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CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 77. *GAMMARUS OCHRIDENSIS* SCHÄF. SPECIES COMPLEX OF OHRID LAKE

77. ПРИЛОГ ПОЗНАВАЊУ AMPHIPODA. *GAMMARUS OCHRIDENSIS* SCHÄF. КОМПЛЕКС ВРСТА ОХРИДСКОГ ЈЕЗЕРА

Abstract

The *Gammarus ochridensis* Schäf. Complex of species from Ohrid Lake is studied and figured. Six different *Gammarus* species (fam. *Gammaridae)* under the name *G. ochridensis* Schäf. were discovered: *G. ochridensis* Schäf. 1925, *G. parechiniformis* n. sp., *G. solidus* n. sp., *G. lychnidensis* (Schell. 1943), *G. macedonicus* G. Kar. 1976 and *G. stankokaramani* G. Kar. 1976.

Gammarus ochridensis and *G. parechiniformis* live in the coastal zone and *G. solidus, G. stankokaramani, G. macedonicus* and *G. lychnidensis* live in deeper zone of Ohrid Lake.

The key for determination of species of *G. ochridensis*—Complex is composed.

Извод

Gammarus ochridensis Schäf. комплекс врста из Охридског језера је студиран и нацртан. Откривено је 6 различитих врста из рода *Gammarus* (fam. *Gammaridae)* вођених до сада под врстом G. *ochridensis: G. ochridensis* Schäf. 1925, *G. parechiniformis* n. sp., *G. solidus* n. sp., *G. lychnidensis* (Schell. 1943), *G. macedonicus* G. Kar. 1976. and *G. stankokaramani* G. Kar. 1976.

Gammarus ochridensis и *G. parechiniformis* живе у обалној зони, а *G. solidus, G. stankokaramani, G. macedonicus* и *G. lychnidensis* живе у дубљим дијеловима Охридског језера.

Приложен је кључ за детерминацију врста *G. ochridensis*—комплекса.

INTRODUCTION

Ohrid Lake is situated in the SW part of Macedonia, on the 695 m. above the sea level; its origin is tectonic, probably of tertier age. The surface of the lake is almost 350 km^2 ant the ma-

ximum depth 286 m. There are many springs along the coast of the lake (Studenčište—Biljanini Izvori springs, springs of Drim River near monastery Sv. Naum etc.).

Because of specific origin, depth and age of the Lake, many endemic genera and species of different animals live in it.

Concerning the Amphipoda, the species of 3 genera are present in the Lake (genera *Niphargus, Synurella* and *Gammarus),* each of them with endemic Lake's species.

The first data about Amphipoda from Ohrid Lake mentioned Schäferna 1925 describing *Gammarus ochridensis* n. sp. from the coast of the Lake.

Karaman S. (1929a) described *Niphargus ohridanus* n. sp. from deeper parts of the Lake and *N. sanctinaumi* n. sp. from spring Šum near Struga.

In the same year Karaman S. (1929b) described three other amphipod from Ohrid Lake: *Synurella longidactylus,* one valid species, *Carinogammarus roeselii meridionalis* recently synonymized with *G. roeselii* Gerv. and *G. echiniformis,* because he has not seen Schäferna's paper of 1925. That last species Karaman S. (1931) synonymized with *G. ochridensis* describing *G. ochridensis abyssalis* n. ssp. from deeper water of the Lake.

Karaman S. (1943) described *Niphargus maximus* n. sp. from spring of Drim River near Sv. Naum. Schellenberg (1943) described *Gammarus ochridensis* forma *lychnidensis* n. f. from Ohrid Lake near Ohrid town, from 17—22 meters depth, now removed to the specific range.

Karaman G. (1963) described *Niphargus maximus petkovskii* n. ssp. from Biljanini Izvori-spring. Recently, Karaman G. (1976a, 1976b) described two new *Gammarus* species from deeper waters of Ohrid Lake, *Gammarus stankokaramani* and *G. macedonicus.*

PROBLEM OF *G. OCHRIDENSIS* SPECIES-COMPLEX

During our recent and present study of *Gammarus ochridensis* Schäf. from different part of Ohrid Lake, we were very surprised when we established that 6 different species were concealed under the name *G. ochridensis : ochridensis, parechiniformis, solidus, lychnidensis, stankokaramani* and *macedonicus.*

Gammarus ochridensis Schäferna (1925) was described from the coastal lake-waters under the stones, accompanied by shells Dreissensia polymorpha. This species has long setae at proximal part of antenna 1 and on antenna 2, what is visible on the fig. 1 of Schäferna's paper (1925, p. 3), and supported by S. Karaman's description of the same species (1929b).

K a r a m a n S. (1931) described *Gammarus ochridensis abyssalis* n. ssp. from deeper waters of the Lake, based on more slender pereopod-dactyls, by more setose pereopods 5—7 and epimere, etc., and all authors (sensu auct.) considered it as a good deep-water subspecies.

During the reexamination of original S. Karaman's material and my material too, we found this taxon accompanied by *G. ochridensis, G. parechiniformis, G. lychnidensis* or *G. stankokaramani* in the mixed populations, but always without transitive forms among them. Based on these facts, we concluded that *abyssalis* is not subspecies but a distinct species living in deeper waters of the Lake.

Unfortunately, the name *abyssalis* is preoccupied name (nom. preocc.) because D y b o w s k y described in 1874 *Gammarus borowskii* subvar. *abyssalis* n. subv., one amphipod from Baykal Lake, and we propose the new name, *Gammarus solidus* n. sp. (nom. nov.) for it (sensu art. 57 of International Code of Zoological Nomenclature).

S c h e l l e n b e r g (1943) described *G. ochridensis* forma *lychnidensis* n. f. from Ohrid Lake. After the reexamination of topotipic material and other material of this taxon also, we concluded that *lychnidensis* is not form but one good distinct species well characterized by long third peduncle segment of antenna 1, by setose antenna 2 without calceola etc. This species was found sometimes intermixed with *G. solidus, G. stankokaramani, G. parechiniformis* and *G. ochridensis.*

G. lychnidensis was never later elevated to the specific or subspecific range, but this taxon is valid sensu International Code of Zoological Nomenclature, art. 10b, and we elevated it now to the specific range, *Gammarus lychnidensis* (S c h e l l e n b e r g 1943).

G. stankokaramani G. Kar. 1976. is a good distinct species living in deeper Lake's water, characterized by specific armature and pilosity of antennae 1 and 2, by armature of gnathopods 1—2 etc.

G. macedonicus G. Kar, 1976, one species living in deeper part of the Lake is allied to *G. stankokaramani* in the armature of gnathopods 1—2 in males and females, but differing from in the shape and pilosity of antennae 1—2 and mandible palp, as well as in smaller and stouter body and extremities.

In several localities along the coast of Ohrid Lake we found the populations of *Gammarus* very similar to *G. ochridensis,* but differing from it only in the presence of short setae on proximal part of antenna 1 and on antenna 2. These populations with short setae were found sometimes intermixed with specimens of *G. lychnidensis* or *G. solidus* (in coastal waters on depht of up to 40 meters), but never together with *G. ochridensis.*

Although very similar to *G. ochridensis,* we decided to consider these populations with short setae on antenna 1 provisorily as a distinct species, *Gammarus parechiniformis* n. sp., because:

— We have had still not proved that *parechiniformis* is identic with *G. ochridensis* because along the coast of Ohrid Lake we found populations with long setae on antenna 1 (at coast of Lake between Ohrid and Sv. Naum on several places, in deeper coastal waters up to 40 meters depth) belonging to *G. ochridensis,* and populations with short setae on antenna 1 (springs Biljanini Izvori, springs of Drim River near Sv. Naum etc.) belonging to *G. parechiniformis,* always in isolated populations;

— The pilosity of antenna 1 is very stable specific character within many other groups of genus *Gammarus (Gammarus frater* and *G. komareki* within *G. pulex* group etc.);

— We found not transitive specimens within each population of both species.

But, on the other hand, the absence of the finding of both species in the mixed populations, although they occur similar coastal area, the difference of both species to each other in the pilosity of antennae 1—2, only, as well as the finding of one sample of several damaged specimens from 40 meters depth having pilosity of antennae 1—2 transitive between both species (although depth of 40 meters is the maximal depth on which both species were found, and this ecological data must also be taken in consideration), suggested that the specific range of *G. parechiniformis* is still slightly uncertain and that it must be checked and supported in the future trough the detailed examination of both species based on much richer material as well as through the breeding experiments.

KEY TO THE SPECIES OF GAMMARUS OCHRIDENSIS-COMPLEX

1. Flagellum of antenna 2 with numerous short setae at inferior margin forming brush. Third mandible palp segment with C-setae. (calceolas absent)

G. macedonicus G. Kar. 1976b

— Flagellum of antenna 2 without brush of setae at inferior margin. Third mandible palp segment without C-setae 2

2. Antenna 2 in females with calceolas (palm of gnathopods 1—2 in females with median palmar spine)

G. stankokaramani G. Kar. 1976a

— Antenna 2 in females without calceolas 3

3. Peduncle segment 3 of antenna 1 as long as or longer than peduncle segment 1. Calceolas on antenna 2 in males absent (peduncle of antenna 1 with long setae at ventral margin)

G. lychnidensis (Schell. 1943)

— Peduncle segment 3 of antenna 1 shorter than peduncle segment 1. Calceolas on antenna 2 in males present 4

4. Inferior surface of segment 2 of pereopods 6—7 in males with setae. Epimere 2—3 with numerous setae. Anterior margin of pereopods 5—7 with spines intermixed with numerous long setae (pereopods 3—4 moderately setose)

G. solidus n. sp.

— Inferior surface of segment 2 of pereopods 6—7 in males without setae. Epimere 2—3 with spines, sometimes intermixed with 1—2 setae only. Anterior margin of pereopods 5—7 with spines only 5

5. Ventral margin of peduncle and proximal flagellum segments of antenna 1 bearing long setae. Antenna 2 with long setae

G. ochridensis Schäf. 1925

— Ventral margin of peduncle and of proximal flagellum segments of antenna 1 bearing short setae. Antenna 2 with short setae.

G. parechiniformis n. sp.

GAMMARUS OCHRIDENSIS (SCHÄFERNA 1925)

figs.: I—III

Syn.: *Echinogammarus ochridensis* Schäferna 1925, p. 3, figs. 1—8.

Gammarus echiniformis Karaman S. 1929a, p. 94, fig. 8.

Gammarus ohridensis ohridensis Karaman S. 1931, p. 53, fig. 11b, f, d.

Gammarus (Rivulogammarus) ochridensis Schellenberg 1937, p. 270; Stanković and Pljakić 1962, p. 68, fig. 1a.

Gammarus (Rivulogammarus) ochridensis (part.) Schellenberg 1943, p. 97.

Rivulogammarus ochridensis ochridensis Karaman G. 1968, p. 55.

Rivulogammarus ochridensis Straškraba 1967, p. 208.

Gammarus ochridensis ochridensis Karaman G. 1974, p. 11.

Description: Male: Body length of our specimens up to 18 mm. Dorsal surface of last mesosomsegment smooth, that of all three metasomsegments provided with several spines intermixed with several setae each, like that in *G. stankokaramani* (fig. I,9). Urosome weakly elevated, urosomites 1—3 with one dorsomedian and 2 dorsolateral groups of elements each (elements are composed of 2—3 spines accompanied by 1—3 setae each) (fig. I,9).

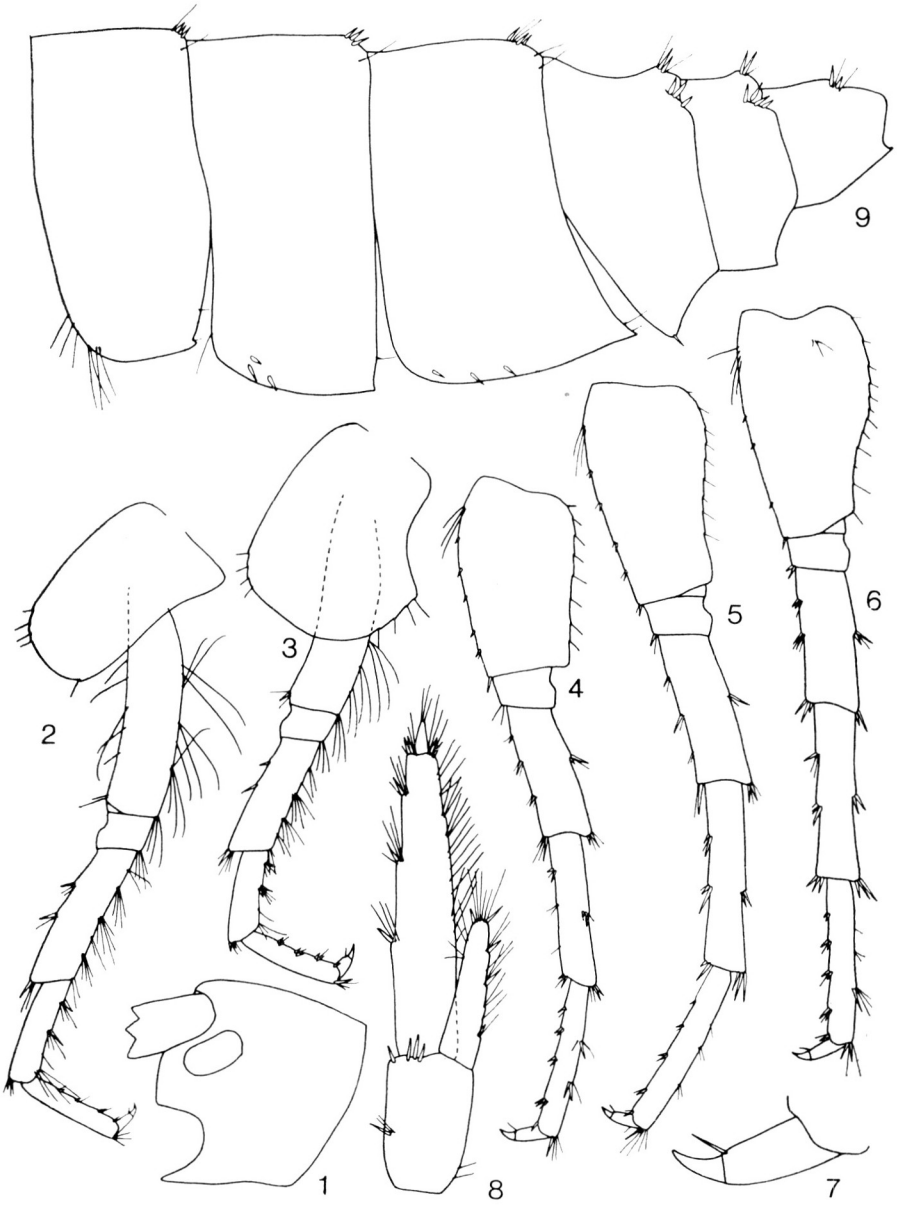

Fig. I. *Gammarus ochridensis* Schäf., coast of Ohrid Lake, male 15 mm. 1 = head; 2 = pereopod 3; 3 = pereopod 4; 4 = pereopod 5; 5 = pereopod 6; 6—7 = pereopod 7; 8 = uropod 3; 9 = metasome and urosome.

Сл. I. *Gammarus ochridensis* Schäf., обала Охридског језера, мужјак 15 mm: 1 = глава; 2 = переопод 3; 3 = переопод 4; 4 = переопод 5; 5 = переопод 6; 6—7 = переопод 7; 8 = уропод 3; метазом и урозом.

Lateral cephalic lobes subrounded, eyes slightly reniform, as long as or slightly longer than the diameter of the peduncle of antenna 1 (fig. I,1).

