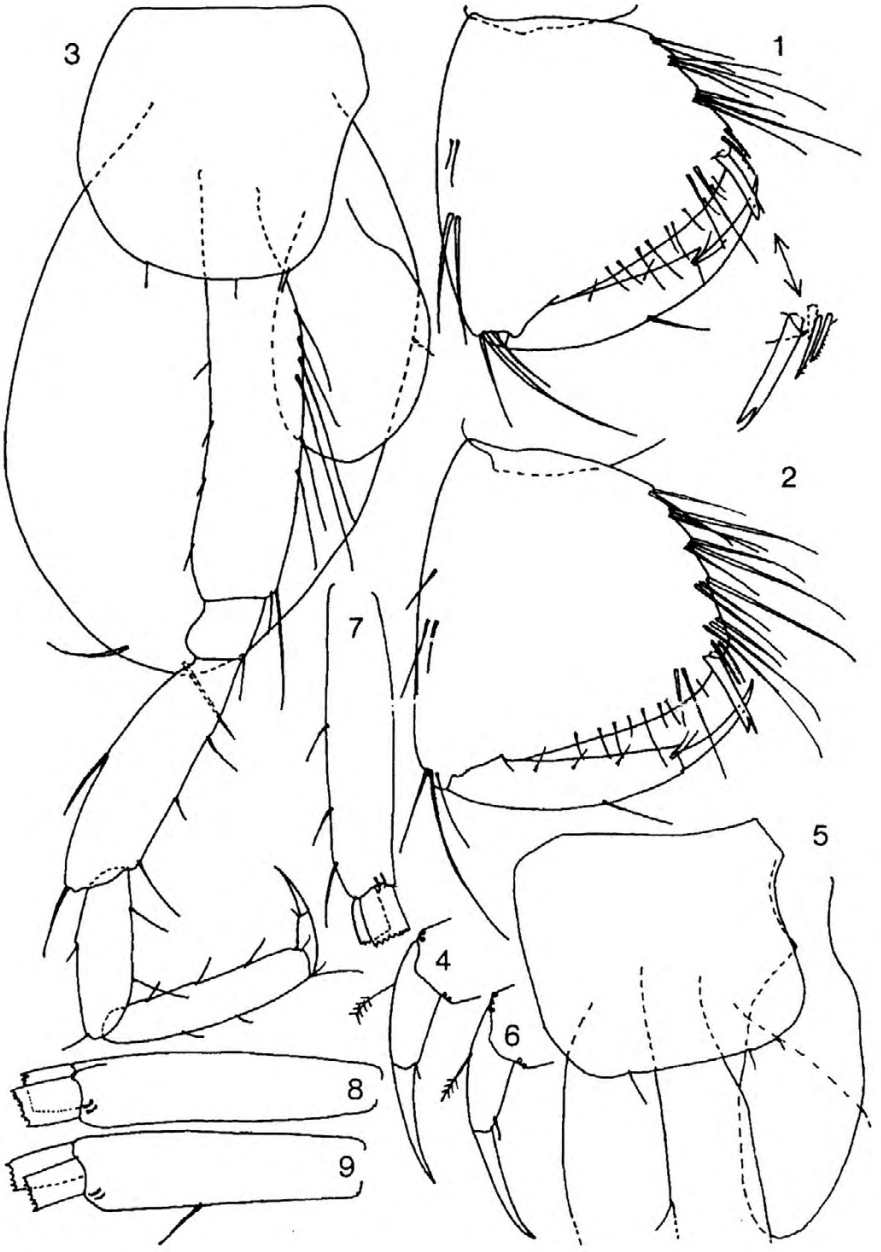

Fig. II. *Niphargus biljanae*, n. sp., Zelenikovo, female 3. 4 mm: 1 = gnathopod 1; 2 = gnathopod 2; 3-4 = pereopod 3; 5-6 = pereopod 4; 7-9 = peduncle of pleopods 1-3.

