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THE GENUS PARAPHOXUS SARS, 1891 (FAM. PHOXOCEPHALIDAE) IN THE MEDITERRANEAN SEA (CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 171)

ROD PARAPHOXUS SARS, 1891 (FAM. PHOXOCEPHALIDAE) U SREDOZEMNOM MORU (171. PRILOG POZNAVANJU AMPHIPODA)

ABSTRACT

The Genus *Paraphoxus Sars,* 1891 (Fam. *Phoxocephalidae)* in the Mediterranean Sea was studied and its species are described and figured. The new species, *Paraphoxus lincolni,* n. sp. is described from Adriatic (Boka Kotorska Bay) and Mediterranean Sea, and its taxonomic status is discussed. Key to the *Paraphoxus* species from the Mediterranean Sea is composed.

IZVOD

Pročavan je rod *Paraphoxus* Sars, 1891 (fam. *Phoxocephalidae)* u Sredozemnom moru, i njegove vrste su opisane i nacrtane. Iz Jadranskog mora (Bokokotorski zaljev) i Sredozemnog mora, opisana je nova vrsta, *Paraphoxus lincolni,* n. sp., i njen taksonomski položaj je razmatran. Sastavljen je ključ za određivanje vrsta roda *Paraphoxus* u Sredozemnom moru.

INTRODUCTION

The genus *Paraphoxus* was described by S a r s (1891) with the type species *Phoxus oculatus* Sars, 1879 from North Atlantic.

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Chevreux described (1888) a new species, *Phoxus maculatus*, n. sp. from Gascogne Bay (N. Atlantic), removed later by Chevreux (1898) to the genus *Paraphoxus* Sars.

Della Valle redescribed (1893) *Phoxocephalus oculatus* from Bay of Napoli, and Chevreux (1910) mentioned *Paraphoxus maculatus* for the coast of Tunisia.

J. L. Barnard (1960) removed *P. maculatus* to the species *P. oculatus* as synonym.

Later, several authors cited *Paraphoxus oculatus* or *Paraphoxus maculatus* for some localities in the Mediterranean Sea (western part) (Ledoyer, 1968; Febvre-Chevalier, 1969; G. Karaman, 1973; Bellan-Santini & Ledoyer, 1973; Ledoyer, 1977).

We have no more material of *Paraphoxus oculatus* from Atlantic to establish the limits of variability of *P. oculatus* and to prove Barnard's conclusions, and we used his conclusions in our work, i. e. the identity of *P. maculatus* with *P. oculatus*.

During our recent more detailed study of populations of genus *Paraphoxus* from the Mediterranean Sea, we established the presence of two different species, clearly different to each other in several taxonomic characters in males and females.

One of these species agree completely with description and figures of Chevreux (1900) and Chevreux & Fage (1925) of *P. maculatus*, and of Lincoln (1979) of *P. oculatus*, and we mention it under the name of *Paraphoxus oculatus* (Sars, 1879).

The second our species differs clearly from *P. oculatus* (and *maculatus)* by several characteristics, and we consider it as a distinct new species, *Paraphoxus lincolni*, n. sp.

Going back through the literature and descriptions of *P. oculatus* given by various authors in the Mediterranean Sea, we found that the figures and description of *Phoxocephalus oculatus* given by Della Valle (1893) from Bay of Napoli, as well as these given by G. Karaman (1973) of *Paraphoxus oculatus* from Adriatic Sea, agree completely with description and figures of new species, *Paraphoxus lincolni.*

Our more detailed redescription of *Paraphoxus oculatus* from the Mediterranean Sea, we hope, will be usefull, on the one hand, to distinguish more easily *P. lincolni* as a distinct species; on the other hand, to help the further studies of various populations of genus *Paraphoxus* from Atlantic Ocean to establish the limits of the variability of certain species and the relations between Mediterranean and Atlantic taxa.

This work was realized in colaboration with the Institute for Oceanography and Fishery in Split.

Acknowledgments: I am thankful to Dr. Sandro Ruffo from the Museum of Natural History in Verona (Italy) for the loan of part of material used in this study, as well as to

Dr. Roger J. Lincoln from the British Museum (Natural History) in London and Dr. Michael H. Thurston from the Institute of Oceanographic Sciences in Surrey (Great Britain) for the informations about some taxonomic characters of studied species in Atlantic Ocean.

TAXONOMIC PART

Family PHOXOCEPHALIDAE

Genus PARAPHOXUS Sars 1891

Type-species: *Phoxus oculatus* Sars, 1879 (monotypy).

Short diagnosis: Rostrum developed, eyes present. Antenna 1 short in males and females, antenna 2 long in males. Mandibular palp 3-segmented, slender. Maxilla 1 with 2-segmented palp, inner plate with 2 setae, outer plate with 11 spines.

Maxilliped with short inner and outer plates. Gnathopods 1 and 2 like these in genus *Harpinia;* pereopods 3—4, 6 and 7 like these in genus *Harpinia;* pereopod 5 with broad, lobed segment 2. Epimeral plate 3 subrounded ventroposteriorly. Uropods 1—3 like these in genus *Harpinia.*

Taxa: known several species, two of them in the Mediterranean Sea : *oculatus* (Sars, 1879), *lincolni,* n. sp. Numerous other *Paraphoxus* species from Atlantic and Pacific have been later removed to other different genera.

Key to the Species (Mediterranean Sea only): (males and females)

1. Segment 6 of gnathopods 1 larger than that of gnathopod 2. Peduncle of uropods 1 and 2 with well developed distolateral comb, rami pointed distally, without distal strong spine, but with distal flake... P. LINCOLNI, n. sp.

— Segment 6 of gnathopods 1 and 2 subequal in size. Peduncle of uropods 1 and 2 without distolateral comb, rami with distal strong spine, without flake... P. OCULATUS (Sars)

PARAPHOXUS OCULATUS (Sars, 1879)

figs.: I — IV

Phoxus oculatus Sars 1879: 441; Sars 1885: 154, pl. 13, fig. 4, 4a — e.
Phoxus maculatus Chevreux 1888 : 2.

Paraphoxus maculatus Chevreux 1898: 477; Stebbing 1906: 723; Chevreux 1900: 34, pl. 5, fig. 5; Chevreux 1910: 187, pl. 10, fig. 12, 13; Chevreux & Fage 1925: 103, fig. 97; Ledoyer 1968: 191; Bellan-Santini & Ledoyer 1973: 924.

Paraphoxus oculatus Sars 1891: 149, pl. 51; Stebbing 1906: 137; Barnard, J. L. 1960: 240, pl. 27, 28; Lincoln 1979: 368, fig. 174 a-j; Barnard, J. L. & Drummond, 1978: 145.

nec *Paraphoxus oculatus* G. Karaman 1973: 91 (= *P. lincolni).*

nec *Phoxocephalus oculatus* Della Valle 1893: 740 (= *P. lincolni).*

Loc. typ.: Jan Mayen (N. Atlantic).

Material examined: N. ATLANTIC: Liholmene, coast of Norway, depth 40 m (E-132-69), 1 exp. (leg?) (Verona Mus. Coll.);

MEDITERANEAN SEA: Bay of Napoli (ITALY):

— Off Punta Caruso, Ischia, detritus of Posidonia, Oct. 29, 1969, 15 spec. (leg. U. Schiecke) (Verona Mus. Coll.);
— Off Baia near Forio, depth 140 m, May 6, 1968, 5 spec. (leg. U. Schiecke) (Verona Mus. Coll.);
— Off Forio, depth 100 m, May 6, 1968, one spec. (leg. U. Schiecke) (Verona Mus. Coll.);
— N. of Ischia, depth 120 m, June 1968, 10 spec. (leg. U. Schiecke) (Verona Mus. Coll.);
— Vervece, corraligenous bottom ,depth 55—70 m, May 4, 1970, 8 spec. (leg. U. Schiecke) (Verona Mus. Coll.).