Antenna 1 reaching 3/5 of the body, densely setose. Peduncle segments 1—3 progressively shorter toward segment 3, bearing groups of setae at ventral margin: first peduncle segment bearing 3—4 groups of setae, segment 2 bearing 5—6, and segment 3 bearing 4—5 groups of setae at ventral margin (setae are as long as first peduncle segment) or longer than the diameter of the segment s (segments 2—3). Principial flagellum up to 26-segmented, bearing long setae in proximal part (setae are up to 2.5 times as long as the diameter of the segments) and short setae in distal part (setae are as long as or shorter than the diameter of the segments). Accessory flagellum 3—4 segmented (fig. II, 1).

Antenna 2 moderately setose. Peduncle segments 4—5 bearing 6—7 groups of setae at ventral margin each (setae are as long as or much longer than the diameter of the segments) (fig. II, 2,9). Flagellum moderatelly slender, weakly dorsoventrally compressed, poorly setose. Flagellar segments bearing at ventral margin setae almost as long as or weakly longer than the diameter of the segments, neverforming a brush; calceolas present, antennal gland cone short (fig. II, 2, 9).

Mouthparts normal. Mandible palp: first segment with one seta, second segment with 6—8 setae in proximal and 6—9 setae in distal part. Third segment with 32—38 D-setae, 5—6 E-setae, 3 groups of B-setae and one group of A-setae (fig. II, 3).

Coxa 1 with weakly concave anterior margin (fig. II, 4), coxae 2—4 normal (fig. I, 2—3, II, 4, 6).

Gnathopods 1—2 moderately setose, bearing all straight setae. Gnathopod 1: segment 6 pyriform, with 3—5 groups of setae and 2—3 pairs of short spines at posterior margin. Palm with one median and 3 corner spines on outer surface and with 2 subcorner spines on inner surface (fig. II, 4—5). Dactyl moderately slender, bearing one, ocassionally 2 setae at dorsal surface.

Gnathopod 2: segment 6 nearly as long as that of gnathopod 1, with 8—10 groups of setae at posterior margin. Palm weakly concave, with one median and 3 corner spines on outer surface and with 2 subcorner spines on inner surface (fig. II, 6—7), dactyl like that of gnathopod 1.

Pereopods 3—4 poorly setose, similar to each other by the pilosity. Posterior margin of their segment 4 with 6 groups of setae as long as or shorter than the diameter of the segments; segment 5 at posterior margin with 3—4 groups of short setae intermixed with spines; posterior margin of segment 6 with 4—5 pairs of short spines accompanied by one short seta (fig. I, 2—3). Dactyl short and stout.

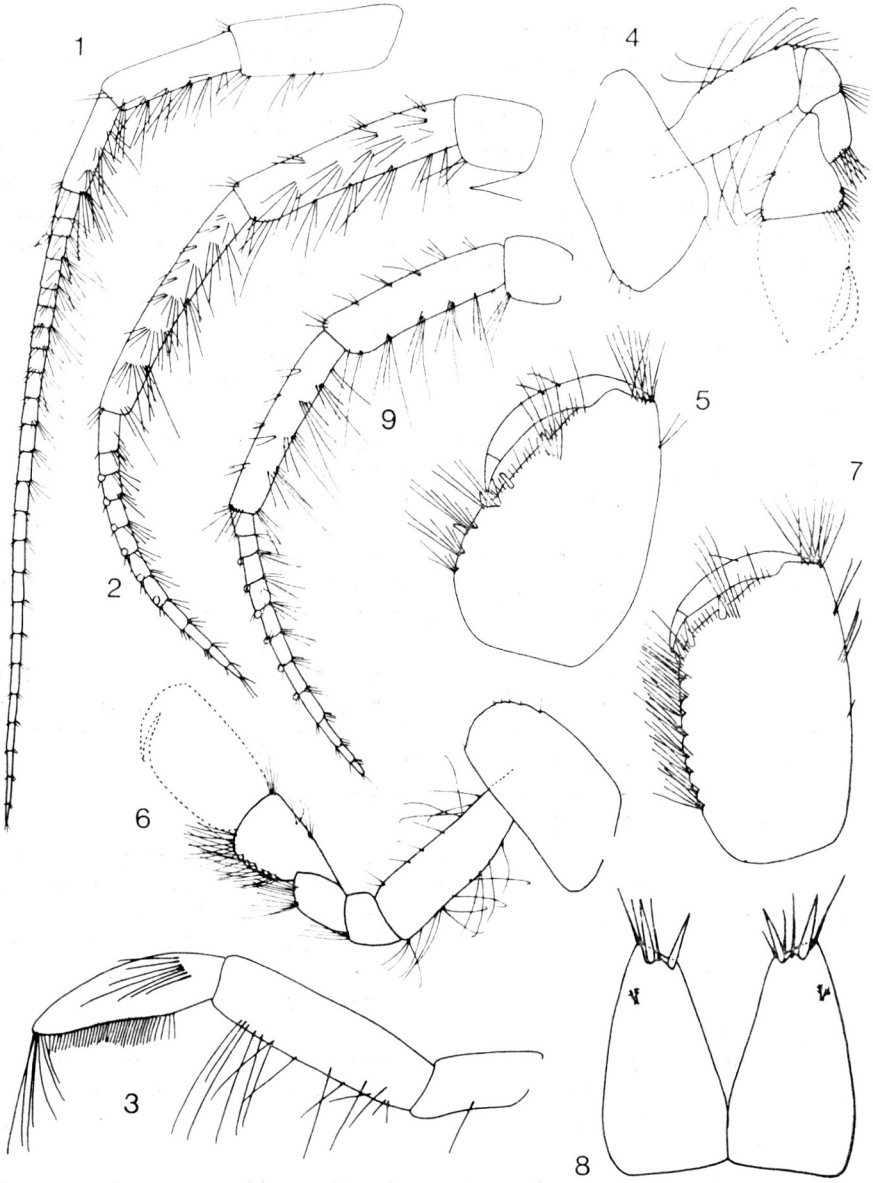

Fig. II. *Gammarus ochridensis* Schäf., coast of Ohrid Lake, male 15 mm: 1 = antenna = 1; 2 = antenna 2; 3 = mandible palp; 4—5 = gnathopod 1; 6—7 = gnathopod 2; 8 = telson; 9 = antenna 2 of male 14 mm.

Сл. II. *Gammarus ochridensis* Schäf., обала Охридског језера, мужјак 15 mm: 1 = антена 1; 2 = антена 2; 3 = мандибуларни палпус; 4—5 = гнатопод 1; 6—7 = гнатопод 2; 8 = телзон; 9 = антена 2 мужјака од 14 mm.

Pereopods 5—7 moderately long, their segments 3—6 at both margins with groups of spinses, without or with 1—2 very short setae each; segment 2 without setae on distoposterior part of inner surface (fig. I, 4—6). Dactyl short and stout (fig. I, 7).

Pleopods with 2 retinacula each. Epimere 1—2 moderately pointed, epimera 3 moderately or shoarp pointed. Distal margin of epimere 2—3 provided with 2—3 spines, usually without setae (fig. I, 9).

Uropods 1—2 normal. Uropod 3 moderately long, poorly setose (fig. I, 8). Inner ramus reaching 2/5 — 1/2 of first segment of outer ramus, bearing plumose setae intermixed with spines at both margins. Outer ramus with short plumose setae at inner margin and with simple setae intermixed with single spines at outer margin.

Telson short, slightly broader than long (fig. II, 8). Each lobe with 2 distal spines intermixed with 2—3 short setae, dorsal surface smooth.

Female: The pilosity of antennae 1—2 (fig. III, 2), uropod 3 (fig. III, 9), epimere and pereopods 5—7 (fig. III, 7) like those in males. Calceola absent (fig. III, 2).

Gnathopod 1: palm of segment 6 with 2 corner and several marginal spines, as well as with 2 subcorner spines; median palmar spine absent (fig. III, 3).

Gnathopod 2: Palm with 2 corner and 2 subcorner spines, median palmar spine absent (fig. III, 4).

Pereopods 3—4 bearing remarkably longer setae than those in males (fig. III, 5—6). Posterior margin of segment 4 of pereopod 3 with 4—5 groups of setae longer than the diameter of the segment; that of pereopod 4 with setae nearly as long as the diameter of the segment.

Variability. The number of groups of setae on antenna 1 is variable as well as the armature of dorsal surface of all three metasomsegments. Calceola are present and last mesosomsegment is smooth in all our specimens. The length of setae on antennae 1—2 is rather variable, but always within the limit of the species.

Material examined: Yugoslavia: Ohrid Lake:

— Ohrid Lake, W. of the Ohrid Town, under stones on the coast of the Lake, July 13, 1939, many spec. (leg. S. Karaman);
— coast of Ohrid Lake, 1924, 10 spec. (leg. S. Karaman);
— coast near Sv. Jovan, Ohrid, June 17, 1939, 6 exp. (leg. S. Karaman);
— spring near Ohrid Town, 1934, 20 spec. (leg. S. Karaman);
— Beach between Ohrid and Sv. Naum, under stones, July 1969, many spec. (leg. G. Karaman);

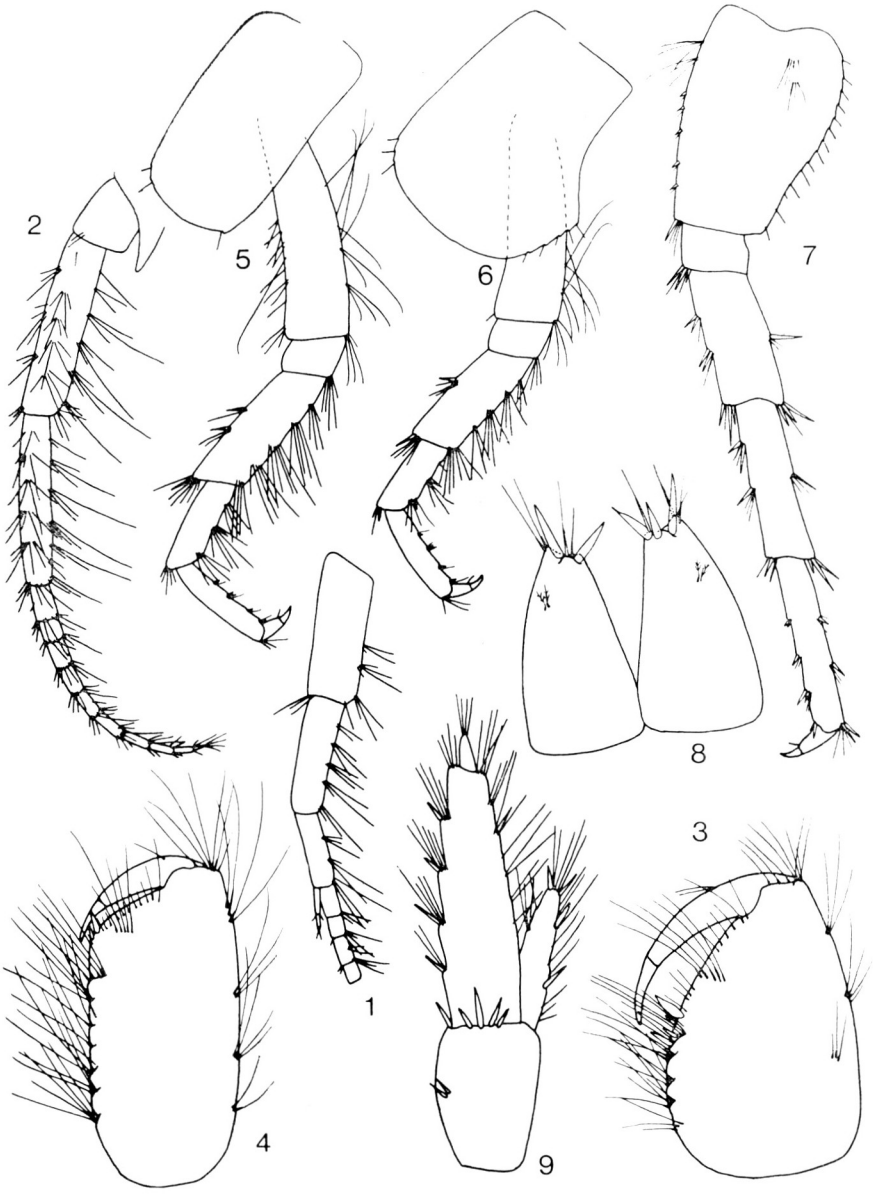

Fig. III. *Gammarus ochridensis* Schäf., coast of Ohrid Lake, female 9.5 mm: 1 = antenna 1; 2 = antenna 2; 3 = gnathopod 1; 4 = gnathopod 2; 5 = pereopod 3; 6 = pereopod 4; 7 = pereopod 7; 8 = telson; 9 = uropod 3.

Сл. *III. Gammarus ochridensis* Schäf., обала Охридског језера, женка 9.5 mm: 1 = антена 1; 2 = антена 2; 3 = гнатопод 1; 4 = гнатопод 2; 5 = переопод 3; 6 = переопод 4; 7 = переопод 7; 8 = телзон; 9 = уропод 3.

— Beach and small spring between Ohrid and Sv. Naum, June 14, 1972, many spec. (leg. G. Karaman);

— Ohrid Lake, August 30, 1970, many juv spec. accompanied by *G. lychnidensis* (leg. Atanasov).

Localities cited: coast of Ohrid Lake (Schäferna 1925, Karaman S. 1929, 1931).

Loc. typ.: Coast of Ohrid Lake, under stones.

Remarks and affinities: Based of scarce pilosity of the body, *G. ochridensis* belongs to *Gammarus balcanicus* group. *G. ochridensis* is characterized by dorsal armature of all three metasomsegments consisting several spines and setae each. The similar armature of metasomsegments has *G. accolae* G. Karaman 1973 described from Kirgöz by Antalya in Turkey, but *G. ochridensis* differs from it by more setose antenna 2 bearing calceola in males and by less pointed epimera 3.

Ecology: *G. ochridensis* lives in coastal Lake waters.; it was found with *G. lychnidensis* in one sample only.

GAMMARUS PARECHINIFORMIS N. SP.

figs.: IV—VI

Syn.: *Gammarus (Rivulogammarus) ochridensis* (part.) Schellenberg 1943, p. 97.

Gammarus ochridensis ochridensis (part.) Karaman G. 1974. p. 11.

Descrption: Male: Body length of our specimens up to 16.7 mm. Mesosomsegments dorsally smooth. Metasomsegments 1—3 bearing on dorsal surface 5—15 spines each, intermixed with 4—6 setae (fig. IV, 8).

Urosome slightly elevated, urosomites 1—3 bearing one dorsomedian and 2 dorsolateral groups of elements consisting 2—4 spines accompanied by 0—2 setae each.

Lateral cephalic lobes subrounded, eyes slightly reniform, as long as or slightly longer than the diameter of peduncle of antenna 1 (fig. IV, 1).

