

The Amphipoda
of the Mediterranean

Editor

Sandro RUFFO



PART 1

GAMMARIDEA

(ACANTHONOTOZOMATIDAE TO GAMMARIDAE)

MEMOIRES ^{DE} L'INSTITUT
Océanographique
FONDATION ALBERT I^{er}, PRINCE DE MONACO

Les études publiées dans les *Mémoires de l'Institut océanographique* sont analysées ou indexées dans :

The works published in the Mémoires de l'Institut océanographique are abstracted or indexed in :

Aquatic sciences & fisheries abstracts ;

Bibliographie géographique internationale ;

Biological abstracts ;

Bulletin signalétique du C.N.R.S. ;

Oceanic abstracts ;

Oceanographic literature review (Deep-sea research) ;

Referativnyi zhurnal ;

Underwater information bulletin ;

Zoological record.



Les commandes ainsi que les demandes de tarifs pour toutes les publications du Musée océanographique doivent être envoyées à l'adresse suivante :

The orders and any inquiries concerning the price-lists for all publications of the Oceanographic Museum should be sent to the following address :

Musée océanographique (Service des publications)
Avenue Saint-Martin
Monaco-Ville
MC 98000 MONACO



Les publications envoyées en échange des *Mémoires de l'Institut océanographique* doivent être adressées à :

The publications sent in exchange for the Mémoires de l'Institut océanographique must be forwarded to :

Musée océanographique (bibliothèque)
Avenue Saint-Martin
Monaco-Ville
MC 98000 MONACO

The Amphipoda of the Mediterranean

editor

Sandro RUFFO

TO
Edouard CHEVREUX
Achille COSTA
Antonio DELLA VALLE
Camil HELLER
Paul MAYER

The Amphipoda
of the
Mediterranean

Part 1

Gammaridea

(Acanthonotozomatidae to Gammaridae)

by

Denise BELLAN-SANTINI,
Gordan KARAMAN,
Gertraud KRAPP-SCHICKEL,
Michel LEDOYER,
Alan A. MYERS,
Sandro RUFFO,
Ulrich SCHIECKE

BIBLIOTECA
MUSEO CIVICO DI STORIA
NATURALE — VERONA
N° d'ingresso
27657

Descripteurs :

Crustacés Amphipodes, Méditerranée.



(Manuscrit reçu le 24 juillet 1978 ; accepté après corrections et mises à jour le 18 mars 1980)



CONTRIBUTORS

Denise BELLAN-SANTINI

Station marine d'Endoume, rue de la Batterie des Lions,
F - 13007 Marseille (France).

Gordan KARAMAN

Biological Institute, P.O. Box 40
Titograd (Jugoslavija).

Gertiand KRAPP-SCHICKEL

Museum A. Koenig, Adenauerallee 150-164
D-53 Bonn (B.R.D.).

Michel LEDOYER

Station marine d'Endoume, rue de la Batterie des Lions,
F - 13007 Marseille (France).

Alan A. MYERS

Department of Zoology, University College
Cork (Eire).

Sandro RUFFO

Museo civico di Storia Naturale, Lungadige Porta Vittoria 9
I - 37129 Verona (Italia).

Ulrich SCHIECKE

Umweltbundesamt, Bismarckplatz 1
D-1000 Berlin (B.R.D.).

ISBN 2-7260-0133-5 (part 1)

ISBN 2-7260-0132-7 (ensemble des volumes)

CONTENTS

	<i>pages</i>
Préface, by Th. Monod	V
Summary	VI
Résumé	VI
Foreword, by S. Ruffo	VII
Localities and Map	
List of Abbreviations	IX
Key to Suborders	X
Key to Families	XI
 Suborder GAMMARIDEA	
Family ACANTHONOTOZOMATIDAE, by S. Ruffo and U. Schliecke	1
Genus <i>Coboldus</i> Krapp-Schickel, 1974	2
Genus <i>Iphimedia</i> Rathke, 1843	2
Family AMPELISCIDAE, by D. Bellan-Santini	19
Genus <i>Ampelisca</i> Krøyer, 1842	19
Genus <i>Byblis</i> Boeck, 1871	61
Genus <i>Haploops</i> Liljeborg, 1855	64
Family AMPHILOCHIDAE, by G. Krapp-Schickel	70
Genus <i>Amphilochoides</i> G.O. Sars, 1892	70
Genus <i>Amphilocheus</i> Bate, 1862	74
Genus <i>Gitana</i> Boeck, 1871	82
Genus <i>Peltocoxa</i> Calla, 1875	88
Family AMPHITHOIDAE, by G. Krapp-Schickel	94
Genus <i>Amphithoe</i> Leach, 1814	94
Genus <i>Cymadusa</i> Savigny, 1816	104
Genus <i>Sunamphithoe</i> Bate, 1857	109
Family AORIDAE, by A. A. Myers	111
Genus <i>Aora</i> Krøyer, 1845	112
Genus <i>Lembas</i> Bate, 1856	116
Genus <i>Leptocheirus</i> Zaddach, 1844	129
Genus <i>Microdeutopus</i> A. Costa, 1853	139
Genus <i>Unclotella</i> Chevreux, 1911	157
Family ARGISSIDAE, by S. Ruffo	159
Genus <i>Argissa</i> Boeck, 1871	159
Family BIANCOLINIDAE, by S. Ruffo	162
Genus <i>Biancalina</i> Della Valle, 1893	162
Family CALLIOPHIDAE, by G. Krapp-Schickel	164
Genus <i>Amphithopsis</i> Boeck, 1861	164
Genus <i>Apherusa</i> Walker, 1891	167
Genus <i>Leptamphopus</i> G.O. Sars, 1893	175
Family CHELURIDAE, by U. Schliecke	179
Genus <i>Chelura</i> Philippi, 1839	179
Family COLOMASTIGIDAE, by S. Ruffo	183
Genus <i>Colomastix</i> Grube, 1861	183
Family COROPHIIDAE, by A. A. Myers	185
Genus <i>Corophium</i> Latreille, 1806	185