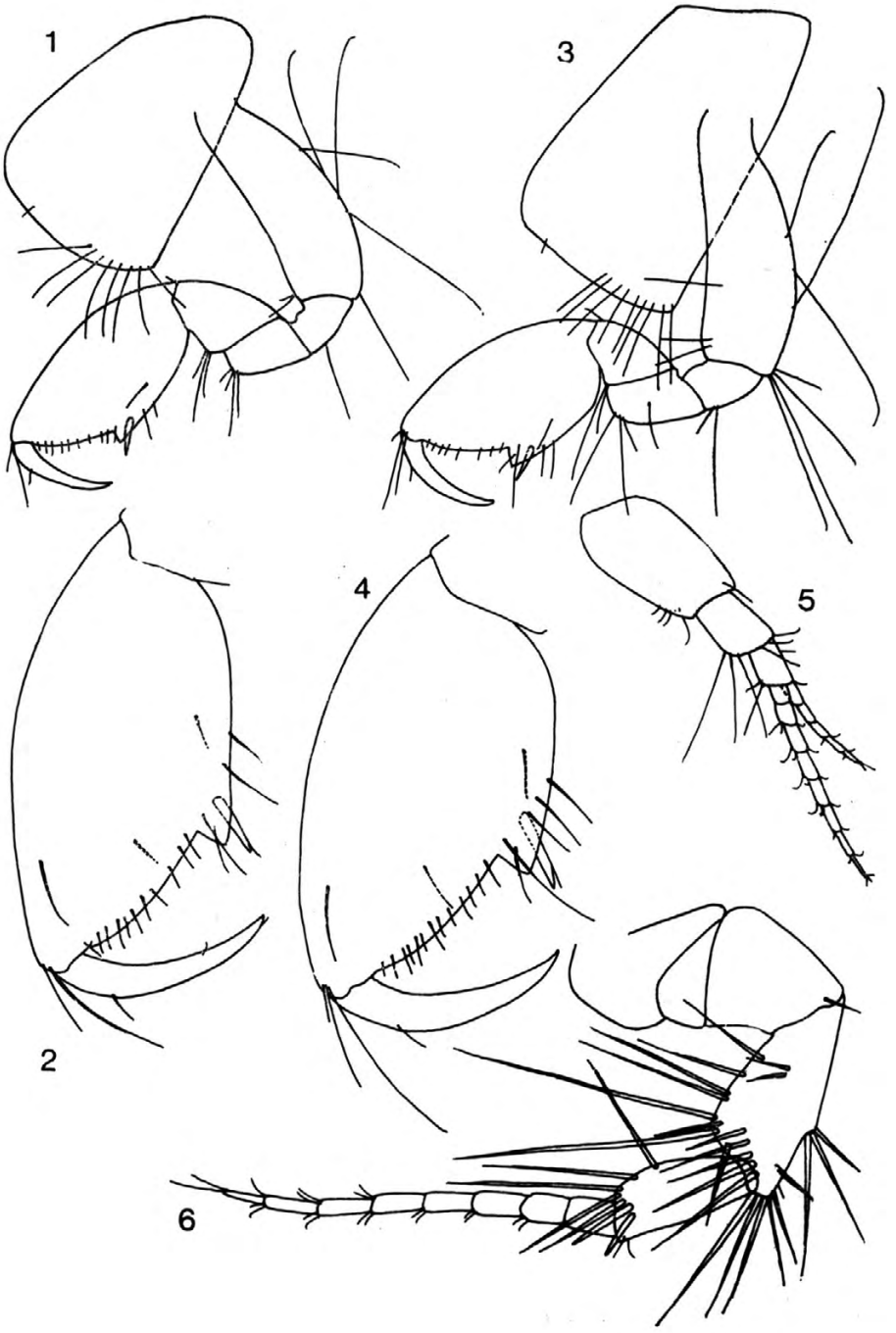
Description: Ovig, female 2.9 mm. Body smooth; Head with well developed rostrum, but without dorsal carina (fig. II, 4), eyes ovoid, moderate (fig. II, 4). Antenna 1: peduncular segments 1—3 progressively shorter, poorly setose, main flagellum with 8 articles, accessory flagellum with 5 articles (fig. I, 5).

Antenna 2: ensiform process on peduncle absent, peduncular segments 4 and 5 with numerous long slender spines, main flagellum long, with 8 articles (fig. I, 6).

Mouthparts like these of *P. lincolni.* Labium with inner lobes. Maxilla 1: inner plate with 2 setae, outer plate with 11 spines, palp 2-segmented. Mandibular palp with linear 3 articles. Both plates of maxilliped small.

Fig. I. *Paraphoxus oculatus* (Sars, 1879), Bay of Napoli (Punta Caruso), female 2.7 mm: 1—2 = gnathopod 1; 3—4 = gnathopod 2; 5 = antenna 1; 6 = antenna 2.

Sl. I. *Paraphoxus oculatus* (Sars, 1879). Napuljski zaljev (Punta Caruso); ženka 2,7 mm: 1—2 = gnatopod 1; 3—4 = gnatopod 2; 5 = antena 1; 6 = antena 2.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Coxae 1—3 progressively longer, with row of up to 9 submarginal setae (fig. I, 1, 3; II, 3), coxa 4 lobed, poorly setose (fig. II, 1); coxae 5—7 progressively shorter (fig. II, 2; III, 1), coxae 5—6 with posterior lobe larger than anterior one.

Gnathopods 1—2 similar to each other (fig. I, 1, 3), segment 6 of gnathopod 1 as long as that of gnathopod 2 but slightly more narrow (fig. I, 2, 4), palm oblique, convex, defined by one strong corner tooth accompanied by strong corner spine; dactyl slender, with one seta at outer margin sitting in the proximal part of dactyl.

Pereopods 3—4 relatively stout, similar to each other; segment 5 short, at distoposterior margin with one long strong spine almost reaching tip of segment 6, accompanied by row of long setae (fig. II, 1, 5, 6); segment 6 at posterior margin with 2 mediolateral setae, at tip with 2 spines distinctly shorter than dactyl; dactyl distinctly shorter than segment 6, stout, at outer margin wih one seta sitting near the middle of dactyl (fig. II, 5, 6).

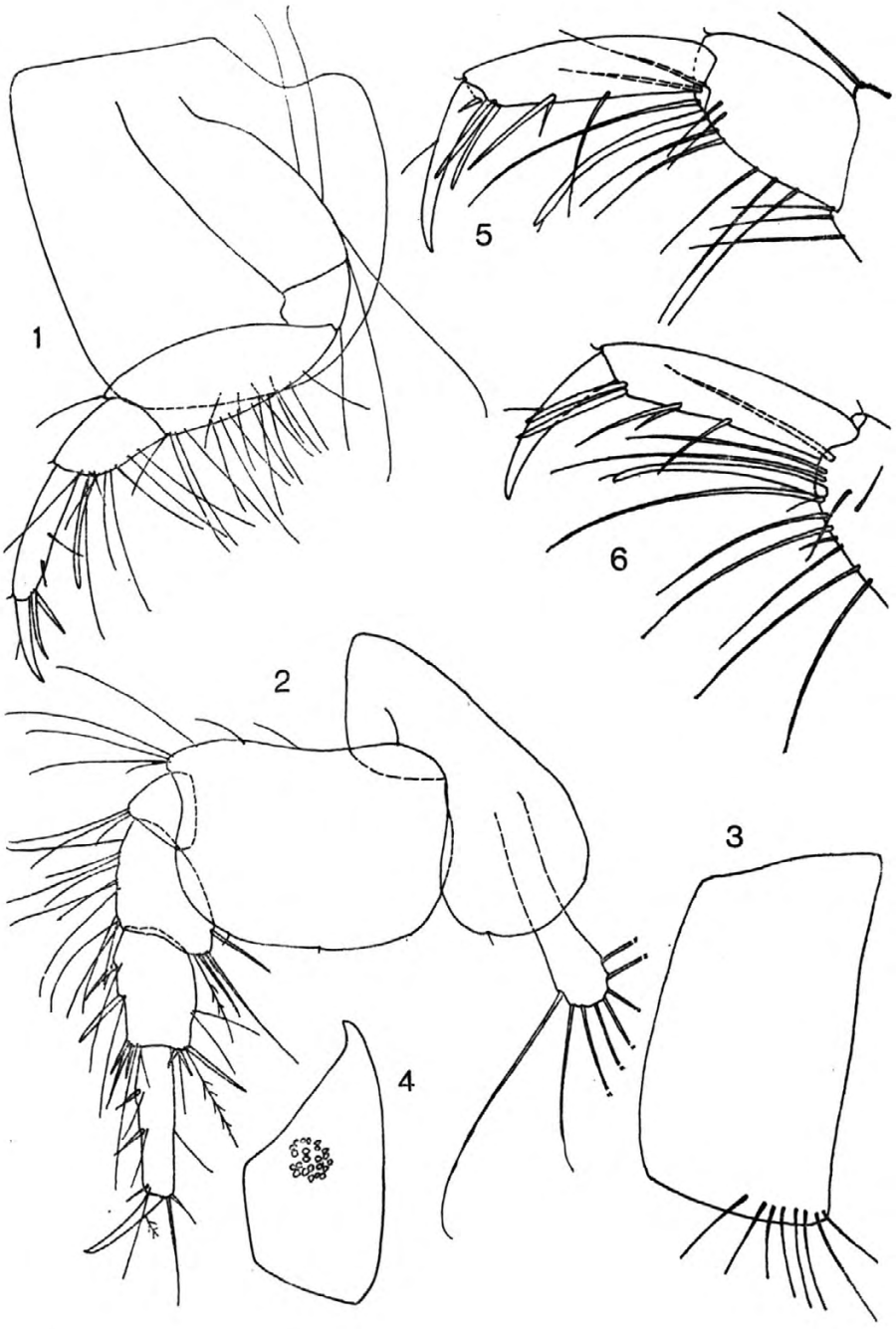
Pereopod 5: segment 2 ovoid, lobed (fig. II, 2) ,at posterior margin with 2—3 very short setae; segments 3—6 at anterior margin with simple setae accompanied on segments 5—6 with spines (fig. II, 2), at posterior margin of segments 4—5 appear simple and plumose setae accompanied by single spines, dactyl shorter than segment 6.