Antenna 1 reaching 3/5 of the body, poorly setose (fig. IV, 2). Peduncle segments 1—3 progressively shorter towards segment 3. Segment 1 with 2 groups, segment 2 with 3—4 groups and segment 3 with 2—3 groups of short setae at ventral margin (setae are usually shorter than the diameter of the segments except segment 3 where the setae are nearly as long as the diameter of the segments). Principal flagellum poorly setose, up to 30 segmented, segments bearing short setae as long as or shorter than the diameter of the seg-

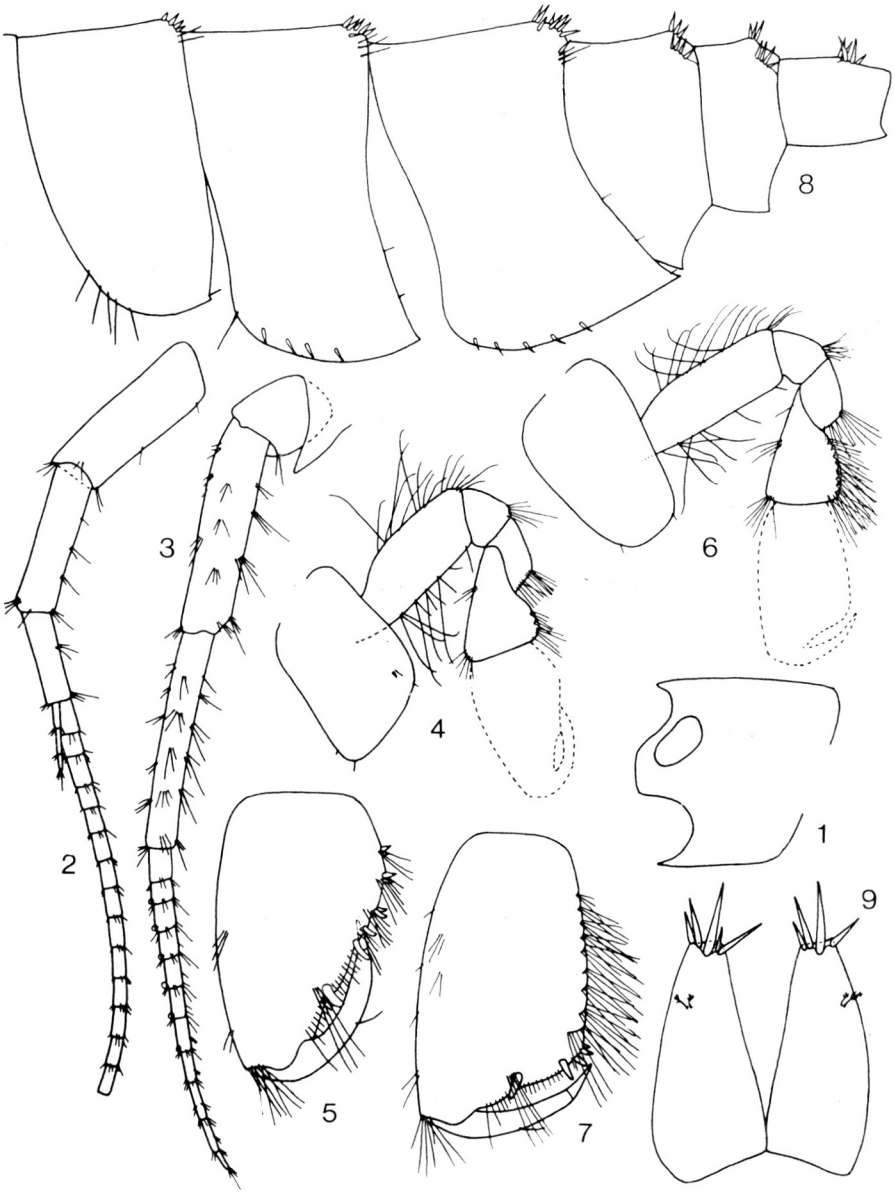

Fig. IV. *Gammarus parechiniformis* n. sp., spring near Sv. Naum, male 14.3 mm: 1 = head; 2 = antenna 1; 3 = antenna 2; 4—5 = gnathopod 1; 6—7 = gnathopod 2; 8 = metasome and urosome; 9 — telson.

Сл. IV. *Gammarus parechiniformis* n. sp., извор код Св. Наума, мужјак 14.3 mm: 1= глава; 2 = антена 1; 3 = антена 2; 4—5 = гнатопод 1; 6—7 = гнатопод 2; 8 = метазом и урозом; 9 = телзон.

ments. Accessory flagellum 3—4 segmented. Antennal gland cone short.

Antenna 2 poorly setose: peduncle segment 4 with 4 groups of short setae, segment 5 with 5—6 groups of setae at ventral margin (setae are as long as or shorter than the diameter of the segments). Flagellum slender, up to 13-segmented, segments with short setae at ventral margin not forming a brush (setae are as long as or shorter than the diameter of the segments), calceolas present (fig. IV, 3).

Mouthparts basic. Mandible palp: first segment without setae, second segment with 7—10 setae in proximal and 8—10 setae in distal part. Third palp segment with 28—32 D-setae, 6—7 E-setae, one group of A-setae and 2 groups of B-setae; C-setae are absent (fig. V, 1).

Coxa 1 with slightly concave anterior margin, coxae 2—4 normal (fig. IV, 4). Gnathopods 1—2 bearing all straight setae, moderately setose.

Gnathopod 1: segment 6 pyriform, with 3—4 groups of spines at posterior margin intermixed with groups of setae (fig. IV, 4—5). Palm with one median and 2—3 corner spines on outer surface and with 2—3 subcorner spines on inner surface. Dactyl moderately slender, bearing one seta on dorsal margin.

Gnathopod 2: segment 6 scarcely longer than that of gnathopod 1, bearing 8—10 groups of straight setae at posterior margin (fig. IV, 6, 7). Palm concave, with one median and 3—4 corner spines on outer surface and with 2 subcorner spines on inner surface. Dactyl like that of gnathopod 1.

Pereopods 3—4 poorly setose. Pereopod 3: Posterior margin of segment 4 with 5—6 groups of setae as long as or shorter than the diameter of the segment (fig. V, 2). Segment 5 with 3 groups of short setae intermixed with spines. Posterior margin of segment 6 bearing 5—6 pairs of short spines accompanied by one short seta each. Dactly stout, short.

Pereopod 4 weakly shorter and slightly less setose than pereopod 3 (fig. V, 3).

Pereopods 5—7 moderately long (fig. V, 4—6), their segments 3—6 bearing groups of spines at both margins, practically without setae. Posterior margin of segment 2 with slightly longer setae; no setae on distionferior surface of segment 2. Dactyl stout, short, less than half as long as segment 6 (fig. V, 7).

Pleopods with 2 retinacula each. Epimere 1—2 moderately, epimera 3 almost strongly pointed (fig. IV, 8). Distal margin of epimere 2—3 provided with 3—5 spines each, without setae.

Uropods 1—2 normal. Uropod 3 moderately long, poorly setose (fig. V, 8). Inner rumus reaching 2/5 to 1/2 of the first segment of outer ramus, bearing at both margins plumose setae intermixed

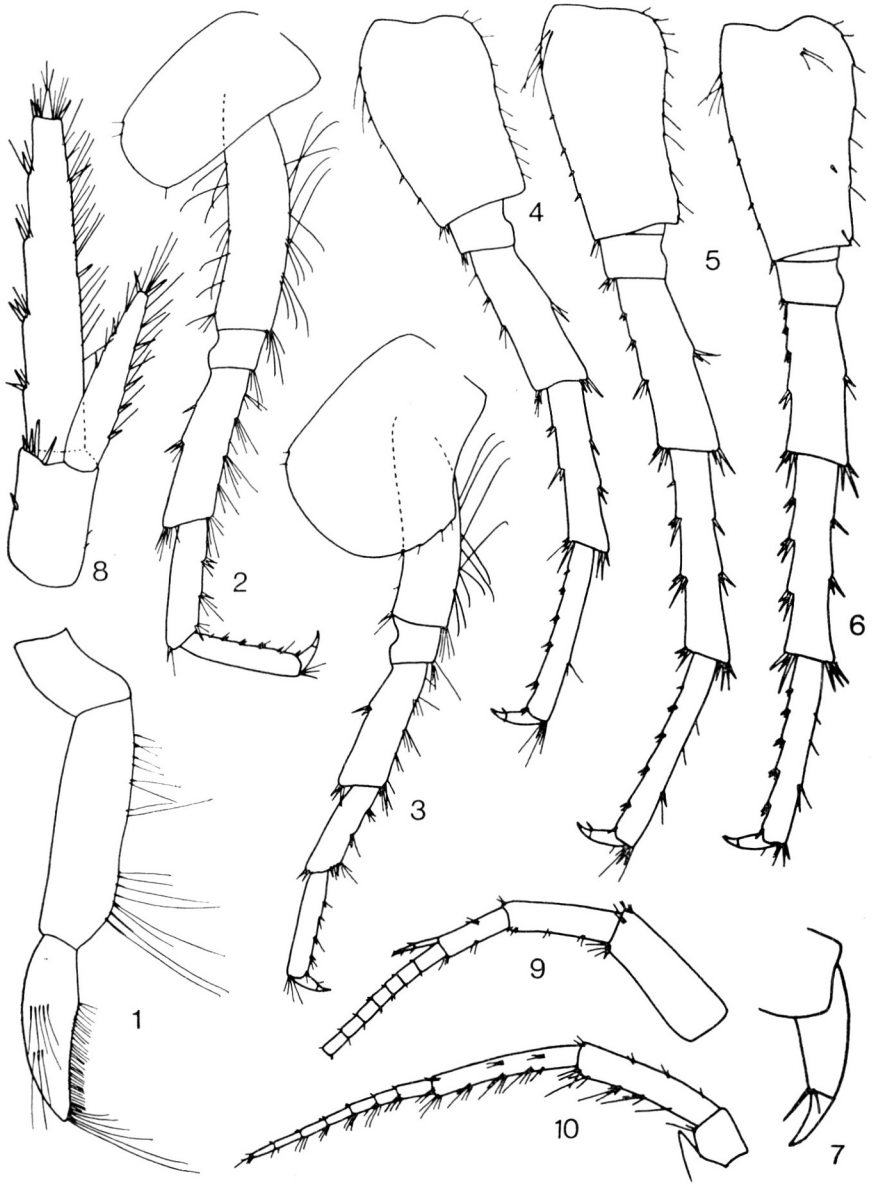

Fig. V. *Gammarus parechiniformis* n. sp., spring near Sv. Naum, male 14.3 mm: 1 = mandible palp; 2 = pereopod 3; 3 = pereopod 4; 4 = pereopod 5; 5 = pereopod 6; 6—7 = pereopod 7; 8 = uropod 3. Female 9.3 mm: 9 = antenna 1; 10 = antenna 2.

Сл. V. *Gammarus parechiniformis* n. sp., извод код Св. Наума, мужјак, 14.3 mm: 1 = мандибуларни палпус; 2 = переопод 3; 3 = переопод 4; 4 = переопод 5; 5 = переопод 6; 6—7 = переопод 7; 8 = уропод 3. Женка 9,3 mm: 9 = антена 1; 10 = антена 2.

with single spines. Outer ramus bearing groups of spines intermixed with sinple setae at outer margin; inner margin of the same ramus with plumose setae accompanied by single spines.

Telson slightly longer than broad, each lobe with 2—4 distal spines accompanied by 0—2 short setae (fig. IV, 9), dorsal surface of lobes smooth.

Female: Dorsal armature of the body and the pilosity of antennae 1—2 like those in males (fig. V, 9). Flagellum of antenna 2 slender, without calceolas, setae are scarcely longer than those in males (fig. V, 10).

Gnathopod 1: segment 6 pyriform, bearing several spines accompanied by groups of setae at posterior margin. Median palmar spine absent, but 3 corner and 2 subcorner spines are present. Dactyl with one dorsal seta.

Gnathopod 2: segment 6 slightly longer than of gnathopod 1, palm with 3 corner and 2 subcorner spines, median palmar spine absent. Dactyl like that of gnathopod 1.

Pereopods 3—4 distinctly more setose than those in males: posterior margin of their segments 4—5 with several groups of numerous setae as long as or longer than the diameter of the segments (fig. VI, 1—2). The pilosity of pereopods 3—4 subequal to each other.

Pereopods 5—7: anterior margin of segments 3—6 provided with spines accompanied by single short setae (fig. VI, 3—5). Proximoinferior surface of segment 2 of all three pereopods with setae, distoinferior one without setae.

Epimere, uropods and telson like those in males.

Variability. The length of setae on antennae 1—2 is rather variable but always within the limit of the species. Telson lobes bearing 2—4 spines each.

Material examined: Yugoslavia, Ohrid Lake:

— Springs near Sv. Naum Monastery, Sept., 1934, many spec. (leg. S. Karaman);

— ibid., July 21, 1969, many spec. intermixed with *G. roeselii* (leg. G. Karaman).

— Sv. Naum — Kolibarci, August, 3, 1930, 6 spec. (leg. S. Karaman);

— Biljanini Izvori — springs, July 21, 1969, many spec. intermixed with *G. roeselii* (leg. G. Karaman);

— Ohrid Lake, depth 20—25 m, Sept. 1, 1939, 30 spec. intermixed with *G. lychnidensis* (leg. Dr. T. Wolski);

— Ohrid Lake, depth 0,20 m, Sept. 4, 1934, 20 spec. (leg Dr. T. Wolski);

— Ohrid Lake, depth up to 40 m near Sv. Jovan, July 18, 1939, 15 spec. intermixed with *G. lychnidensis* (leg S. Karaman);

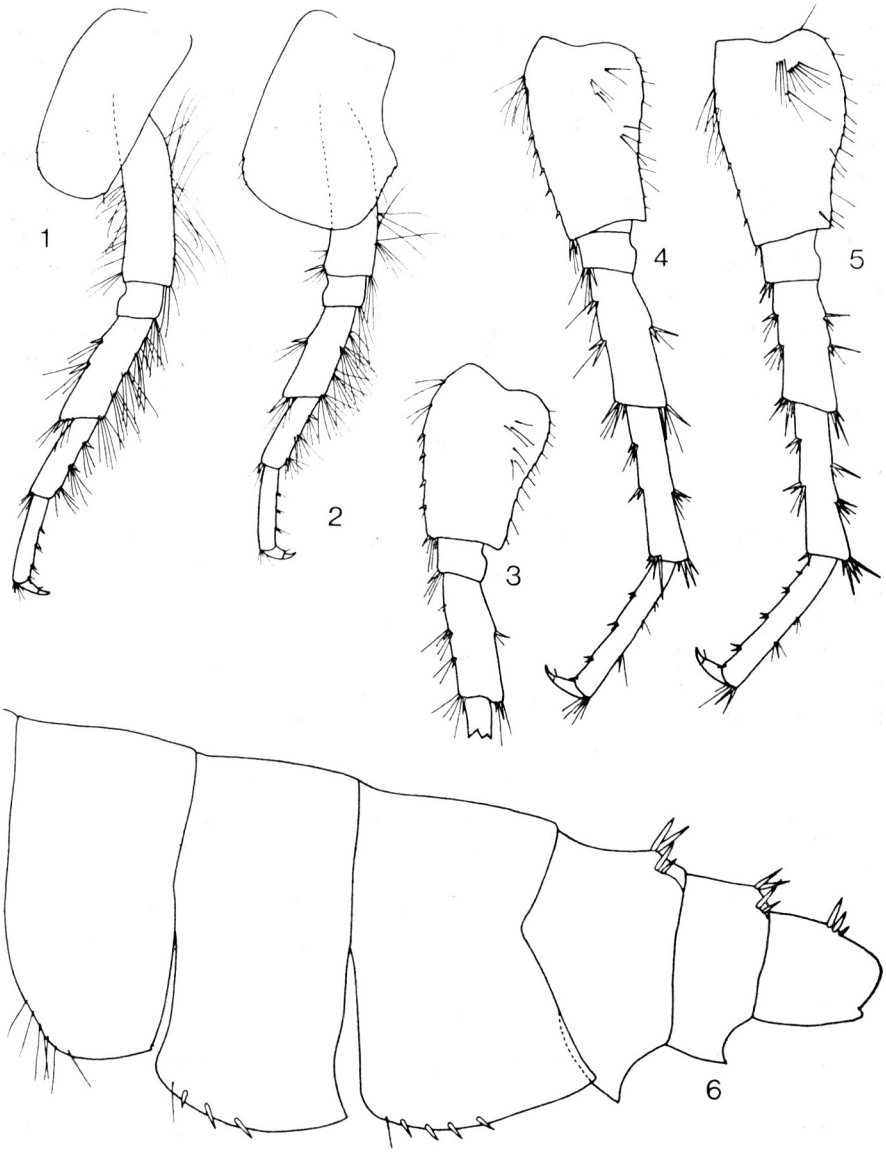

Fig. VI. *Gammarus parechiniformis* n. sp., spring near Sv. Naum, female 9.3 mm: 1 = pereopod 3; 2 = pereopod 4; 3 = pereopod 5; 4 = pereopod 6; 5 = pereopod 7.