Genus <i>Erichthonius</i> Milne Edwards, 1830	199
Genus <i>Siphonoeetes</i> Krøyer, 1845	204
Family CRESSIDAE, by S. Ruffo	209
Genus <i>Cressa</i> Boeck, 1871	209
Family DEXAMINIDAE, by D. Bellan-Santini	212
Genus <i>Atylus</i> Leach, 1815	212
Genus <i>Dexamine</i> Leach, 1814	220
Genus <i>Guernea</i> Chevreux, 1887	225
Genus <i>Lepechinella</i> Stebbing, 1908	228
Genus <i>Tritaeta</i> Boeck, 1876	230
Family ELSIRIDAE, by M. Ledoyer	233
Genus <i>Eusiroides</i> Stebbing, 1888	233
Genus <i>Eusirus</i> Krøyer, 1845	235
Genus <i>Rhachotropis</i> Smith, 1883	235
Family GAMMARIDAE, by G. S. Karaman	245
Genus <i>Abludomelita</i> G. Karaman, 1981	246
Genus <i>Bogidiella</i> Hertzog, 1933	252
Genus <i>Carangollopsis</i> Ledoyer, 1970	258
Genus <i>Ceradocus</i> A. Costa, 1853	261
Genus <i>Cheirocratus</i> Norman, 1867	265
Genus <i>Echinogammarus</i> Stebbing, 1899	271
Genus <i>Elasmopus</i> A. Costa, 1853	282
Genus <i>Eriopisa</i> Stebbing, 1890	291
Genus <i>Gammarella</i> Bate, 1857	294
Genus <i>Gammarellus</i> Herbst, 1793	295
Genus <i>Gammarus</i> Fabricius, 1775	299
Genus <i>Longigammarus</i> G. Karaman, 1969	306
Genus <i>Maera</i> Leach, 1814	309
Genus <i>Maerella</i> Chevreux, 1911	326
Genus <i>Marinobogidiella</i> G. Karaman, 1981	328
Genus <i>Megaluropus</i> Hock, 1889	330
Genus <i>Meiira</i> Leach, 1814	335
Genus <i>Neogammarus</i> Ruffo, 1937	345
Genus <i>Psammogammarus</i> S. Karaman, 1955	351
Genus <i>Pseudoniphargus</i> Chevreux, 1901	354
Genus <i>Rhipidogammarus</i> Stock, 1971	360

tooth on inner face, but no spines; dactylus very stout, with obtuse tip. P3-4 slender; dactylus < propodus; nail very short. P5-7 basis ovate, posterior margin serrate, posterodistal lobe present; dactylus < 1/2 propodus. Ep1-2 almost rectangular; Ep3 posterodistally acutely produced, distal margin smooth with some spine, posterior margin smooth or weakly serrate. U1 peduncle anterior margin smooth. U3 peduncle > 1/2 outer ramus, outer ramus 2-articulate, art 2 short, but longer than distal spines on art 1. Telsonic lobes acuminate, with 2 groups of spines.

♀ differs from male in shape of Gn2; carpus slightly shorter than propodus; propodus ovate, posterior margin with 4-5 groups of setae; palm oblique, denticulate, defined by tooth, with 1 lateral and 1 sublateral spine.

Distribution: ? *Mediterranean*. Apparently rare. *Italy-Tyrrhenian Sea*: Napoli [A. COSTA, 1857].

General: N. Atlantic Ocean (West Africa). ? *Mediterranean Sea*.

Ecology: Usually 0-20 m depth (found down to 376 m); may (in Atlantic) occur in association with sea anemones and echinoderms (Asteroidea, Holothuroidea).

Remarks: No *Mediterranean* material of this species was available. The presence of this species in the *Mediterranean Sea* is dubious and needs confirmation, especially as *A. obtusata* was often confused with *A. gladiosa*; *Gammarus obtusunguis* described by A. COSTA [1853] is a dubious species, possibly belonging to *A. obtusata* or *Gammarella fucicola*.

