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THE MEDITERRANEAN SPECIES
OF *GAMMAROPSIS* LILJEBORG
(Crustacea, Amphipoda)

The genus *Gammaropsis* LILJEBORG and related genera clearly require intensive taxonomic study on a worldwide basis. When this is accomplished, considerable changes in their classification can be expected. The present classification of the *Gammaropsis*-like forms is clearly unsatisfactory and it would seem most sensible at this point in time, to utilise the all embracing definition of the genus sensu BARNARD (1973), with the exception that *Megamphopus* sensu MYERS (1976) be considered a distinct genus. This latter genus is characterised by shortened article 3 of the mandibular palp, enlarged male coxa 2 and scarcely enlarged female gnathopod 2. It includes the three Mediterranean species given by MYERS (1976) and also *M. longidactylus* CHEVREUX (*Podoceropsis* (as sub-genus of *Gammaropsis*) by BARNARD 1973).

Prior to the present work, four species only were attributed to the genus *Gammaropsis* LILJEBORG in the Mediterranean, viz. *G. maculata* (JOHNSON), *G. dentata* (CHEVREUX), *G. ostroumowi* (SOWINSKY) and *G. pseudostroumowi* LEDOYER. The genus *Gammaropsis* sensu lato, herein includes ten mediterranean species. To the four species mentioned above are added *G. palmata* (STEBBING & ROBERTSON) (formerly *Megamphopus*), *G. sophiae* (BOECK) (formerly *Podoceropsis*), *G. togoensis* (SCHELLENBERG) recorded here for the first time from the Mediterranean, and three species new to science described here.

The study was based on material in the Verona Museum, in the collections of Drs. U. Schiecke, D. Bellan-Santini and M. Ledoyer and in those of the authors (mainly G. K-S).

KEY TO THE MEDITERRANEAN SPECIES OF *GAMMAROPSIS*

1. Coxa 1 and urosome toothed 2
Coxa 1 and urosome smooth 5
2. Epistome very long and acute, clearly longer than labrum 3
Epistome only as long as or shorter than labrum 4
3. ♂ gnathopod 2 dactylus much more than half length of propodus (fig. 3) *G. pseudostroumowi*
♂ gnathopod 2 dactylus less than half length of propodus (figs. 1-2) *G. dentata*
4. Uropod 3 rami longer than peduncle. ♂ pereopod 6 merus as large as basis. ♀ gnathopod 2 propodus a little longer than gnathopod 1 propodus. Maximum length 4.0 mm (fig. 4) *G. ostroumowi*
Uropod 3 rami subequal in length with peduncle. ♂ pereopod 6 merus not enlarged. ♀ gnathopod 2 propodus 2x length of gnathopod 1 propodus. Maximum length 6.0 mm (figs. 5-6) *G. emancipata*
5. Uropod 3 rami spiniform, lacking a terminal cluster of spines (fig. 14) 9
Uropod 3 rami normal, with group of terminal spines 6
6. Head lobes slender, strongly projecting, eye totally situated on lobe. (fig. 12) *G. togoensis*
Head lobes only a little projecting, eyes partially situated behind point of insertion of antennae 7
7. Gnathopod 2 ♂ & ♀ with single deep excavation in palm, eye relatively small, sub-round (fig. 9) *G. crenulata*
Gnathopod 2 ♂ & ♀ never as above, either with smoothly oblique palm or with several excavations, eye relatively large, oval or lageniform 8
8. ♂ gnathopod 2 carpus more than half length of propodus, palm more than half length of propodus. P 5-7 basis robust (figs. 7-8) *G. maculata*
♂ gnathopod 2 carpus less than half length of propodus, palm less than half length of propodus. P 5-7 basis slender. In very shallow depths (0.2 m) (fig. 10) *G. ulrici*
9. Antenna 1 lacking accessory flagellum. ♂ gnathopod 1 palm evenly rounded. ♀ gnathopod 2 propodus sub-ovoid (fig. 14) *G. sophiae*
Antenna 1 with 2-3 articulate accessory flagellum. ♂ gnathopod 1 palm sinuous. ♀ gnathopod 2 propodus narrow, anterior and posterior margins approximately parallel. ♀ ov. 2 mm. ♂ 1 mm (fig. 15) *G. palmata*

The Mediterranean species of *Gammaropsis* can conveniently be segregated into two groups: Group 'A' with toothed urosome, toothed coxa 1 and long, acute epistome, and group 'B' with smooth urosome, smooth coxa 1 and short epistome.

GROUP 'A'

Included here are *G. dentata* CHEVREUX, *G. ostroumowi* SOWINSKY, *G. pseudostroumowi* LEDOYER and *G. emancipata* sp. nov. The

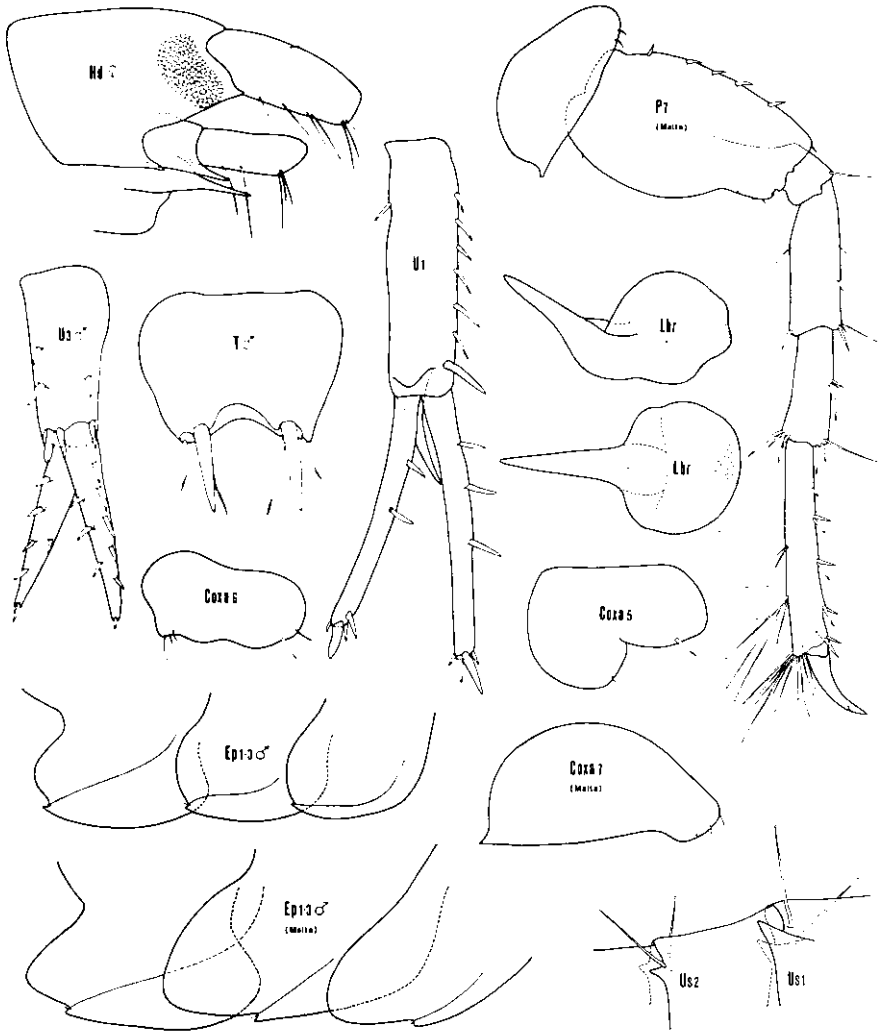


Fig. 1. *Gammaropsis dentata* (CHEVREUX). Napoli and (where stated) Malta.

Atlantic species *G. longicarpa* REID*, *G. hirsutimana* REID, and *G. avara* REID which also have a toothed urosome are closely similar

* Syntypic material of this species is located in the Universitetets Zoologiske Museum at Copenhagen and in the Royal Scottish Museum at Edinburgh. One of us (G. K-S) has selected a lectotype and allolectotype as follows:
 Atlantide Station 153. 1 ♂ Lectotype U.Z.M.
 Atlantide Station 145. 1 ♀ Allolectotype U.Z.M.

to the Mediterranean species, but lack a toothed coxa 1. Other species of *Gammaropsis* with a toothed urosome are: *abyssalis* (STEPHENSON), *anomala* (CHEVREUX), *crassipes* (HASWELL), *dimorpha* (K. H. BARNARD), *gurvitzii* (BULYCHEVA), *holmesi* (STEBBING), *lobata* (CHEVREUX), *longitarsa* (SCHELLENBERG), *lophomeria* (K. H. BARNARD), *serricrus* (K. H. BARNARD), *sexdentata* (STEPHENSON), *thompsoni* (WALKER), *thomsoni* (STEBBING) and *tonichi* (J. L. BARNARD).

Gammaropsis dentata (CHEVREUX)

(fig. 1-2)

Eurystheus dentatus CHEVREUX, 1900, p. 93-94, pl. 12, fig. 1; CHEVREUX, 1910, p. 250; CHEVREUX, 1927, p. 111; CHEVREUX, 1935, p. 126.

