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## NEW RECORDS OF DECAPOD CRUSTACEA FROM THE MEDITERRANEAN COAST OF ISRAEL AND THE EASTERN MEDITERRANEAN

by

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Since the publication by Holthuis & Gottlieb (1958) of a list of the Decapod Crustacea known at that time to inhabit the Mediterranean waters of Israel, several additional species, 18 in number, have been found in the area, while just prior to the issue of the paper by Holthuis & Gottlieb a publication by Forest & Guinot (1958) appeared in which one species not mentioned by the former authors was listed, namely *Alpheus crassimanus* Heller. The total number of Decapoda now known from the Mediterranean coast of Israel thus amounts to 137 (61 Brachyura, 21 Anomura and 55 Macrura).

In the present paper the 18 new records are enumerated, while moreover some interesting finds of Decapoda in the eastern Mediterranean within and outside Israel waters are discussed. The larger part of the new Israel species (12 of the 18) were collected in the littoral area, to the study of which during the last few years particular attention has been paid by the Zoology Department of Tel-Aviv University. Of these 12 species 8 are typically Mediterranean, 4 being of Indo-West Pacific origin; the latter must have reached the Israel coast by way of the Suez Canal. The continued research by Dr. E. Gilat (= E. Gottlieb), Sea Fisheries Research Station at Haifa, of the deeper parts of the coastal waters off Israel (at depths roughly between 20 and 100 m), yielded relatively few new species (4), which shows that this area has become relatively well known by the previous explorations

by Dr. Gilat. Among these four new finds there are not less than three immigrants from the Red Sea, at least one of which (*Charybdis longicollis*) must have arrived rather recently in Israel waters, where it now is established so well that it has become a true pest. Finally, two species were added to our list as the result of the exploration of very deep water off the Israel coast; these two species both were since long known from the rest of the Mediterranean.

We like to express here our sincere thanks to Dr. E. Gilat, who so kindly placed the new material collected by him at our disposal and graciously allowed us to publish on it. Mr. O. H. Oren, Director of the Haifa Sea Fisheries Research Station kindly provided us with the deep sea material, while Dr. F. D. Por and Mr. M. Zur-Namal of the Hebrew University, Jerusalem allowed us the use of their material.

The abbreviation cl. is used here to denote the carapace length.

Macrura

Penaeidae

**Metapenaeus stebbingi** Nobili, 1904

Lagoon of Kishon River, north of Haifa, Israel; 25 September 1958; H. Steinitz and A. Ben-Tuvia, NS. 618. — 2 males, 6 juveniles.

The males (cl. 20 and 21 mm) have the petasma well developed and prove to be adult. The shape of the petasma agrees perfectly with the description and figures given of that organ by Tirmizi (1962: 103-105, fig. 1, 2). In the juveniles (cl. 3 to 9 mm) the rostrum is much shorter than in the adults: in the smallest specimens it does not reach the base of the cornea and bears only four dorsal teeth, in the larger specimens the rostrum becomes gradually longer and also is provided with more teeth.

The present specimens were collected together with juveniles of *Penaeus japonicus* Bate and *P. kerathurus* (Forskål).

*Metapenaeus stebbingi* was originally described from the Red Sea, from where it was later repeatedly reported. The species is also known from the coast of East Africa (Mozambique and Delagoa Bay), and from Madagascar, while Tirmizi (1962) dealt with specimens from Pakistan (Arabian Sea off Karachi). No records of the species from localities farther east are known to us. *M. stebbingi* is quite common in the Suez Canal (cf. Holthuis, 1956: 307) and has reached the eastern Mediterranean. So far the only published Mediterranean records of the species are from Port Said and the Bay of Abukir near Alexandria. The present find of the species in Israel waters extends the known Mediterranean range of the species considerably to the north.

## Gnathophyllidae

**Gnathophyllum elegans** (Risso, 1816)

Atlit, Israel; 2-3 m deep; 12 July 1950; Ch. Lewinsohn. — 1 female.

Tantura; 1-2 m deep; 14 September 1960; L. Fishelson, NS. 546. — 1 ovigerous female.  
0-2 m deep; fish poisoning; 3 May 1962; A. Ben-Tuvia, E. Gilat and L. B. Holthuis. — 1 female.