Genus *BOGIDIELLA* Hertzog

Bogidiella HERTZOG, 1933, p. 226; COINEAU, 1968, p. 195; G. KARAMAN, 1979 a, p. 27

Jugocrangonyx S. KARAMAN, 1933, p. 45

Diagnosis: Body slender. Lateral cephalic lobes short, eyes absent. A1 > A2, accessory flagellum short, present. Labrum entire, labium with small inner lobes. Mandibular palp 3-articulate, palp art 1 short, palp art 3 > 1. Mx1 inner plate present, outer plate with 7 spines, palp 2-articulate. Mx2 inner plate without medial row of setae. Mxp inner and outer plates short, palp long, 4-articulate. Coxae 1-4 very short. Gn1-2 subchelate, carpus of Gn1 with posterodistal lobe, that of Gn2 short, without lobe. P3-7 normal, often with Hertzog's organ. Pleopods reduced, outer ramus 3-4 articulate, inner ramus 1-articulate or absent. U1-2 biramous, normal. U3 long, both rami 1-articulate, subequal. Telson short, entire or emarginate. Gills on pereon segs 4-6, oostegites short, on pereon segs 2-5 or 3-5.

TYPE SPECIES: *Bogidiella albertimagni* Hertzog, 1933

KEY TO SPECIES

1. Telson with 2 spines. Pleopods with inner ramus *B. italica*
- Telson with 4 spines. Pleopods without inner ramus 2
2. Telson as long as broad *B. dalmatina*
- Telson distinctly broader than long *B. chappuisi*

Bogidiella chappuisi Ruffo, 1952

fig. 169-171

Bogidiella chappuisi RUFFO [in RUFFO & DELAMARE-DEBOUTEVILLE], 1952, p. 1636, fig. 1-4; 1954, p. 145, fig. 1-2; BALAZUC, 1954, p. 187; COINEAU, 1966, p. 389; G. KARAMAN, 1973 a, p. 33; G. KARAMAN, 1979 a, p. 22, fig. 1-4

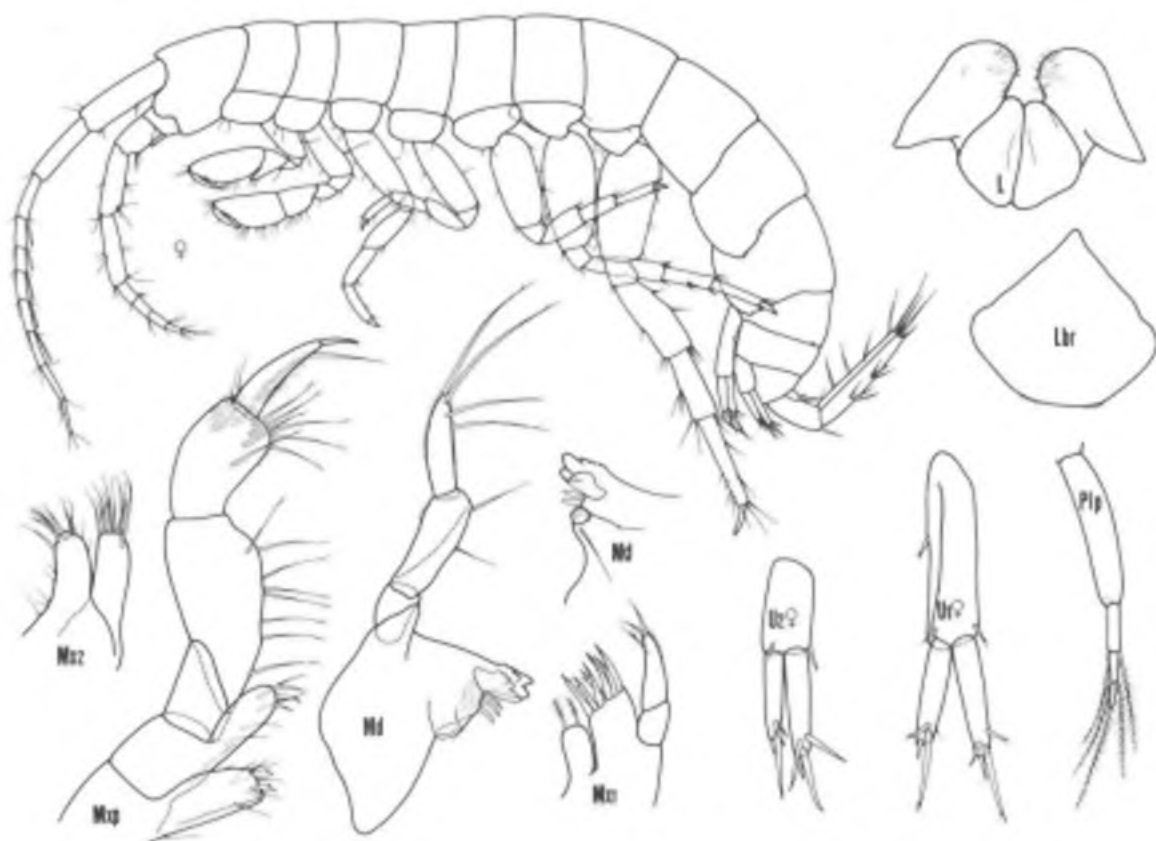


FIG. 169. — *Bogidiella chappuisi* Ruffo, 1952. Female (Crete).