MATERIAL EXAMINED: Castromarina (Puglia): grattature Grotta Poesia; Sicilia: Capo Molini, algae, 10 m & 32 m; Isola Lachea (Catania), red algae, 10 m; Catania, *Posidonia* meadow, 5 m; Gulf of Napoli: Bocca Piccola, *Lithothamnium*, 70 m; Punta Tiberio in Bocca Piccola, *Peyssonelia*, 70 m; Secca d'Ischia, *Posidonia*, *Codium*, *Peyssonelia*, 35 m; Casamicciola, *Posidonia* rhizoids, 30 m; Pta S. Angelo (Ischia), sponges; Canale di Procida, 20 m; Capo Tiberio, *Peyssonelia*, 70-75 m; Capri-Monacone, "fango" 120-150 m; Secca near Nisida, *Posidonia* rhizoids, 22 m; Veruce, bryozoans and algae, 40 m; red algae ("coralligène"), 55 m; Capri, bryozoans near Grotta Azzurra, 30-35 m; Island of Ponza: Santo Stefano, 20-25 m, algae 20-25 m; Sardegna: Capo Ferrato, algae, 10-22 m; Capo Caccia, rocks with few algae, 8-20 m; Malta: Golden sands, rocks with *Halimeda*, *Peyssonelia*, 10 m; St. Paul's Bay, algae and *Posidonia*, 18-22 m; Gozo, near Dweira point, phytal and interstitium, 15-35 m; Tunisia: Zembra, algae, 16 m; Israel: Carmel, 27.

DISCUSSION: CHEVREUX (1927) figured a ♂ gnathopod 2 of this species in which the angle between the palm and the posterior margin of the propodus is much greater than in material figured by him in 1900. He attributes the differences between the two materials to the fact that the former material was from 655-888 m (Canary Islands) the latter from 130 m (Azores). Nowhere in the literature does Chevreux comment on, or figure, the form of coxa 7. In material studied by the writers, coxa 7 of the adult ♂ is always drawn out into an acute point (but is evenly rounded in ♀♀ and juveniles). Due to the kindness of Dr. G. Testa (Monaco) it was possible to

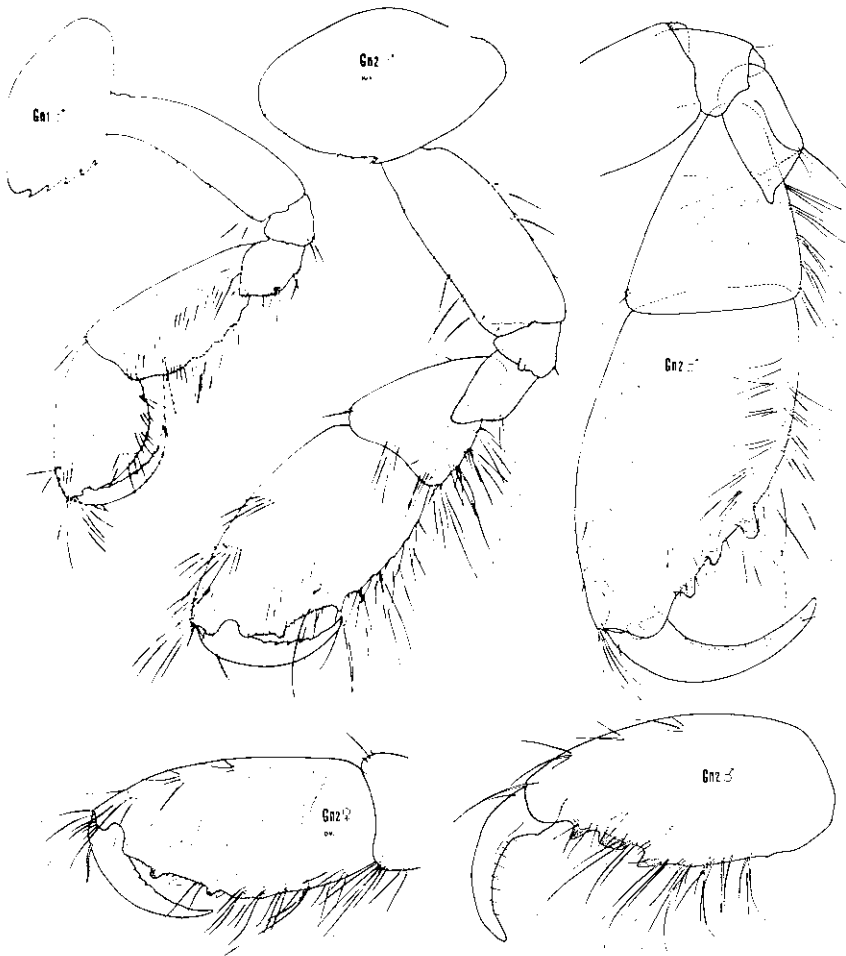


Fig. 2. *Gammaropsis dentata* (CHEVREUX). Napoli.

examine type material. The two ♂♂ studied (4.0 mm) both had an evenly rounded coxa 7, and the propodus of gnathopod 2 exhibited a greater angle between palm and posterior margin than in Mediterranean material examined by the writers. In addition the carpus and merus are particularly small in the type material. In material from Cape Verde (Chevreux 1935 - material transmitted to the authors by Dr. G. Testa) the ♂ coxa 7 has a long, acute prolongation on the posterior margin, and the specimens (4.0 - 5.0 mm) are weaker

with longer articles to the appendages than is the case in the type material. The form of the epimera appears to change somewhat with age (fig. 1).

ECOLOGY: Among algae, *Posidonia*, sponges & bryozoans in 5-150 m.

MEDITERRANEAN DISTRIBUTION: Tunisia, Malta, Sicily, Ponza, Castramarina, Gulf of Napoli, Sardegna, Israel.

Gammaropsis pseudostroumowi LEDOYER

(fig. 3)

Gammaropsis pseudostroumowi LEDOYER, 1977, p. 347, fig. 9A.

MATERIAL EXAMINED: Marseille: 2 ♂ 7 ♀ ov. 8 juv. (FVP 19, Ledoyer 1978) 4 ♀ ov. (FVP 33, Ledoyer 1978).

DISCUSSION: This species is clearly very close to *G. dentata* (CHEVREUX) but differs significantly in the structure of the male gnathopod 2. The single specimen referred to *G. lobatus* (CHEVREUX) by HARMELIN (1964) has been re-examined by one of us (A.A.M.) and is undoubtedly referable to *G. pseudostroumowi*. *G. lobatus* (CHEVREUX) should therefore be removed from the list of Mediterranean species.

ECOLOGY: On muddy bottoms in deep water.

MEDITERRANEAN DISTRIBUTION: Marseille.

Gammaropsis ostroumowi (SOWINSKY)

(fig. 4)

Protomedeia ostroumowi SOWINSKY, 1898, p. 475, pl. 10, fig. 1-19.

Eurystheus ostroumowi CHEVREUX & FAGE, 1925, p. 311-313, fig. 320-321.

MATERIAL EXAMINED: Malta: St. Paul's Bay, algae with *Posidonia*, 18-22 m; Gulf of Napoli: Capri near Grotta Azzurra, among bryozoans, 30-35 m; Vervece, algae and bryozoans, 40 m, and calcareous algae with epiphytes, 25-40 m.

DISCUSSION: This species has only rarely been collected. Pereopod 6 in the ♂ is diagnostic, but is unfortunately frequently missing in

preserved material. This species will be dealt with fully in a forthcoming publication on Mediterranean Amphipoda. At this point, the included key should suffice to distinguish ♀♀, and ♂♂ lacking pereopod 6.

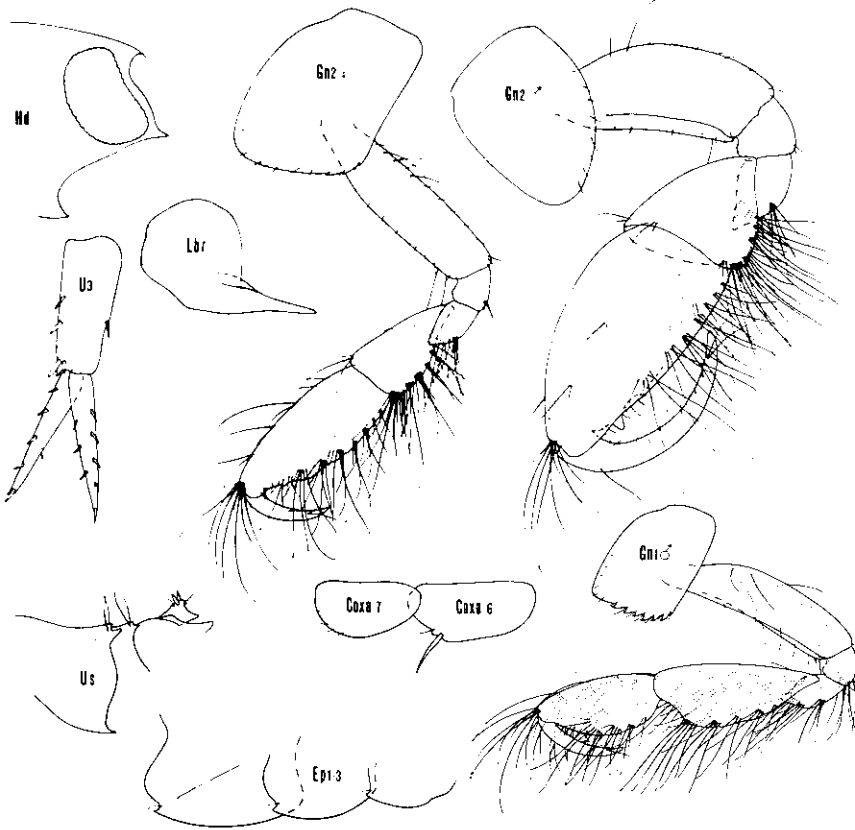


Fig. 3. *Gammaropsis pseudostroumowi* LEDOYER. Marseille.

