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CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA
106. TWO NEW BOGIDIELLA SPECIES (FAM. GAMMARIDAE)
FROM ITALY

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Synopsis

Two new *Bogidiella* species (fam. *Gammaridae*) from Italy are described: *Bogidiella paraichnusae*, n. sp. from the subterranean waters near the coast of Bay of Neapel (Golfo di Napoli), intermixed with *Bogidiella chappuisi* Ruffo, and *Bogidiella italica*, n. sp. from the mesopsammon of Bay of Neapel (Golfo di Napoli, »Spiaggia degli Inglesi«, on depth of 1-2 m).

Sinopsis

PRILOG POZNAVANJU AMPHIPODA 106.
DVIJE NOVE VRSTE RODA BOGIDIELLA (FAM. GAMMARIDAE)
IZ ITALIJE

Dvije nove vrste iz roda *Bogidiella* (fam. *Gammaridae*) su opisane iz Italije: *Bogidiella paraichnusae*, n. sp. iz podzemnih voda blizu morske obale u Napuljskom zaljevu, sakupljene zajedno sa *Bogidiella chappuisi* Ruffo, i *Bogidiella italica*, n. sp. iz mezopsamona Napuljskog zaljeva (»Spiaggia degli Inglesi«), na dubini od 1-2 metra.

INTRODUCTION

Thanks to Dr. U. Schiecke from Neuherberg (Federal Republic of Germany) and Dr. S. Ruffo from the Museum of Natural History in Verona (Italy) some samples of *Bogidiella* from different parts of Italy were given to me at disposition to study.

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Among other species found in this material, two new *Bogidiella* species from the Napoli region are discovered and described here, *B. italica*, n. sp., and *B. paraichnusae*, n. sp.

A c k n o w l e d g m e n t s: I am thankful to Dr. Sandro Ruffo from the Museum of Natural History in Verona, Italy, and to Dr. Ulrich Schiecke, from Gesellschaft f. Strahlen- und Umverlfforschung in Neuherberg, Federal Republik of Germany for the loan of material used in this study and Dr. Giuseppe Pesce from the University of L'Aquila, Italy, for the literature.

GENUS BOGIDIELLA IN ITALY

First member of the genus *Bogidiella* discovered in Italy was *Bogidiella albertimaghi* Hertzog (Ruffo 1952, 1963, 1973) (rivers Adige and Piave; vicinity of Verona).

Coineau (1968) described a new species *Bogidiella vandeli* n. sp. from the subterranean freshwaters of Sardegna Island (Rio di Quirra).

Schiecke, U. (1973) described *Bogidiella tyrrhenica*, n. sp. from the mesopsammon of Golfo di Napoli.

Ruffo mentioned (1973) *Bogidiella chappuisi* Ruffo 1952 for Golfo di Napoli, Porto Badisco. Ruffo and Vigna-Taglianti (1975) mentioned *B. chappuisi* for Sardegna also.

Karaman, G. (1979) mentioned *B. chappuisi* for the mouth of Sele River (Paestrum), removing the species *B. minotaurus* Ruffo et Schiecke 1976 from Greece to *B. chappuisi* as synonym.

Ruffo et Vigna-Taglianti (1975) described *Bogidiella ichnusae* n. sp. from river Lisica, Sardegna Island.

Pesce, G. (1979) described *B. aprutina*, n. sp. from Central Italy (Abruzzo).

The discovery of two new *Bogidiella* species from Italy described here, *B. italica*, n. sp. and *B. paraichnusae*, n. sp., elevated the number of *Bogidiella* species known in Italy on 8 (*albertimaghi* Hertzog 1933, *aprutina* Pesce 1979, *chappuisi* Ruffo 1952, *ichnusae* Ruffo et Vigna-Taglianti 1975, *italica*, n. sp., *paraichnusae*, n. sp., *tyrrhenica* Schiecke, U. 1973, *vandeli* Coineau 1968).

KEY TO THE BOGIDIELLA SPECIES IN ITALY

1. Outer ramus of pleopod 2 consisting of 4 articles (inner ramus 1-articulate, female) *B. italica*, n. sp.
- Outer ramus of pleopods 1-3 consisting of 3 articles 2
2. Uropods 1-2 partially reduced, pleopods 1-3 modified (male) *B. tyrrhenica* Schiecke
- Uropods 1-2 well developed, pleopods unmodified 3

3. Telson with 4 spines 4
 — Telson with 2 spines 6
4. Inner ramus of pleopods 1-3 absent in females, present in males (Hertzog's organ crenellated) *B. vandeli* Coineau
 — Inner ramus of pleopods 1-3 absent in males and females . . 5
5. Hertzog's organ distinct, with crenellated margin
B. aprutina Pesce
 — Hertzog's organ distinct or undistinct, if present, always with smooth margin
B. chappuisi Ruffo
6. Article 6 of gnathopod 1 remarkably larger than that of gnathopod 2, both gnathopods with undefined palm (Hertzog's organ ringshaped) *B. ichnusae* Ruffo et V. Tag.
 — Article 6 of gnathopod 1 nearly as large as that of gnathopod 2, both gnathopods with well defined palm 7
7. Hertzog's organ absent. Article 2 of gnathopods 1-2 with one long and one short seta at posterior margin. Inner ramus of uropod 2 with modified distal spine in males
B. paraichnusae, n. sp.
 — Hertzog's organ present. Article 2 of gnathopods 1-2 with one short seta at posterior margin. Inner ramus of uropod 2 without modified distal spine in males *B. albertimagni* Hertzog

***Bogidiella italica*, n. sp.**

figs. I-III

Description: Female ovig. 1.9 mm (holotype): Body smooth, urosomites free, smooth. Eyes absent, rostrum short (fig. I, 1), lateral cephalic lobes subrounded, short, ventroanterior sinus present.