Bogidiella chappuisi (partim) RUFFO, 1973, p. 51
Bogidiella minotaurus RUFFO & SCHIECKE, 1976 a, p. 147, fig. 1-4
 ? *Bogidiella balearica* DANCAU, 1973, p. 113, fig. 1-4

TYPE LOCALITY: Racou near Argeles (S. France)

Description: ♀ 2 mm. Urosome seg 2 with 1 pair of short dorsolateral setae. Lateral cephalic lobes rounded. A1 = 1/2 body: flagellum with up to 8 arts, aesthetascs present; accessory flagellum with 2-3 arts. Mandibular palp art 2 with 2-3 setae, art 3 with 3-4 setae. Mx1 inner plate with 2 distal setae, outer plate with spines with 1-3 teeth each, palp with 2 distal setae. Gn1 propodus ovate; palm very oblique, denticulate, with 1 lateral and 2 sublateral spines. Gn2 slightly smaller than Gn1, propodus subrectangular; palm oblique, finely denticulate, with 1 lateral and 1 sublateral spine. P3-4 basis dilated, ischium-propodus narrow; dactylus short. P5-7 basis dilated; P7 dactylus = 1/2 propodus. Hertzog's organ in basis of P3-7 ovoid, smaller than width of basis. Pleopods with outer ramus 3-articulate, inner ramus absent. Ep1-3 rectangular, with small posterodistal tooth, posterior margin with 1-2 setae. U1 peduncle with 1 strong spine on anterior margin; inner ramus slightly longer than outer, both rami with distal spines of variable length, 1/3-1/1 as long as rami, marginal spines absent. U2 reaching tip of U1. U3 with rami subequal, 1-articulate, lanceolate, with marginal and distal spines. Telson short, broader than long, emarginate, telsonic lobes with 2 distal spines of unequal length, 1/2-1/1 as long as telson. Gills on pereon segs 4-6; oostegites on pereon segs 2-5.

♂ differs from female in presence of a distal toothed spine on U2 inner ramus. U1-3 often with slightly longer spines.

Distribution: *Mediterranean. Balearic Islands:* ? Mallorca [DANCAU, 1973, sub *B. balearica*]. *France:* Argeles-sur-Mer (Racou) [RUFFO, in RUFFO & DELAMARE-DEBOUTEVILLE, 1952; RUFFO, 1954]. *Corsica:* Gulf of Sagone (mouth of river Liscia) [COINEAU, 1966]. *Italy-Tyrrhenian Sea:* Gulf of Napoli