ECOLOGY: Found in 18-40 m in rhizoids of *Posidonia*, in calcareous algae and among bryozoans. This species appears to prefer hard and 'crusty' biotopes rather than floating algal thalli.

MEDITERRANEAN DISTRIBUTION: Bosphorus, Adriatic, Malta, Gulf of Napoli, Monaco.

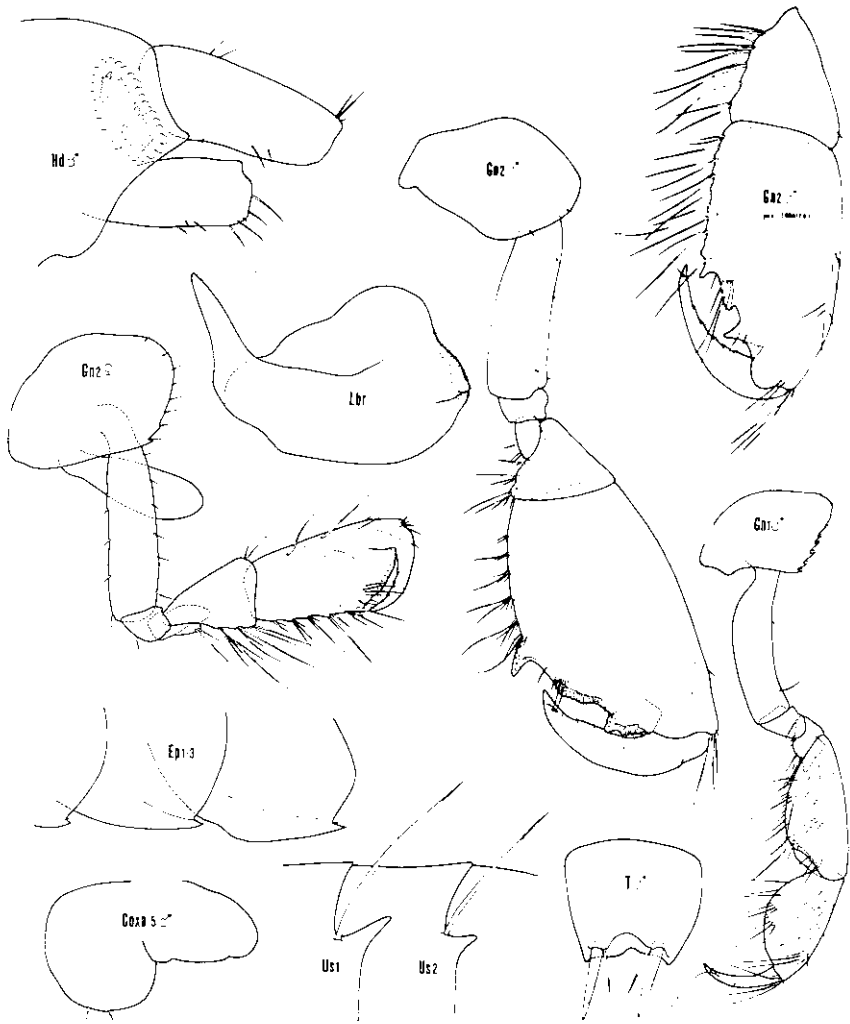


Fig. 4. *Gammaropsis ostroumowi* (SOWINSKY). Napoli and (where stated) Malta.

Gammaropsis emancipata sp. nov.

(figs. 5-6)

MATERIAL EXAMINED: Gulf of Napoli: 2 ♂ 3 ♀ ov. Vervece, fragments of calcareous rocks with crust of algae, 30-35 m; 1 ♂ Vervece,

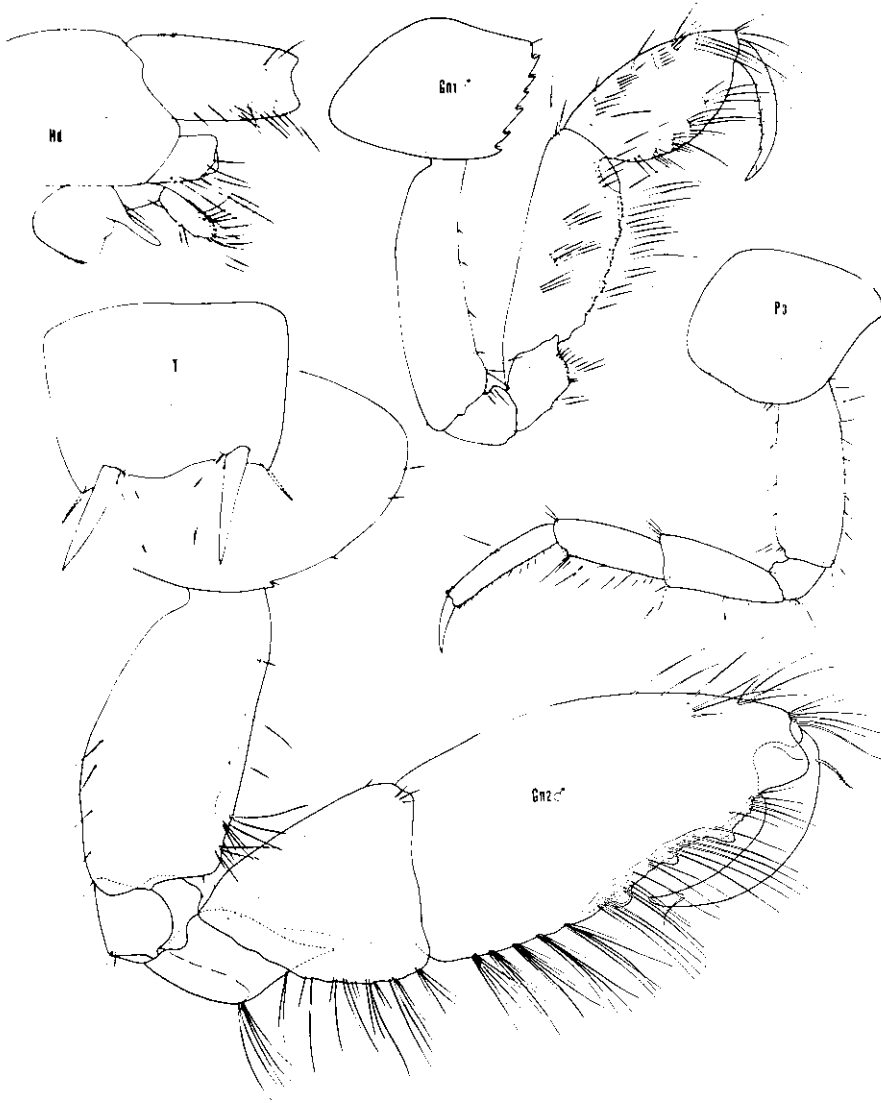


Fig. 5. *Gammaropsis emancipata* sp. nov. Napoli.

calcareous rocks with epiphytes 25-40 m; 1 ♂ 1 ♀ ov. Canale di Procida, 20 m; 1 ♀ ov. Capo Tiberio, Peyssonelia, 66-83 m. Type Locality: Vervece, Gulf of Napoli.