Antenna 1 shorter than body, with peduncular articles 1-3 progressively shorter (fig. I, 2), ped. article 1 with one ventral spine; main flagellum 7-articulate, some of articles with one aesthetasc not longer than articles themselves; accessory flagellum 2-articulate, shorter than first flagellar article of main flagellum (fig. I, 2).

Antenna 2: peduncle article 3 short, ped. article 4 with bunch of cca 12 slender setae at ventrodorsal part (fig. I, 3), ped. article 5 slightly shorter than 4, flagellum partially missing. Antennal gland cone short, not reaching tip of ped. article 3.

Labrum emarginate distally. Labium with short inner lobes (fig. II, 1). Maxilla 1: inner lobe with 2-3 setae, outer lobe with 7 spines bearing 0-1 tooth (inner spine with 3 lateral teeth), palp 2-articulate, bearing 3 distal setae (fig. I, 4).

Maxilla 2 like that in *B. paraichnusae*. Maxilliped: inner lobe short, with 3 distal spine-like setae; outer lobe short, with 4 distola-

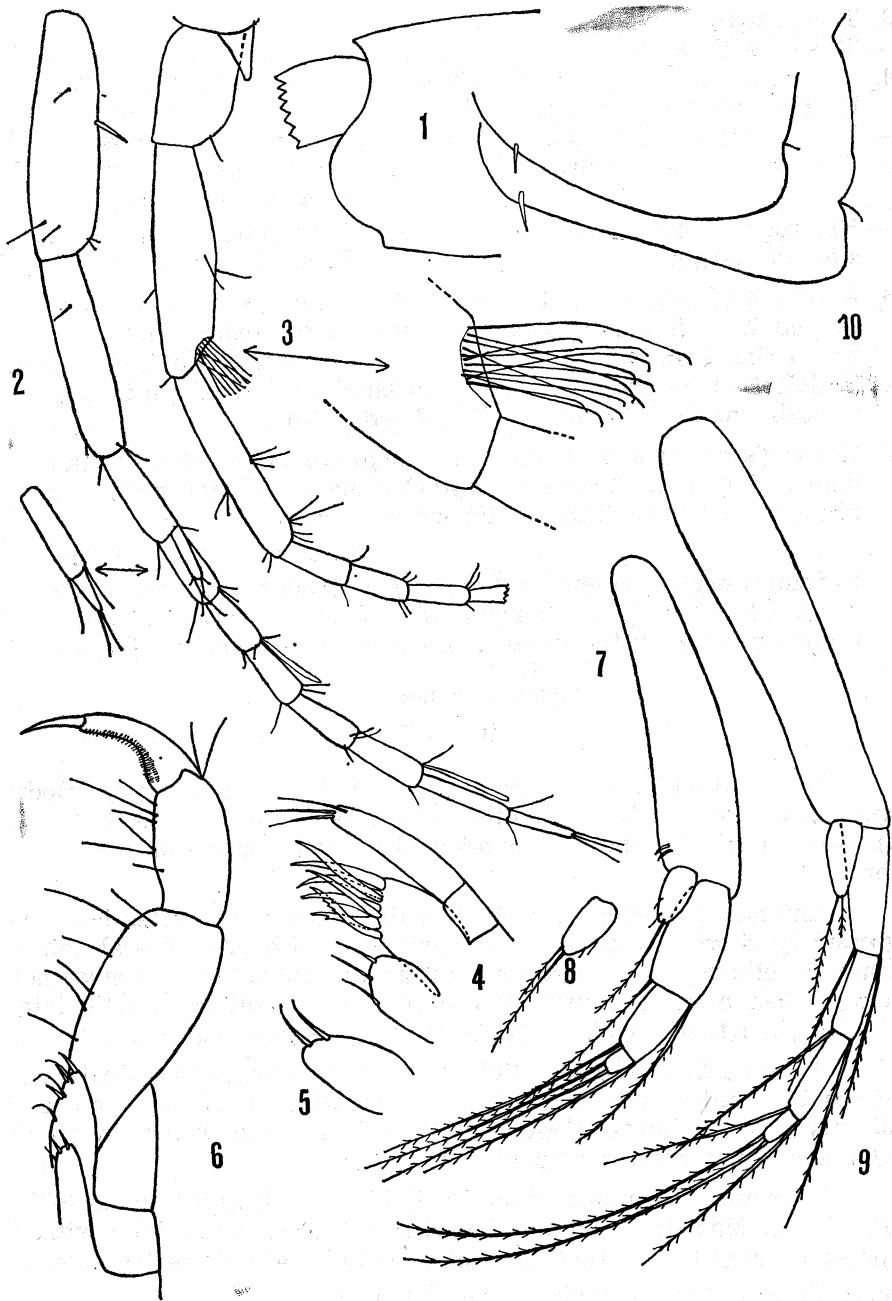


Fig. I. *Bogidiella italica*, n. sp., Napoli, female 1.9 mm: 1 = head; 2 = antenna 1; 3 = antenna 2; 4 = maxilla 1; 5 = inner lobe of maxilla 1; 6 = maxilliped; 7-8 = pleopod 3; 9 = pleopod 2; 10 = epimeral plates 2-3.