Pereoopd 6: segment 2 ovoid, with distinct ventroposterior lobe poorly setose along posterior margin (fig. IV, 6); segments 4—6 along both margins with short spines, accompanied at posterior margin of segments 5—6 with simple setae (fig. IV, 6), at segment 4 with simple and plumose setae (fig. IV, 6); dactyl much shorter than segment 6.

Pereopod 7: segment 2 large, with moderately serrate ventroposterior margin bearing short single seta on each incision (fig. III, 1); ventroposterior lobe long, reaching or exceeding tip of segment 4; segments 3—4 poorly dilated only, segments 4—6 with simple setae at both margins, dactyl only slightly shorter than segment 6 (fig. III, 1).

Fig. II. *Paraphoxus oculatus* (Sars, 1879), Bay of Napoli (Punta Caruso), female 2.7 mm: 1 = pereopod 4; 2 = pereopod 5; 3 = coxa 3; 4 = head; 5 = pereopod 3, female 2.9 mm; 6 = pereopod 6, female 2.5 mm.

Sl. II. *Paraphoxus oculatus* (Sars, 1879), Napuljski zaljev (Punta Caruso), ženka 2.7 mm: 1 = pereopod 4; 2 = pereopod 5; 3 = koksa 3; 4 = glava; 5 = pereopod; 3, ženka 2,9 mm; 6 = pereopod 6, ženka 2.5 mm.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Pleopods with 2 retinacula accompanied by one plumose seta.

Epimeral plates 1—2 subangular, with subventral simple and/or plumose setae (fig. III, 2), epimeral plate 3 with subrounded ventroposterior corner and convex smooth posterior margin, without any setae (fig. III, 2).

Uropods 1—2 moderately slender. Uropod 1: peduncle on proximal tip near urosomite with 1 lateral seta (fig. III, 5, 6) and with 2 laterofacial setae; peduncle with 2 dorsoexternal and 2 dorsointernal spines; outer ramus longer than inner one, both rami with 1—2 lateral spines and one strong stout distal (subgeniculate) spine (no flake) (fig. III, 5, 6).

Uropod 2: peduncle with 1 laterofacial seta and row of dorsomedian spines (fig. III, 5, 6), outer ramus longer than inner one, rami with 1 lateral (dorsal) spine and short strong distal (subgeniculate) spine, no flake. Peduncle of uropods 1—2 without distolateral comb.

Uropod 3: peduncle short, with 3—4 long slender spines at distoexternal tip (fig. III, 3); inner ramus short, reaching half of first segment of outer ramus, bearing one distal seta (fig. III, 3), first segment of outer ramus without mediolateral setae along inner margin, at outer margin with 2 groups of mediolateral setae; second segment of outer ramus short, with 2 unequal distal setae.

Telson incised nearly to the basis ,each lobe with 1—2 distal spines accompanied by 1 short seta; a pair of short plumose setae appears near the middle of each lobe (fig. III, 4).

Coxal gillis occur on pereonites 2—7, simple, ovoid. Oosteogyts occur on pereonites 2—5, narrow, setose (fig. II, 2).

M a l e s : length up to 3 mm. The males like females by numerous characters, including presence of stout strong distal spine on both rami of uropods 1—2, absence of distolateral comb on peduncle of uropods 1—2 (fig. IV, 3), shape of gnathopods and pereopods 3—7.

Head with strong rostrum, eyes large, ovoid (fig. IV, 1), antenna 1 with peduncle bearing numerous ventral setae on first

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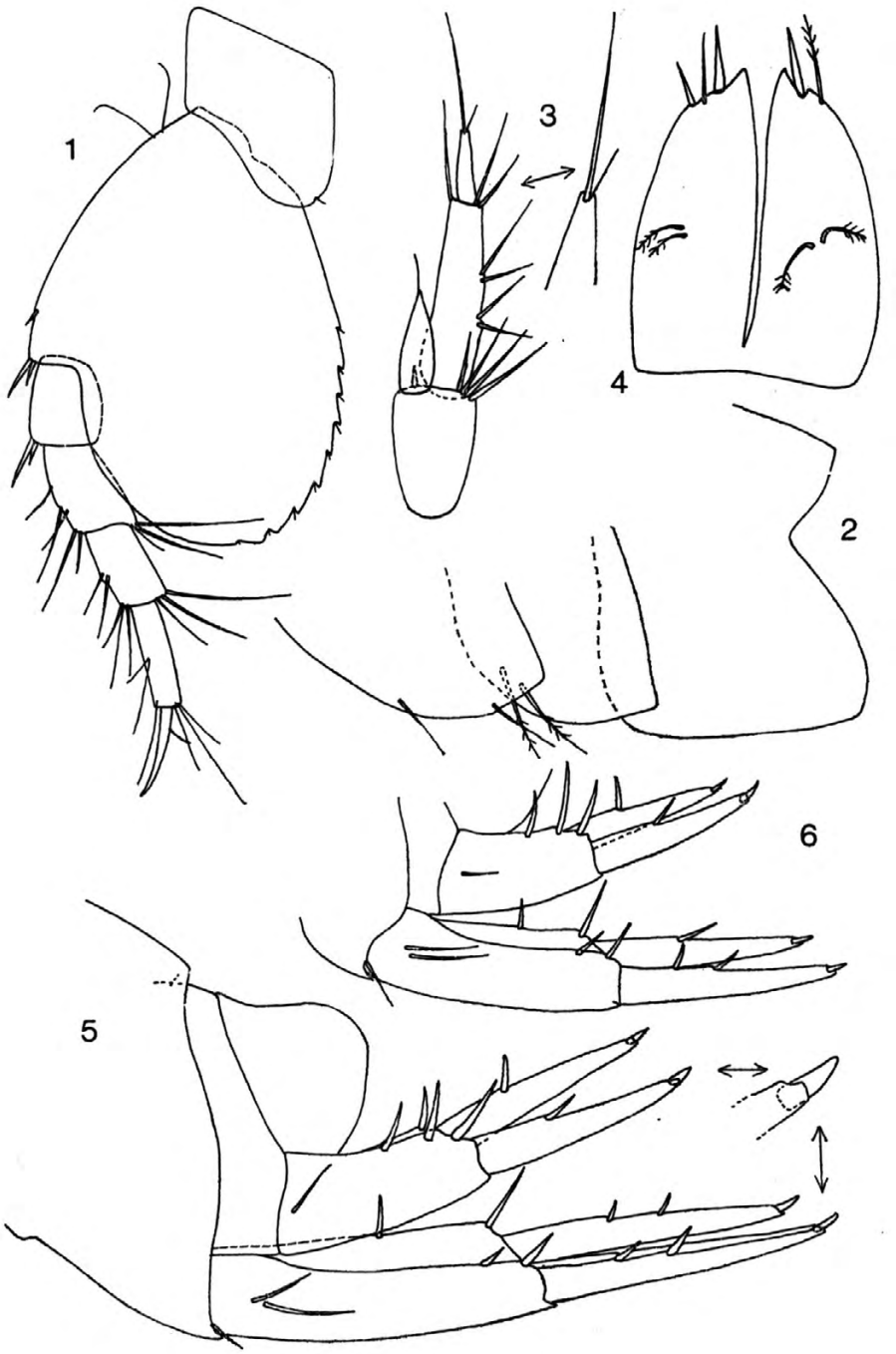
Fig. III. *Paraphoxus oculatus* (Sars, 1879), Bay of Napoli (Punta Caruso), female 2.7 mm: 1 = pereopod 7; 2 = epimeral plates 1—3; 3 = uropod 3, female 2.9 mm; 4 = telson, female 2.9 mm; 5 = urosome with uropods, female 2.9 mm; 6 = urosome with uropods, female 2.5 mm.