DESCRIPTION: ♂ 5.5 mm. Eyes oval, relatively smaller than in *E. ostroumowi*, strongly pigmented. Head lobes rounded. Epistome acute, maximally reaching same length as labrum, never longer. Antenna 1 two thirds body length, flagellum with 14 art, accessory flagellum with 6 art. Antenna 2 missing in all material examined. Gnathopod 1 coxa strongly dentate on lower margin, carpus and propodus with posterior margin harmonically convex and strongly

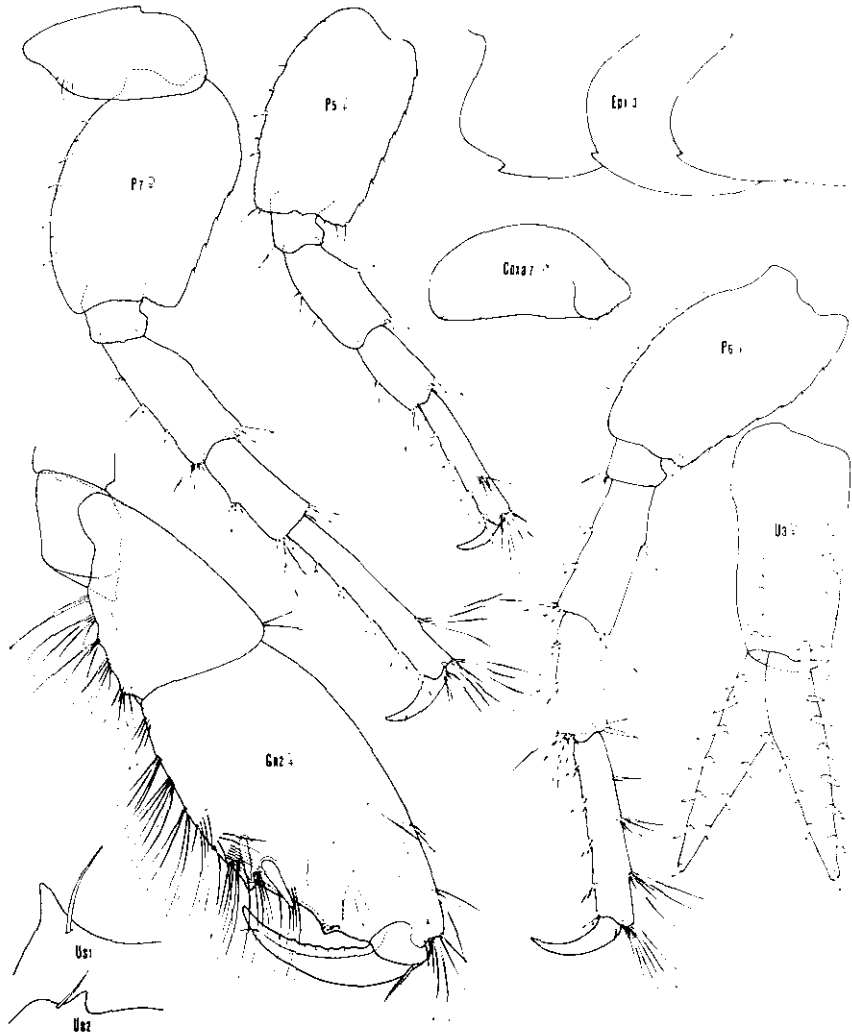


Fig. 6. *Gammaropsis emancipata* sp. nov. Napoli.

setose, dactylus three quarters length of propodus. Gnathopod 2 propodus with posterior margin nearly straight, with three protuberances, dactylus half length of propodus. Gnathopod 1 propodus less than half length of gnathopod 2 propodus. Epimera 1-3 each with a small incision bearing a small seta on the postero-distal margin. Urosome seg 1 with a large dorso-lateral tooth on either side. Urosome seg. 2 similar, but teeth smaller. Pereopods robust, basis, merus and carpus clearly widened. Coxa 7 oval with posterior margin harmonically rounded. Uropod 3 robust, with many strong spines, rami subequal in length with peduncle. Telson with two strong distal spines, a slender spine, and one or two plumose setae.

♀ 6.0 mm. Gnathopod 2 similar to that of ♂ but a little smaller, propodus with posterior margin bearing two protuberances and two strong spines, palm not clearly defined. Gnathopod 1 propodus about half length of gnathopod 2 propodus.

ECOLOGY: So far known only from Gulf of Napoli in depths of 20-40 m. In two samples it occurred together with *G. ostroumowi*, so it may be inferred that *G. emancipata* prefers biotopes with calcareous or 'crusty' algae.

Holotype (Microscopical preparations) M.V.

Paratypes M.V.

DERIVATIO NOMINIS: Within the group of *Gammaropsis* with urosome and coxa 1 dentate the present species is the only one in which the development of gnathopod 2 is nearly as great in ovigerous females as in adult males.

GROUP 'B'

Included here are *G. maculata* (JOHNSTON), *G. crenulata* sp. nov., *G. ulrici* sp. nov., *G. togoensis* (SCHELLENBERG), *G. sophiae* (BOECK) and *G. palmata* (STEBBING & ROBERTSON).

Gammaropsis maculata (JOHNSTON)

(figs. 7-8)

Gammarus maculatus JOHNSTON, 1827, p. 176.

Gammaropsis erythrophthalmus LILJEBORG, 1855, p. 455; SARS, 1894, p. 558, pl. 198.

Gammaropsis maculatus STEBBING, 1888, p. 131.

Protomedeia maculata (in part) DELLA VALLE, 1893, p. 436, pl. 57, figs. 8-11.

Eurystheus tridentatus BATE, 1857, p. 143.

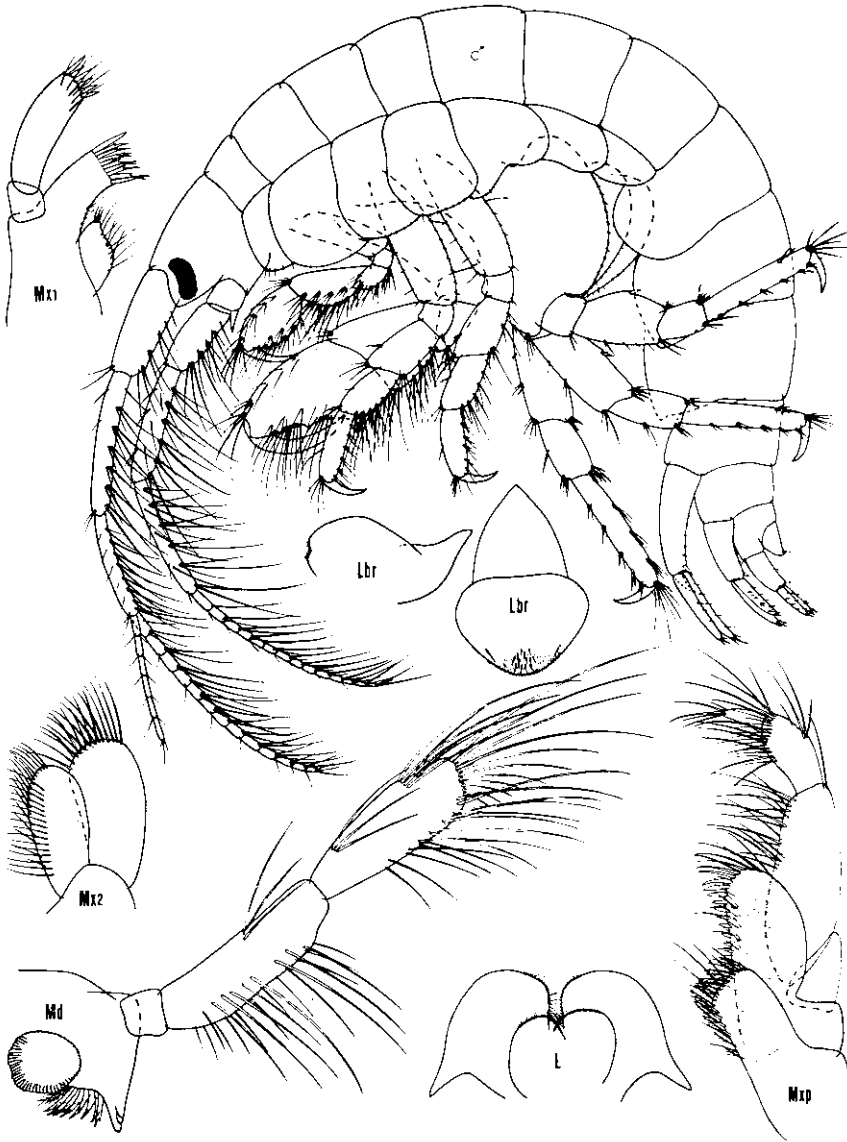


Fig. 7. *Gammaropsis maculata* (JOHNSTON). Rovigno.

Eurystheus maculatus CHEVREUX & FAGE, 1925, p. 314, fig. 323; GURJANOVA, 1951, p. 851, fig. 596.