Gammarus lychnidensis (Schell.), Ohrid Lake near Sv. Jovan, depth 30—40 m, male 12.7 mm: 6 = metasome and urosome.

Сл. VI. *Gammarus parechiniformis* n. sp., извор код Св. Наума, женка 9.3 mm: 1 = переопод 3; 2 = переопод 4; 3 = переопод 5; 4 = переопод 6; 5 = переопод 7.

Gammarus lychnidensis (Schell.), Охридско језеро код Св. Јована, дубина 30—40 m, мужјак 12.7 mm: 6 = метазом и урозом.

— Ohrid Lake, depth 40 m, Sept. 1934, 15 spec. intermixed with *G. solidus* (leg. Dr. T. Wolski);

— Ohrid Town, spring near pomp, July 26, 1939, 20 juv. spec. (leg. S. Karaman).

Localities cited: Spring near Sv. Naum, Bej Bunar spring and Studenčište (= Biljanini Izvori — springs) (Schellenberg 1943 sub *G. ochridensis).*

Loc. typ.: Spring near Sv. Naum Monastery, Ohrid Lake.

Holotype: male 14.3 mm. Holotype and paratypes are deposited in Karaman's Collection in Titograd.

Remarks and affinities: *G. parechiniformis* is very similat to *G. ochridensis* Schäf. 1925 by body armature, by pilosity of gnathopods, pereopods and uropods, shape and pilosity of epimere etc., but differs from *G. ochridensis* by poorly setose antennae 1—2.

Ecology: *G. parechiniformis* lives in the coastal zone of the Ohrid Lake, prevalently in the spings, but occurs in the Lake up to 40 meters depth; (in this last case was found intermixed with *G. lychnidensis* and *G. solidus).*

GAMMARUS LYCHINIDENSIS (SCHELL. 1943)

figs.: VI—IX

Syn.: *Gammarus (Rivulogammarus) ochridensis* f. *lychnidensis* Schellenberg 1943, p. 98, fig. 1.

Description: Male: Body-length of our specimens up to 14 mm. Body dorsally smooth or last mesosomsegment and all three metasomsegments provided with several spines or setae each (fig. VI, 6).

Urosome weakly elevated, urosomites 1—3 bearing one dorsomedian and 2 dorsolateral groups of elements consisting 2—3 spines each, almost without setae (fig. VI, 6).

Lateral cephalic lobes subrounded, eyes slightly reniform, nearly as long as the diameter of the peduncle of antenna 1 (fig. VII, 1).

Antenna 1 reaching 3/5 to 2/3 of the body, densely setose (fig. VII, 2). Peduncle segments 1 and 3 subequal or segment 3 weakly longer than 1; segment 2 is slightly longer than segments 1 or 3. Peduncle segment 1 provided at ventral margin with 5 groups of setae, segments 2 and 3 with 7—8 groups of setae at ventral margin (setae of segment 1 are as long as or shorter than the diameter of segment, these of segments 2 and 3 are 2—3 times as long as the diameter of the segments (fig. VII, 2). Principal flagellum up

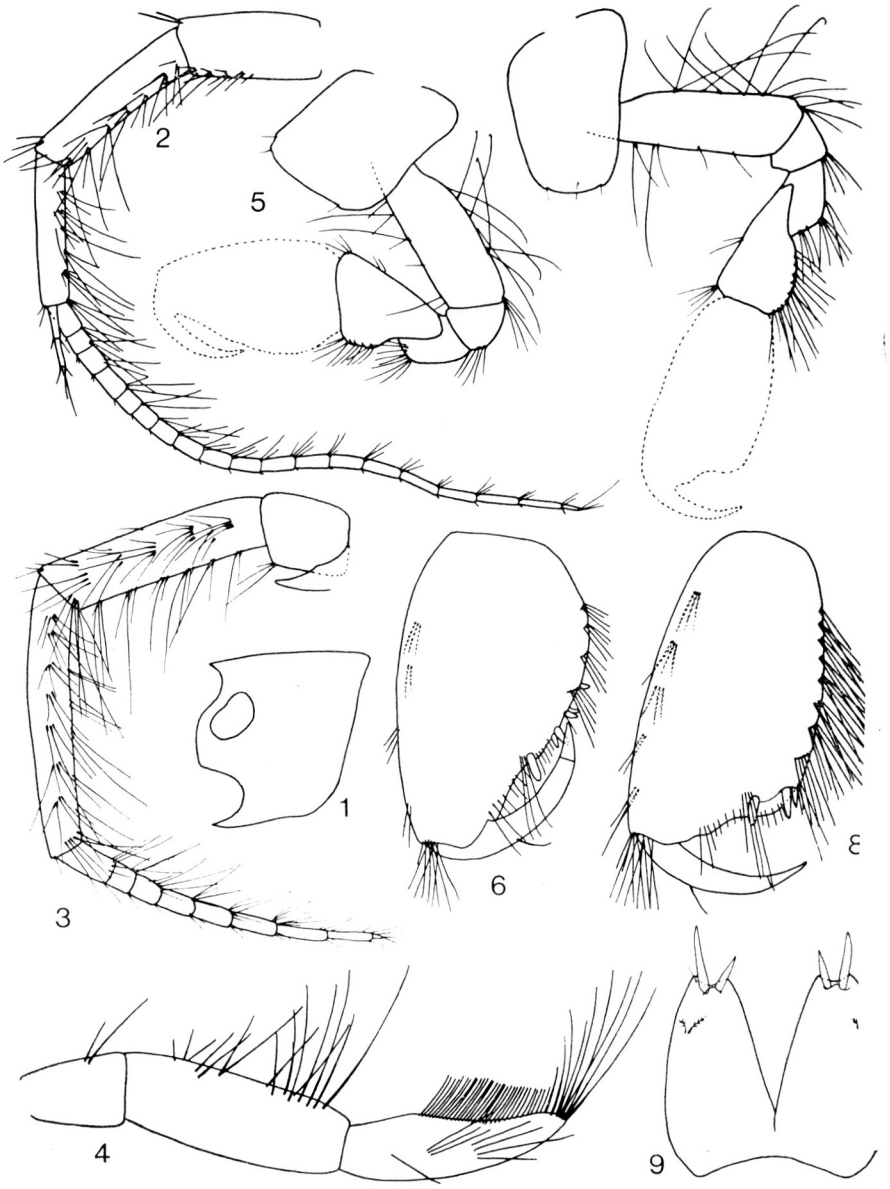

Fig. VII. *Gammarus lychnidensis* (Schell.), Ohrid Lake near Sv. Jovan, depth 30—40 m, male 12.7 mm: 1 = head; 2 = antenna 1; 3 = antenna 2; 4 = mandible palp; 5—6 = gnathopod 1; 7—8 = gnathopod 2; 9 = telson.

Сл. VII. *Gammarus lychnidensis* (Schell.), Охридско језеро код Св. Јована, дубина 30—40 m, мужјак 12.7 mm: 1 = глава; 2 = антена 1; 3 = антена 2; 4 = мандибуларни палпус; 5—6 = гнатопод 1; 7—8 = гнатопод 2; 9 = телзон.

to 29-segmented: proximal segments bearing very long setae, distal segments with short setae at ventral margin (fig. VII, 2). Accessory flagellum 3-segmented.

Antenna 2 slender, bearing numerous long setae (fig. VII, 3). Peduncle segment 4 provided with 6—7 groups of long setae at ventral margin, segment 5 with 7—8 groups of long setae at ventral margin (setae are up to twice as long as the diameter of the segments). Flagellum distinctly slender, up to 10-segmented, segments with several long setae at ventral margin each (setae are up to 2.5 times as long as the diameter of the segments), calceola absent, antennal gland cone short.

Mouthparts normal. Mandible palp: first segment with 2 setae, second segment with 5—7 setae in proximal and 8—11 setae in distal part; third segment provided with one group of A-setae, 2—3 groups of B-setae, 8—9 E-setae and 28—31 D-setae (fig. VII, 4).

Coxa 1 with almost straight anterior margin (fig. VII, 5).

Gnathopods 1—2 moderately setose, bearing all straight setae. Gnathopod 1: segment 6 pyrifom, bearing 2 pairs of spines and 3—4 groups of setae at posterior margin. Palm oblique, with one median and 2 corner spines on outer surface and 3 subcorner spines on inner surface. Dactyl slender, bearing one seta at superior margin (fig. VII, 5, 6).

Gnathopod 2: segment 6 slightly longer than that of gnathopod 1, bearing 7—9 groups of setae at posterior margin. Palm concave, with one median and 2 corner spines on outer surface and with 2 subcorner spines on inner surface (fig. VII, 7, 8), dactyl like that of gnathopod 1.

Pereopods 3—4 poorly setose, subequal to each other in the shape and pilosity (fig. VIII, 1, 2). Posterior margin of their segment 4 with 3—4 groups of setae as long as or shorter than the diameter of the segment. Posterior margin of segments 5 and 6 with 3—4 groups of short setae each, intermixed with single short spines. Dactyl short and stout.

Pereopods 5—7 relatively stout, their segments 3—6 bearing spines at both margins, setae are practically absent (fig. VIII, 3—5). Segment 2 without setae at inferior durface. Dactyl stout and short (fig. VIII, 6).

Pleopods with 2 retinacula each. Epimere moderately pointed. Epimere 2—3 with 3—4 distal spines and one seta each (fig. VI, 6).

Uropods 1—2 normal. Uropod 3 moderately long, poorly setose (fig. VIII, 7). Peduncle half as long as outer ramus. Inner ramus reaching 2/5 to 1/2 of first segment of outer ramus, bearing one spine and plumose setae at outer margin. Outer ramus bearing at outer margin 3—4 groups of spines intermixed with 1—3 short setae each; inner margin provided with short simple setae and plumose setae intermixed with 1—2 spines.

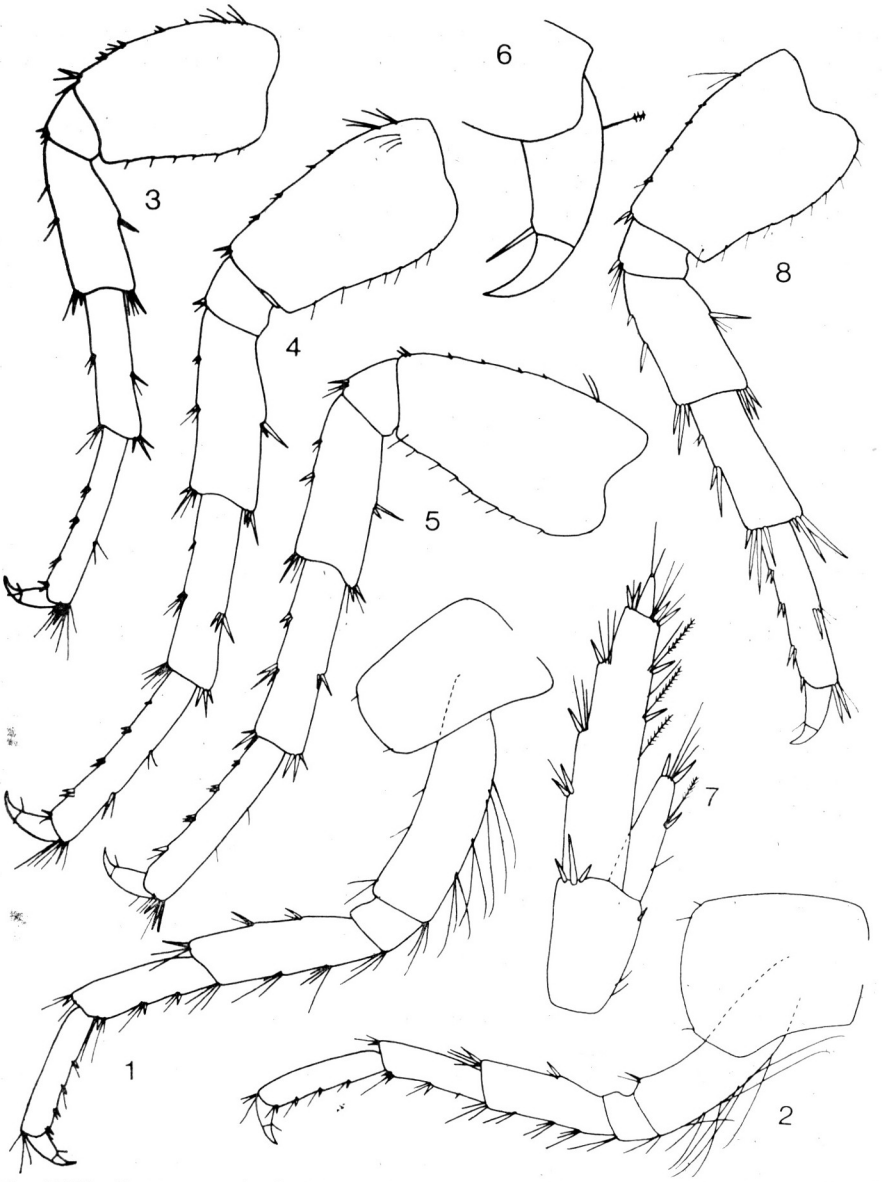

Fig. VIII. *Gammarus lychnidensis* (Schell.), Ohrid Lake near Sv. Jovan, depth 30—40 m, male 12.7 mm: 1 = pereopod 3; 2 = pereopod 4; 3 = pereopod 5; 4 = pereopod 6; 5—6 = pereopod 7; 7 = uropod 3. Female 9 mm: 8 = pereopod 7.

Сл. VIII. *Gammarus lychnidensis* (Schell.), Охридско језеро код Св. Јована, дубина 30—40 m, мужјак 12.7 mm: 1 = переопод 3; 2 = переопод 4; 3 = переопод 5; 4 = переопод 6; 5—6 = переопод 7; 7 = уропод 3. Женка 9 mm: 8 = переопод 7.

Telson slightly broader long, each lobe with 2 distal spines only (fig. VII, 9). Dorsal surface of telson smooth.

Female: The dorsal armature of the body like that in males. Antenna 1 like that in males, densely setose.

Antenna 2 slender, densely setose, setae on flagellum are slightly longer than those in males, calceola absent (fig. IX, 1).

Mandible palp segment 1 with 2 setae. Coxa 1 with straight or concave anterior margin (fig. IX, 2).

Gnathopod 1: segment 6 with 5 groups of setae at posterior margin, palm with 2 corner and 2—3 subcorner spines; median palmar spine absent (fig. IX, 2—3).

Gnathopod 2: segment 6 slightly longer and narrower than that of gnathopod 1 (fig. IX, 4, 5). Its posterior margin with 6—7 groups of setae, palm slightly convex, with 2 corner and 2 subcorner spines; median palmar spine absent. Dactyl of gnathopods 1—2 moderately slender, with one, occasionally 2 setae at dorsal surface.

Pereopods 3—4 slightly more setose than those in males (fig. IX, 6—7). Pereopods 5—7 relatively stout, with segments 3—6 provided with spines without setae at both margins (fig. VIII, 8), dactyl short, segment 2 without setae on inner surface.

Epimere and telson like those in males (fig. IX, 9). Uropod 3 short, with armature similar to that in males (fig. IX, 8). Oostegyts broad, occur on thoracal segments 2—5.

Variability. The armature of dorsal surface of body is very variable: there are the specimens with completely smooth meso — and all metasomsegments, the specimens with spines and setae on last meso — and all there metasomsegments as well as the specimens with body — armature transitive between both cases.