Fig. II. *Bogidiella italica*, n. sp., Napoli, female 1.9 mm: 1 = labium; 2 = mandible; 3-4 = gnathopod 1; 5-6 = gnathopod 2; 7 = urópod 3.

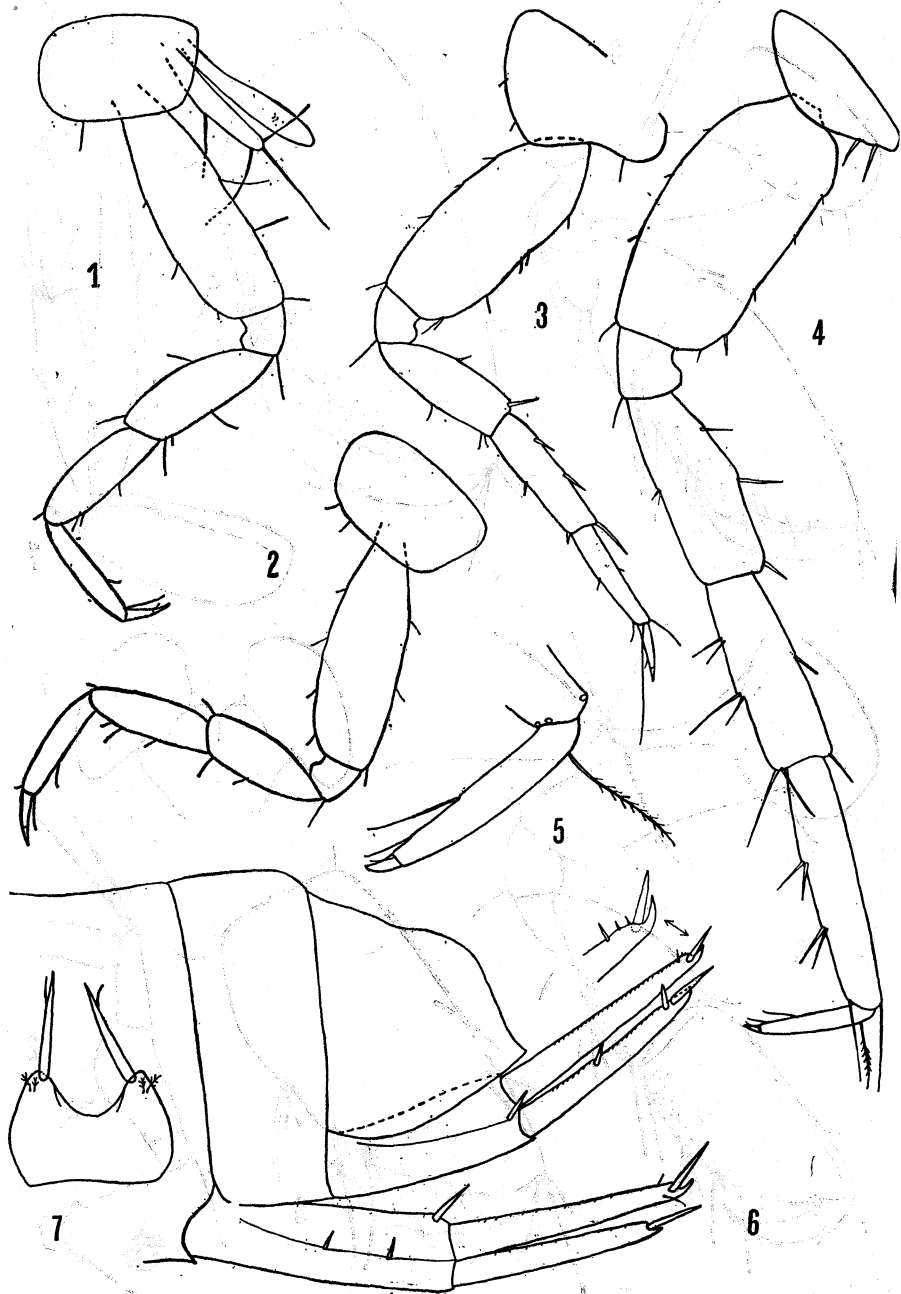


Fig. III. *Bogidiella italica*, n. sp., Napoli, female 1.9 mm: 1 = pereopod 3; 2 = pereopod 4; 3 = pereopod 5; 4-5 = pereopod 7; 6 = urosome with uropods 1-2; 7 = telson.

teral spines (fig. I, 6), palp 4-articulate, palp article 4 tapering distally, bearing nail shorter than article 4 itself.

Mandible: incisor toothed, molar tritulative (fig. II, 2), palp 3-articulate, article 1 short, article 2 with 1 seta, article 3 shorter than article 2, bearing 4 setae (fig. II, 2).

Coxae 1-4 broader than high (fig. II, 3, 5; III, 1, 2), coxa 5 not shorter than coxa 4 (fig. III, 3).