Sl. III. *Paraphoxus oculatus* (Sars, 1879), Napuljski zaljev (Punta Caruso), ženka 2.7 mm; 1 = pereopod 7; 2 = epimere 1—3; 3 = uropod 3, ženka 2.9 mm; 4 = telzon, ženka 2.9; 5 = urozom sa uropodima, ženka 2.9 mm; 6 = urozom sa uropodima, ženka 2.5 mm.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segment (fig. IV, 1), main flagellum with 7 articles, accessory flagellum with 5 articles (fig. IV, 1).

Antenna 2 very long, almost reaching the length of body (fig. IV, 1), fourth peduncular segment along dorsal margin with numerous short setae (brush) (fig. IV, 1), flagellum multisegmented.

Uropod 3 : both rami at outer and inner margin with long plumose setae (fig. IV, 4), inner ramus reaching tip of first segment of outer ramus; tip of outer and inner ramus with 2 long distal plumose setae each (fig. IV, 4).

Non adult males with uropod 3 like that in females, but inner ramus elongated, reaching tip of first segment of outer ramus, and bearing 1 distal seta (fig. IV, 5).

Variability: Rami of uropods 1—2 can be slender to slightly stout (fig. III, 5, 6).

Distribution: North Atlantic, Pacific, Mediterranean Sea.

Remarks and Affinities. Our specimens in hands from the Mediterranean Sea and N. Atlantic (England) agree completely with descriptions and figures of species given by J. L. Barnard (1960) from Pacific and Lincoln (1979) from England sub name of *Paraphoxus oculatus*, as well as with these given by Chevreux (1900, 1910) and Chevreux & Fage (1925) from N. Atlantic (coast of France) and Mediterranean Sea (Tunisia) sub name of *Paraphoxus maculatus;* although, Chevreux (1900, p. 35) mentioned that *P. maculatus* differs from *P. oculatus by:* shorter rostrum, longer antennae, small number of submarginal setae on anterior soxae (only 6 setae on coxa 1), shorter dactyl of pereopods 3—4, shorter inner ramus of uropod 3, as well as by different color of the body.

But, figures and descriptions of Sars (1885, 1891) of *P. oculatus* indicated already short inner ramus of uropod 3 and long flagellum of antenna 2 in females.

On the other hand, the figures and descriptions of *P. oculatus*, given by Sars (1885; 1891) differ from our specimens from the Mediterranean Sea and N. Atlantic, as well as of these mentioned and figured by Lincoln (1979) from England and mentioned sub na-

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Fig. IV. *Paraphoxus oculatus* (Sars, 1879), Bay of Napoli, male 2.5 mm: 1 = head; 2 = tip of mandibular palp; 3 = uropods 1—2; 4 = uropod 3, male 3 mm; 5 = uropod 3, juv. male 2.9 mm; 6 = pereopod 6, female 2.7 mm.

Sl. IV. *Paraphoxus oculatus* (Sars, 1879) Napuljski zaljev, mužjak, 2.5 mm: 1 = glava; 2 = vrh mandibularnog palpusa; 3 = uropodi 1—2; 4 = uropod 3, mužjak 3 mm; 5 = uropod 3, juv. mužjak 2.9 mm; 6 = pereopod 6, ženka 2.7 mm.


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me of *P. oculatus*, by (?longer) inner ramus of uropod 3 bearing 2 distal setae, long dactyl of pereopods 3—4, higher number (14) submarginal setae on coxa 1, very slender and long article 4 of maxilliped palp and by more oblique posterior margin of epimeral plate 3; however, segment 6 of gnathopods 1—2 and antenna 2 are of the same size, what suggested that *Paraphoxus lincolni* can be not identic with *P. oculatus* also.

It is not possible to exclude completely the possibility that *Paraphoxus oculatus* of Sars is not identic with *P. oculatus* mentioned by all other authors, including Lincoln (1979) and this our paper (in this case, the name *P. maculatus* will be reestablished as a distinct taxon). But, without the reexamination of the topotypic material of *P. oculatus* of Sars is not possible to resolve this problem.

Localities cited from Mediterranean Sea: Off France: Gulf of Fos (Fevre-Chevalier, 1969); Maerl (Marseille region) (Ledoyer, 1968); Fos and Riou (Bellan-Santini & Ledoyer, 1973); Canyon de Planier, 160—360 m depth; Canyon de Cassidaigne, 170—400 m depth; Banc des Blauquieres, 180—300 m; SE. of Planier, 90—120 m depth; SW. of Planier, 100 m depth; S. of Embiez, depth 100—220 m; SE. of island Riou, depth 100—115 m; S. of island Riou, depth 100 m; N. of Ratonneau (Ledoyer, 1977);

Tunisia: between Galite and Cap Serrat (37° 20'N, 6° 51'E, depth 170 m, on muddy bottom (Chevreux, 1910; Chevreux & Fage, 1925).