MATERIAL EXAMINED: Gulf of Napoli: Secca di Forio, mixture of sands with ferric oxides, 50 m; Punta Palumno, *Posidonia* detritus and "fango" 105 m; Veruce, sands, 25 m; Secca di Forio, *Vidalia* 50 m; Secca della Gaiola, *Lithothamnium*; algae, *Posidonia*, 10-40 m; Between Gaiola and Trentaremi, *Posidonia*, 20 m; Near Capo Tibe-

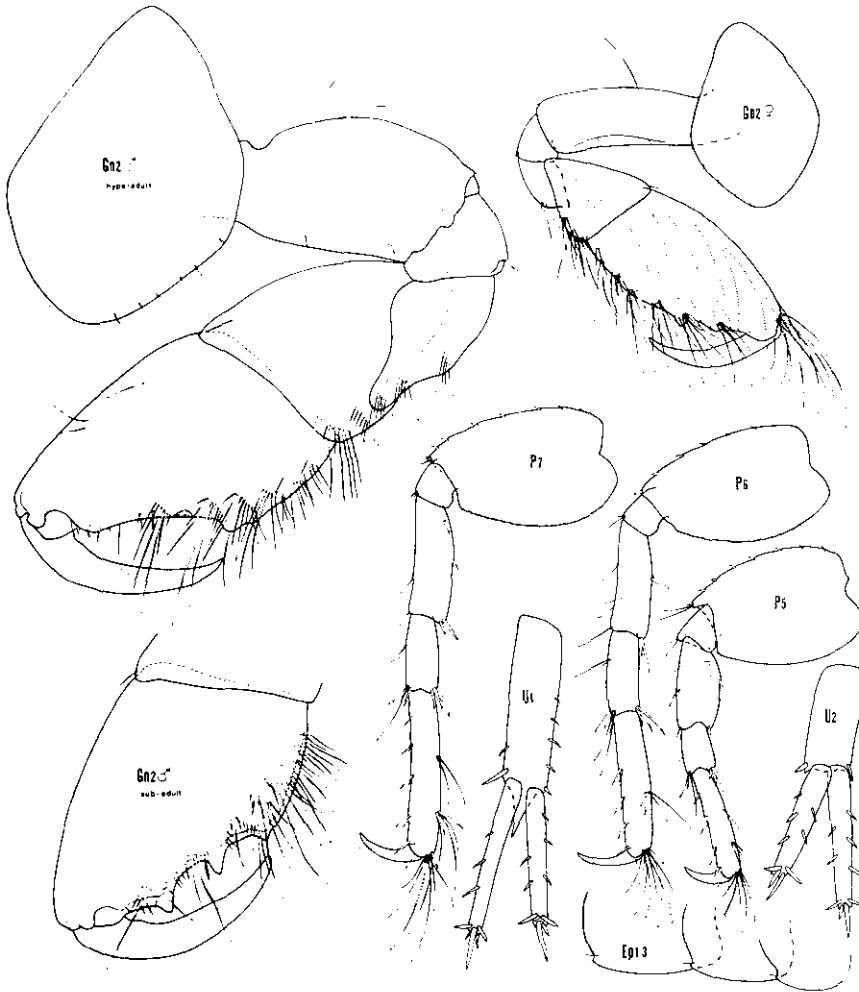


Fig. 8. *Gammaropsis maculata* (JOHNSTON). Napoli.

rio, *Codium* & *Posidonia*, 30-35 m; Pozzuoli, fango & ascidians, 35-40 m; Posillipo, material from Della Valle collection (as *Protomedeia maculata*) and recent material from algae, 10 m; Mergellina, shallow, crusting algae; Epifauna & Epiflora of *Diogenes prideauxi*, 10 m; Civitavecchia Torvaldaliga: algae, 3 m; Sardegna: Capo Caccia, 10-20 m; Sicilia: Catania-Brucoli, *Posidonia*, 10 m; Capo Molini, 10-32 m; Malta: N.W. of "Golden sands", 0-4 m; Pantelleria: shallow, algae; Tunisia: Tabarka, algae 16 m; Adriatic: coast of Yugoslavia, 18-27 m; Marseille: artificial reef.

DISCUSSION: Considerable confusion has existed in the past, over the status of the various names listed in the above synonymy, particularly of *G. maculatus* (JOHNSTON) and *G. erythrophthalmus* LILJEBORG. This confusion is partly a result of the growth changes which can be demonstrated in the male gnathopod 2. In young males, the palm has three triangular teeth (as figured by Sars 1894) but in old males, these teeth become obsolete resulting in the form figured by CHEVREUX & FAGE (1925). In one specimen examined in the present investigations one gnathopod 2 was of one form and one of the other, possibly due to damage to one gnathopod which had not then regenerated beyond the juvenile type.

In addition to the Mediterranean material listed above, one of us (A.M.) was able to examine a considerable amount of fresh material from S. Ireland and there seems little doubt but that this and Mediterranean material are conspecific.

ECOLOGY: Most commonly among 'crusty' algae, bryozoans, tunicates etc., but also in *Posidonia* beds.

MEDITERRANEAN DISTRIBUTION: Widely distributed in the Mediterranean but of uncertain status in the Eastern Mediterranean. Lack of records from the Aegean may be a result of the scarcity of amphipod collections from the area rather than a true absence of the species from the region.

Gammaropsis crenulata sp. nov.

(fig. 9)

MATERIAL EXAMINED: Sicily: Capo Molini (Catania) 1 ♀ ov. 10 m; Napoli: Mergellina, 4 ♂ 1 ♀ ov. 19 juv. algae, 1-2 m; Pietra Salata, 1 ♂ 3 ♀ ov. 1 juv. Porifera, 6-12 m; Ischia Castello, 1 ♀ ov. 2 juv.

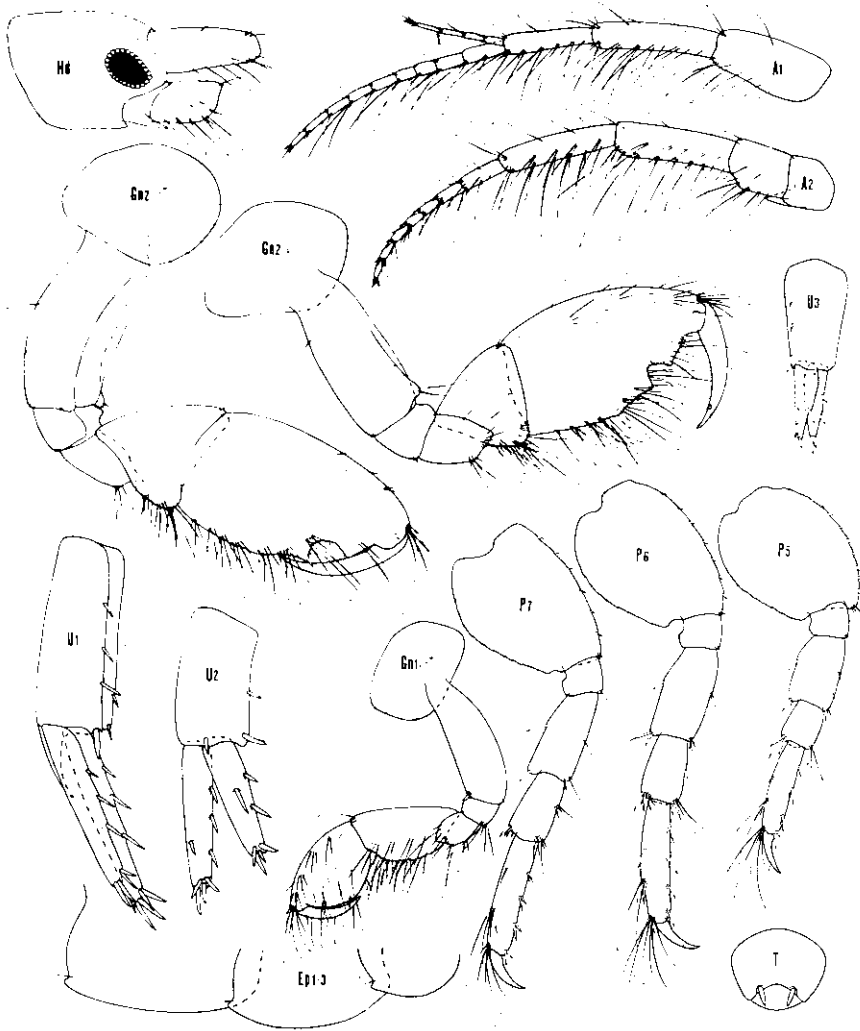


Fig. 9. *Gammaropsis crenulata* sp. nov. Napoli.

Peyssonelia, 5-10 m; Secca delle Formiche, 1 ♀ ov. 20 m; S. Lucia, 6 ♀ ov. & juv, 1-3 m; Trentaremi, 1 ♂ 3 ♀, 1 juv. 0-3 m; Sardegna: Capo Caccia 12 juv Porifera, partially in caves, 1-20 m; Cagliari 1 ♂ 4 ♀ ov.; Civitavecchia Torvaldaliga, 1 juv, *Halopteris*, 1.7 m; Malta: Meillicha Bay, S.W. of Madonna Church, 3 ♂ 7 ♀ ov. & juv. Intersti-