Gnathopod 1: article 2 with 2 long and one short seta along posterior margin (fig. II, 3), articles 3-4 short; article 5 triangular, with short ventroposterior lobe bearing distal spines (fig. II, 3); article 6 ovoid, with smooth palm well defined, reaching half of posterior margin of article 6 and defined by 3 short corner spines on outer face and by 2 long spines on inner face (fig. II, 4), dactyl with one seta at outer margin.

Gnathopod 2: article 2 with 2 long and one short seta along posterior margin, articles 3-4 short (fig. II, 5); article 5 triangular, non lobed, poorly setose; article 6 twice longer than broad, with smooth palm reaching less than half of posterior margin of article 6 (fig. II, 6) and defined by one corner spine; dactyl with one seta on outer margin, smooth. Article 6 of gnathopod 2 is smaller than that of gnathopod 1 (fig. II, 3, 5).

Pereopods 3-4 with narrow articles, article 2 without any trace of Hertzog's organ (fig. III, 1, 2), dactyl not exceeding half of article 6. Pereopods 3-4 similar in the shape and size.

Pereopod 5: article 2 linear (fig. III, 3), with slightly convex posterior margin bearing 4 groups of short setae, article 6 slightly shorter than 5, dactyl nearly reaching half of article 6.

Pereopod 6 missing. Pereopod 7 much longer than 5, with article 2 twice longer than broad, provided with straight posterior margin without distoposterior lobe (fig. III, 4), bearing one spine and 4 setae along posterior margin; articles 4-6 strong, article 6 slightly longer than 5, bearing 2 groups of short setae at anterior margin; dactyl hardly exceeding half of article 6, bearing one median and one subdistal seta along inferior margin and one long plumose seta at outer margin, nail short (fig. III, 4-5). Article 2 of pereopods 5 and 7 without any trace of Hertzog's organ.

Epimeral plates 2-3 with subrounded distoposterior corner (fig. I, 10), and with one spine at ventral margin.

Pleopod 1 missing. Pleopod 2 well developed, with peduncle slightly longer than outer ramus, bearing 2 retinacula; inner ramus short, 1-articulate, provided with 2 unequal distal plumose setae (fig. I, 9); outer ramus 4-articulate, each article with 2 plumose setae.

Pleopod 3 with peduncle much longer than outer ramus; inner ramus short, 1-articulate, with 1-2 plumose distal setae (fig. I, 7, 8); outer ramus with 3 articles bearing 2 plumose setae each.

Uropods 1-2 well developed, relatively slender. Uropod 1: peduncle slightly longer than inner ramus, bearing 3 dorsal spines, without ventrofacial spine (fig. III, 6); rami unequal, inner ramus slightly longer than outer one, both rami with one distal spine.

Uropod 2 remarkably exceeding tip of uropod 1 (fig. III, 6); peduncle shorter than rami, bearing one dorsal spine; rami of uropod 2 as long as these of uropod 1, outer ramus slightly shorter than inner one, bearing 1 dorsal and 2 distal spines; inner ramus with 1 distal spine. Distal tip of both rami of uropods 1-2 recurved distally (fig. III, 6). Rami of uropods 1-2 finely serrate along dorsal margin.

Uropod 3: peduncle shorter than rami (fig. II, 7), rami subequal, 1-segmented, bearing bunches of spines along margins and tip.

Telson short, broader than long (high), broadly incised distally and provided with 2 long distal spines longer than telson itself; a pair of short plumose setae occurs near the tip of each lobe (fig. III, 7).

Coxal gills simple, ovoid; oostegites narrow, occur on thoracal segments 2-4 (fig. III, 1).

Males unknown.

Material examined: Napoli, »spiaggia degli Inglesi«, depth 1-2 meters, July 1, 1966, leg. U. Schiecke, one ovig. female.

Holotype: ovig. female 1.9 mm. Holotype is deposited in the Museum of Natural History in Verona, Italy.

Remarks and affinities: *Bogidiella italica*, n. sp. is similar to *Bogidiella tyrrhenica* Schiecke 1973 known from the mesopsammon of Golfo di Napoli also (subrounded epimeral plates, elevated number of long setae along posterior margin of article 2 of gnathopods 1-2, inner lobe of maxilla 1 with 3 setae, absence of Hertzog's organ, 2-articulate accessory flagellum). *B. tyrrhenica* was described based on one male and one juv. specimen only.

B. tyrrhenica differs from *B. italica*, n. sp. by presence of 3-4 long setae at posterior margin of article 2 of gnathopods 1-2 (2 in *italica*), by more setose articles 4-5 of peduncle of antenna 2, by absence of long median seta at inferior margin of dactyl of pereopod 7, by shortened uropod 1 without spines on tip of both rami, by absence of lateral spines on rami of uropod 2, by different shape of pleopods 1-3, by 3-articulate outer ramus of pleopod 2, by very short palp article 3 of mandible, by pereopod 7 poorly longer than pereopod 5, etc.

As *B. italica* was described based on ovig. female only (male unknown) and *B. tyrrhenica* based on male only, theoretically, some

of established differences between both species can represent sexual dimorphic characters only, and in this case *B. tyrrhenica* and *B. italica* should be considered as male and female of the same species, *B. tyrrhenica*.