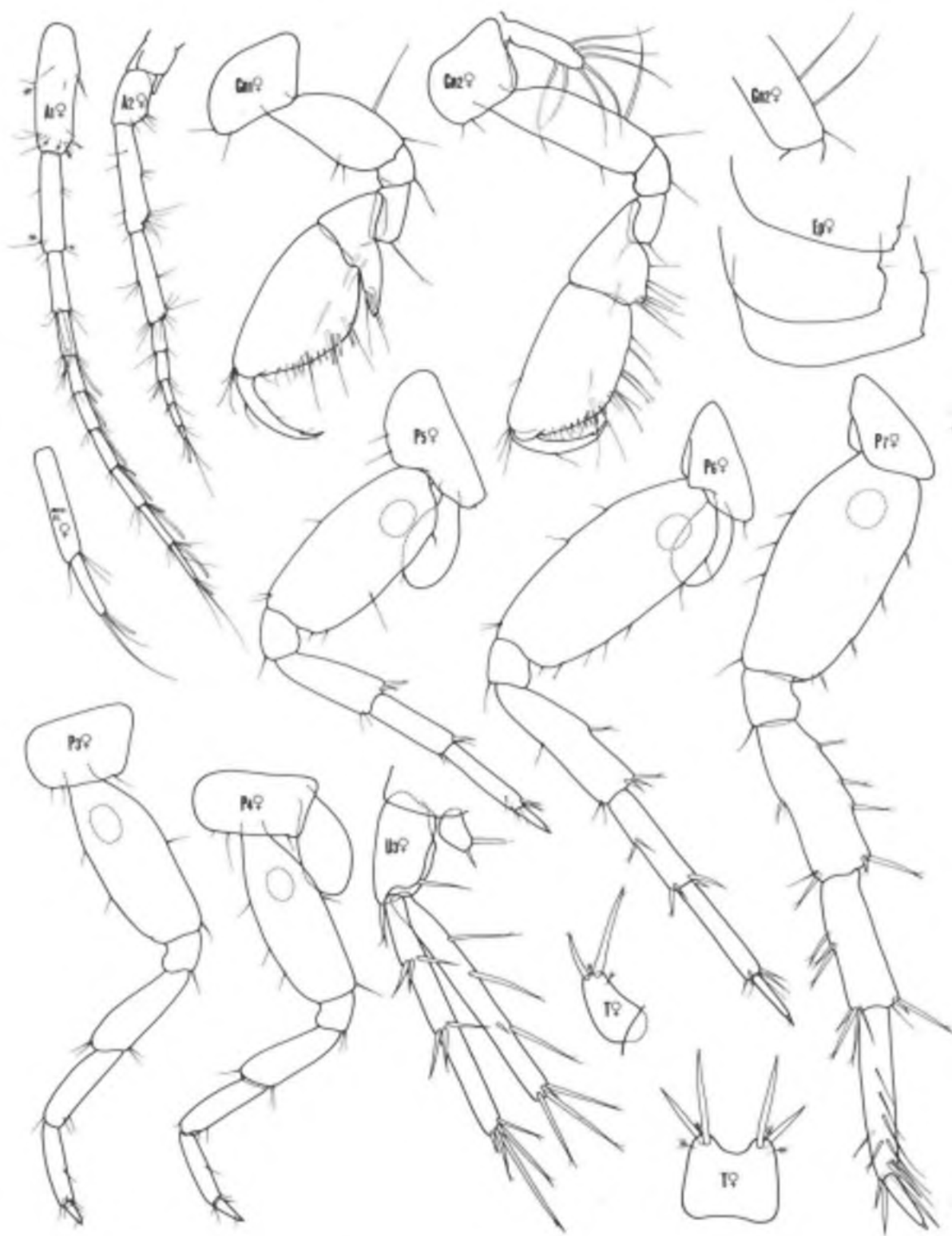


FIG. 170. — *Bogidiella chappuisi* Ruffo, 1952. Female (Crete).

[RUFFO, 1973]; mouth of river Sele [G. KARAMAN, 1979 a]. *Italy-Adriatic Sea*: Otranto (Porto Badisco) [RUFFO, 1973]. *Greece*: Ierápeira [RUFFO & SCHIECKE, 1976 a, sub *B. minotaurus*]. *Algeria*: Skikda (beach Miramar near Stora) [RUFFO, 1954 a].
General: Mediterranean endemic.

Ecology: In subterranean waters near the sea, usually brackish or freshwater (wells, springs etc.).