PARAPHOXUS LINCOLNI, n. sp.*

figs.: V — VIII

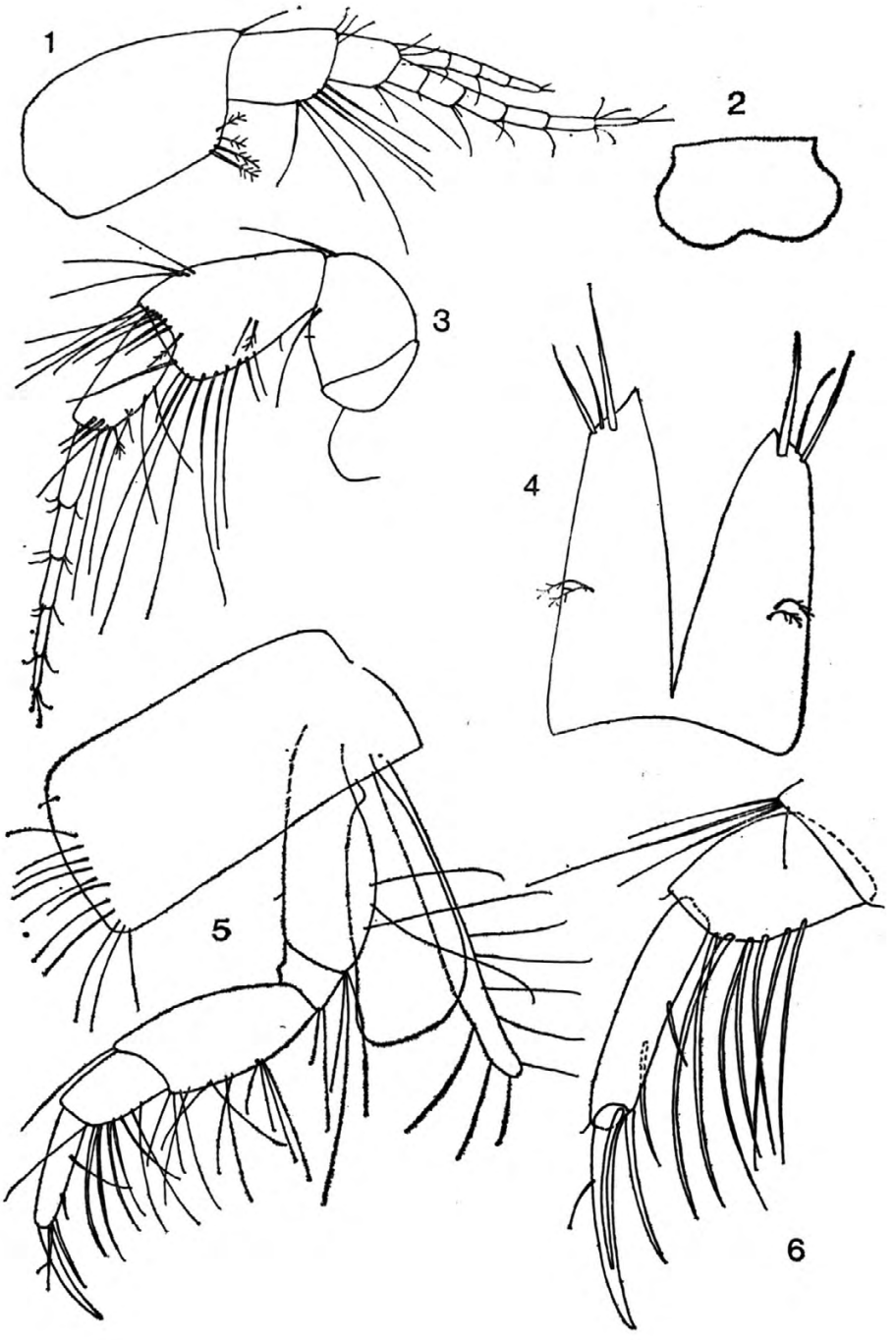
Phoxocephalus oculatus Della Valle 1893: 740, pl. 5, fig. 5; pl. 35, fig. 19 — 28.

Paraphoxus oculatus G. Karaman 1973: 91, pl. 25 — 28.

* This species is dedicated to Dr. *Roger J. Lincoln* from the British Museum (Natural History) in London, for his important contributions to the knowledge of the marine Amphipoda.

Fig. V. *Paraphoxus lincolni*, n. sp., Bay of Napoli, female 2.6 mm: 1 = antenna 1; 2 = labrum; 3 = antenna 2; 4 = telson; 5—6 = pereopod 3.

Sl. V. *Paraphoxus lincolni*, n. sp., Napuljski zaljev, ženka 2.6 mm: 1 = antena 1; 2 = labrum; 3 = antena 2; 4 = telzon; 5—6 = pereopod 3.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Loc. typ.: Boka Kotorska Bay (Adriatic Sea, Yugoslavia).

Material examined: ADRIATIC SEA, Boka Kotorska Bay : P. 11, depth 21 m, Jan. 28, 1964, 2 spec.; P. 17, depth 33 m, Jan. 28, 1964, 2 spec.; P. 24, depth 20 m, May 28, 1963, 1 spec.; P. 25, depth 32 m, May 28, 1963, 2 spec.; ibid., Sept. 28, 1963, one spec.; P. 26, depth 35 m, Jan. 26, 1964, 4 spec.; P. 34, depth 14 m, Jan. 27, 1964, one spec.; P. 36, depth 27 m, March 28, 1964, one spec.; P. 40, depth 12 m, Sept. 28, 1963, one spec.; P. 45, depth 37.5 m, Jan. 27, 1964, one spec.; P. 47, depth 22 m, Oct. 9, 1963, one spec.; P. 49, depth 35 m, Jan. 27, 1964, one spec.; ibid., April 4, 1964, one spec.; P. 58. depth 18 m, Jan. 27, 1964, one spec.; ibid., April 3, 1964, 3 spec.; P. 59, depth 18 m, May 29, 1963, 2 spec.; P. 65, Oct. 9, 1963, depth 37 m, 6 spec.; P. 75, depth 36 m, Jan. 24, 1964, one spec.; P. 82, depth 42 m, Jan. 22, 1964, one spec.; P. 84, depth 44 m, Jan. 22, 1964, one spec. (leg. G. Karaman);

BAY OF NAPOLI (ITALY, TYRRHENIAN SEA):

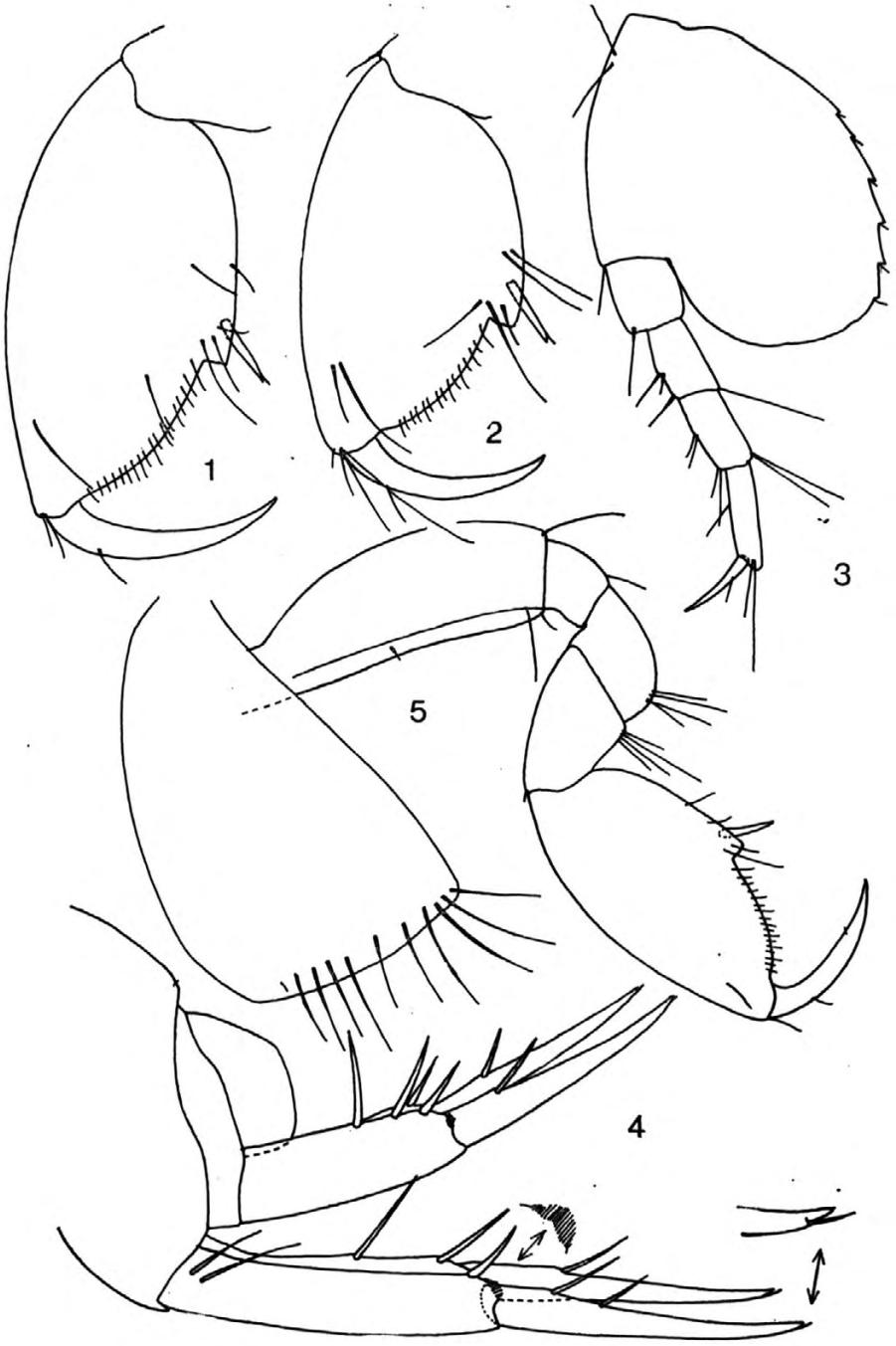
— NW. of Ischia Porto, mudd, depth 110 m, Jan. 17, 1970, 2 spec. (leg. U. Schiecke); ibid., mudd, depth 105 m, Jan. 17, 1970, one spec. (leg. U. Schiecke); ibid., mudd, depth 100—105 m, June 27, 1968, 2 spec. (leg. U. Schiecke);
— Ischia Porto, mudd, depth 100—110 m, Jan. 17, 1970, one spec. (leg. U. Schiecke);
— Ischia North, depth 70 m, May 19, 1968, 2 spec. (leg. U. Schiecke);
— SW. of Punta S. Pancrazio, mudd, depth 150 m, Jan. 17. 1970, one spec. (leg. U. Schiecke);
— N. of Ischia Porto, mudd, depth 90 m, May 16, 1968, 2 spec. (leg. U. Schiecke).