But, as the reduction of uropod 1, shape of dactyl of pereopod 7, mandible palp and pilosity of article 2 of gnathopods 1-2 are not known as sexual dimorphic characters within the species of genus *Bogidiella*, we couldn't synonymize both species, considering for the moment *B. italica* as a distinct species. The discovering of a new specimens of both species will show the exact taxonomic status of both species and their relationships.

B. italica differs from *B. skopljensis* by shorter uropod 1, by shape of article 5 of gnathopod 1, shape of dactyl of pereopods 5-7, by antenna 2, epimeral plates etc.

Ecology: *B. italica* probably belongs to the subterranean littoral fauna (mesopsammon) like *B. tyrrhenica* Schieckel 1973 from Napoli.

***Bogidiella paraichnusae*, n. sp.**

figs. IV-VI

Description: Male 2 mm (holotype): Body smooth. Rostrum short, lateral cephalic lobes subrounded, ventroanterior sinus present (fig. IV, 1).

Antenna 1 shorter than body, ped. articles 1-3 progressively shorter, ped. article 1 with 2 ventral spines (fig. IV, 2), main flagellum up to 8-articulate, many of them with one aesthetasc longer than the article itself (fig. IV, 1), accessory flagellum 3-articulate.

Antenna 2: ped. article 3 short, ped. article 4 with tuft of 4-5 setae at ventrodistal tip; ped. article 5 shorter than 4, flagellum 5-articulate, antennal gland cone shorter than article 3 (fig. IV, 3).

Labrum with emarginate distal tip (fig. IV, 4), labium with small inner lobes (fig. V, 6). Maxilla 1: inner lobe with 2 setae, outer lobe with 7 spines bearing 0-1 lateral tooth each; palp 2-articulate, second article with 2 distal setae (fig. V, 5).

Maxilla 2 with both lobes provided with several distal setae (fig. IV, 5), inner lobe without dorsal oblique row of setae.

Maxilliped: inner lobe short, provided with 3 slender spines; outer lobe crenellated along inferior margin and provided with 3 distal spines intermixed with several setae (fig. IV, 6), palp 4-articulate, strong, palp article 3 not lobed, article 4 with short nail.

Mandible well developed, incisor toothed, molar triturative; palp 3-articulate: first article smooth, second article with one seta, third article with 4 setae (fig. IV, 7).

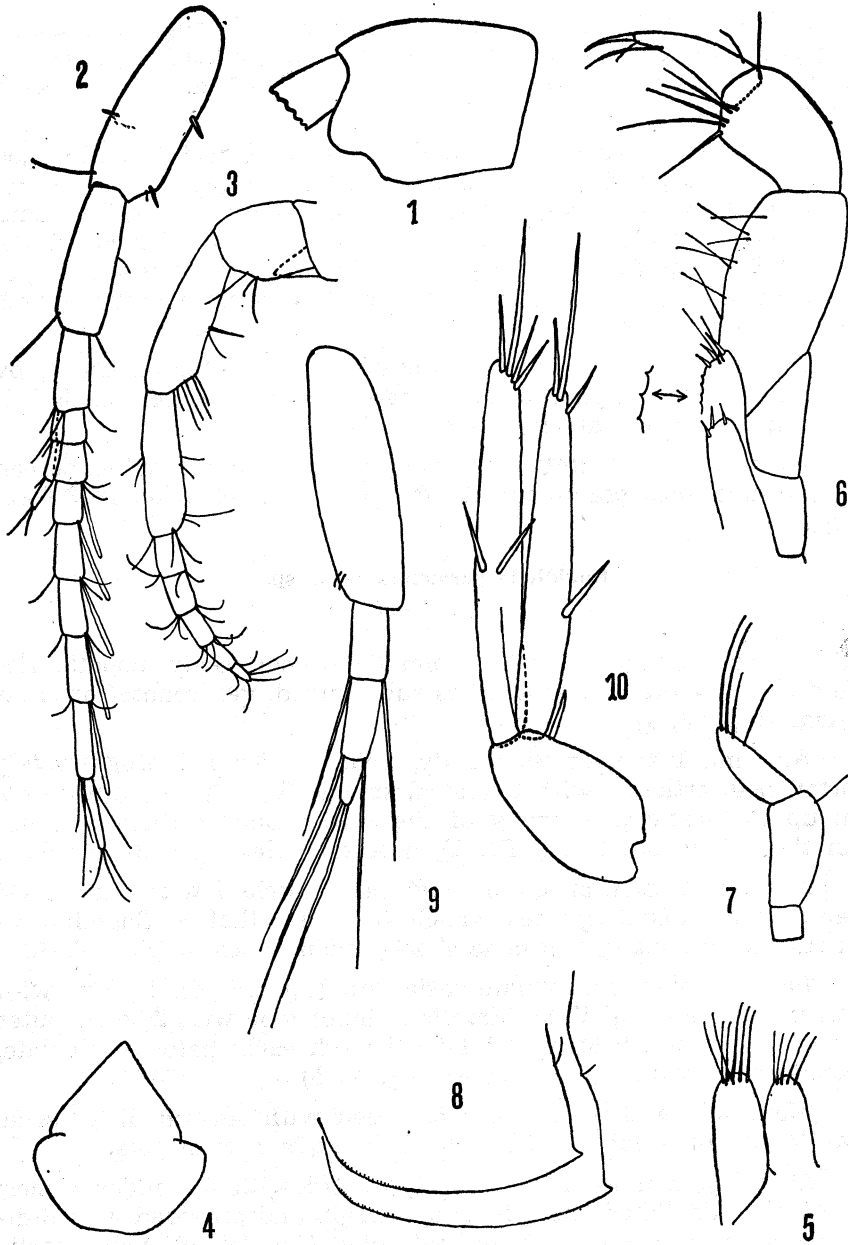


Fig. IV. *Bogidiella paraichnusae*, n. sp. Golfo di Napoli, male 2 mm: 1 = head; 2 = antenna 1; 3 = antenna 2; 4 = labrum; 5 = maxilla 2; 6 = maxilliped; 7 = mandible palp; 8 = epimeral plates 2-3; 9 = pleopod; 10 = uropod 3.