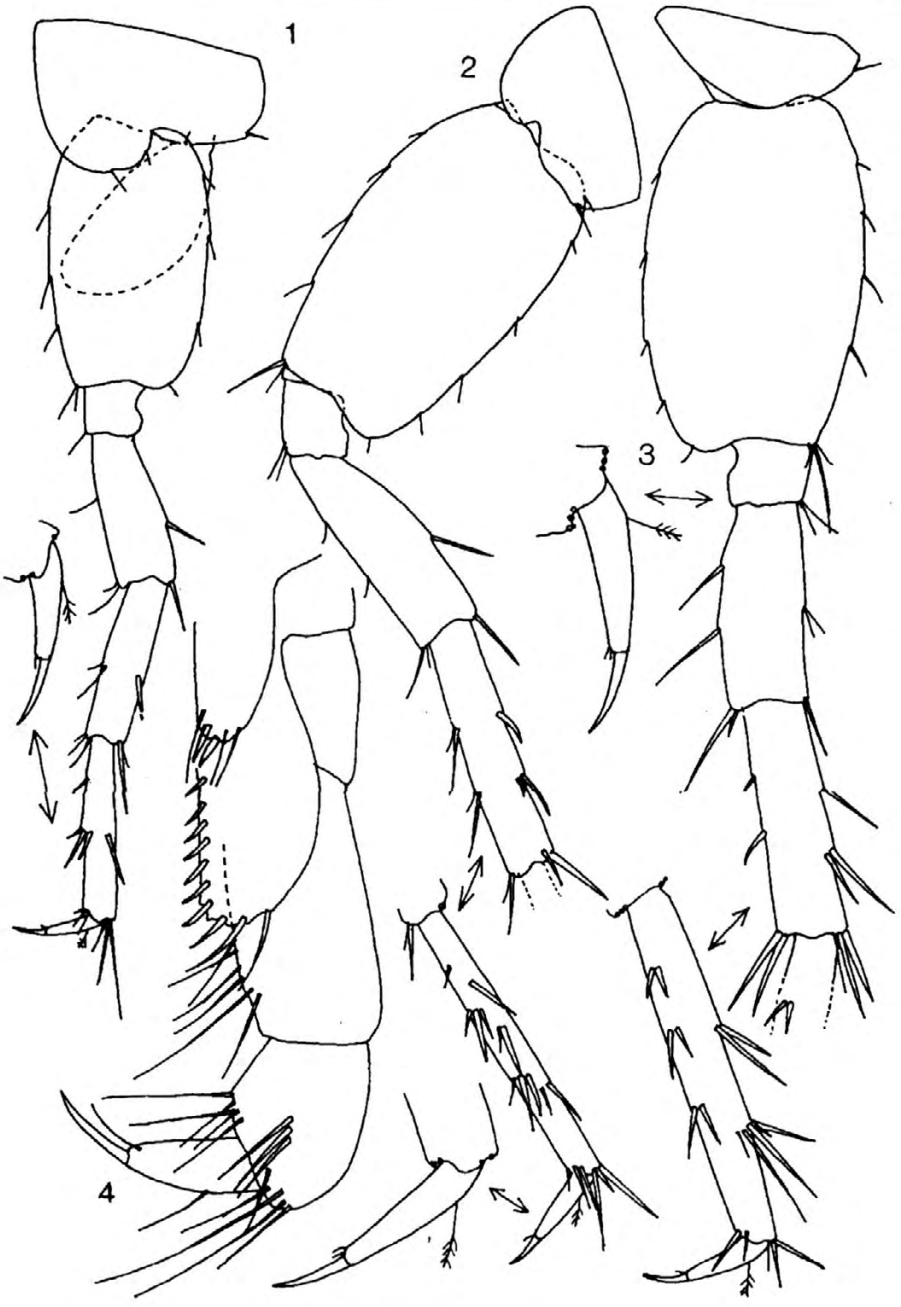

Fig. III. *Niphargus biljanae*, n. sp., Zelenikovo, female 3. 4 mm: 1 = pereopod 5; 2 = pereopod 6; 3 = pereopod 7; 4 = maxilliped.