Apollonia, 2 km north of Herzliya; 1-2 m deep; August 1952; Ch. Lewinsohn. — 1 ovigerous female.

The present four specimens, all adult females (cl. 7 to 11 mm), show the striking colour pattern typical for the species.

Though *Gnathophyllum elegans* is a well known species in the western Mediterranean, it had so far not been reported from the eastern half of that sea. Outside the Mediterranean the species has been found at Madeira, the Azores and the Canary Islands. It is nowhere common.

## Alpheidae

**Alpheus rapacida** De Man, 1908 (fig. 1 a-e)

Off the Israel coast south of Tel-Aviv, Station 8; 19-20 fathoms; 25 October 1960; E. Gilat. — 1 male. 2 November 1961. — 1 male, 1 female. 3 January 1962. — 1 female.

Off the Israel coast south of Tel-Aviv, Station 9; 20 fathoms; 3 January 1962; E. Gilat. — 1 male, 1 female. 2 February 1962. — 1 male.

Off the Israel coast south of Tel-Aviv, Station 12; 20 fathoms; 3 January 1962; E. Gilat. — 2 males, 1 female.

Off the Israel coast south of Tel-Aviv, Station 14; 25 fathoms; 27 July 1961; E. Gilat. — 1 ovigerous female.

Off the Israel coast south of Tel-Aviv, Station 15; 25 fathoms; 3 January 1962; E. Gilat. — 1 male, 1 female.

The carapace length of the examined specimens ranges from 7 to 15 mm, the largest specimen being the ovigerous female. The animals on the whole agree well with De Man's (1911: 394; 1915: pl. 20 fig. 91) description and figures of this species. There are, however, a few differences:

1. The rostrum reaches well beyond the middle of the visible part of the antennular peduncle.

2. The second segment of the antennular peduncle is twice as long as the visible part of the first and slightly less to slightly more than three times as long as broad.

3. In both the males and the females the merus of the large chelipeds possesses an antero-dorsal spine; only in the regenerated cheliped of one specimen such a spine is absent.

4. The third maxilliped reaches distinctly beyond the antennal peduncle, viz., with from half the ultimate to half the penultimate segment.

Most of these differences are of a minor importance, and without knowing more about the variability of these characters in material from the type area,

no definite conclusions as to the taxonomic relation between the eastern and the western form can be reached.