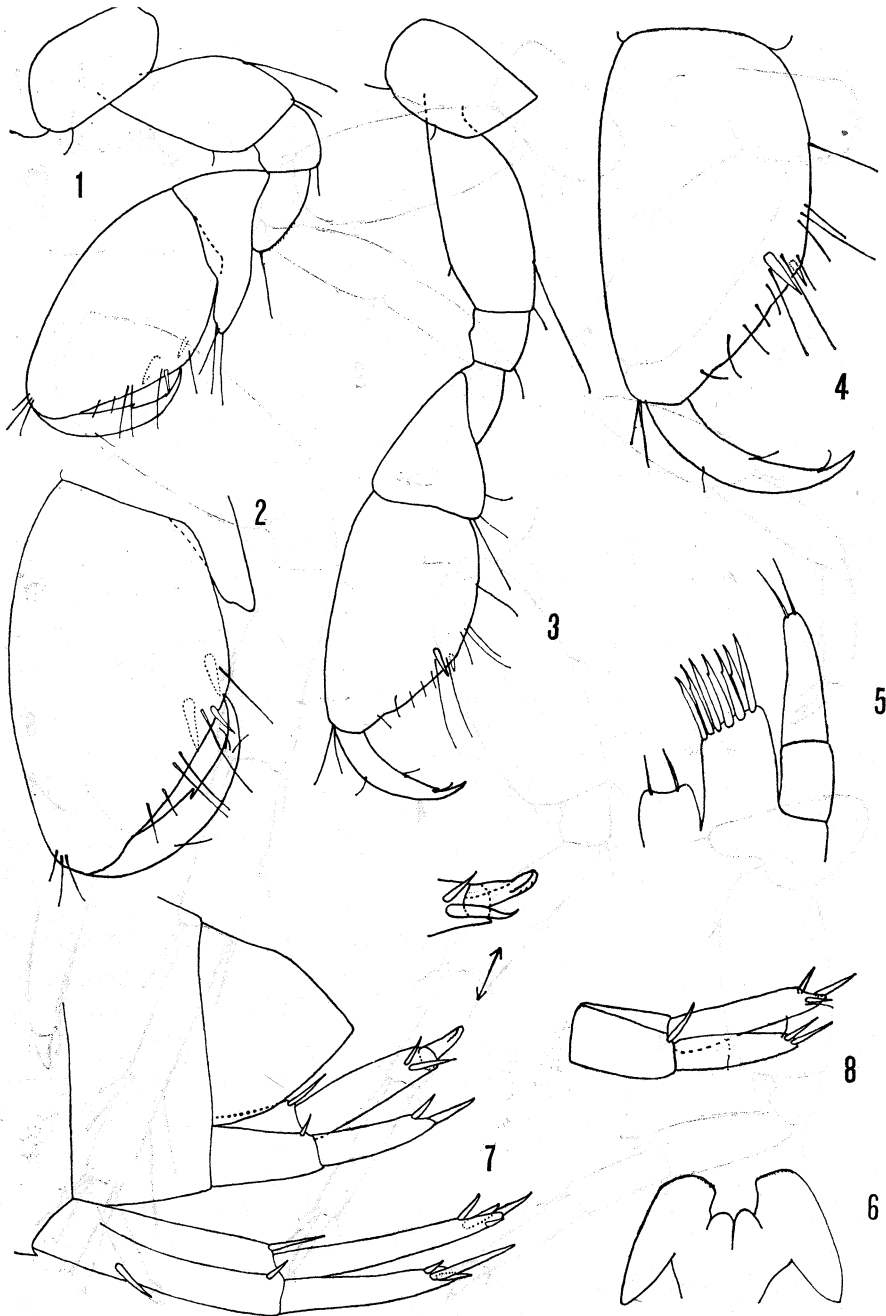


Fig. V. *Bogidiella parachnusae*, n. sp., Golfo di Napoli, male 2 mm: 1-2 = gnathopod 1; 3-4 = gnathopod 2; 5 = maxilla 1; 6 = labium; 7 = urosome with uropods 1-2; 8 = uropod 2, female 1.8 mm.