The length of third peduncle segment of antenna 1 is rather variable (as long as or longer than first peduncle segment) but never shorter than first peduncle segment. Eyes are ovoid or slightly reniform.

The presence of long setae on antennae 1—2 is very stable character, as well as the absence of calceola.

Material examined: Yugoslavia, Ohrid Lake:

— Ohrid Lake, depth 100 m, 1939, 4 spec. accompanied by *G. solidus* and *G. stankokaramani* (leg. S. Karaman);

— Ohrid Lake, Ohrid Town near bridge, depth 10—26 m, Sept, 13, 1934, 10 spec. (leg. Dr. T. Wolski);

— Ohrid Lake, depth 160—240 m, 1934, 3 spec. (leg. S. Karaman);

— Ohrid Lake near Sv. Jovan, depth 30—40 m, July 16, 1939, many specimens accompanied by *G. parechiniformis* (leg. S. Karaman);

— Ohrid Lake, depth, 20—25 m, Sept. 1, 1934, 4 spec. intermixed with G. *parechiniformis* (leg. Dr. T. Wolski);

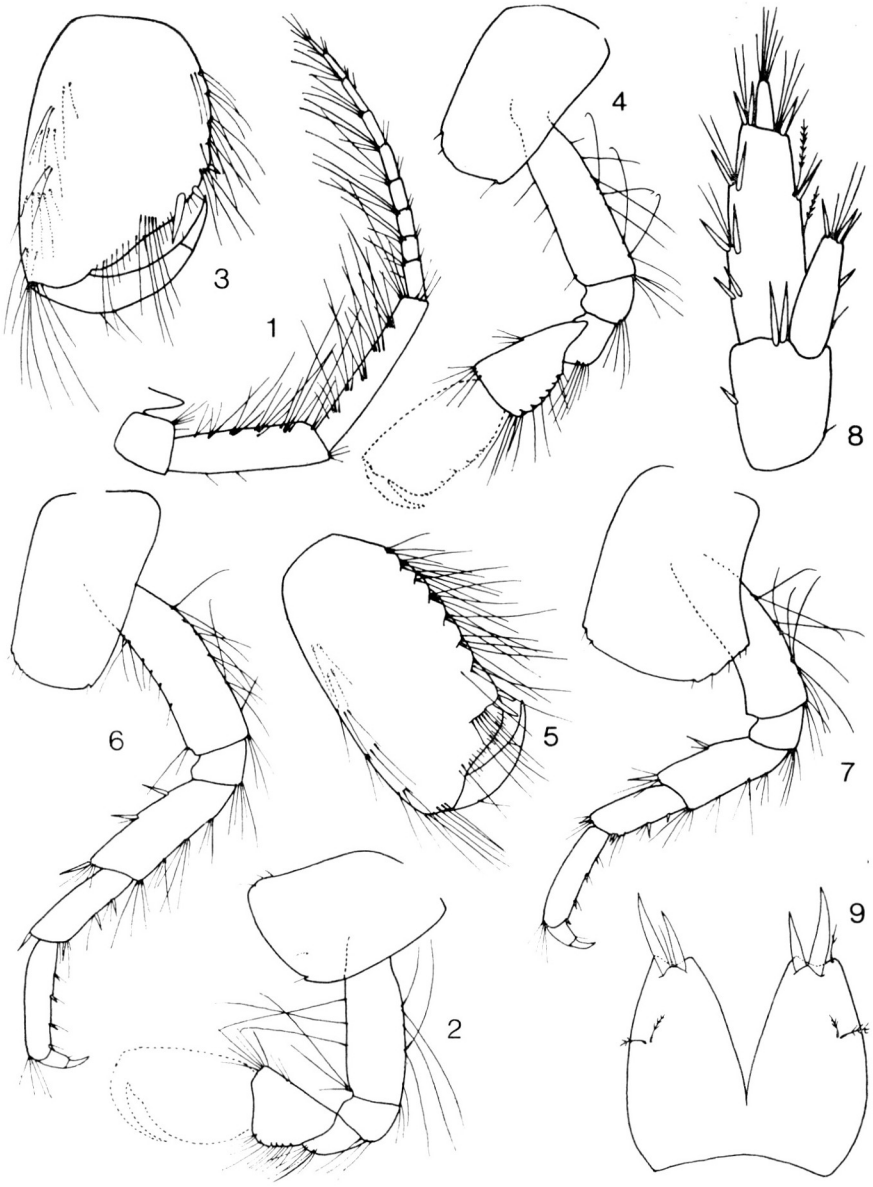

Fig. IX. *Gammarus lychnidensis* (Schell.), Ohrid Lake near Sv. Jovan, depth 30—40 m, female 9 mm: 1 = antenna 2; 2—3 = gnathopod 1; 4—5 = gnathopod 2; 6 = pereopod 3; 7 = pereopod 4; 8 = uropod 3; 9 = telson.

Сл. IX. *Gammarus lychnidensis* (Schell.), Охридско језеро код св. Јована, дубина 30—40 m, женка 9 mm: 1 = антена 2; 2—3 = гнатопод 1; 4—5 = гнатопод 2: 6 = переопод 3; 7 = переопод 4; 8 = уропод 3; 9 = телзон.

— Ohrid Lake, W of Ohrid town, July 13, 1939, 4 spec. intermixed with *G. ochridensis* (leg. S. Karaman);

Localities cited: Ohrid Lake, depth 17—22 m in front of Ohrid town (Schellenberg 1943).

Loc typ.: Ohrid Lake near Sv. Jovan, depth 30—40 m.

Holotyipe: male 12.7 mm. Holotype and paratypes are deposited in Karaman's Collecition in Titograd.

Remarks and affinities. *G. lychnidensis* differs from all other *Gammarus* species from Ohrid Lake by long third peduncle segment of antenna 1.

G. lychnidensis is without calceola on antenna 2 in males, similar to that in *G. macedonicus*, but differs from *macedonicus* by absence of brush of setae on flagellum of antenna 2, etc.

G. ochridensis has also densely setose antennae 1—2, but *G. lychnidensis* differs from it by absence of calceola etc.

Ecology. *G. lychnidensis* lives in deeper parts of the Lake, occasionally in shallow water; it was found intermixed with *G. solidus*, *G. stankokaramani*, *G. parechiniformis* and *G. ochridensis*.

GAMMARUS SOLIDUS N. SP.

figs.: X — XIII

Syn.: *Gammarus ochridensis abyssalis* Karaman S. 1931, p. 53, fig. 11 a, c, e.

Gammarus (Rivulogammarus) ochridensis abyssalis Schellenberg 1943, p. 99; Pljakić 1962, p. 68, fig. 1b.

Rivulogammarus ochridensis abyssalis Karaman G. 1968, p. 55.

Gammarus ochridensis abyssalis Karaman G. 1974, p. 15.

Description: Male: Body-lenght of our specimens up to 15 mm. Mesosome smooth, metasomsegments 1—3 with groups of spines intermixed with single setae dorsal surface, similar to those in *G. ochridensis* (fig. XIII, 1). Urosome slightly elevated, urosomites 1—3 with one dorsomedian and 2 dorosolateral groups of elements consisting of 2—5 spines intermixed with 1—2 setae each (fig. XIII, 1).

Lateral cephalic lobes subrounded, eyes ovoid, almost reniform, nearly as long as or slightly longer than the diameter of the peduncle segment 1 of antenna 1 (fig. X, 1).

Antenna 1 poorly setose, reaching 3/5 of the body (fig. X, 2). Peduncle segment 1 with 1—2 groups of short setae at ventral margin, segment 2 with 3 groups and segment 3 with 2 groups

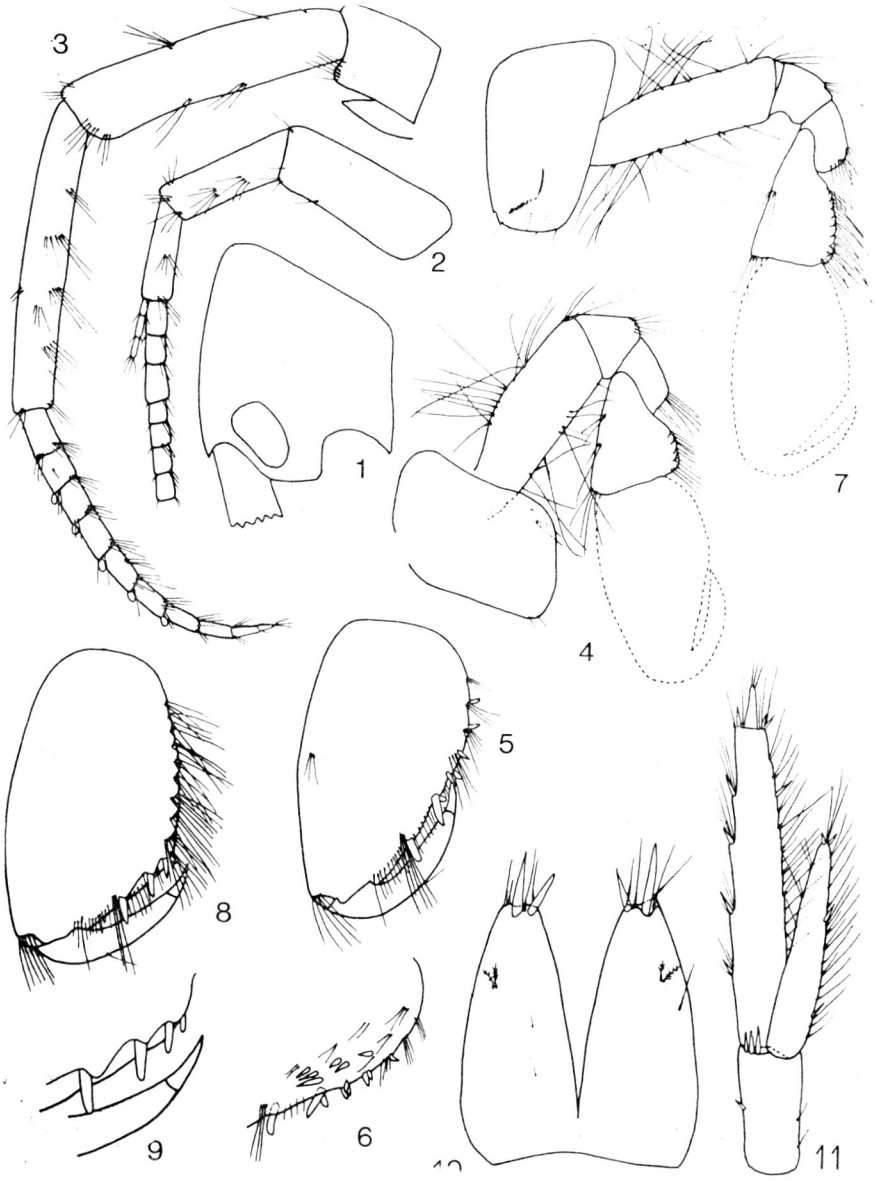

Fig. X. *Gammarus solidus* n. sp., Ohrid Lake, depth, 160—240 m, male 13 mm: 1 = head; 2 = antenna 1; 3 = antenna 2; 4—6 = gnathopod 1; 7—9 = gnathopod 2; 10 = telson; 11 = uropod 3.

Сл. X. *Gammarus solidus* n. sp., Охридско језеро, дубина 160—240 m, мужјак 13 mm: 1 = глава; 2 = антена 1; 3 = антена 2; 4—6 = гнатопод 1; 7—9 = гнатопод 2; 10 = телзон; 11 = уропод 3.

of short setae at ventral margin (setae are as long as or shorter than the diameter of the segments). Principal flagellum up to 33--segmented, segments with short setae at ventral margin (setae are as long as or shorter than the diametar of the segments). Accessory flagellum 3—4 segmented (fig. X, 2).

Antenna 2 slender, poorly setose (fig. X, 3). Peduncle segment 4 with 3 groups of setae at ventral margin, segment 5 with 5—6 groups of setae at ventral margin (setae are nearly as long as the diameter of the segments). Flagellum slender, poorly setose, up to 11-segmented: each flagellar segment with group of short setae at ventral margin nearly as long as the diameter of the segments (fig. X, 3), setae are not forming a brush; calceola present, antennal gland cone short.

Mouthparts normal. Mandible palp: first segment without setae, second segment with 14—17 setae, third segment with 30—32 D-setae, 8—10 E-setae, 2 groups of B-setae and one group of A--setae (fig. XI, 1).

Coxa 1 with almost straight anterior margin, coxae 2—4 normal (fig. X, 4, 7; XI, 2, 3).

Gnathopod 1: segment 6 pyriform, bearing 3—4 pairs of short spines at posterior margin, intermixed with groups of setae, as well as with 2 groups of spines on inner surface (fig. X, 4—6). Palm with one median and 2 corner spines on outer surface and between them occurs one pair of spines also; subcorner spines are three in number. Dactyl moderately slender, bearing one seta on dorsal surface.

Gnatopod 2: segment 6 weakly longer than that of gnatopod 1, bearing 8—10 groups of setae at posterior margin. Palm oblique, bearing one median and 2 corner spines on outer surface and with one spine between them (this spine is deposited closer to corner than to median spine) (fig. X, 7—9). Dactyl like that of gnathopod 1.

Pereopods 3—4 moderately setose (fig. XI, 2, 3). Pereopod 3: posterior margin of segments 2—5 bears groups of setae as long as or slightly longer than the diameter of the segments. Posterior margin of segment 6 with several pairs of short spines intermixed with one short seta. Dactyl moderately slender (fig. XI, 2).

Pereopod 4 almost similar to pereopod 3 (fig. XI, 3).

Pereopods 5—7 relatively slender and long, their segments 3—6 provided at anterior margin with groups of spines intermixed with several setae longer than the spines (fig. XI, 4—7); segment 6 is poorly setose. Segment 2 of pereopods 5—7 with moderately long setae at posterior margin; inferior surface of segment 2 of pereopod 5 without setae, that of pereopods 6 and 7 with several groups of longer setae. Dactyl moderately slender (fig. XI, 6, 8).