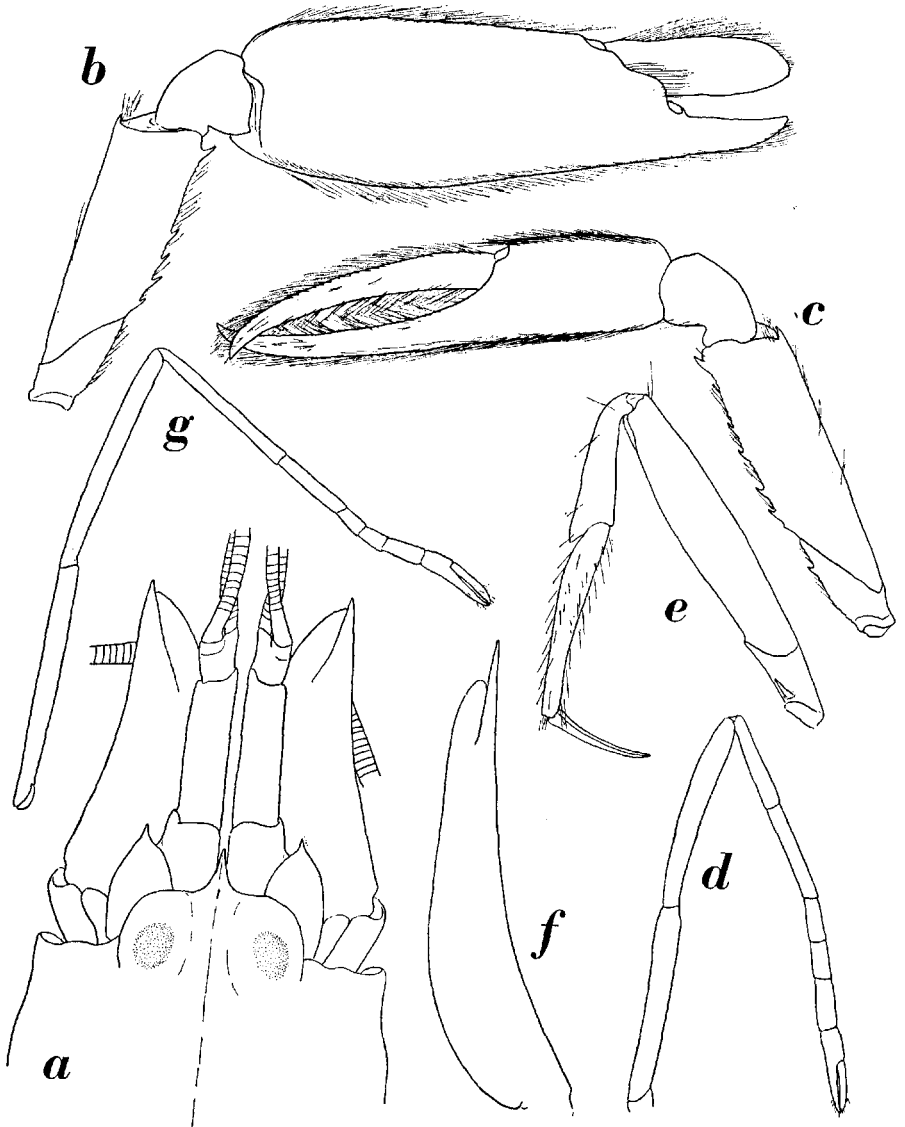


Fig. 1 a-e. *Alpheus rapacida* De Man, ovigerous female, Israel. a, anterior part of body in dorsal view; b, larger first pereopod; c, smaller first pereopod; d, second pereopod; e, third pereopod.

Fig. 1 f, g. *Alpheus glaber* (Olivier), specimen from off the coast of Israel, south of Tel-Aviv, E. Gilat, A 622. f, scaphocerite; g, second pereopod. a, f, g,  $\times 11$ ; b-e,  $\times 7.5$ .

Like *Alpheus glaber* (Olivi) the present species belongs to the "brevirostris" group of the genus *Alpheus*. The two species are rather closely related, but may be distinguished by various salient features like the following:

1. The scaphocerite in the present species (fig. 1a) is much wider than that of *A. glaber* (fig. 1f).

2. The chelae of the first pair of chelipeds (fig. 1b) are much higher in *A. rapacida*, being much more slender in *A. glaber*.

3. These chelae in *A. rapacida* show no trace of the longitudinal carina that is so conspicuous in *A. glaber*.

4. The antero-dorsal spine of the merus of the first pair of chelipeds is placed terminal in *A. rapacida*, it is much stronger in *A. glaber* and placed distinctly subterminal.

5. In *A. glaber* the carpus of the second pereiopod has the proximal of the five segments distinctly longer than the second (fig. 1g). In *A. rapacida* it is the second segment that is longer (be it only slightly so) than the first (fig. 1d).

These differences make it rather easy to distinguish between the two species even in imperfect material.

*A. rapacida* as well as *A. glaber* is not encountered in shallow water. All Israel specimens of *A. rapacida* were dredged at depths between 20 and 25 fathoms.

*Alpheus rapacida* was described after material from the Malay Archipelago, later it was also found in S. and SE. Africa. Its presence in Israel waters makes it very probable that its range also includes the Red Sea.

### ***Synalpheus hululensis* Coutière, 1908 (fig. 2)**

Gesher-Haziv, north of Nahariya, Israel; June 1961; Ch. Lewinsohn, NS. 551. — 2 females (one of which ovigerous). 27 June 1963; Ch. Lewinsohn. — 1 male, 1 ovigerous female.

Acre; 17 October and 26 November 1963; M. Zur-Namal. — 3 specimens.

Haifa Bay; 11 June 1963; Ch. Lewinsohn. — 1 male.

Tantura; rock pools, 0-2 m deep; fish poisoning; 3 May 1962; A. Ben-Tuvia, E. Gilat and L. B. Holthuis. — 3 specimens (2 ovigerous females).