Description: G. Karaman gave (1973) a detailed description of this species under the name of *Paraphoxus oculatus* (Sars), omitting only the presence of comb on peduncle of uropods 1—2. The discovery of new localities of this species in the Mediterranean Sea showed the limits of the variability, and we present here the short description of this new species, based on material from Boka Kotorska and Bay of Napoli.

Female ovig. up to 3 mm long. Body smooth, urosome low. Head without dorsal longitudinal carina and with subrounded anterior tip, eyes small, ovoid (fig. VII, 7).

Fig. VI. *Paraphoxus lincolni*, n. sp., Bay of Napoli, female 2.6 mm: 1 = gnathopod 1; 2 = gnathopod 2; 3 = pereopod 7; 4 = urosome with uropods; 5 = gnathopod 1, female 3 mm from Boka Kotorska.

Sl. VI. *Paraphoxus lincolni*, n. sp., Napuljski zaljev, ženka 2.6 mm: 1 = gnatopod 1; 2 = gnatopod 2; 3 = pereopod 7; 4 = urozom sa uropodima; 5 = gnatopod 1, ženka 3 mm iz Boke Kotorske.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Antenna 1 short, peduncular segments progressively shorter; main flagellum consisting of 5—6 articles only, accessory flagellum with 4, rather 5 articles (fig. V, 1).

Antenna 2 relatively short, peduncular segment 1 without ensiform process, peduncular segments 4—5 with long setae, flagellum with 5—6 articles only (fig. V, 3).

Labrum weakly incised distally (fig. V, 2), labium with well developed inner lobes. Mandibular molar nontriturative, with distal spines; left lacinia mobilis with 5 teeth, right lacinia mobilis bifurcate, pluritoothed. Mandibular palp 3-segmented, linear, palp segment 2 with 2 setae, segment 3 with 5—6 distal setae only.

Maxilla 1: inner plate small, with 2 distal setae, outer plate with 11 toothed spines, palp slender, 2-segmented. Both plates of maxilla 2 with dista setae only.

Maxilliped: inner plate short, with 3 distal setae, outer plate short, with row of distolateral spine-like setae; palp segment 3 unlobed, segment 4 slender, longer than segment 3, with nail shorter than pedestal (fig. VII, 6).

Coxae 1—4 longer than broad, with entire margins and with row of up to 11 submarginal ventral setae each (fig. V, 5; VI, 5). Coxae 5—7 progresively smaller, coxa 7 unlobed (fig. VII, 4).

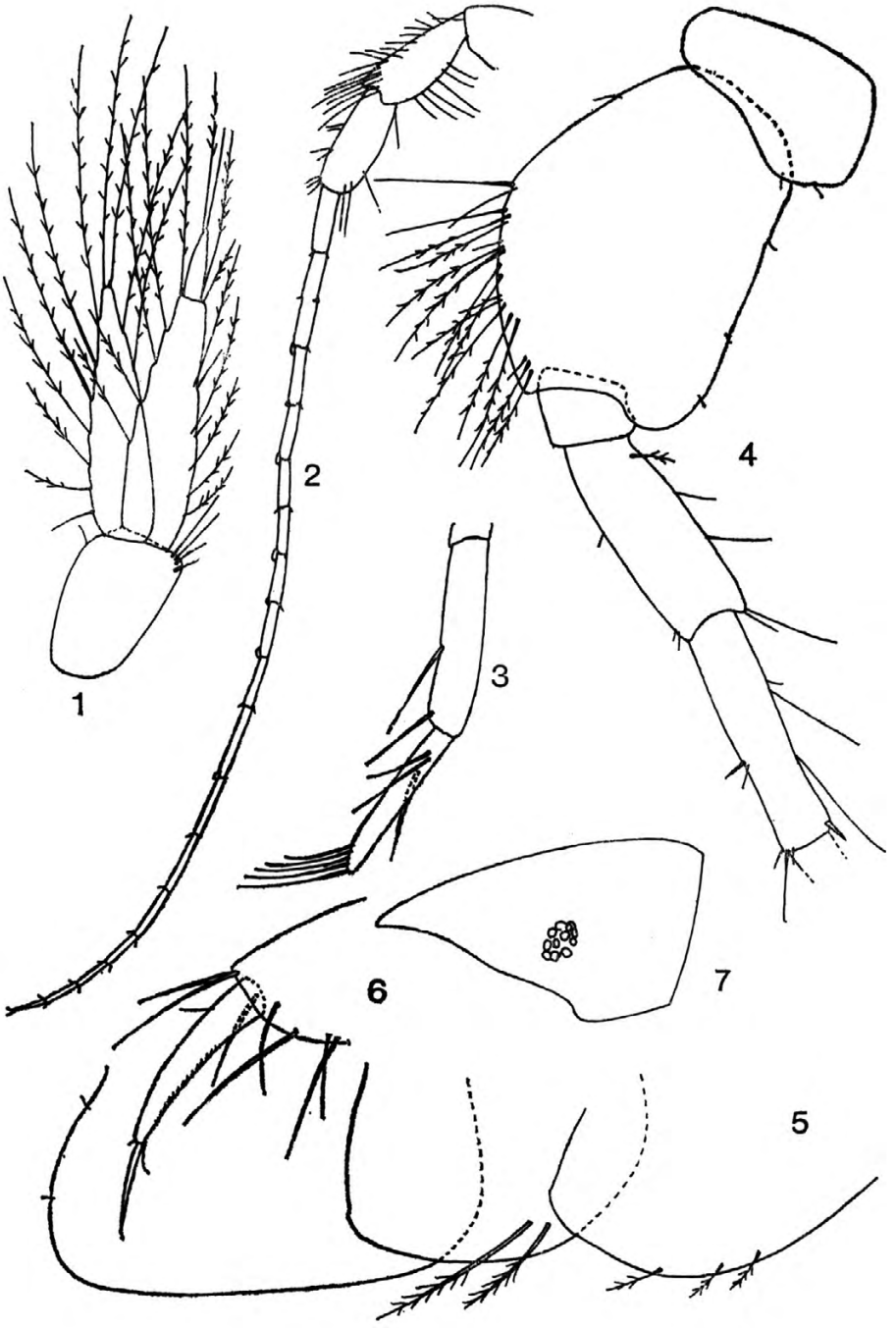
Gnathopods 1—2 of the similar shape and size, but segment 6 of gnathopod 1 is longer than that of gnathopod 2, both with convex oblique palm defined by strong corner tooth acoompanied by strong corner spine (fig. VI, 1, 2, 5); dactyl recurved, slender, at outer margin with seta sitting in the proximal part of dactyl.