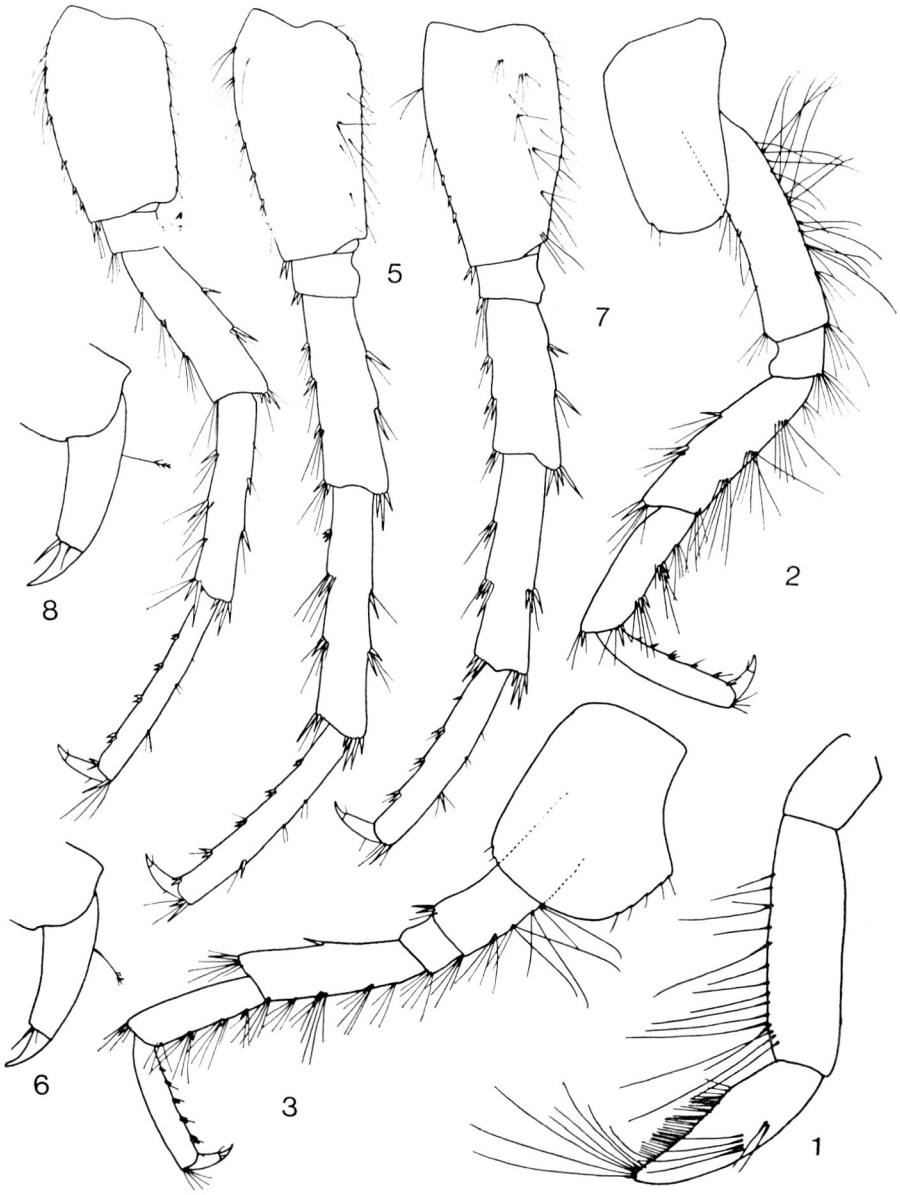

Fig. XI. *Gammarus solidus* n. sp., Ohrid Lake, depth 160—240 m, male 13 mm: 1 = mandible palp; 2 = pereopod 3; 3 = pereopod 4; 4 = pereopod 5; 5—6 = pereopod 6; 7—8 = pereopod 7.

Сл. XI. *Gammarus solidus* n. sp., Охридско језеро, дубина 160—240 m, мужјак 13 mm: 1 = мандибуларни палпус; 2 = переопод 3; 3 = переопод 4; 4 = переопод 5; 5—6 = переопод 6; 7—8 = переопод 7.

Pleopods with 2 retinacula each. Epidemere moderately pointed, bearing long setae at distal margin, occasionally intermixed with one spine (fig. XIII, 1). The dorsal surface of epimere 2—3 provided with several groups of setae also.

Uropods 1—2 normal. Uropod 3 moderately setose and moderately long (fig. X, 11). Peduncle remarkably shorter than outer ramus. Outer ramus bearing spines intermixed with simple setae at outer margin and plumose setae at inner margin. Inner ramus reaching 3/5 of first segment of outer ramus, bearing plumose setae at both margins, intermixed with single spines at outer margin.

Telson slightly longer than broad: each lobe with 2 distal spines intermixed with several setae not longer than the spines (fig. X, 10). Dorsal surface of telson smooth or provided with 1—2 setae.

Female: The pilosity and armature of pereopods 3—7, epimere, body, uropods, antennae 1 and telson like those in males (fig. XII, 1, 10). The setae on segments 4—5 of antenna 2 like these in males or slightly longer. Calceola absent (fig. XII, 2).

Gnathopod 1: dactyl with one seta at dorsal margin. Segment 6 with 2 corner and 2 subcorner spines on palm, median palmar spine absent (fig. XII, 3).

Gnathopod 2: palm with 2 corner and 2 subcorner spines, median palmar spine absent (fig. XII, 4).

The pilosity of pereopods 3—4 almost like that in males or weakly reacher (fig. XII, 5—6). The pilosity of pereopods 5—7 like that in males (fig. XII, 7—9).

Uropod 3 with rami slightly shorter than these in males: inner ramus reaching 3/5 of first segment of outer ramus (fig. XII, 10).

Oostegyts broad, occur on thoracal segments 2—5.

Variability: The number of spines and setae on dorsal surface of metasome and the number of setae on inner surface of segment 2 of pereopods 6—7 are variable.

The presence of setae on segment 2 of pereopods 6—7 and epimere as well as the presence of calceola on antenna 2 are stable characters.

Material examined: Yugoslavia, Ohrid Lake:

— Ohrid Lake, depth 160—240 m, 1934, 3 spec. (leg. S. Karaman);

— Ohrid Lake, depth 100 m, 1939, one spec. accompanied by *G. lychnidensis* and *G. stankokaramani* (leg. S. Karaman);

— Ohrid Lake, depth 40 m, Sept. 1934, 10 spec. intermixed with *G. parechiniformis* (leg. Dr. T. Wolski);

— Ohrid Lake, depth, 1934, 6 spec. intermixed with *G. ochridensis* (leg. S. Karaman);

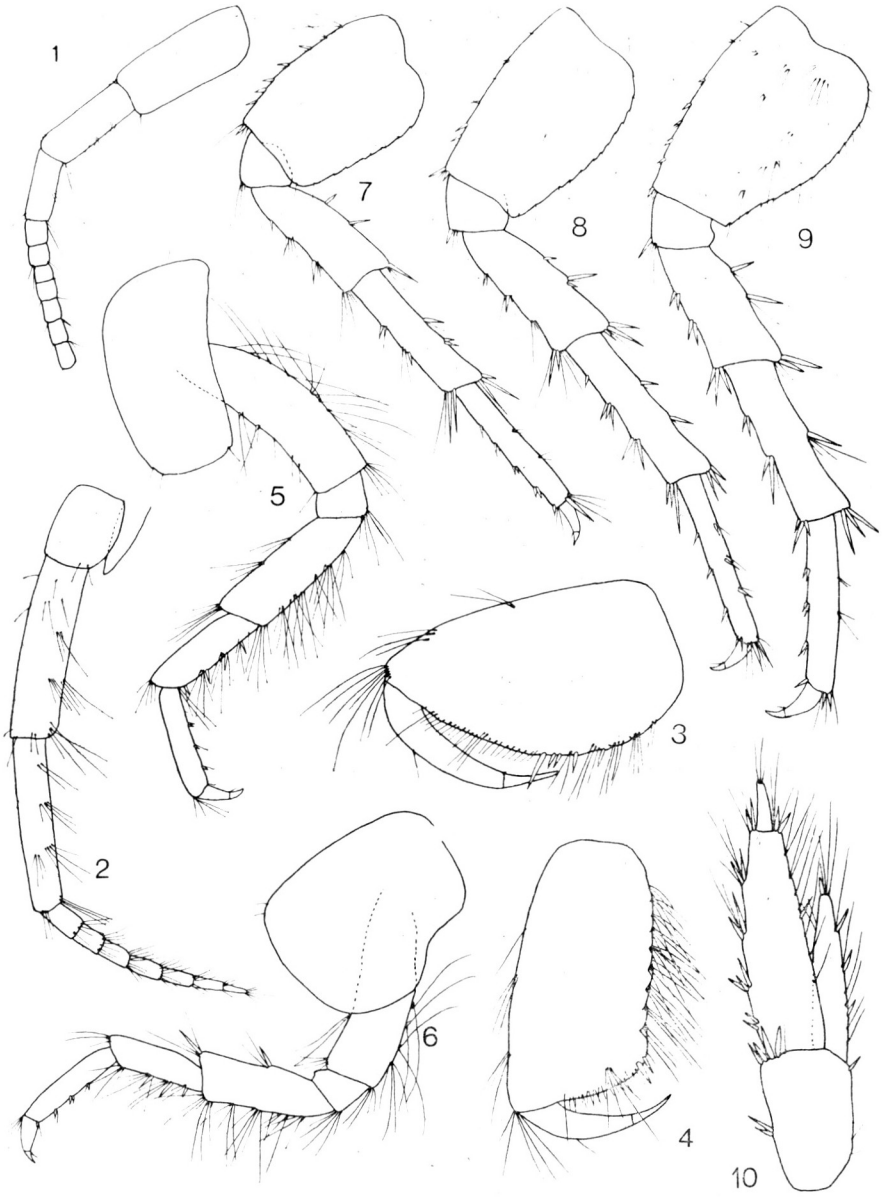

Fig. XII. *Gammarus solidus* n. sp., Ohrid Lake, depth 20—25 m, female 10 mm: 1 = antenna 1; 2 = antenna 2; 3 = gnathopod 1; 4 = gnathopod 2; 5 = pereopod 3; 6 = pereopod 4; 7 = pereopod 5; 8 = pereopod 6; 9 = pereopod 7; 10 = uropod 3.

Сл. XII. *Gammarus solidus* n. sp., Охридско језеро, дубина 20—25 m, женка 10 mm: 1 = антена 1; 2 = антена 2; 3 = гнатопод 1; 4 = гнатопод 2; 5 = переопод 3; 6 = переопод 4; 7 = переопод 5; 8 = переопод 6; 9 = переопод 7; 10 = уропод 3.

— Ohrid Lake, depth 20-25 m, Sept. 1, 1934, one spec. intermixed with *G. lychnidensis*. (leg. Dr. T. Wolski).

Holotype: male 13 mm. Holotype and paratypes are deposited in Karaman's Collection in Titograd.

Loc. typ.: Ohrid Lake, depth 160—240 m.

Remarks and affinities: *G. solidus* is a new name for *G. ochridensis abyssalis* S. Karaman 1931 because this name was nom, preocc.

G. solidus differs from all other *Gammarus* species from Ohrid Lake by the presence of setae on inner surface of segment 2 of pereopods 6—7 and on epimere in males and females.

The poorly setose antennae 1—2 has also *G. stankokaramani*, but *G. solidus* differs from it by absence of calceola and median palmar spine in females.

Ecology: *G. solidus* living in deeper parts of the Lake; it was found intermixed with *G. parechiniformis*, *G. stankokaramani*, *G. lychnidensis* and *G. ochridensis*.

GAMMARUS MACEDONICUS G. KARAMAN 1976c

figs. XIII—XIV

Syn.: *Gammarus macedonicus* Karaman G. 1976c, p. 71, figs. I—V.

Description: Male: Body length up to 14.4 mm. Mesosome dorsally smooth, metasomsegments 1—3 with dorsal spines intermixed with single setae like those in *G. ochridensis*. Urosome slightly elevated, urosomites 1—3 with one dorsomedian and 2 dorsolateral groups of spines.

Lateral cephalic lobes subrounded, eyes slightly reniform. Antenna 1 reaching 1/2 to 3/5 of the body, poorly setose (fig. XIII, 2). Peduncle segments 1—3 progressively shorter towards segment 3: segment 1 with 2 groups of short setae at ventral margin, segments 2—3 with 3 groups of short setae at ventral margin each (fig. XIII, 2). Principal flagellum up to 24-segmented, all flagellar segments bearing very short setae. Accessory flagelum 3—4 segmented.

Antenna 2 moderately setose: peduncle segments 4—5 with 4 groups of setae at ventral margin, setae are as long as the diameter of the segments (fig. XIII, 3). Flagellum short and inflated, up to 10-segmented, bearing numerous short setae forming a brush at inferior margin. Flagellar segments dorsoventrally compressed, slightly inflated, bearing 1—2 transversal rows of setae nearly as

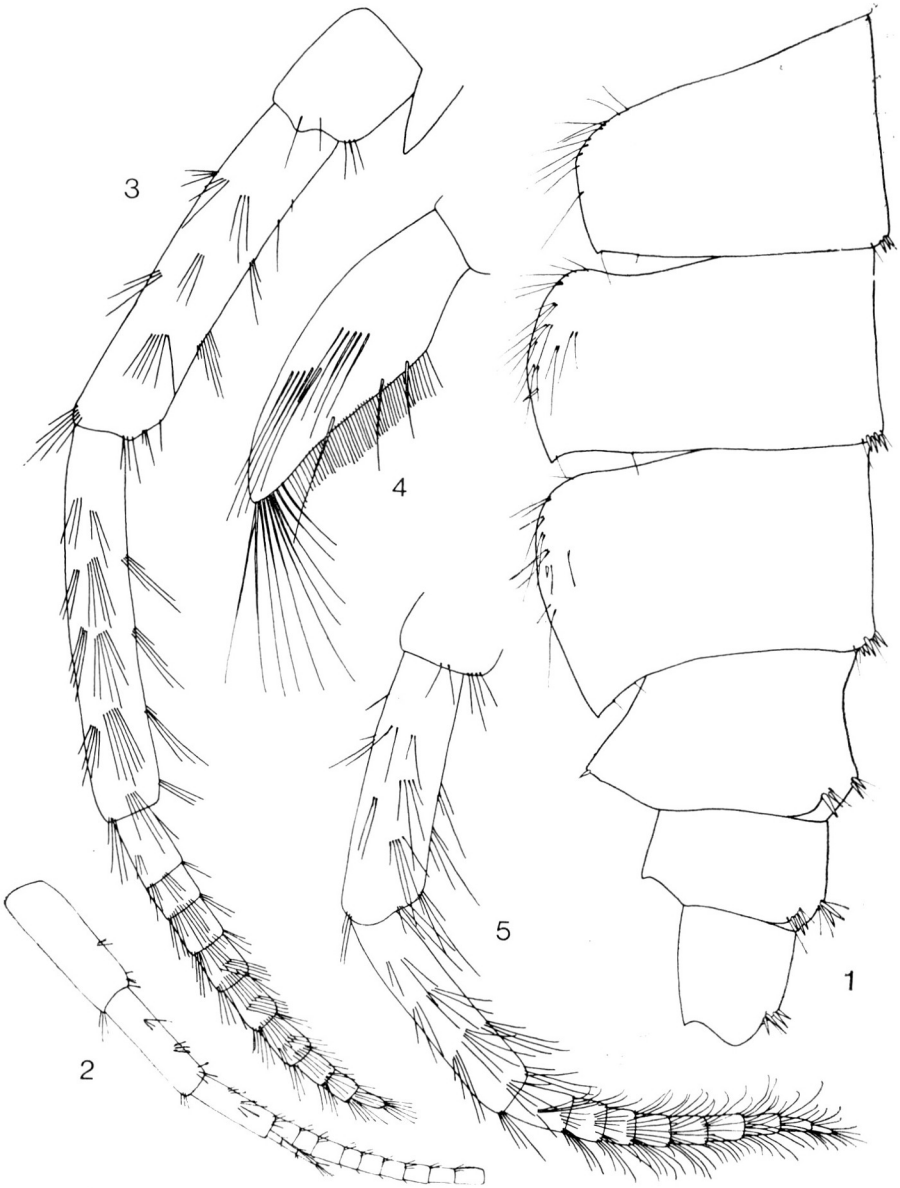

Fig. XIII. *Gammarus solidus* n. sp., Ohrid Lake, depth 160—240 m, male 13 mm: 1 = metasome and urosome. *Gammarus macedonicus* G. Kar. 1976b, Ohrid Lake, depth 40 m, male 14.4 mm: 2 = antenna 1; 3 = antenna 2; 4 = third segment of mandible palp, inner face. Female 9 mm: 5 = antenna 2.

Сл. XIII. *Gammarus solidus* n. sp., Охридско језеро 160—240 m, мужјак 13 mm: 1 = метазом и урозом. *Gammarus macedonicus*. G. Kar. 1976b, Охридско језеро, дубина 40 m, мужјак 14.4 mm: 2 = антена 1; 3 = антена 2; 4 = трећи сегмент мандибуларног палпуса, унутрашња страна. Женка 9 mm: 5 = антена 2.

long as the diameter of the segments (each seta-row consisting of up to 18 setae). Calceola absent.

Mandible palp: first segment without setae, second segment with 18—22 setae; third segment with 8—10 E-setae, 38—40 D--setae, 2 groups od A-setae, 2 groups of B-setae and 3—4, rather only 2 C-setae on inner submarginal part of segment 3. (fig. XIII, 4).