Apollonia, 2 km north of Herzliya; 3 October 1961; Ch. Lewinsohn. — 1 ovigerous female. August 1962; Ch. Lewinsohn. — 1 ovigerous female. 14 April 1963; M. Zur-Namal. — 1 ovigerous female, 1 juvenile.

As pointed out by Holthuis (1958: 32) the taxonomic status of the species of *Synalpheus* belonging to the "paulsoni" group is not yet well understood. The present specimens agree best with the one assigned by Holthuis (1958: 31) to *Synalpheus hululensis*, though there are some differences. It is

probable, however, that these fall within the range of variation shown by the species. So in the present specimens the number of spines on the posterior margin of the propodus of pereiopods 3 and 4 varies between 7 and 9.

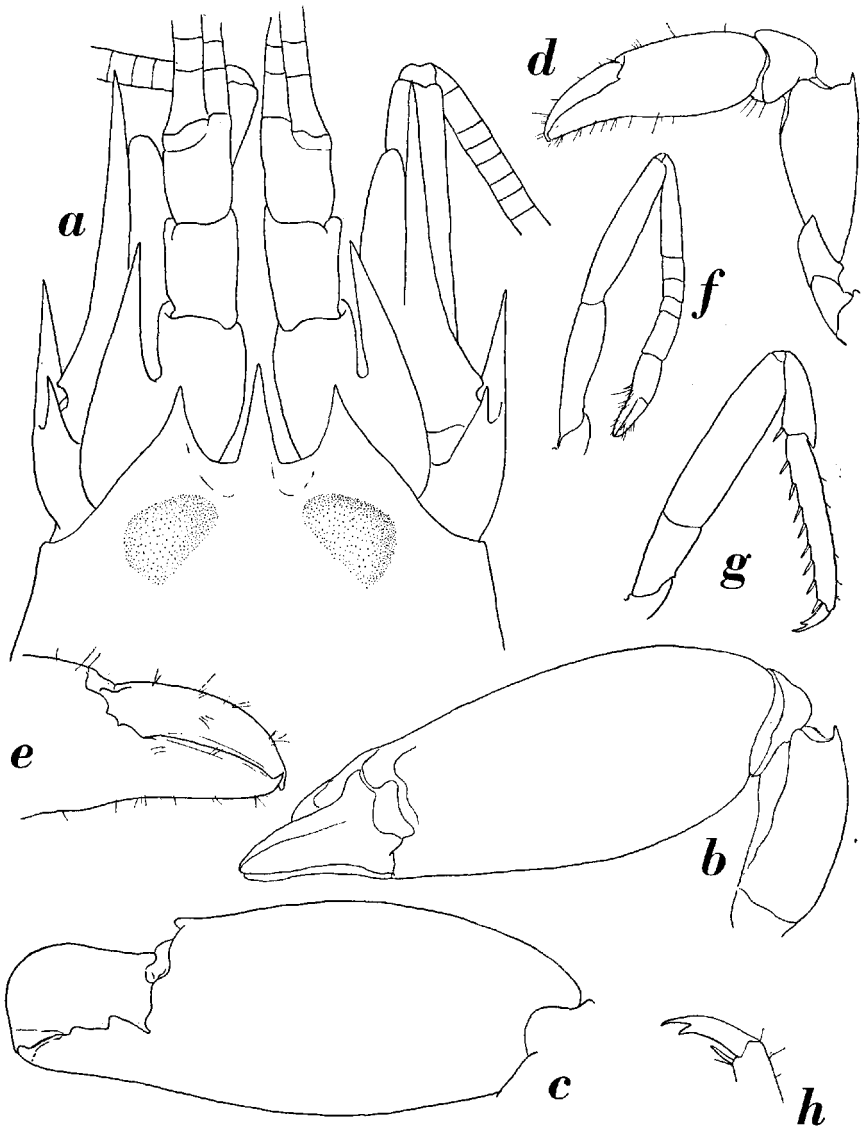


Fig. 2. *Synalpheus hululensis* Coutière, specimen from Gesher-Haziv. a, anterior part of body in dorsal view; b, larger first pereiopod in dorsal view; c, chela of larger first pereiopod in lateral view; d, smaller first pereiopod; e, fingers of smaller first pereiopod; f, second pereiopod; g, third pereiopod; h, dactylus of third pereiopod.

a, e, h,  $\times 20$ ; b-d, f, g,  $\times 10$ .