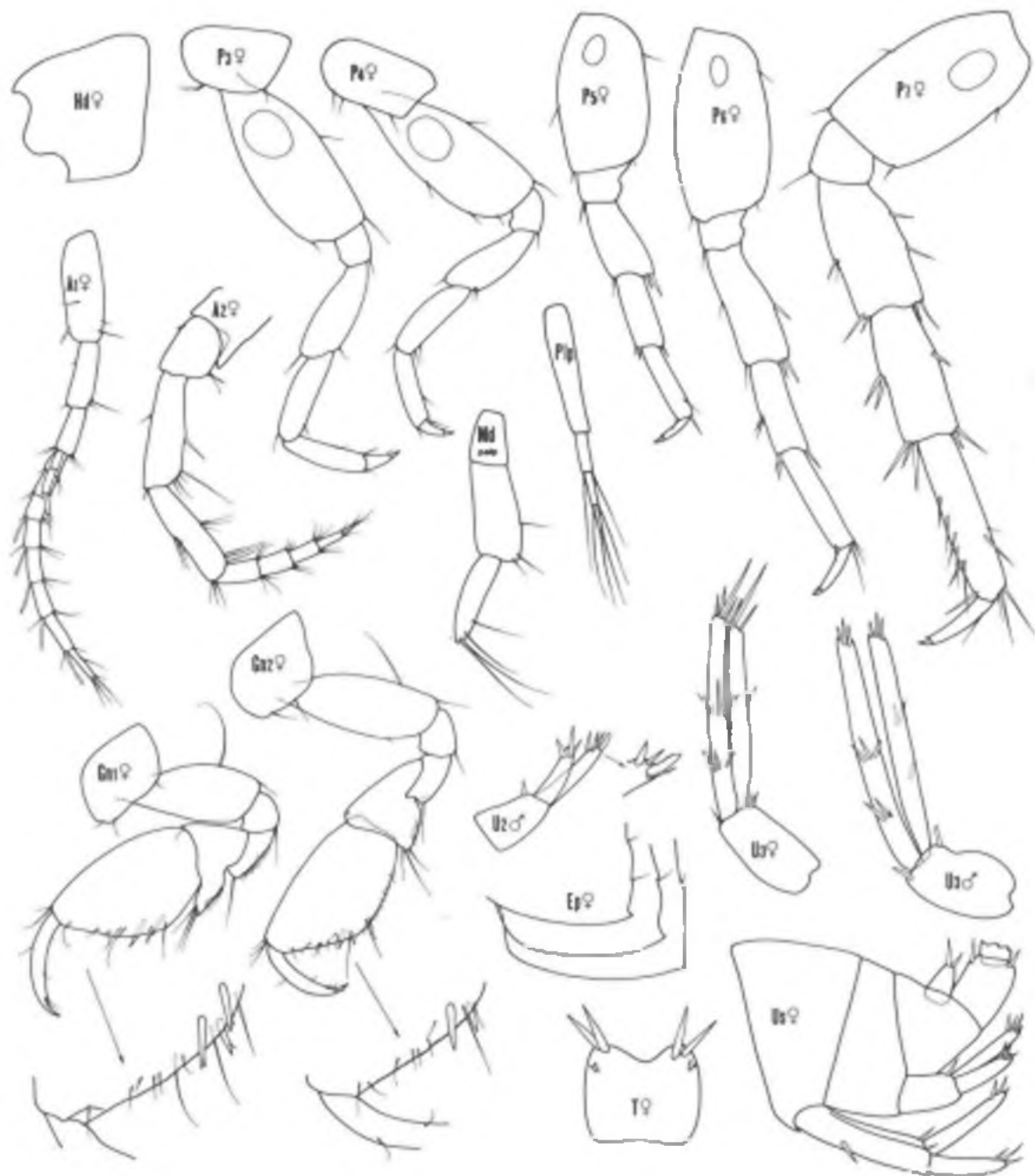


FIG. 171. — *Bogidiella chappuisi* Ruffo, 1952. Male, female (Racou near Argeles-sur-Mer).

Bogidiella dalmatina S. Karaman, 1953

fig. 172

Bogidiella albertimagni dalmatina S. KARAMAN, 1953, p. 141, fig. 1-2; 1959, p. 346

Bogidiella chappuisi dalmatina MESTROV, 1961, p. 79

Bogidiella chappuisi (partim) RUFFO, 1963, p. 190; MATEUS & MACIEL, 1967, p. 37; RUFFO, 1973, p. 51

Bogidiella dalmatina G. KARAMAN, 1973 a, p. 27, fig. 3-5; 1974 a, p. 5

TYPE LOCALITY: Lapad (Dubrovnik), Adriatic Sea

Description: ♀ 2 mm. Lateral cephalic lobes rounded. A1 flagellum with 7 arts; accessory flagellum with 2-3 arts. A2 peduncle art 4 > 5, flagellum with 5 arts. Mandibular palp art 2 with 2 setae, art 3 with 4 setae. Mx1 inner plate with 2 setae, outer plates with 7 distal spines, each with 1-2 lateral teeth; palp with 3-4 distal setae. Gn1 propodus with palm oblique, finely denticulate, with 1 lateral and 2 sublateral spines. Gn2 propodus elongate, with lateral margins almost parallel, palm oblique with 2 sublateral spines. P3-4 basis slightly inflated, dactylus short. P5-7 basis slightly dilated, with posterior margin entire. Hertzog's organ in basis P3-7 present, very small, subcircular, smaller than width of basis. Pleopods 1-3 with outer ramus 3-articulate, inner ramus absent. Ep1-3 with small posterodistal tooth. U1 peduncle with 1 strong spine on anterior margin. U1-2 rami with distal spines relatively short. U3 much exceeding