Coxa 1 with slightly concave anterior margin. Gnathopod 1: segment 6 pyriform, its palm with one median and 2 corner spines on outer surface and 3—4 subcorner spines on inner surface. Dactyl moderately slender, with one seta at dorsal margin (fig. XIV, 1).

Gnathopod 2: segment 6 slightly longer than that of gnathopod 1, its palm with one median, 3 corner and 3 subcorner spines; dactyl like that in gnathopod 1 (fig. XIV, 2).

Pereopods 3—4 nearly subequal in length poorly setose. Posterior margin of segment 4 with 4 groups of setae shorter than the diameter of the segment. Segment 5 with 3 groups of short setae at posterior margin, intermixed with single spines. Dactyl moderately slender.

Pereopods 5—7 moderately long, their segments 3—6 bearing spines at both margins (fig. XIV, 3), segment 2 without setae on inner surface Dactyl relatively long, moderately slender (fig. XIV, 3, 4).

Epimere 1—3 moderately pointed. Epimere 2—3 bearing several spines at distal margin; on dorsal surface of epimera 2 occurs one spine (sometimes, not always).

Uropod 3 moderately short and poorly setose. Inner ramus reaching half of first segment of outer ramus, bearing plumose setae intermixed with single spines at both margins. Outer ramus bearing short plumose setae at inner margin and 4—5 groups of spines intermixed with one simple seta at outer margin.

Telson slightly longer than broad, bearing 2 distal spines intermixed with 1—2 setae on each lobe.

F e m a l e: The pilosity of antennae 1—2, of epimere, pereopods and uropods like these in males. Antenna 2 without calceola. Gnathopod 1: segment 6 with one median palmar and 2 corner spines on outer surface and with 2 subcorner spines on inner surface (fig. XIV, 5).

Gnathopod 2: segment 6 with one median palmar and 2 corner spines on outer surface and with 2 subcorner spines on inner surface (fig. XIV, 6).

Pilosity of pereopods 3—7 like those in males (fig. XIV, 3).

Oostegyts broad, occur on thoracal segments 2—5.

V a r i a b i l i t y: The presence of brush of setae on flagellum of antenna 2 in males and females, presence of median palmar spi-

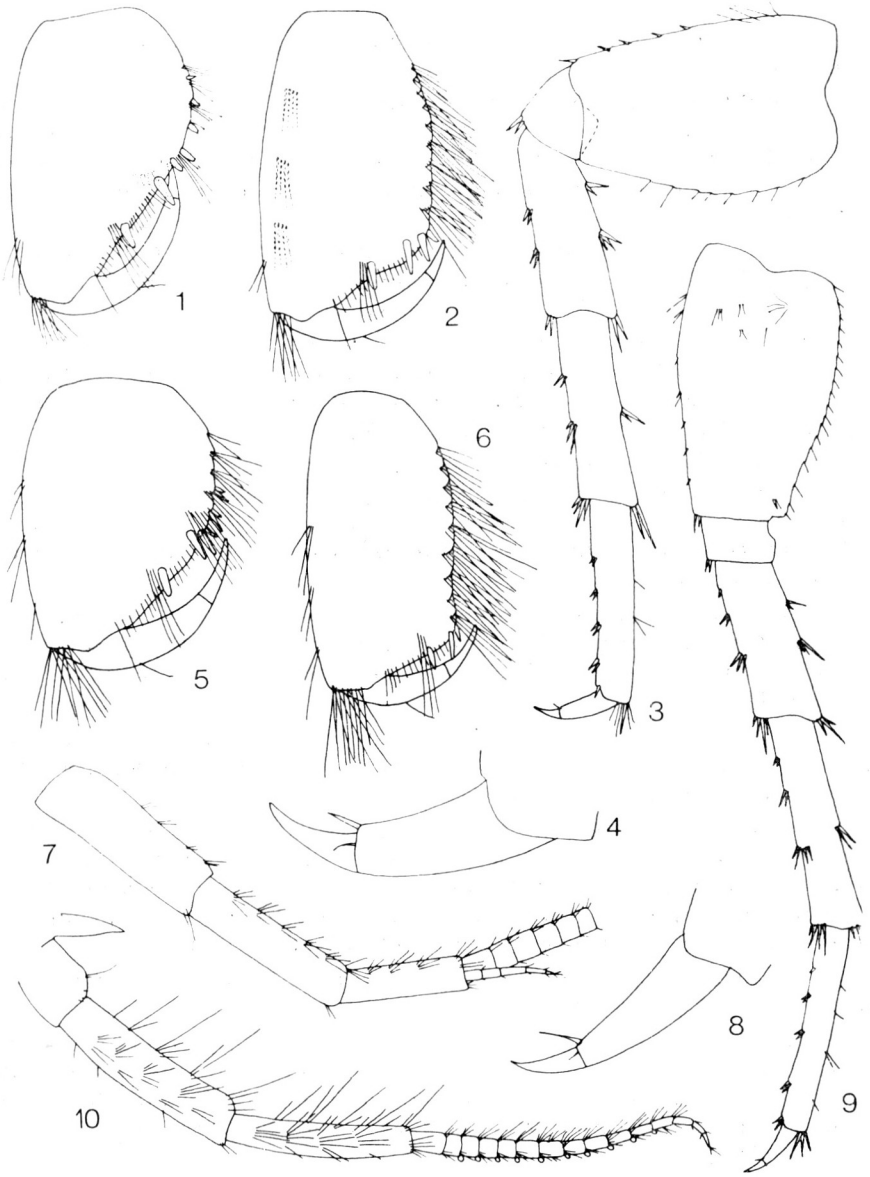

Fig. XIV. *Gammarus macedonicus* G. Kar. 1976b, Ohrid Lake, depth 40 m, male 14.4 mm: 1 = gnathopod 1; 2 = gnathopod 2; 3—4 = pereopod 7. Female 9 mm: 5 = gnathopod 1; 6 = gnathopod 2. *Gammarus stankokaramani* G. Kar. 1976a, Ohrid Lake, depth 100 m, male 17 mm: 7 = antenna 1; 8—9 = pereopod 7. Female 10 mm: 10 = antenna 2.

Сл. XIV *Gammarus macedonicus* G. Kar. 1976b, Охридско језеро, дубина 40 m, мужјак 14.4 mm: 1 = гнатопод 1; 2 = гнатопод 2; 3—4 = переопод 7. Женка 9 mm: 5 = гнатопод 1; 6 = гнатопод 2. *Gammarus stankokaramani* G. Kar. 1976a, Охридско језеро, дубина 100 m, мужјак 17 mm: 7 = антена 1; 8—9 = переопод 7. Женка 10 mm: 10 = антена 2.

ne on gnathopods 1—2 in males and females and absence of calceola are very stable characters of this species.

Material examined: Yugoslavia, Ohrid Lake:

— Ohrid Lake, depth 160—240 m, 1934, one spec. intermixed with *G. stankokaramani* (leg. S. Karaman);

— Ohrid Lake, depth 40 m, Sept. 14, 1934, 8 spec. accompanied by *G. stankokaramani* (leg. Dr. T Wolski).

Localities cited: see sub „material examined".

Loc. typ.: Ohrid Lake, depth 40 m.

Remarks and affinities: *G. macedonicus* is very allied to *G. stankokaramani* (by presence of median palmar spine in males and females) but differs from it by absence of calceola in males and females, by more setose antenna 2, by smooth last mesosomsegment, by presence of C-setae on third palp segment of mandible.

Ecology: *G. macedonicus* lives in deeper parts of the Lake; it was found intermixed with *G. stankokaramani.*

GAMMARUS STANKOKARAMANI G. KARAMAN 1976b

figs.: XIV—XV

Syn.: *Gammarus stankokaramani* Karaman G. 1976b, p. 87, figs. I—V.

Description: Males: Length of body of our specimens up to 19 mm. Last mesosomsegment and all three metasomsegments with group of elements on dorsal surface consisting of several spines intermixed with single setae each. Urosome like that of *G. ochridensis.*

Lateral cephalic lobes subrounded, eyes weakly reniform.

Antenna 1 scarcely setose, reaching 1/2—3/5 of the body. Peduncle segments 1—3 progressively shorter tovards segment 3. Peduncle segment 1 with 4 groups of setae at ventral margin, peduncle segment 2 with 6, segment 3 with 4 groups of setae at ventral margin (setae are shorter than the diameter of the segments. Principal flagellum up to 29-segmented, poorly setose, all setae are as long as or shorther than the diameter of the segments.

Antenna 2 moderately setose (fig. XV, 1). Peduncle segments 4—5 bearing 5—6 groups of setae at ventral margin each (setae are as long as or slightly longer than the diameter of the segments). Flagellum strong, weakly inflated (almost slender), scarcely setose (setae are nearly as long as the diameter of the segments), calceola present.

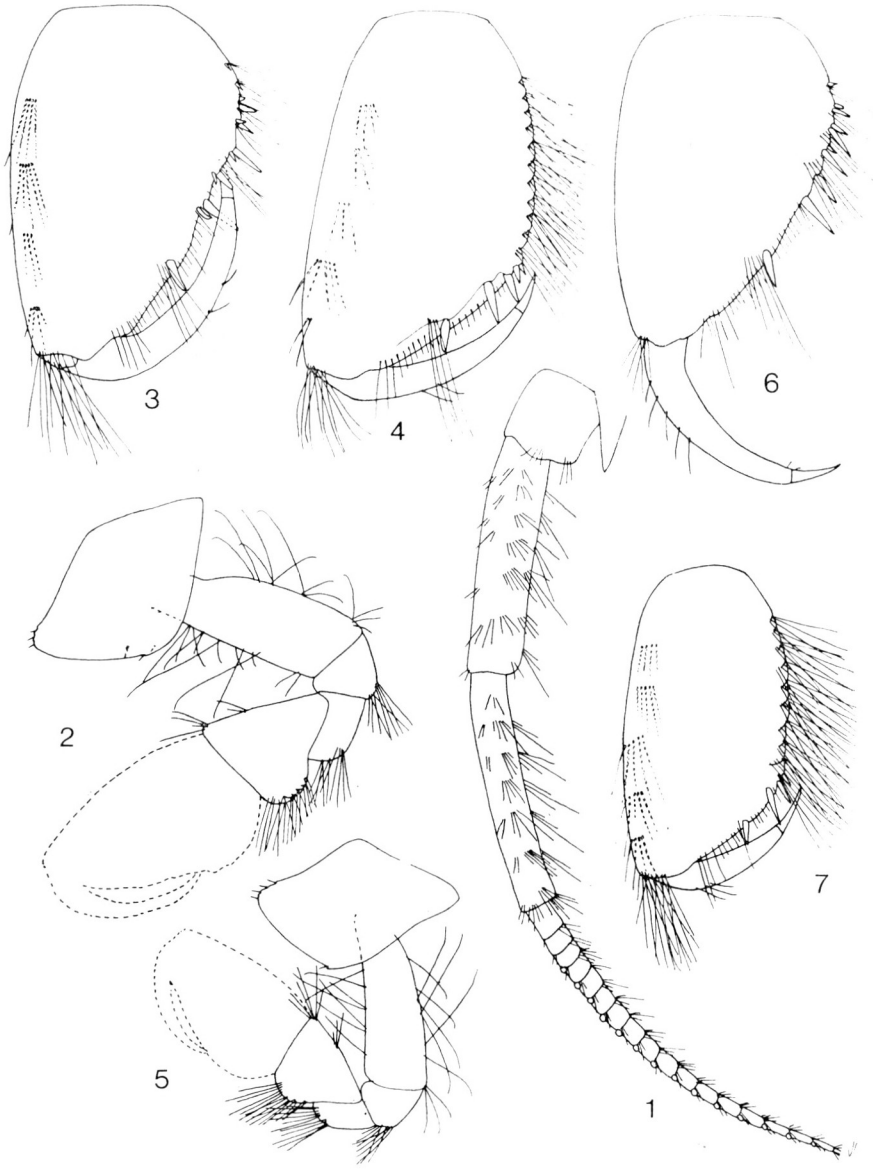

Fig. XV. *Gammarus stankokaramani* G. Kar. 1976a, Ohrid Lake, depth 100 m, male 17 mm: 1 = antenna 2; 2—3 = gnathopod 1; 4 = gnathopod 2. Female 10 mm: 5—6 = gnathopod 1; 7 = gnathopod 2.

Сл. XV. *Gammarus stankokaramani* G. Kar. 1976a, Охридско језеро, дубина 100 m, мужјак 17 mm: 1 = антена 2; 2—3 = гнатопод 1; 4 = гнатопод 2. Женка 10 mm: 5—6 = гнатопод 1; 7 = гнатопод 2.

Mandible palp: first segment with one seta, second segment with 20—26 setae; third segment with 32—39 D-setae, 6—8 E-setae, one group of A-setae and 3 groups of B-setae.

Coxa 1 with slightly concave anterior margin (fig. XV, 2, 5).

Gnathopod 1: segment 6 pyriform, with one median and 2 corner spines: between corner and median spine occurs one pair of spines also (fig. XV, 2). Three subcorner spines are present on inner surface. Dactyl narrow, recurved, bearing 2—3 setae at superior margin (rather occur up to 5 setae).

Gnathopod 2: segment 6 weakly longer than that of gnathopod 1, its palm with one median and 3 corner spines as well as one spine between median and corner spines (fig. XV, 4). Two or three subcorner spines occur on inner surface of segment 6. Dactyl with 2—3, rather 4 setae at superior margin.

Pereopods 3—4 poorly setose, their segment 4 with 4—5 groups of short setae at posterior margin (setae are as long as or shorter than the diameter of the segment). Setae at posterior margin of segments 5—6 are very scarce and short, intermixed with short spines. Pereopods 5—7 moderately long, their segments 3—6 bearing spines at both margins. Inferior surface of segment 2 of pereopods 5—7 without setae. Dactyls moderately slender.

Epimere 2—3 moderately pointed, or epimera 3 almost sharp pointed; both epimere bearing spines at distal margin, sometimes spines are intermixed with 1—2 single setae.

Uropod 3 moderately long: inner ramus moderately setose, reaching 3/5—2/3 of the first segment of outer ramus, bearing plumose setae at both margins, intermixed with spines. Outer ramus bearing groups of spines intermixed with several simple setae at outer margin, and bearing plumose setae accompanied by 1—2 spines at inner margin.

Telson nearly as long as broad, each lobe with 2—4 distal spines intermixed with 1—2 setae; dorsal surface of each lobe provided with 1—2 setae or one spine.

F e m a l e: Palm of gnathopods 1—2 bearing median spine. Flagellum of antenna 2 with calceola (in ovigerous females also).

The pilosity of antenna 1 and flagellum of antenna 2 like those in males. The setae on peduncle of antenna 2 are slighty longer than those in males.

The setae on pereopods 3—4 are slightly longer than those in males. Pereopods 5—7, epimera and uropods 1—3 like those in males.

Gills ovoid, oostegyts large.

V a r i a b i l i t y: The presence of calceola on flagellum of antenna 2 in females and presence of median palmar spine in females are very stable characters, differing it from all other known Lake species.

Material examined: Yugoslavia, Ohrid Lake:
— Ohrid Lake, depth 80 m, August, 1934, 15 spec. (leg. S. Karaman);
— Ohrid Lake, depth 40 m, Sept. 14, 1934, many spec. (leg. Dr. T.Wolski);
— Ohrid Lake, depth 160—240 m, 1934, 30 spec. intermixed with *G. macedonicus;*
— Ohrid Lake, depth 65—70 m, Sept., 1934, 7 spec. (leg. Dr. T. Wolski);
— Ohrid Lake, depth 100 m, 1939, one spec. intermixed with *G. solidus* and *G. lichnidensis* (leg. S. Karaman);

Localities cited: see sub „material examined".