The disto-dorsal margin of the palm does not show a spine in any of the specimens examined, though in some it is slightly lobiform produced.

The present is the second species of the genus *Synalpheus* to become known from the Mediterranean. So far the genus was only represented there by *Synalpheus gambarelloides* (Nardo) (= *S. laevimanus* (Heller)).

Though the two species resemble each other rather strongly superficially, there are many points of difference which make it rather easy to distinguish between them:

1. The ocular spines are sharply pointed in *S. hululensis* (fig. 2a), being blunt in *S. gambarelloides* (fig. 3a).

2. The stylocerite in *S. hululensis* (fig. 2a) reaches beyond the middle of the second segment of the antennular peduncle, while it fails to reach the base of that segment in *S. gambarelloides* (fig. 3a).

3. In *S. gambarelloides* the lamella of the scaphocerite is reduced to a small lobe at the base of the tooth of the scaphocerite (fig. 3a); in *S. hululensis* this lamella is rather well developed, reaching at least two-thirds of the length of the tooth (fig. 2a).

4. In *S. hululensis* the antennal peduncle shows two distinct sharp teeth near the base of the scaphocerite: the outer of these teeth is the longest but fails to reach as far as the stylocerite, the upper tooth is much smaller but well formed and sharply pointed (fig. 2a). In *S. gambarelloides* the outer tooth reaches beyond the stylocerite and is sharply pointed, the upper tooth, however, is entirely absent here (fig. 3a).

5. The palm of the large cheliped in *S. gambarelloides* (fig. 3b, c) ends dorsally in a strong sharply pointed anterior spine; in *S. hululensis* there is at most a blunt lobe there (fig. 2b, c).

6. In *S. gambarelloides* the merus of the first chelipeds bears a spine at the antero-ventral angle of the outer surface (fig. 3b); this angle is rounded in *S. hululensis* (fig. 2b).

7. The smaller first cheliped of *S. gambarelloides* bears a conspicuous tuft of hairs on the upper margin of the dactylus (fig. 3d); no such tuft is present in *S. hululensis* (fig. 2d).

8. The dactyli of the walking legs are far more slender in *S. hululensis* (fig. 2g, h) than in *S. gambarelloides* (fig. 3e, f).

*S. hululensis* was found among stones and sponges, and associated with *Alpheus audouini* Coutière, *Alpheus inopinatus* Holthuis & Gottlieb, *Alpheus dentipes* Guérin and *Athanas nitescens* (Leach).

All the specimens of *S. hululensis* were collected at depths ranging from 1 to 3 m, except one, the male from Haifa Bay which was dredged at a depth of 10 fathoms and found among corals (*Dendrophyllia* (?) *corni-*

*gera* (Lam.)). These corals are inhabited by *S. gambarelloides* which, together with *A. dentipes*, is the common alpheid there.

*Synalpheus hululensis* is known from the Red Sea and the western Indian Ocean, it is now reported for the first time from the Mediterranean.