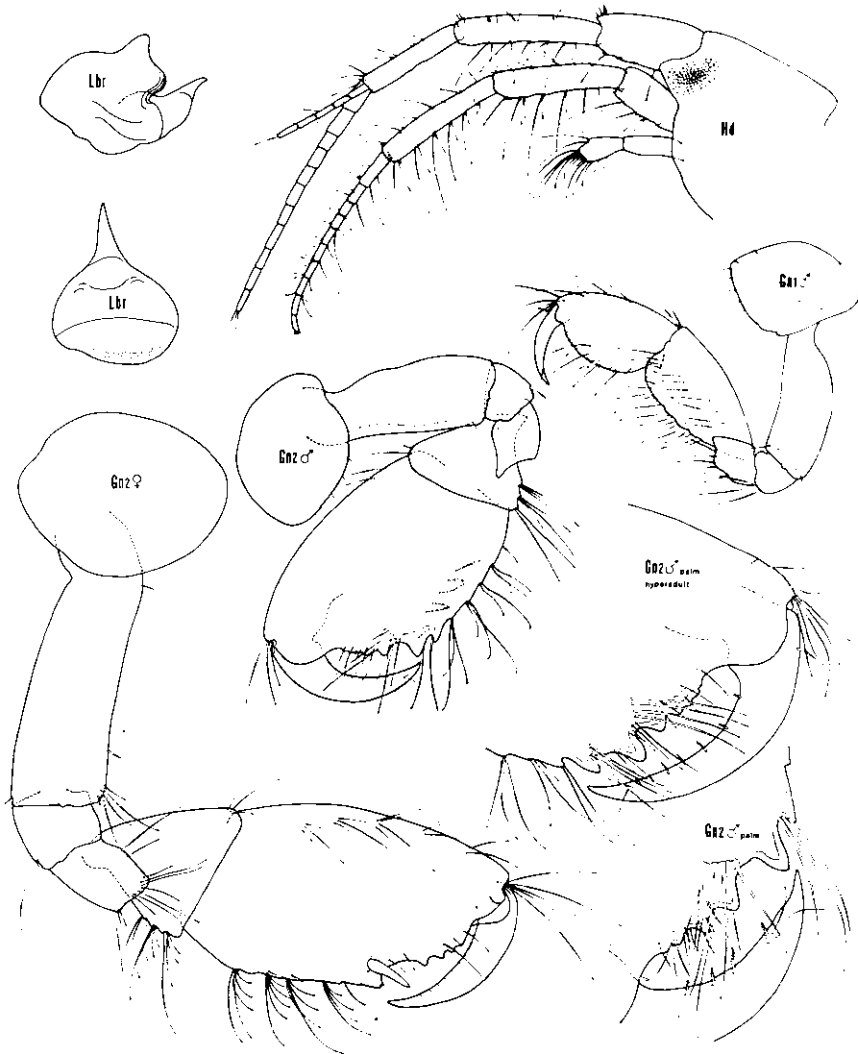


Fig. 10. *Gammaropsis ulrici* sp. nov. Tunisia.

tium, 0-3 m; Tunisia: Gulf of Tunis, Sidi Bou Said, 5 juv, *Posidonia* rhizoids, 0-2 m; Rhodos: Lindos 2 ♂ 2 ♀ ov. 1 juv, 0-2.5 m. Type Locality: Pietra Salata (Gulf of Napoli).

DESCRIPTION: ♂ 6.0 mm. Eyes relatively small, sub-round. Head lobes rounded. Antenna 1 peduncles relatively short, Antenna 1 art 2,

length little more than 4x breadth, flagellum shorter than peduncle with about 9 art, accessory flagellum with 5 art, the terminal art rudimentary. Antenna 2 flagellum with about 7 art. Gnathopod 1 coxa smooth, carpus and propodus sub-equal in length, propodus with posterior margin harmonically rounded, dactylus over half length of propodus. Gnathopod 2 carpus: propodus = 2:5, palm with a single deep rounded excavation, posterior margin weakly convex proximally, becoming weakly concave distally, this distal concavity and the palmar excavation evenly crenulate, and separated by a triangular tooth, which bears a stout spine, a further spine located on the posterior margin, dactylus over half length of propodus. Coxa 7 narrow, oval, with smooth margin. Pereopods 5-7 basis with posterior margin convex. Epimera 1-3 each with a small tooth, above which is inserted a small seta, at the lower hind corner. Urosome segments smooth. Uropod 3 robust, rami distinctly shorter than peduncle. Telson with two, stout, distal spines.

♀ 6.0 mm. Gnathopod 2 similar to that of male, but palmar excavation more triangular and distal region of posterior margin sloping more markedly towards the palm.

ECOLOGY: Among algae, *Posidonia* rhizoids, sponges and epizoites in 1-20 m.

MEDITERRANEAN DISTRIBUTION: Apparently widespread, from the Western Basin to the Aegean and North Africa.

Holotype M.V.

Paratypes M.V.

DERIVATIO NOMINIS: The name applies to the crenulate margin of the palmar excavation and posterior distal margin of the gnathopod 2 propodus in both sexes.

Gammaropsis ulrici sp. nov.

(figs. 10-11)

MATERIAL EXAMINED: Tunisia: Gulf of Tunis, Sidi Bou Said 3 ♂ juv, rhizoids of *Posidonia* 0-2 m; 15 juv. algae, 0-2 m; Tunis Marsa, 8 ♂ 7 ♀ ov. & juv. algae and fine sand, 0-2 m; Marseille: artificial reef 1 ♂ 1 ♀ ov.

Type Locality: Sidi Bou Said, Tunisia.

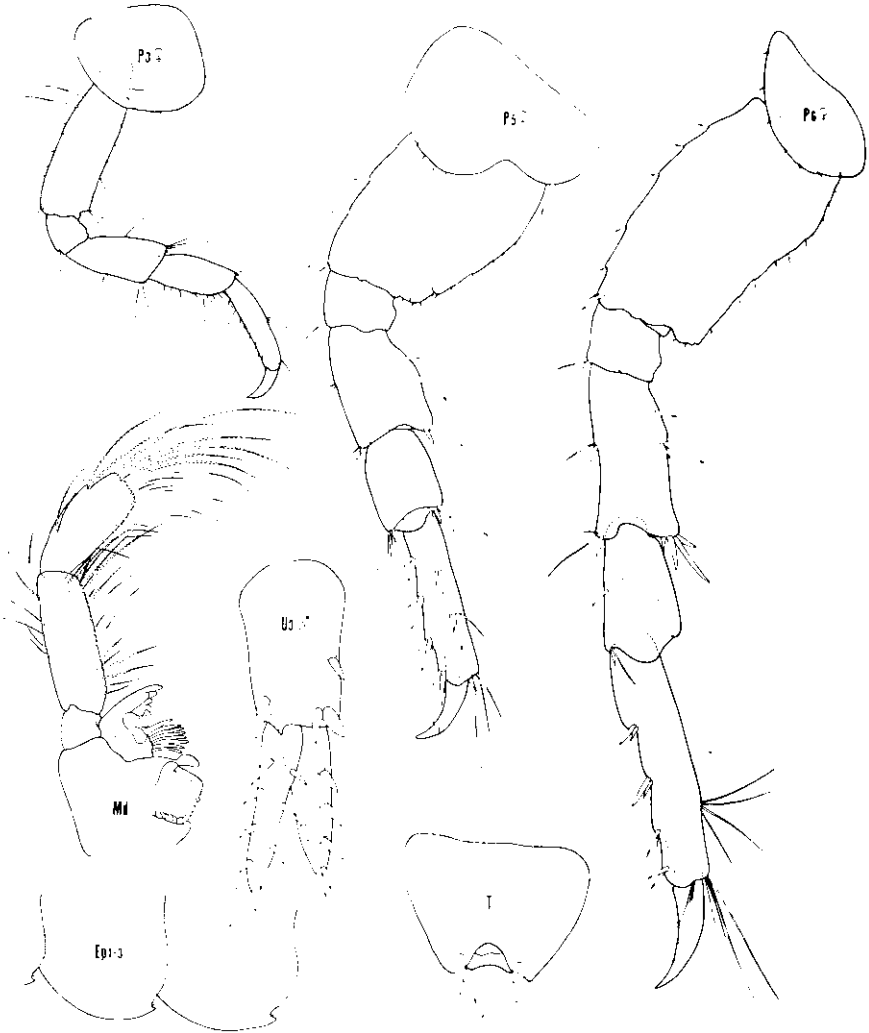


Fig. 11. *Gammaropsis ulrici* sp. nov. Tunisia.

DESCRIPTION: ♂ 5.0 mm. Eyes not very large, oval. Head lobes rounded. Labrum robust with relatively short, but very thin, acute epistome. Antennae equal to about half the body length, accessory flagellum with 4-5 art. Gnathopod 1 coxa smooth, carpus: propodus = 6:5, carpus with posterior margin almost straight, propodus with posterior margin harmonically rounded, dactylus a little over

half length of propodus. Gnathopod 2, carpus: propodus = 1:3, palm with several small distal protuberances, and at the palmar angle two (in hyperadults three) deep incisions separated by a strong tooth opposable to the tip of the dactylus, a distinct angle between the palm and the posterior margin. Coxa 7 narrow, oval, with smooth margin. Pereopods 6-7 basis with posterior margin almost straight, the posterior distal angle almost 90°, carpus and merus short and broad. Epimera 1-3 each with a small tooth above which is inserted a small seta, at the lower hind corner. Urosome segs smooth but with a distinct indentation at the insertion of dorsal setae. Uropod 3 robust, rami = peduncle. Telson trapezoidal with two short, thick, and two longer, more slender distal spines.

♀ 5.5 m. Gnathopod 2 similar to that of ♂, but palm with one deep, rounded incision at the palmar angle, below which is inserted a strong spine, carpus: propodus = 1:3.