Loc. typ.: Ohrid Lake, depth 100 m.

Remarks and affinities: *Gammarus stankokaramani* differs from all other Gammarus species from Ohrid Lake and Yugoslavia by presence of calceola on flagellum of antenna 2 in females and by presence of median palmar spine in females.

Gammarus stankokaramani has dorsal body-armature similar to that of *G. accolae* G. Kar. 1973 known from Kirgöz by Antalya, Turkey, but *G. stankokaramani* differs from it by stronger antenna 2 with calceola, by less pointed epimere etc.

Ecology: *G. stankokaramani* lives in deeper Lake waters; it was found intermixed with *G. solidus, G. macedonicus* and *G. lychnidensis.*

GENERAL VARIABILITY OF *G. OCHRIDENSIS*-COMPLEX

The dorsal armature of the body is very similar in all 6 studied species, therefore all these species were considered as one species so long time.

The species *G. ochridensis, G. parechiniformis, G. solidus* and *G. macedonicus* have dorsal armature (consisting of spines and setae) on all three metasomsegments only; *G. stankokaramani* has dorsal armature on last mesosom — and all three metasomsegments; *G. lychnidensis* has very variable dorsal body-armature: from completely smooth all meso — and metasomsegments up to spinose last meso — and all metasomsegments.

The calceolas on antenna 2 in females are present only in *G. stankokaramani;* it is very rare case within genus *Gammarus.*

The calceloas on antenna 2 in males are present in *G. ochridensis, G. parechiniformis, G. solidus* and *G. stankokaramani,* absent in *G. lychnidensis* and *G. macedonicus.*

Distinctly setose epimere and inferior surface of segment 2 of pereopods 6—7 in males has only *G. solidus.* C-setae on third mandible palp are present only in *G. macedonicus.*

Median palmar spine on gnathopods 1—2 in females is present in *G. stankokaramani* and *G. macedonicus,* absent in *G. ochridensis, parechiniformis, lychnidensis* and *solidus.*

Proximal part of antenna 1 bearing long setae in *G. lychnidensis* and *G. ochridensis,* bearing short setae in *G. parechiniformis, solidus, stankokaramani* and *macedonicus.*

CONCLUSIONS

The Amphipoda fauna of Ohrid Lake is composed of 3 genera belonging to the family *Gammaridae: Gammarus, Synurella* and *Niphargus.* Each of these genera has endemic species in the Lake.

Within the genus *Gammarus, Gammarus ochridensis*-Complex is the most numerous one, consisting of 6 species: *G. ochridensis* Schäf., *G. parechiniformis* n. sp., *G. lychnidensis* (Schell.)., *G. solidus* n. sp., *G. stankokaramani* G. Kar. and *G. macedonicus* G. Kar.

Although the distribution area of these species in Ohrid Lake is still poorly known, because we studied a few samples only, some very interesting datas were observed.

In the littoral zone of Ohrid Lake live *G. ochridesis* and *G. parechiniformis,* usually from 0—20 meters depth, ooccasionally up to 40 meters depth. *G. ochridensis* lives prevalently in the shallow coastal waters under stones, and *G. parechiniformis* lives prevalently in the springs along the coast of the Lake.

The species *G. lychnidensis, G. stankokaramani, G. macedonicus* and *G. solidus* live in deeper parts of the Lake, usually from 20—240 meters; these species was colected often in mixed populations consisting 2—3 species each.

The ecology of all species is still unknown, so that the ecological „niche" of each of these species in the Lake is unknown also.

Concerning the origin of *G. ochridensis*-Complex, we consider that all 6 studied species belong to *Gammarus balcanicus*-group, forming 3 groups of species: one group consisting of *G. stankokaramani* and *G. macedonicus;* group consisting of *G. ochridensis, G. parechiniformis* and *G. solidus* and group consisting of *G. lychnidensis.*

Our present knowledge of these species not permit us to conclude if all 6 species have the same origin of one species or not.

The genus *Echninogammarus* Stebb. is not present in Ohrid Lake, although in Skadar Lake, which is in connection with Ohrid Lake through Drim River, live 2 *Echinogammarus* species: *E. scutarensis* Schäf. and *E. veneris* Hell. Recently (1976) we submerged genera *Chaetogammarus* and *Pectenogammarus* into genus *Echinogammarus* as synonyms.

REFERENCES

Dybovsky B. N. (1874): Beiträge zur näheren Kenntnis der in dem Baikal-See vorkommenden niederen Krebsen aus der Gruppe der Gammariden. Russ. Entomolog. Ges. Petersburg, 10:1—190.

Karaman G. (1968): Quelques aspects de la faune de l'eau douce en Yougoslavie. Trav. Museum Hnst. Nat. Grigore Antipa, Cent. G. Antipa 1867—1967, Bucarest, 8:49—58.

Karaman G. (1973): 53 Contribution to the Knowledge of the Amphipoda. Some new or very interesting Gammarus species from southern Europe and Asia Minor. Poljoprivreda i šumarstvo, Titograd, 19(3): 1—42.

Karaman G. (1974 a): 58. Contribution to the Knowledge of the Amphipoda. Genus Synurella Wrzes. in Yugoslavia with remarks on its all World known species, their synonymy, bibliography and distribution (fam. Gammaridae). Poljoprivreda i šumarstvo, Titograd, 20 (2—3): 83—133.

Karaman G. (1974b): Catalogus Faunae Jugoslaviae, Amphipoda (60. Contribution to the Knowledge of the Amphipoda). Catalogus Faunae Iugoslaviae 3(3):1—42, Ljubljana, Acand. Sc. Art. Slov.

Karaman G. (1976a): 69. Contribution to the Knowledge of the Amphipoda. Revision of the Echinogammarus Genera-Complex (fam. Gammaridae). Arhiv bioloških nauka, Beograd (in press).

Karaman G. (1976b): Contribution to the Knowledge of the Amphipoda 75. Description of one new species of the Genus Gammarus (family Gammaridae) from the Ohrid Lake, G. stankokaramani n. sp. Poljoprivreda i šumarstvo, Titograd, 22 (1):78—96.

Karaman G. (1976c): Contribution to the Knowledge of the Amphipoda 76. Gammarus macedonicus n. sp., one new species from Ohrid Lake. Mus. Mac. Sc. Nat. Skoplje, posebno izdanje 7:71—80.

Karaman S. (1929a): Beiträge zur Kenntnis der Amphipoden Jugoslaviens. Zoolog. Anzeiger, 85 (9—10):218—225.

Karaman S. (1929b): II. Beitrag zur Kenntnis der Amphipoden Jugoslaviens. Glasnik Zem. muzeja u Bosni i Hercegovini, 41 (1):83—100.

Karaman S. (1931): III. Beitrag zur Kenntnis der Amphipoden Jugoslaviens sowie einger Arten aus Griechenland. Prir. Razprave, Ljubljana, 1:31—66.

Karaman S. (1943): Die Unterirdische Amphipodei Südserbiens. Srpska akad. nauka, Pos. izd. 135 (4):161—312, Beograd.

Schäferna K. (1925): Gammaridea ze sberu prof. Dra. Julia Komareka v Makedonii. Vest. Kral. Ces. Spol. Nauk Praha, 2:1—15.

Schellenberg A. (1937): Schlüssel und Diagnosen der dem Süsswasser--Gammarus nahestenden Einheiten ausschliesslich der Arten des Baikalsees und Australiens. Zooloo. Anzeiger, 117 (11—12):267—280.

Schellenberg A. (1943): Die Amphipoden des Ochridasees. Zoolog. Anzeiger, 143 (3—4):97—103.

Stanković S. and Pljakić, M. (1962): Variabilité intraspecifique des Amplipodes et des Isopodes endemiques du lac d'Ohrid. Izdanija, Zbornik na Dr. S. Karaman, 3 (2):67—97, Skoplje.

Straškraba M. (1967): Amphipoda, in: Limiofauna Europaea, Stuttgart 1967, pp. 202—209.

77. ПРИЛОГ ПОЗНАВАЊУ AMPHIPODA. *GAMMARUS OCHRIDENSIS* SCHÄF. КОМПЛЕКС ВРСТА ОХРИДСКОГ ЈЕЗЕРА

*Гордан С. КАРАМАН**

Резиме

Студија Amphipoda Охридског језера показала је да се под врстом *Gammarus ochridensis* Schäf. у ствари крило 6 различитих врста које су по спољашњем изгледу доста сличне али се низом карактера јасно разликују међусобно. Те врсте су: *Gammarus ochridensis* Schäf. 1925. *G. parechiniformis* n. sp., *G. lychnidensis* (Schell. 1943)., *G. solidus* n. sp., *G. stankokaramani* G. Kar. 1976b i *G. macedonicus* G. Kar. 1976c.

Врсте *G. ochridensis* и *G. parchiniformis* живе у обалној плићој зони овог језера, као и у изворима по његовом ободу, док се врсте *G. macedonicus, G. stankokaramani, G. solidus и G. lychnidensis* налазе у дубљим зонама Охридског језера, често у мјешовитим популацијама.

Кључ за опредјељивање врста Gammarus ochridensis комплекса Охридског језера

1. Бич друге антене носи на унутрашњем рубу низ кратких длака које формирају четку. Трећи сегмент палпуса мандибуле носи Ц-длаке (калцеола нема)

G. macedonicus G. Kar. 1976c

— Бич друге антене на унутрашњем рубу нема многобројних кратких длака које формирају четку. Трећи сегмент палпуса мандибуле без Ц-длака — — — — — — — — — — — — — 2

2. Друга антена у женки носи калцеоле (палма првог и другог гнатопода у женки са средњим палмарним трном)

G. stankokaramani G. Kar. 1976b

Друга антена у женки без калцеола — — — — — — — 3

3. Трећи сегмент дршке прве антене једнако дуг или дужи од првог сегмента дршке. Друга антена у мужјака без калцеола (дршка прве антене са дугим длакама на вентралној страни)

G. lychnidensis (Schell. 1943).

— Трећи сегмент дршке прве антене краћи од првог сегмента дршке.

Друга антена у мужјака са калцеолама — — — — — — 4

4. Унутрашња површина другог сегмента переопода 6—7 у мужјака са длакама. Друга и трећа епимера са многобројним длакама.

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Предњи руб переопода 5—7 са трновима и многобројним дугим длакама (трећи и четврти переоподи умјерено длакави)

G. solidus n. sp.

— Унутрашња површина другог сегмента переопода 6—7 у мужјака без длака. Друга и трећа епимера са трновима, понекад уз њих долазе и 1—2 длаке. Предњи руб переопода 5—7 само са трновима — — — — — — — — — — — — — — — 5

5. Вентрални руб дршке и проксималних сегмената бича прве антене са дугим длакама. Друга антена са дугим длакама

G. ochridensis Schäf. 1925

— Вентрални руб дршке и проксималних сегмената бича прве антене са кратким длакама. Друга антена са кратким длакама

G. parechiniformis n. sp.

Дијагноза врсте Gammarus ochridensis Schäf. 1925

Дужина тијела до 18 mm. Трећи мезозомални сегмент гладак, сва три метазомална сегмента са групама трнова и длака на дорзалној површини. Урозомални сегменти са једном средњом и двије бочне групе трнова.

Прва антена носи дуге длаке на сегментима дршке и проксималним сегментима бича. Друга антена носи на дршци и бичу дуге длаке, бич друге антене у мужјака носи калцеоле, у женки је без калцеола. Переоподи 3—4 слабо су длакави. Гнатоподи 1—2 носе средњи палмарни трн у мужјака; а женке немају средњи палмарни трн.

Переоподи 5—7 без длака на унутрашњој површини другог сегмента, а сегменти 3—6 са трновима на предњем рубу. Епимере 2—3 средње или јако зашиљене, са трновима на доњем рубу. Уропод 3 слабо длакав.

Дијагноза врсте Gammarus parechiniformis n. sp.

Дужина тијела до 16,7 mm. Мезозомални сегменти глатки, сва три метазомална сегмента носе трнове и длаке на дорзалној површини. Урозомални сегменти као у *G. ochridensis*. Антена 1 носи кратке длаке. Антена 2 носи такође кратке длаке. Бич друге антене у мужјака носи калцеоле, а у женки је без калцеола. Гнатоподи 1—2 у мужјака са средњим палмарним трном; без средњег палмарног трна је у женки. Переоподи 3—4 слабо длакави. Переоподи 5—7 као у *G. ochridensis*. Епимере и уропод 3 као код *G. ochridensis*.

Дијагноза врсте Gammarus lychnidensis (Schell. 1943)

Дужина тијела до 14 mm. Задњи мезозомални и сва три метазомална сегмента глатки или покривени трновима и длакама. Прва антена

носи дуге длаке. Трећи сегмент дршке прве антене једнако дуг или дужи од првог сегмента дршке. Друга антена танка, и носи дуге длаке на дршци и бичу. Калцеола нема ни у мужјака ни у женки. Гнатоподи 1—2 са средњим палмарним трном у мужјака, без средњег палмарног трна у женки. Переоподи 3—4 слабо длакави. Сегмент 2 переопода 5—7 без длака на унутрашњој површини; сегменти 3—6 са трновима на предњем рубу. Епимере умјерено зашиљене и носе трнове на доњем рубу. Уропод 3 слабо длакав.

Дијагноза врсте Gammarus solidus n. sp.

Дужина тијела до 15 mm. Мезозомални сегменти глатки, метазомални сегменти са трновима и длакама на леђној површини. Антена 1 слабо длакава. Антена 2 такође слабо длакава, њен бич носи калцеола у мужјака, а нема калцеола у женки. Гнатоподи 1—2 са средњим палмарним трном у мужјака, без средњег палмарног трна у женки. Переоподи 3—4 умјерено длакави. Сегмент 2 переопода 6 и 7 носи дуге длаке по унутрашњој површини. Предњи руб сегмента 3—6 од переопода 5—7 носе трнове и дуге длаке. Епимере 2—3 умјерено зашиљене и носе многобројне длаке на доњем рубу и површини. Уропод 3 умјерено длакав, његова унутрашња грана достиже 3/5 дужине вањске гране.

Дијагноза врсте Gammarus macedonicus G. Kar. 1976c

Дужина тијела до 14,4 mm. Мезозомални сегменти глатки на леђној површини, метазомални сегменти носе групе трнова и длака. Прва антена слабо длакава и носи кратке длаке. Друга антена умјерено длакава, њен бич носи многобројне кратке длаке на унутрашњем рубу које образују четку. Калцеоле недостају у мужјака и у женки. Трећи сегмент палпуса мандибуле има С-длаке. Гнатоподи 1—2 са средњим палмарним трном и у мужјака и у женки. Переоподи 3—4 слабо длакави. Переоподи 5—7: сегмент 2 без длака по унутрашњој површини; предњи руб сегмената 3—6 носи трнове. Епимере 2—3 умјерено зашиљене и носе трнове на доњем рубу. Уропод 3 слабо длакав.

Дијагноза врсте Gammarus stankokaramani G. Kar. 1976b

Дужина тијела до 19 mm. Задњи мезозомални и сва три метазомална сегмента са групама трнова и длака. Антена 1 слабо длакава. Антена 2 слабо длакава, њен бич у мужјака носи калцеоле; у женки такође носи калцеоле, што је веома риједак случај у роду *Gammarus*. Гнатоподи 1—2 са средњим палмарним трном и у мужјака и у женки. Переоподи 3—4 слабо длакави. Переоподи 5—7: сегмент 2 без длака по унутрашњој површини, сегменти 3—6 са трновима на предњем рубу. Епимере умјерено зашиљене и носе трнове на доњем рубу.

Уропод 3 слабо длакав, његова унутрашња грана достиже од 3/5 до 2/3 дужине првог сегмента вањске гране.