Pereopods 3—4 stout, subequal in size and shape; their segmegt 5 is short, at distoposterior margin with row of 6—8 long, stronger spine-like setae as long as or longer than segment 6 (no distinct spines were observed) (fig. V, 5, 6); segment 6 at posterior margin with 2 mediolateral setae and at distal margin with 2 long spines slightly shorter than dactyl itself (fig. V, 5, 6); one seta is sitting in proximal part of outer margin of dactyl.

Pereopod 5 like that of *P. oculatus*, with ovoid, lobed segment 2.

Fig. VII. *Paraphoxus lincolni*, n. sp., Boka Kotorska, male 3.1 mm: 1 = uropod 3; 2 = antenna 2; 3 = mandibular palp; 4 = pereopod 6, female 3 mm; 5 = epimeral plates 1—3, female 3 mm; 6 = maxilliped palp, female 2.6 mm from Bay of Napoli; 7 = head, female 2.6 mm from Bay of Napoli.

Sl. VII. *Paraphoxus lincolni*, n. sp., Boka Kotorska, mužjak 3.1 mm: 1 = uropod 3; 2 = antena 2; 3 = mandibularni paplus; 4 = pereopod 6, ženka 3 mm; 5 = epimere 1—3, ženka 3 mm; 6 = palpus maksilipeda, ženka 2.6 mm iz Napuljskog zaljeva; 7 = glava, ženka 2.6 mm iz Napuljskog zaljeva.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Pereopod 6: segment 2 broad, with numerous plumose setae at anterior margin and with well developed ventroposterior lobe (fig. VII, 4); segment 4 at posterior margin with simple and plumose setae, segments 5—6 at both margins with simple setae accompanied with single short spines (fig. VII, 4).

Pereopod 7: segment 2 large, ovoid, with ventroposterior lobe almost reaching distal tip of segment 4, and with poorly serrate posterior margin bearing single short setae in the incisions (fig. VI, 3); segments 3—6 linear, dactyl slightly shorter than segment 6.

Pleopods with 2 retinacula accompanied by one plumose seta.

Epimeral plates 1—2 subangular, with subventral plumose setae (fig. VII, 5); epimeral plate 3 smooth, with subrounded ventroposterior corner and convex posterior margin (fig. VII, 5).

Uropods 1—2 slender and long. Uropod 1: peduncle with 2—3 laterofacial setae (fig. VI, 4), dorsointernal row of 2—4 spines present, distolateral comb well developed; outer ramus longer than inner one, both rami with 1—2 lateral (dorsal) spines, rami distally pointed, with flake (without distal strong spine) (fig. VI, 4).

Uropod 2: peduncle with distolateral comb and dorsal spines (fig. VI, 4); outer ramus longer than inner one, rami with 1—2 lateral spines, rami distally with flake, pointed distally, like these in uropod 1 (fig. VI, 4).

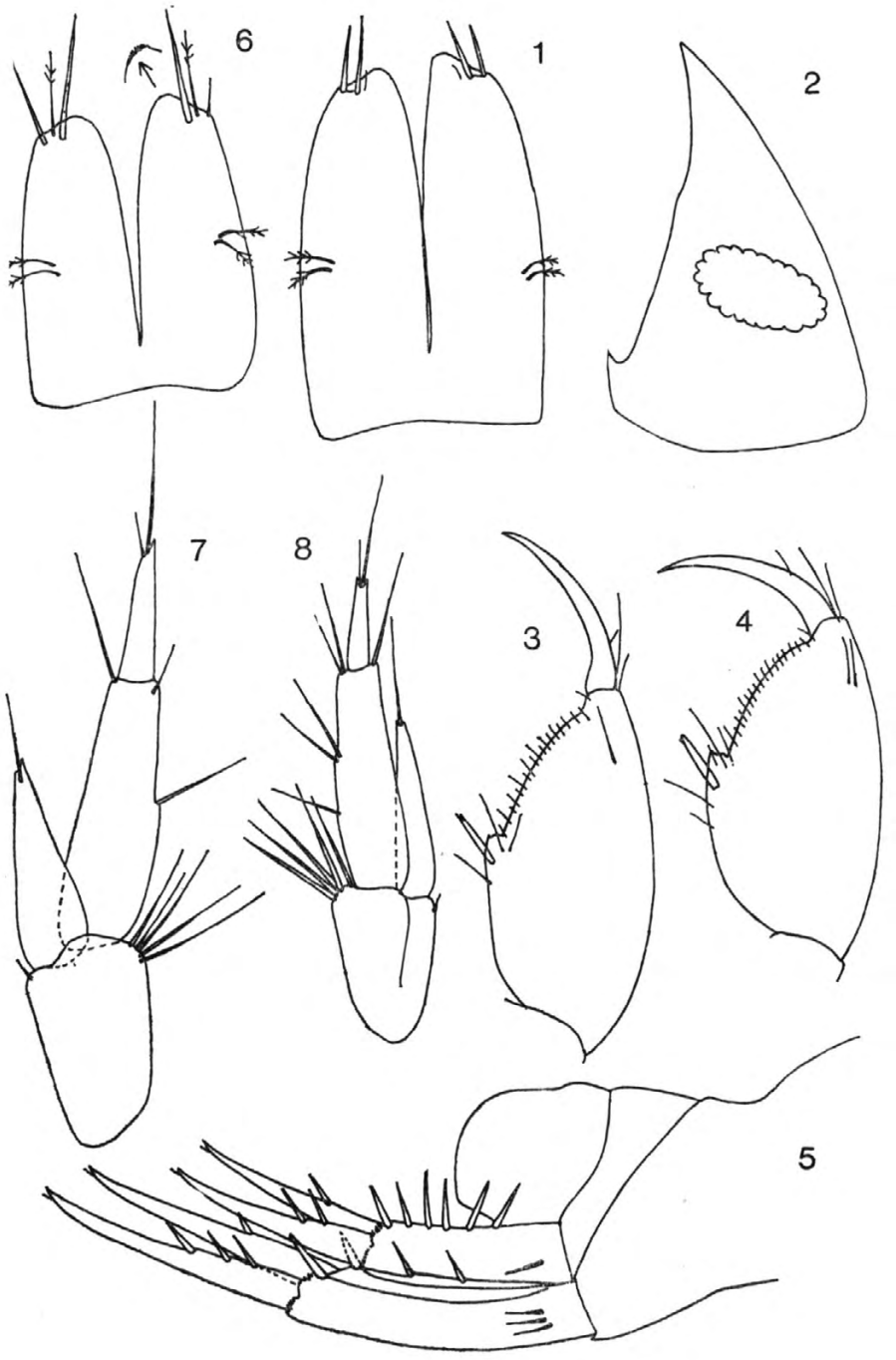
Uropod 3: peduncle with distoexternal bunch of long setae (fig. VIII, 7, 8), inner ramus distinctly exceeding half of first segment of outer ramus, with one longer distal seta; first segment of outer ramus with 1—2 mediolateral bunches of spine-like setae at outer margin, inner margin smooth; second segment shorter, with 2 distal unequal setae (fig. VIII, 7, 8).

Telson narrow, deeply incised, each lobe distally subrounded or tapering (fig. V, 4; VIII, 6), with 2 distal long spine-like setae accompanied often by 1 simple or plumose seta; a pair of short plumose setae appears near the middle of each lobe.

Coxal gills simple, ovoid, occur on pereonites 2—7 (fig. V, 5). Oostegyts narrow, setose, occur on pereonites 2—5 (fig. V, 5).

Fig. VIII. *Paraphoxus lincolni*, n. sp., Boka Kotorska, male 3.1 mm: 1 = telson; 2 = head; 3 = gnathopod 1; 4 = gnathopod 2; 5 = urosome with uropods, male 2.7 mm; 6 = telson, female 3 mm; 7 = uropod 3, female 3 mm; 8 = uropod 3, female 2.6 mm from Bay of Napoli.