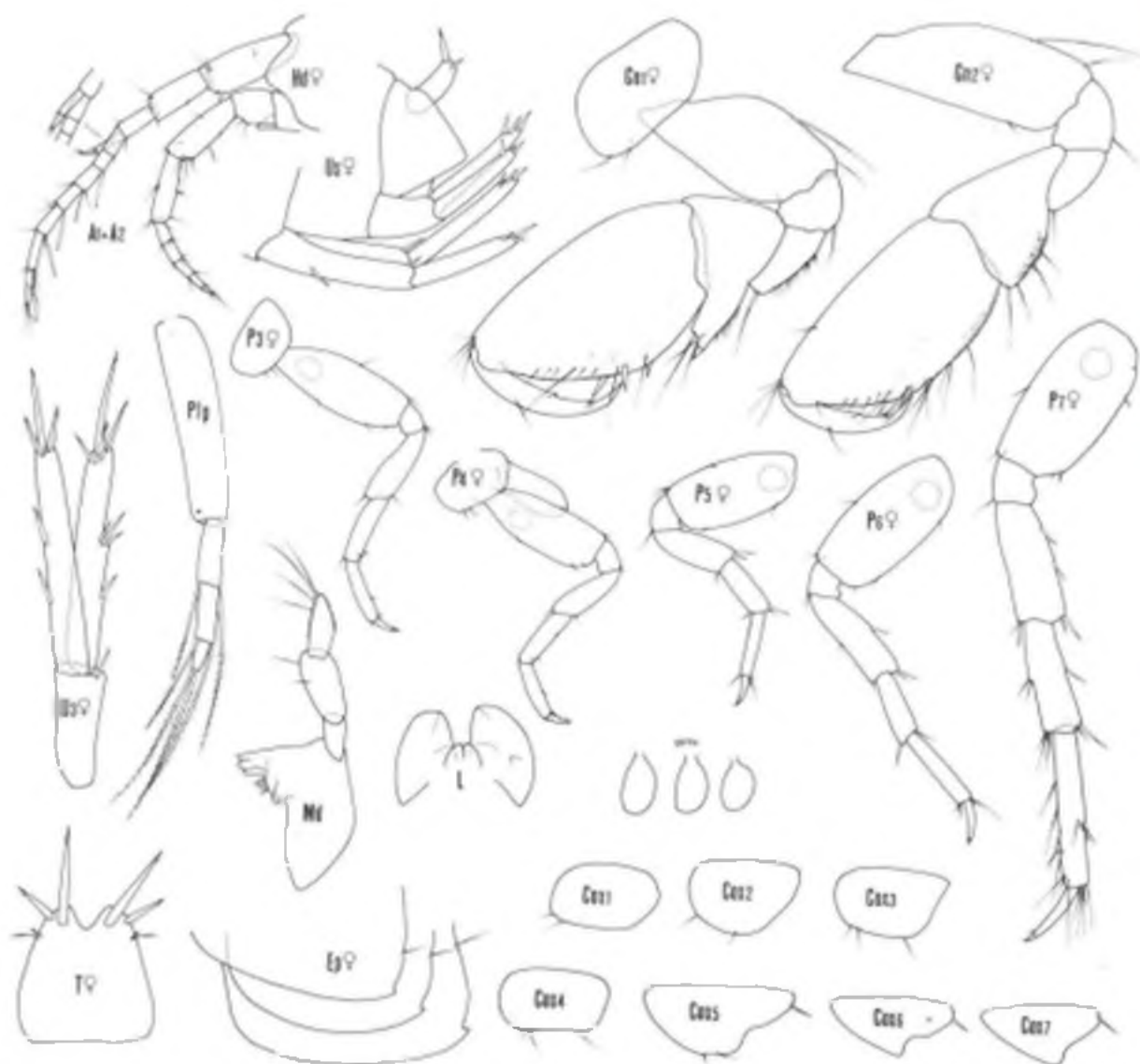


FIG. 172. — *Bogidiella dalmatina* S. Karaman, 1953. Female (Boka Kotorska).

tip of U1. peduncle short; rami subequal, 1-articulate, lanceolate, with long marginal and distal spines. Telson as long as broad, emarginate, each lobe with 2 unequal spines shorter than the lobes. No sexual dimorphism observed.

Distribution: *Mediterranean*. *Yugoslavia*: Dubrovnik (Lapad); Cavtat [S. KARAMAN, 1953]; Boka Kotorska (Verige); Budva [G. KARAMAN, 1973 a, 1974 a].

General: Adriatic endemic.

Ecology: In subterranean waters (spring, wells, etc.) near the sea shore, sometimes together with *Psammogammarus caecus*, *Melita valesi*, etc.

Bogdiella italica G. Karaman, 1979

fig. 173

Bogdiella italica G. KARAMAN, 1979 b, p. 103, fig. 1-3.

TYPE LOCALITY: Napoli

Description: ♀ 1.9 mm. Lateral cephalic lobes rounded. A1 shorter than body, peduncle art 1 with 1 ventral spine; flagellum 7-articulate, accessory flagellum 2-articulate; A2 peduncle art 3 short, art 4 > 5, with bunch of ca 12 slender setae in ventrodistal part. Mx1 inner plate with 2-3 setae, outer plate with 7 spines, each with 0-1 tooth (inner spine with 3 teeth), palp 2-articulate, bearing 3 distal setae. Mandibular palp art 1 < 2 > 3, art 2 with 1 seta, art 3 with 4 setae. Gn1 basis with 3 posterior setae; propodus ovate, posterior margin with 5 spines, palm oblique, smooth. Gn2 basis with 3 posterior setae; propodus ovate, with 2 spines at posterior margin. P3-4 dactylus < 1/2 propodus, basis without any trace of Hertzog's organ. P5 basis linear, dactyl = 1/2 propodus. P6 unknown. P7 basis linear, without Hertzog's organ; dactyl slightly exceeding 1/2 propodus. Pleopod 1 unknown. Pleopods 2-3 with short inner ramus 1-