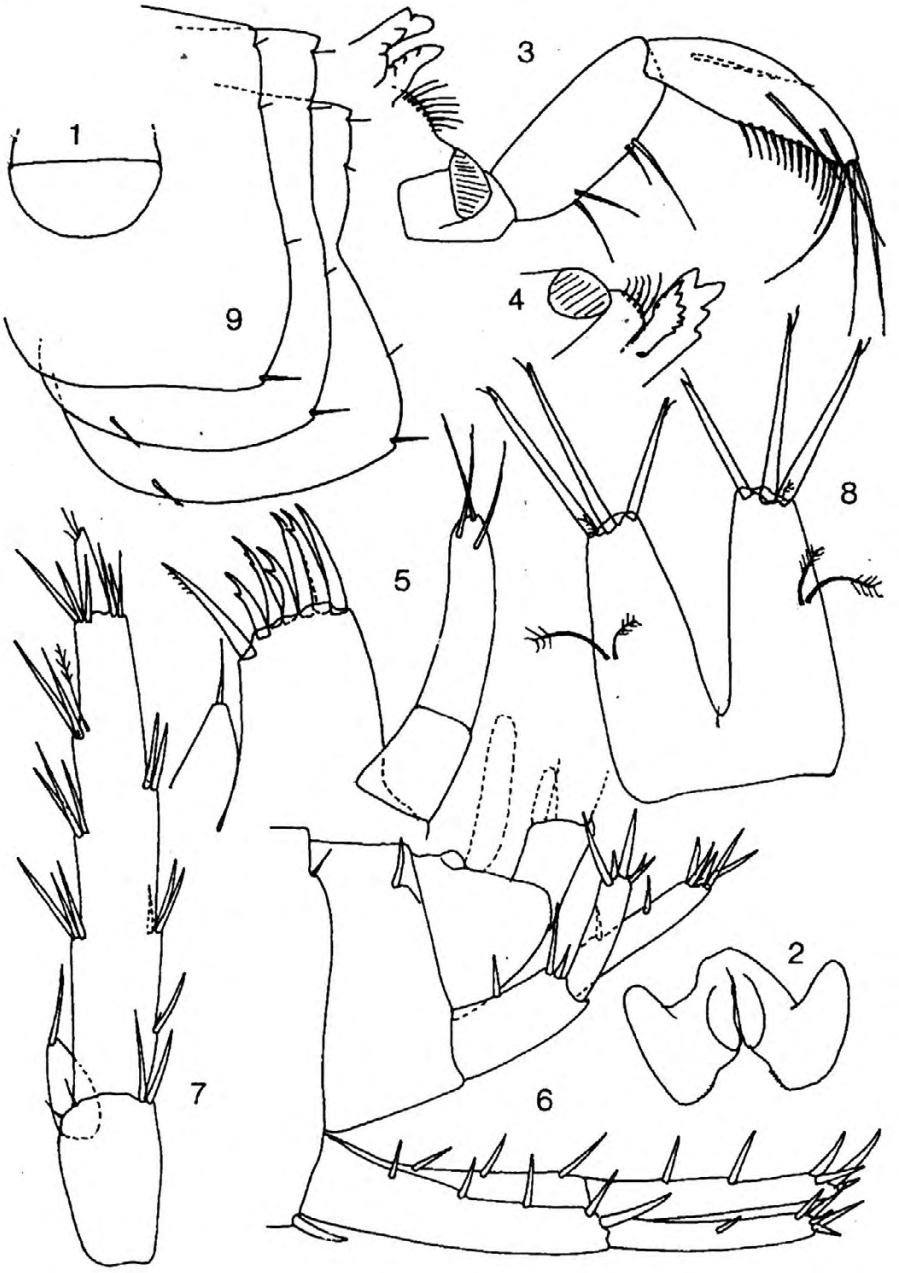

Fig. IV. *Niphargus biljanae*, n. sp., Zelenikovo, female 3. 4 mm: 1 = labrum; 2 = labium; 3 = left mandible; 4 = tip of right mandible; 5 = maxilla 1; 6 = urosome with uropods 1-2; 7 = uropod 3; 8 = telson; 9 = epimeral plates 1-3.

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NOVI PODACI O GAMARIDNIM AMFIPODIMA IZ MAKEDONIJE
(235. Prilog poznavanju Amphipoda)

R e z i m e

Fauna *Amphipoda* na teritoriji Makedonije se istražuje već skoro 70 godina, i do sada je nadeno preko 50 vrsta i podvrsta iz ove grupe životinja. Prve podatke o amfipodima Makedonije je dao SCHÄFERNA (1926) koji je opisao novu vrstu *Echinogammarus ochridensis*, n. sp. (sada *Gammarus ochridensis*) iz Ohridskog jezera, navodeći u istom radu i tri druge vrste za Makedoniju (*Gammarus balcanicus* Schf. 1922, *Carinogammarus* sp. (sada *Gammarus roeselii* f. *triacanthus* Schf. 1922, *Gammarus spinicaudatus* Schf. 1922 (sada synonim vrste *G. balcanicus*) i *Niphargus stygius* (Schiödte 1847) (sada *Niphargus pancici* f. *peristerica* S. Kar. 1960).

STANKO KARAMAN u periodu od 1929. do 1960. opisao je niz novih vrsta i rodova. SCHELLENBERG je opisao (1943) jednu novu vrstu iz Ohridskog jezera (*Gammarus lychnidensis* Schell. 1943).

GORDAN KARAMAN je opisao niz novih vrsta iz Makedonije tokom višegodišnjih studija te faune.

Proučavajuci faunu Amphipoda Makedonije, na osnovu materijala sakupljenog lično ili dobijenog od drugih istraživaca, utvrdili smo niz taksona, bilo novih za nauku, bilo novih za područje Makedonije. U ovom radu iznosimo podatke o tri takva taksona: *Niphargus biljanae,* n. sp. iz bunara u selu Zelenikovo kod Skoplja, *Niphargus jovanovici* S. Kar. 1931 iz podzemnih voda rijeke Bosavice kod Demir Kapije, iz izvora Deribašž kod sela Stari Dojran i iz bunara u selu Krivogastani kod Prilepa, i vrsta *Orchestia cavinmana* Heller, 1865 iz ušća potoka u Ohridsko jezero kod manastira Sveti Naum.

Vrsta *Niphargus biljanae*, n. sp. je donekle slična vrstama *Niphargus osogovensis* S. Kar. 1959, poznate sa Osogovo planine, i *Niphargus vodnensis kosanini* S. Kar. 1943, poznate iz podzemnih voda kod sela Gradmanci (25 km istočno od Skoplja), ali se od obje vrste jasno razlikuje nizom karaktera (oblik gnatopoda, broj retinakula, oblik epimera i dr.).

Vrsta *Niphargus jovanovici* S. Kar. 1931 je nađena u nekim novim lokalitetima Makedonije, dok je vrsta *Orchestia cavimana* Heller 1865 nađena sada po prvi put u bazenu Ohridskog jezera. Ova poslednja vrsta je vjerovatno u procesu ekspanzije svog areala rasprostranjenja na Balkanu.

Očigledno je da je fauna Amphipoda na teritoriji Makedonije još uvijek nedovoljno proučena i da je nastavljanje proučavanja te faune neophodno.