Sl. VIII. *Paraphoxus lincolni*, n. sp., Boka Kotorska, mužjak 3.1 mm: 1 = telzon; 2 = glava; 3 = gnatopod 1; 4 = gnatopod 2; 5 = urozom sa uropodima, mužjak 2.7 mm; 6 = telzon, ženka 3 mm; 7 = uropod 3, ženka 3 mm; 8 = uropod 3, ženka 2.6 mm iz Napuljskog zaljeva.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Male up to 3.1 mm long. Mainly like females but head with strong rostrum, eyes large, ovoid (fig. VIII, 2). Peduncle of antenna 1 with numerous short setae, main flagellum with 7 articles, accessory flagellum with 4 articles.

Antenna 2 long, almost reaching the body-length, peduncular segments 4—5 more setose (fig. VII, 2) flagellum plurisegmented; flagellum of antennae 1—2 in males with calceola, like these in *P. oculatus.*

Mandibular palp segment 3 with one group of A setae, one group of B-setae and with 5—6 distal E-setae (fig. VII, 3).

Gnathopods 1—2 (fig. VIII, 3, 4), pereopods 3—7 and uropods 1—2 like these of females; peduncle of uropods 1—2 with distolateral comb, rami with distal flake, without distal strong spine (fig. VIII, 5), urosome more elevated (fig. VIII, 5).

Uropod 3 in adult males similar to that of *P. oculatus,* with inner ramus reaching tip of first segment of outer ramus, both margins of both rami with long plumose setae, second segment of outer ramus with 2 long distal plumose setae, like these 2 distal setae of inner ramus (fig. VII, 1).

Telson long, narrow, each lobe with 2 short distal slender spines (fig. VIII, 1).

Non adult males are with uropod 3 like that in females, but inner ramus elongated, reaching tip of first segment of outer ramus, like that in *P. oculatus;* also, antenna 2 in non adult males is remarkably shorter than that in adult males.

Variability: peduncle of uropod 2 with or without laterofacial seta, the length of inner ramus of uropod 3 is rather variable (fig. VIII, 7, 8). The presence of comb on uropods 1—2, pointed rami of uropods 1—2 with flake and unequal segment 6 of gnathopods 1—2 are stable characters in males and females.

Holotype: female 3 mm. Holotype is deposited in KARAMAN'S Collection in Titograd.

Distribution: Mediterranean endemic species (Bay of Napoli, 30—150 m depth; Adriatic Sea, 12—44 m depth).

Localities cited: Napoli, depth 30—40 m, muddy bottom (Della Valle, 1893); Boka Kotorska Bay (G. Karaman, 1973).

Remarks and Affinities: The new species, *Paraphoxus lincolni,* is very alied to the species *P. oculatus* by numerous characters, and for this reason it was often confused with later species (see sub synonymy). *P. lincolni* differs clearly from *P. oculatus* by: unequal long segment 6 of gnathopods 1—2 in males and females; by presence of distolateral comb on peduncle of uropods 1—2 in males and females; by narrow and distally pointed both rami of uropods 1—2 having distal flake, in males and females; by more slender and longer distal spine-like setae on telson in females;

by shorter flagellum of antenna 2 in females provided with lower number of articles; by absence of distinct distoposterior strong spines on segment 5 of pereopods 3—4 in males and females; by longer dactyl of pereopods 3—4 in males and females; by longer inner ramus of uropod 3 in females; maybe by shorter and stouter head in males and different shape of eyes.

The species *Paraphoxus simplex* (Gurjanova, 1938) from Japan Sea is rather similar to our species, but differs clearly from it by presence of strong dital spine on inner ramus of uropod 3.

CONCLUSIONS

Genus *Paraphoxus* Sars, 1891 *(Amphipoda Gammaridea,* fam. *Phoxocephalidae)* is presented in the Mediterranean Sea by two species: *Paraphoxus oculatus* (Sars, 1879), known from Atlantic, Pacific and the Mediterranean Sea, and *Paraphoxus lincolni,* n. sp., described here from the Adriatic Sea (Boka Kotorska Bay) and Tyrrhenian Sea (Bay of Napoli).

P. lincolni is probably endemic for the Mediterranean Sea. He is very similar to the species *P. oculatus,* but differs from later by numerous characters, including the shape of gnathopods 1—2 and uropods 1—3.

Paraphoxus oculatus was found in the Mediterranean Sea on depth between 55 and 400 meters, usually on muddy bottom, but never together with *P. lincolni* in the same locality.

Paraphoxus lincolni was found in the Mediterranean Sea on depth between 12 m (Boka Kotorska Bay) and 150 m (Bay of Napoli, S. Pancrazio).

The figures of S a r s (1891) of *P. oculatus* slightly differ from the figures of *P. oculatus* of other authors, but no distinct differences were possible to observe without topotypic material in hands. It is necessary to study large number of samples of *P. oculatus* from *Atlantic* Ocean and the Mediterranean Sea to prove the identity of *P. oculatus* and *P. maculatus,* as well as their relationships with topotypic material of *P. oculatus* of S a r s.

On the other hand, it is necessary to compare the Atlantic and Pacific specimens of *P. oculatus* to prove or reject the suggestion of G u r j a g o v a (1977) about the segregation of Pacific populations of *P. oculatus* to the distinct taxon.

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ROD PARAPHOXUS SARS, 1891 (FAM. PHOXOCEPHALIDAE) U SREDOZEMNOM MORU

(171. PRILOG POZNAVANJU AMPHIPODA)

Rezime

Morski rod *Paraphoxus Sars* 1891 iz familije *Phoxocephalidae (Amphipoda Gammaridea)* širom svijeta je zastupljen sa samo nekoliko vrsta, poznatih iz Pacifika, Atlantika i Sredozemnog mora, uključujući i Jadransko more (G. Karaman, 1973).

Do sada je iz Sredozemnog mora bila poznata samo jedna vrsta ovog roda, *Paraphoxus oculatus* (Sars, 1879), opisana po prvi put iz Sjevernog Atlantika (Jan Mayen). S druge strane, mnogi naučnici su smatrali da u Sredozemnom moru ne dolazi ova vrsta, već vrsta *Paraphoxus maculatus* (Chevreux 1888), opisana po prvi put iz Gaskonjskog zaljeva u Francuskoj (Atlantik).

Kako se obje vrste vrlo malo i nejasno međusobno razlikuju, J. L. Barnard je (1960) vrstu *P. maculatus* sinonimizirao sa vrstom *P. oculatus.*

Naša proučavanja velikog broja uzoraka roda *Paraphoxus* iz Jadranskog mora i Sredozemlja, kao i jednog uzorka iz Atlantika, pokazala su da u Sredozemnom moru žive 2 zasebne vrste roda *Paraphoxus* od kojih je jedna bila nova za nauku, *Paraphoxus lincolni,* n. sp., a druga je odgovarala opisima vrste *P. oculatus* odnosno *P. maculatus* nekih drugih autora iz Sredozemnog mora i Atlantika.

Pri tome se jedino slike Sars-a (1891) nešto razlikuju od ostalih opisa i slika ove vrste, ali se bez uporedbe tipičnih primjeraka vrste *P. oculatus* (Jan Mayen) ne može sa sigurnošću utvrditi da li se radi zaista o drugoj vrsti ili samo crteži nisu bili dovoljno precizni (crteži su iz 1891. godine, crtani rukom).

Paraphoxus lincolni, n. sp. je dosta slična vrsti *P. oculatus,* ali se od nje razlikuje nizom taksonomskih karaktera: nejednakom dužinom šestog segmenta prvog i drugog gnatopoda, razvijenim češljem na drški prvog i drugog uropoda, uskim i dugim granama prvog i drugog uropoda zašiljenih na vrhu bez distalnog trna, dužim i tanjim distalnim trnovima na telzonu kod ženki, kraćem biću druge antene kod ženki, nedostatkom jakih distalnih trnova na petom segmentu trećeg i četvrtog pereopoda kao i dužem daktilusu tih istih pereiopoda.

I pored mnogobrojnih uzoraka koje smo pregledali, nismo nikad našli obje vrste zajedno na nekom lokalitetu, što može da upućuje na zaključak da se obje vrste međusobno isključuju jer možda zauzimaju iste ili slične ekološke niše u biocenozama mora.