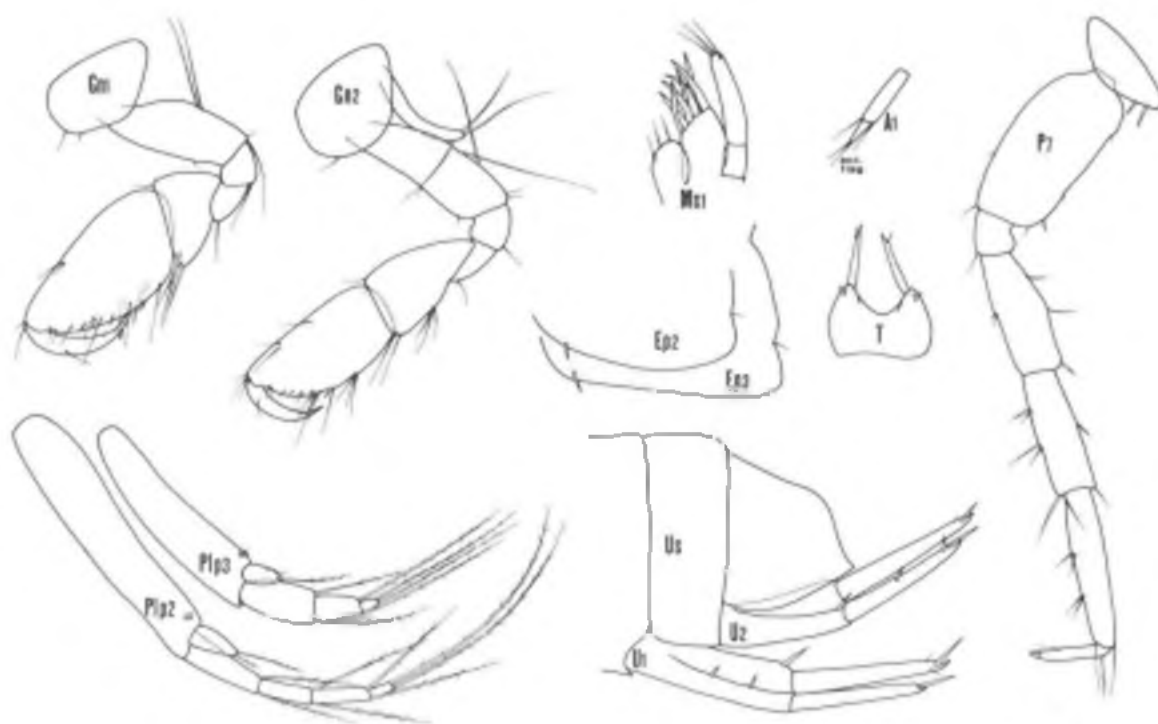


FIG. 173. — *Bogdiella italica* G. Karaman, 1979. Female (Napoli).

articulate. Pleopod 2 outer ramus 4-articulate. Pleopod 3 outer ramus 3-articulate. Ep2-3 with subrounded posterodistal corner and with 1 ventral spine each. U1-2 well developed, U1 not reaching tip of U2. Inner ramus of U1-2 longer than outer one, rami each with 1 subdistal spine. U3 rami subequal, 1-articulate, with spines at margins and tip. Telson broader than long, with 2 long distal spines. Oostegites narrow, present on segs 2-4.

♂ unknown.

Distribution: *Mediterranean. Italy-Tyrrhenian Sea:* Gulf of Napoli [G. KARAMAN, 1979 b].

General: Mediterranean endemic.

Ecology: Near coasts of sea, 1-2 meters, subterranean, marine.

Genus *CARANGOLIOPSIS* Ledoyer

Carangoliopsis LEDOYER, 1970, p. 11; G. KARAMAN & SCHIECKE, 1971, p. 98

Diagnosis: Body smooth, urosomites free. Head obtuse anteriorly, produced anteroventrally. Antennae 1-2 slender, accessory flagellum 1-articulate, short. Labrum concave distally, labium with inner lobes. Mandible normal, palp 3-articulate, art 3 not falciform. Mx1 inner plate conical, outer plate with 9 spines, palp 2-articulate. Mx2 both plates narrow, inner plate without medial row of setae. Mxp inner and outer plate long, palp 4-articulate. Coxae very short, coxa 4 not lobed. Gn1-2 subchelate, Gn1 < Gn2, Gn2 carpus lobed posteriorly. P5-7 subequal in shape, dactylus without nail. U1-2 normal. U3 biramous, inner ramus short, outer ramus 2-articulate, second article short. Telson short, cleft slightly beyond middle. Females like males. Oostegites narrow, setose.

TYPE SPECIES: *Carangoliopsis spinulosa* Ledoyer, 1970

Carangoliopsis spinulosa Ledoyer, 1970

fig. 174, 175

Carangoliopsis spinulosa LEDOYER, 1970, p. 11, fig. 2; G. KARAMAN & SCHIECKE, 1971, p. 91, fig. 1-6.

TYPE LOCALITY: off Monaco, depth 710 m

Description: ♂ 3.5 mm. Body smooth, head quadrate, obtuse anteriorly, rostrum absent, lateral cephalic lobes produced anteroventrally, eyes absent, antennal sinus absent. A1 slender, as long as body, peduncle art 2 longer than art 1, flagellum longer than peduncle, accessory flagellum very short, 1-articulate. A2 shorter than A1, flagellum < peduncle, antennal gland cone short. Inner lobes of labium long. Mx1 inner plate conical, with 3 distal setae, outer plate with 9 toothed spines, palp with distal spines. Maxilliped palp art 4 = 3. Mandible palp articles progressively longer, narrow. Gn1 carpus not lobed, propodus ovoid. Gn2 carpus lobed posteriorly, propodus ovoid, dactylus slender. P3-4 merus, carpus and propodus short, dactylus = propodus, with nail. P5-7 similar to each other in shape, basis with parallel lateral margins, without posterior lobe, anterior margin with numerous spines, posterior margin serrate; dactylus short, without distal nail but with 2 distal setae. Ep1-2 each with strong spine in posterodistal corner, Ep3 produced into sharp point. U1 slender, peduncle with strong spine on anterior margin; outer ramus longer than inner one, both with numerous lateral and distal spines. U2 rami longer than peduncle, inner ramus longer than outer one, both rami with numerous lateral and distal spines. U3 exceeding tip of U1, peduncle short, inner ramus short, outer ramus 2-articulate; second article very short, first article with spines along both margins. Telson short, telsonic lobes triangular, with one spine. Coxal gills present on segs 2-4.

♀ like male except slightly different shape of Gn1-2 propodus. Oostegites narrow, present on segs 2-5.