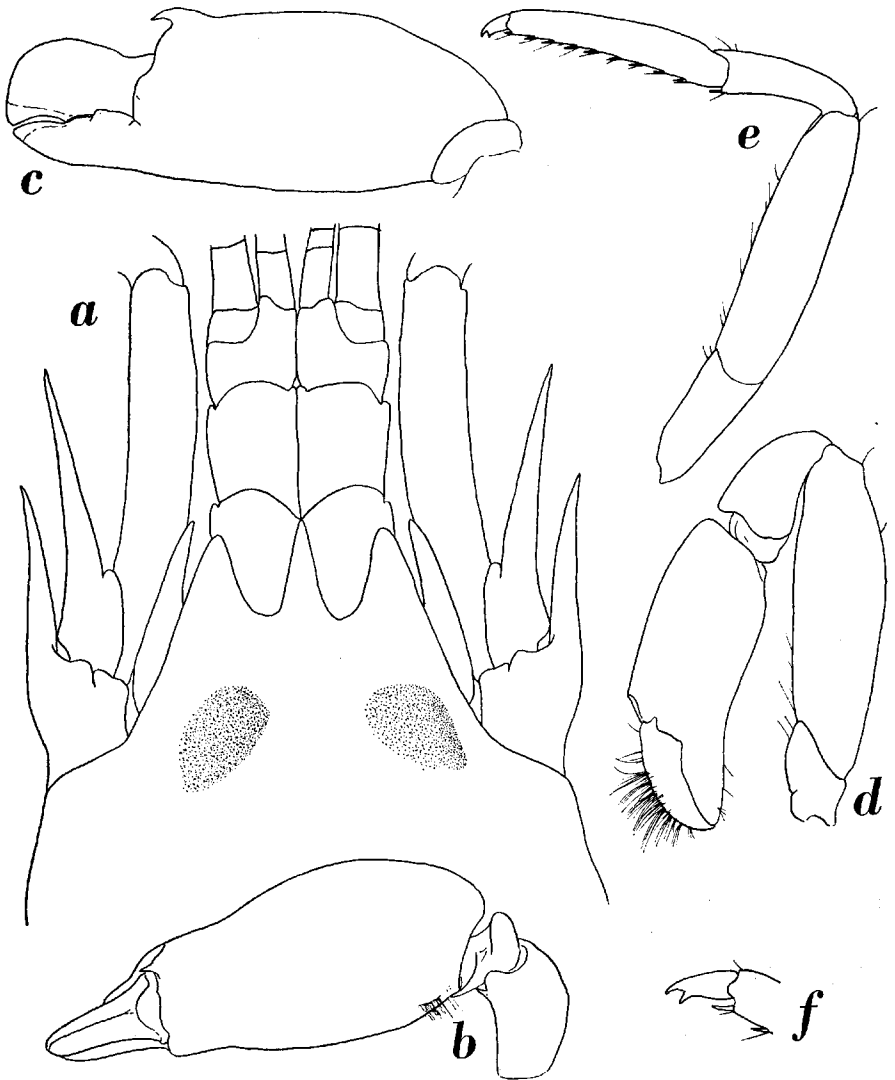


Fig. 3. *Synalpheus gambarelloides* (Nardo), specimen from Israel, NS. 550. a, anterior part of body in dorsal view; b, larger first pereiopod in dorsal view; c, chela of larger first pereiopod in lateral view; d, smaller first pereiopod; e, third pereiopod; f, dactylus of third pereiopod. a,  $\times 20$ ; b,  $\times 7.5$ ; c,  $\times 10$ ; d, e,  $\times 15$ ; f,  $\times 30$ .



## Hippolytidae

***Lysmata seticaudata*** (Risso, 1816)

Atlit, Israel; 12 April 1949; Ch. Lewinsohn. — 1 juvenile.

Caesarea; 13 July 1961; Ch. Lewinsohn, NS. 580. — 2 juveniles. 31 Juli 1963; Ch. Lewinsohn. — 2 juveniles.

The present specimens are juvenile (cl. 6 to 8 mm), but old enough to make a positive identification possible.

So far as known to us the only record of *Lysmata seticaudata* from the eastern Mediterranean is the one by Demir (1954: 396, pl. 7 fig. 4) who reported it from the Sea of Marmara. Dr. Demir was so kind to send one of us a sample of several specimens taken at the coast of Marmara Island, Sea of Marmara, Turkey (rocky shore with *Mytilus*, sponges and algae; 9 February 1961; M. Demir); this material is now preserved in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden. Apart from the Turkish record, the species is known from the western Mediterranean (including the Adriatic) and the Black Sea, so that its occurrence in the eastern Mediterranean is not surprising. Furthermore the species has been reported from the eastern Atlantic, from the Channel Islands south to the Azores and the Canary Islands.

## Pandalidae

***Plesionika heterocarpus*** (Costa, 1871)

Off the Israel coast near Tel-Aviv; 300 fathoms; trawl; 18 July 1962; Sea Fisheries Research Station, Haifa. — 1 specimen.