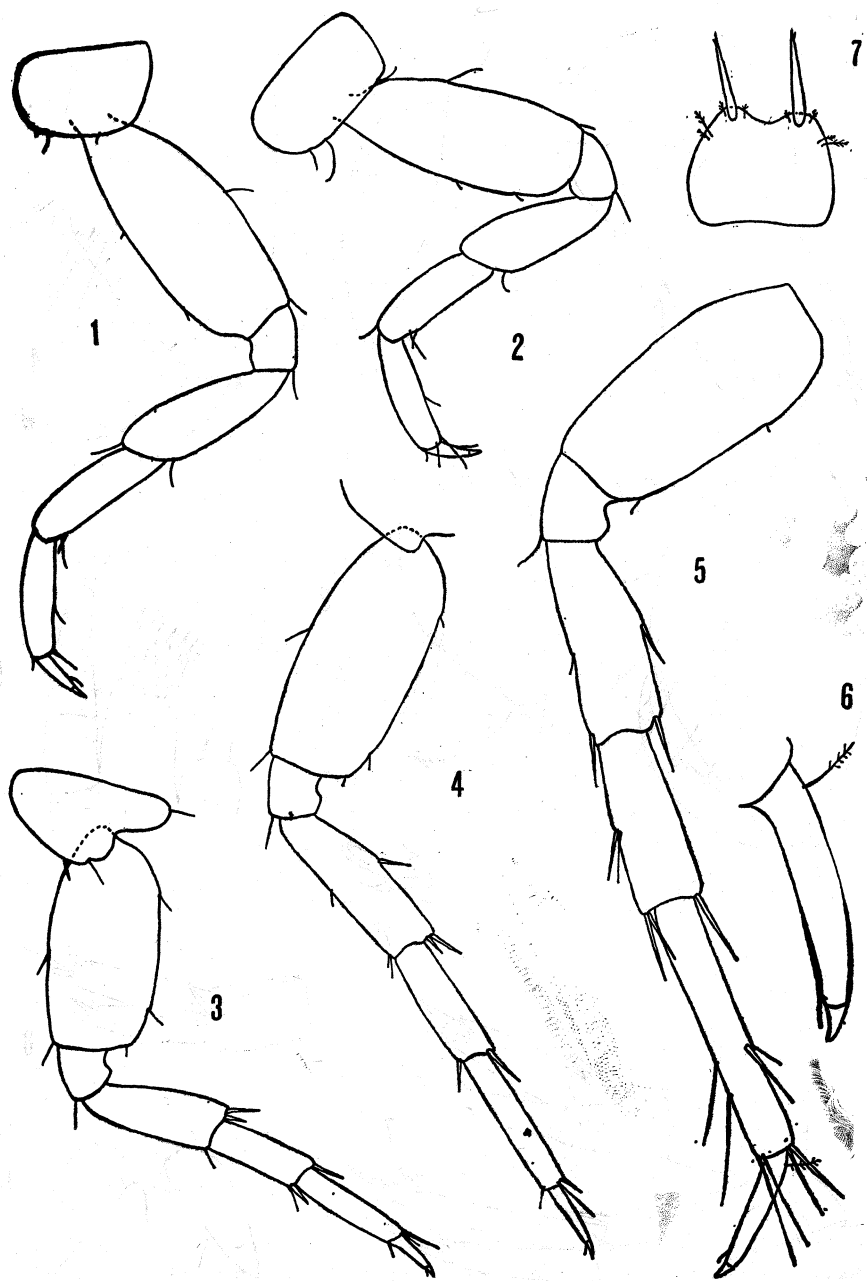


Fig. VI. *Bogidiella paraichnusae*, n. sp., Golfo di Napoli, male 2 mm: 1 = pereopod 3; 2 = pereopod 4; 3 = pereopod 5; 4 = pereopod 6; 5-6 = pereopod 7; 7 = telson.

Coxae 1-4 broader than long (high) (fig. V, 1, 3; VI, 1, 2).

Gnathopods 1-2 subequal in length. Gnathopod 1: article 2 with one long and one short seta along posterior margin, articles 3-4 short; article 5 triangular, with produced distoposterior lobe provided with 3 distal setae; article 6 ovoid, palp well defined, reaching half of the posterior margin of article 6, poorly crenellated in distoposterior corner and provided with one corner spine on outer face and 2 spines along inferior face, dactyl with one seta at outer margin (fig. V, 1, 2).

Gnathopod 2: article 2 with one long and one short seta at posterior margin (fig. V, 3), articles 3-4 short; article 5 triangular, unlobed at distoposterior tip; article 6 with parallel lateral margins, palm well defined, not reaching halfway to the posterior margin of article 6, poorly crenellated in distoposterior part (fig. V, 3, 4), bearing one corner and one subcorner spine, dactyl with one seta at outer margin.

Pereopods 3-4 similar in the shape (fig. VI, 1, 2), with slightly inflated article 2 without any trace of Hertzog's organ, articles 3-6 linear, dactyl reaching nearly half of article 6, with short nail.

Pereopods 5-7 progressively longer so that pereopod 7 is much longer than pereopod 5 (fig. VI, 3-5). Article 2 of pereopods 5-7 linear without Hertzog's organ, with slightly convex posterior margin without distoposterior lobe and with 2-3 setae along posterior margin. Articles 3-6 linear, article 6 longer than 5, that of pereopod 7 with several long marginal setae (fig. VI, 5), dactyl of pereopod 7 hardly exceeding half of article 6, bearing one short seta at inferior margin near the short nail (fig. VI, 6), plumose seta occurs on outer margin of dactyl.

Epimeral plates 1-3 with pointed distoposterior corner and with convex ventral margin (fig. IV, 8).