DISCUSSION: The only described species with which this species could be confused are *G. alamoana* BARNARD, *G. monodi* SCHELLENBERG and *G. spinosa* SHOEMAKER. *G. alamoana* is characterised by a very distinct finger-like process at the palmar angle, *G. monodi* by a much deeper incision in the ♀ gnathopod 2 palm, and *G. spinosa* by much weaker gnathopoda, especially in the ♀.

ECOLOGY: On fine sand among algae and rhizoids of *Posidonia* in 0.2 m.

MEDITERRANEAN DISTRIBUTION: Marseille, Tunisia.

Holotype (Microscopical preparations) M.V.

Paratypes M.V.

DERIVATIO NOMINIS: For Dr. Ulrich Schiecke, in acknowledgement of his ability for discovering interesting biotopes which nearly always yield new or very rare species.

Gammaropsis togoensis (SCHELLENBERG)

(figs. 12-13)

Eurystheus togoensis SCHELLENBERG, 1925, p. 177-79, fig. 23; SCHELLENBERG, 1939, p. 36, fig. 29; SIVAPRAKASAM, 1968, p. 283-85.

MATERIAL EXAMINED: Israel: Ashdod Harbour.

DISCUSSION: This species differs from all other Mediterranean spe-

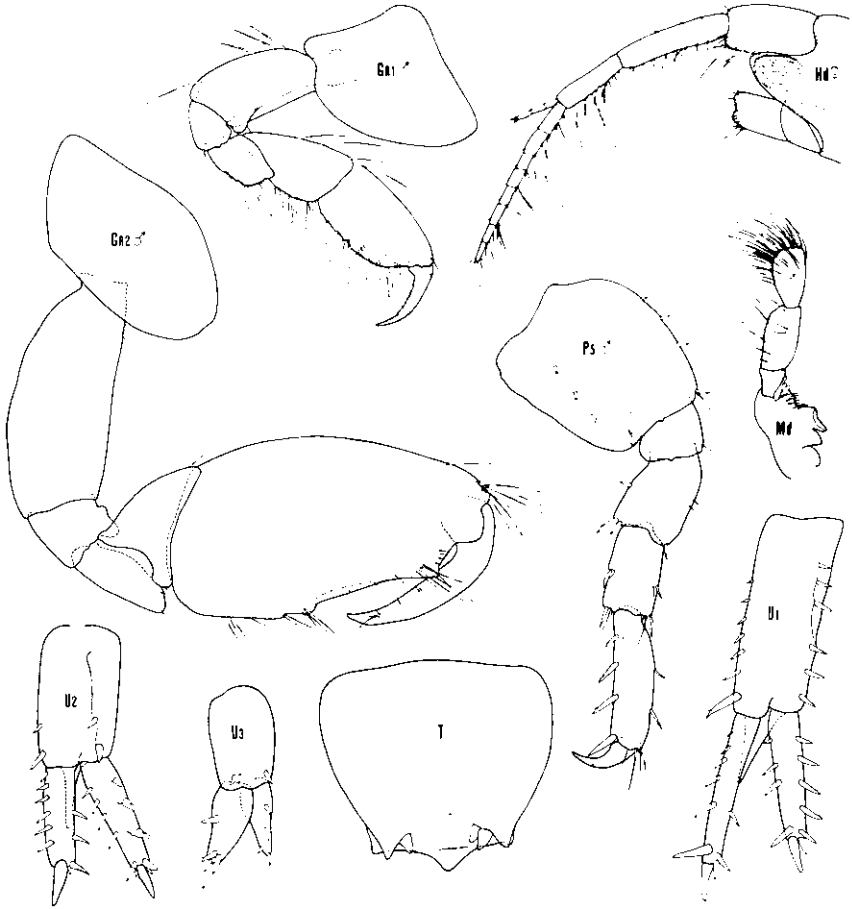


Fig. 12. *Gammaropsis togoensis* (SCHELLENBERG). Ashdod, Israel.

cies, by the prominent slender head-lobes, characteristic ♂ gnathopod 2, and not least by the very short, stout articles 2-3 of the mandibular palp. Body length of Mediterranean material = 4.0-5.5 mm.

ECOLOGY: Unknown.

MEDITERRANEAN DISTRIBUTION: So far known only from the coast of Israel.

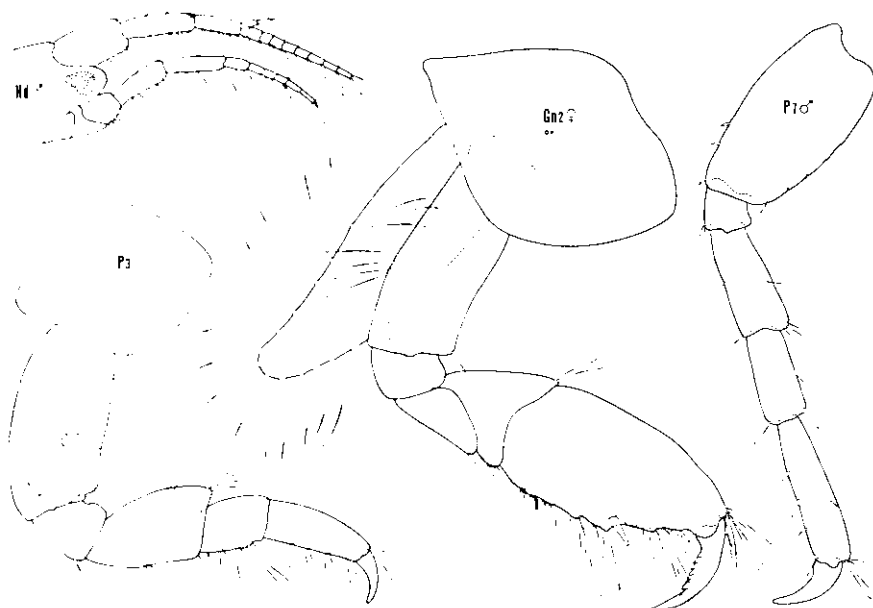


Fig. 13. *Gammaropsis togoensis* (SCHELLENBERG). Ashdod, Israel.

Gammaropsis sophiae (BOECK)

(fig. 14)

Podocerosis sophiae BOECK, 1861, p. 666; STEBBING, 1888, p. 322; BOECK, 1871, p. 242; BOECK, 1876, p. 584, pl. 25, fig. 7; DELLA VALLE, 1893, p. 452, pl. 57, fig. 21-22; SARS, 1894, p. 574, pl. 204; CHEVREUX & FAGE, 1925, p. 316, fig. 325; REID, 1951, p. 264, fig. 53; BARNARD, 1973, p. 18; KARAMAN, 1973, p. 121, fig. 9-11. *Noenia tuberculosa* + *N. undata* BATE, 1862, p. 271, pl. 46, fig. 2, p. 272, pl. 46, fig. 5; BATE & WESTWOOD, 1863, p. 472, 477. *Podocerosis pusilla* CHEVREUX, 1925, p. 385, figs. 28-29.

MATERIAL EXAMINED: Israel: Atlith, 18-35 m; Vitkin, 36 m; Rafah, 18 m; Cesarea, 45 m; Haifa Bay, 54 m; Central Adriatic; Gulf of Napoli.

DISCUSSION: This species is quite variable, particularly in relation to the structure of gnathopod 2 and to a lesser extent pereopod 5. Gnathopod 2 may be relatively slender with the posterior margin of the propodus smoothly rounded as figured by SARS 1894 (Norway) and KARAMAN 1973 (S. Adriatic), or rather broad with the posterior margin of the propodus forming a triangular process as figured by

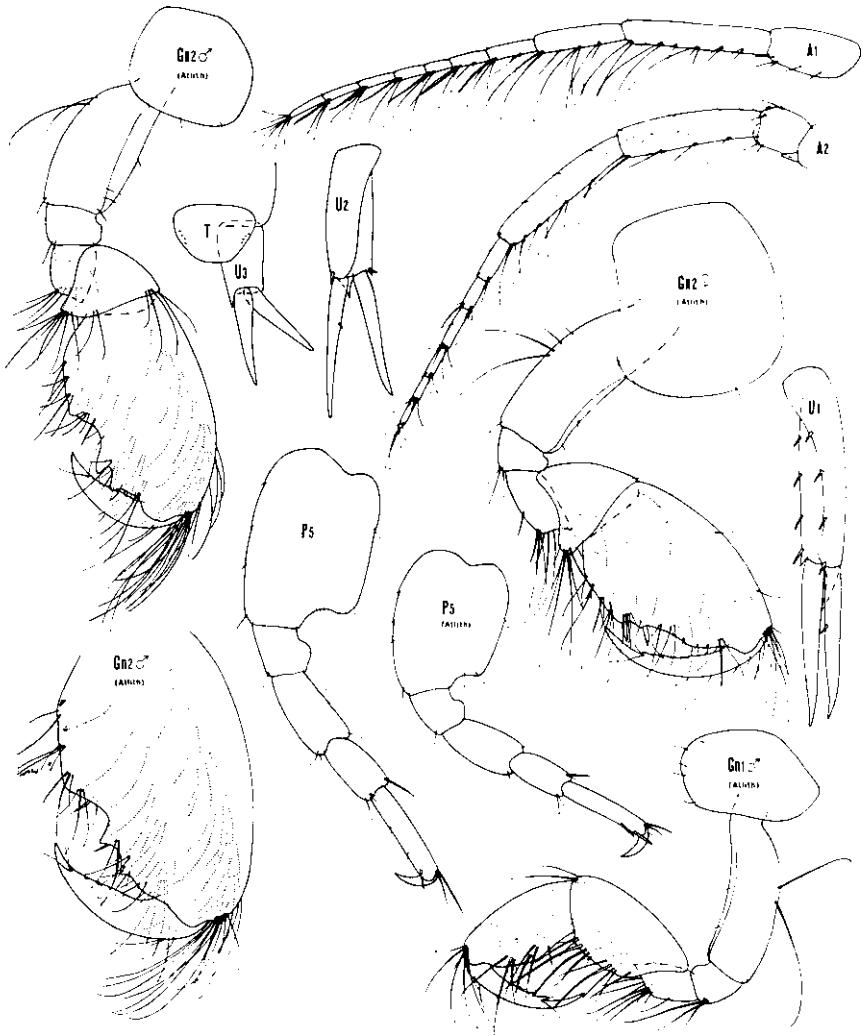


Fig. 14. *Gammaropsis sophiae* (BOECK). Napoli and (where stated) Atlith, Israel.