Pleopods 1-3 well developed, without inner ramus (fig. IV, 9), outer ramus 3-articulate, articles with 2 lateral plumose setae each.

Uropods 1-2 well developed. Uropod 1: peduncle with or without ventrofacial spine, rami unequal, obtuse distally (fig. V, 7), inner ramus longer than outer one, both rami without marginal spines, only with distal spines.

Uropod 2 reaching tip of uropod 1, inner ramus longer than outer one, bearing one distal modified spine (A-spine) (fig. V, 7), both rami without lateral spines.

Uropod 3 much exceeding tip of uropods 1-2, lanceolate (fig. IV, 10), rami subequal, 1-segmented, bearing lateral and distal spines.

Telson broader than long (high), poorly excavated distally, bearing 2 distal spines (fig. VI, 7).

Coxal gillis ovoid, simple, occur on thoracal segments 4-6.

Females: like males except the absence of crenellated strong distal A-spine on inner ramus of uropod 2 (fig. V, 8).

Variability: the females are often with distinctly crenellated palm of gnathopods 1-2. Ventrofacial spine on peduncle of uropod 1 occurs in females and males, but in smaller specimens is often absent.

Material examined: Golfo di Napoli (Italy), coast, interstitial, 1 meter far from coast into land, 6 spec. intermixed with *Bogidiella chappuisi* Ruffo and *Asellidea* gen. sp., July 22, 1968, leg. U. Schiecke.

Holotype: male 2 mm. Holotype and paratypes are deposited in the Museum of Natural History in Verona, Italy. One paratype is deposited in Karaman's Collection in Titograd, Yugoslavia.

Remarks and affinities. *Bogidiella paraichnusae*, n. sp. is rather similar to *B. ichnusae* Ruffo et Vigna-Taglianti known from Sardinia Island, Italy. *B. ichnusae* differs from *B. paraichnusae* by presence of Hertzog's organ on pereopods 3-7, by the shape and size of gnathopods 1-2, by obtuse epimeral plates, by subrounded labrum, by subequal rami of uropod 1 etc.

Bogidiella albertimagni Hertzog differs from *B. paraichnusae* by presence of Hertzog's organ on pereopods 3-7, by absence of modified serrate A-spine on distal tip of inner ramus of uropod 2 in males, by the pilosity of article 2 of gnathopods 1-2, etc.

LITERATURE CITED

- Coinneau, N. 1968. Contribution à l'étude de la faune interstitielle Isopodes et Amphipodes. — Mémoires du Museum National d'Hist. Nat., nouvelle série, ser. A, Zoologie, 55 (3): 145-216.
- Hertzog, L. 1933. *Bogidiella albertimagni* sp. nov., ein neuer Grundwasseramphipoda aus der Rheinebene bei Strassburg. — Zoolog. Anzeiger 102 (9-10): 225-227.
- Karaman, G. 1973. 54. Contribution to the Knowledge of the Amphipoda. On the Genus *Bogidiella* Hert. (fam. Gammaridae) in Yugoslavia. — Poljoprivreda i šumarstvo, Titograd, 19 (4): 21-53.
- Karaman, G. 1979. Contribution to the Knowledge of the Amphipoda 92. *Bogidiella chappuisi* Ruffo 1952 and its variability with remarks to some other species (fam. Gammaridae). — Poljoprivreda i šumarstvo, Titograd, 25 (1): 17-30.
- Karaman, S. 1933. Über zwei neue Amphipoden, *Balcanella* und *Jugocranonyx* aus dem Grundwasser von Skopje. — Zool. Anzeiger 103 (1-2): 41-47.
- Pesce, G. L. 1979. *Bogidiella aprutina* n. sp., a new subterranean amphipod from phreatic waters of Central Italy (Crustacea: Peracarida) — Crustaceana, in press.

- Ruffo, S., Delamare - Debouteville, G. 1952. Deux nouveaux Amphipodes souterraines de France, *Salentinella angelieri* n. sp. et *Bogidiella chappuisi* n. sp. — Comptes Rendus Sci. Acad. Paris, 234: 1636-1638.
- Ruffo, S. 1963. Studi sui crostacei anfipodi LVII. Una nuova specie di *Bogidiella* (Crust. Amphipoda) della depressione del Mar Morto. — The Bulletin of the Research Council of Israel, sect. B, Zoology, 11b (4): 188-195.
- Ruffo, S. 1973. Studi... LXXIV. Contributo alla revisione del genere *Bogidiella* Hertzog (Crustacea, Gammaridae). — Boll. Istituto Entomologia Univ. Bologna, 31: 49-77, 1972/1973.
- Ruffo, S., Vigna - Taglianti, A. 1975. Una nuova *Bogidiella* della Sardegna. — Fragmenta entomologica, 11 (1): 73-82, Roma 1975.
- Ruffo, S., Schiecke, U. 1976. Una nuova *Bogidiella* di Creta. — Bollettino del Museo Civ. St. Nat. Verona, 3: 147-155.
- Schiecke, U. 1973. Ein Beitrag zur Kenntnis der Systematik, Biologie und Autökologie mariner Peracarida (Amphipoda, Isopoda, Tanaidacea) des Golfes von Neapel. — Inaugural Dissertation der Mathem. Naturwiss. Fakultät Christian Albrecht Univ. Kiel, Kiel 1973, pp. 1-408, pls.

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