CHEVREUX & FAGE 1925 (Concarneau) and REID 1951 (Senegal) as well as in material figured here from Israel (fig. 14). The teeth on the palm also show some variation, being a group of widely divergent and weakly incised triangular projections as figured by CHEVREUX & FAGE 1925, and REID 1951, or a more discrete pair of deeply incised and forward projecting teeth as in material figured by SARS

1894, KARAMAN 1973 and in material figured here from Israel. Pereopod 5 varies in that the basis may be weakly expanded (SARS 1894 material) or very expanded (REID 1951, KARAMAN 1973, CHEVREUX & FAGE 1925 material and material figured here from Napoli) and intermediates also occur. There appears to be no correlation between pereopod shape and gnathopod type, Norwegian material (as figured by SARS 1894) differs markedly in pereopod 5 from Adriatic material (figured by KARAMAN 1973) yet both have a closely similar gnathopod 2. Other variables are the number of flagellar articles to the antennae (6-7 art, Israel, 12-13 art, Concarneau) and the presence of spines on the uropods (few, Israel, several, Norway, Concarneau, Adriatic) but this is probably correlated with differences in size (Israel 2-3 mm, Norway, Concarneau, Adriatic 5-6 mm).

Material figured by CHEVREUX 1925 as *P. pusilla* exhibit no characters which enable them to be distinguished from *G. sophiae*. In their small size they resemble material figured herein from Israel, but gnathopod 2 more closely resembles that figured by KARAMAN 1973 from Adriatic material. There seems good reason therefore to synonymise *P. pusilla* CHEVREUX with *G. sophiae* (BOECK).

ECOLOGY: There is insufficient data available to indicate the biotope of this species but it has an extensive depth range (15 m - 420 m).

MEDITERRANEAN DISTRIBUTION: Corsica, Algeria, Napoli, Central Adriatic, Israel.

Gammaropsis palmata (STEBBING & ROBERTSON)

(fig. 15)

Podoceroipsis palmatus STEBBING & ROBERTSON, 1891, p. 36, pl. 6.

Podoceroipsis megacheir SOWINSKY, 1898, p. 466, pl. 9, figs. 1-8.

Gammaropsis nana SARS, 1894, p. 561, pl. 199, fig. 2.

Eurysteus palmatus CHEVREUX, 1910, p. 249, pl. 18, figs. 1-5; CHEVREUX & FAGE, 1925, p. 313, fig. 322.

Megamphopus palmatus BARNARD, 1962, p. 15; KARAMAN, 1973, p. 116, figs. 6-8.

Gammaropsis palmata BARNARD, 1973, p. 18.

MATERIAL EXAMINED: Ischia.

DISCUSSION: This species has only rarely been collected in the Mediterranean and like the previous species appears to be somewhat variable. In material from Norway (SARS 1894 as *G. nana*) the palm of the male gnathopod 2 has a strong medial tooth and a rounded

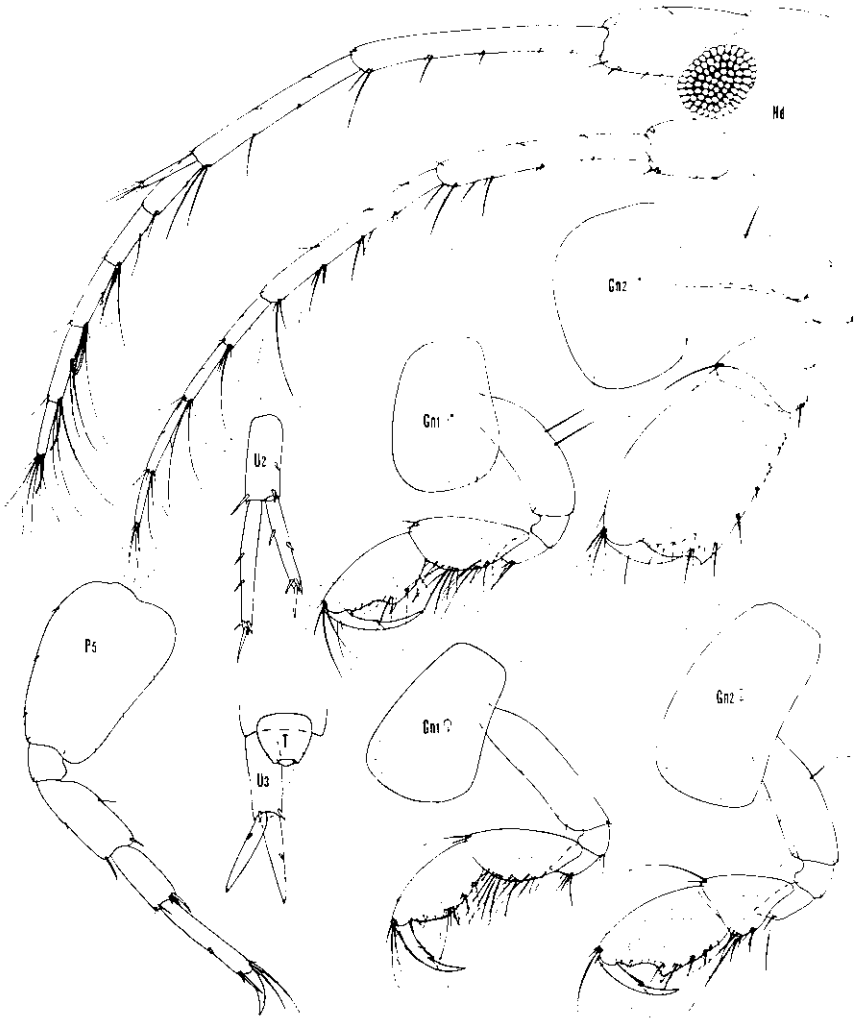


Fig. 15. *Gammaropsis palmata* (STEBBING & ROBERTSON). Ischia.

palmar edge, and a similar form is figured by CHEVREUX (1910) from Algeria. In material figured by CHEVREUX & FAGE 1925 (Gulf of Gascogne) on the other hand, the palm is smooth and oblique with no trace of a medial tooth. In material studied in the present work, from Ischia the palm is evenly convex and terminates in a distinct tooth (fig. 15). Other anomalies include the form of the ocular

cephalic lobes which at one extreme are produced into a very acute point (SARS 1894) and at the other extreme, triangular, obtuse (CHEVREUX 1910 and present material); the articulation of the accessory flagellum: two-articulate in most material, but three-articulate in the material figured by CHEVREUX 1910; and the presence or absence of an apical seta on the inner lobe of maxilla 1.

For the present all forms are considered as belonging to a single species, but the problem seems worthy of further investigation when sufficient material is available for an in depth study.

ECOLOGY: Apparently in depths of 12-100 m but biotope unclear.

MEDITERRANEAN DISTRIBUTION: Marseille, Ischia, Sicily, Algeria, S. Adriatic.

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ABSTRACT

Ten species of *Gammaropsis* LILJEBORG are recorded from the Mediterranean of which three species are new to science and another recorded for the first time from the Mediterranean. The ten species can be segregated into two groups, one characterised by the possession of a toothed urosome, toothed coxa 1 and long, acute epistome, the other by a smooth urosome, smooth coxa 1 and short epistome. Figures are given for all the species and a key is provided for their identification.

RIASSUNTO

LE SPECIE MEDITERRANEE DEL GENERE GAMMAROPSIS

Sono citate per il Mediterraneo dieci specie di *Gammaropsis* LILJEBORG; di esse tre sono nuove per la scienza ed una è indicata per la prima volta nel Mediterraneo. Le dieci specie sono suddivise in due gruppi, uno caratterizzato da urosoma dentato,

coxa I denticolata ed epistoma lungo ed acuto, l'altro da urosoma liscio, coxa I non denticolata ed epistoma corto. Tutte le specie sono figurate; viene inoltre fornita una chiave per la loro identificazione.

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