Zariquiey (1955) recently showed that two species have been confused under the name *Plesionika heterocarpus*, namely the true *P. heterocarpus* and a new species which he named *P. antigai*. The present specimen belongs without any doubt to the typical *Plesionika heterocarpus*.

Though the species has been reported before from the eastern Mediterranean (Sea of Marmara and E. of the Peloponnesos), it was not known from Israel waters. It inhabits the entire Mediterranean and the eastern Atlantic where it has been reported from the west coast of Portugal south to Angola; it is not certain, however, whether all these records actually pertain to the present species.

## Crangonidae

***Pontophilus monacanthus*** Holthuis

Off the Israel coast between Bat-Yam and Ashdod; 18 m deep; sandy bottom; beam trawl; 7 April 1962; E. Gilat, A. 655. — 1 ovigerous female.

The present specimen which has a carapace length of 5 mm, agrees well with the original material. The carapace and part of the abdomen are minutely rugose by the presence of microscopically small granules.

The species was described as late as 1961 from the south coast of Turkey near Mersin, but proves to have a wide distribution in the Mediterranean. It is known from the east coast of Spain, Spanish Morocco, Italy, and Turkey. It is now reported for the first time from Israel. *Pontophilus monacanthus* inhabits sandy shores and has been taken in depths ranging from 0.5 to 18 m.

#### Polychelidae

##### ***Polycheles typhlops*** Heller, 1862

Off the Israel coast near Tel-Aviv; 300 fathoms; trawl; 18 July 1962; Sea Fisheries Research Station, Haifa. — 1 specimen.

The present specimen is somewhat damaged so that the carapace length cannot be accurately measured, it is approximately 32 mm.

*Polycheles typhlops* is a deep-sea species, which was originally described from the Mediterranean and has since been reported also from the East Atlantic (Hebrides south to the Congo region), the West Indies, S. and E. Africa, the Arabian Sea, India and the Malay Archipelago. The West African form was described as a separate subspecies. So far the species was not known from Israel waters, but there are several records of it from the eastern as well as from the western Mediterranean (cf. Holthuis & Gottlieb, 1958: 114).

#### Callianassidae

##### ***Upogebia pusilla*** (Petagna, 1792)

Gesher-Haziv, north of Nahariya, Israel; 0-2 m deep; found together with *Synapta* spec.; 25 February 1960; L. Fishelson, NS. 615. — 1 specimen. 0-2 m depth; 24 June 1962; L. Fishelson, NS. 614. — 1 specimen.

The former of the two above specimens (cl. 11 mm) is much larger than the second (cl. 5 mm). The specimens agree well with the published descriptions of the species.

The above specimens were found in a small sheltered bay with muddy sand bottom which is also inhabited by *Callianassa tyrrhena* (Petagna).

*Upogebia pusilla*, in older literature usually indicated with the name *U. littoralis* (Risso), is a common Mediterranean species, which has also been mentioned from the Black Sea, S.W. France and the Portuguese coast. It has several times been reported from the eastern Mediterranean (cf. Holthuis & Gottlieb, 1958: 115; Holthuis, 1961: 32), but so far was not known from Israel.

## ANOMURA

## Galatheidae

**Galathea bolivari** Zariquiey, 1950

Tantura, Israel; rock pools, 0-2 m deep; fish poisoning; 3 May 1962; A. Ben-Tuvia, E. Gilat and L. B. Holthuis. — 1 specimen.

Caesarea; 0-2 m; 13 July 1961; Ch. Lewinsohn, NS. 617. — 2 specimens.

The carapace length of these specimens varies between 3 and 7 mm.

For a long time *Galathea bolivari* was not recognized as a species distinct from *G. intermedia* Lilljeborg. It was the merit of Zariquiey (1950) to point out the differences between the two species, both of which prove to occur throughout the Mediterranean. A figure of the carapace of both species was provided by Holthuis (1961: 36, fig. 11). The fact that *Galathea bolivari* for so long has been confused with *G. intermedia*, is the cause that its actual distribution is not known with certainty. The only published records of the species are from the east coast of Spain, the Balears and the south coast of Turkey. The Leiden Museum furthermore possesses material of the species from S. France (Banyuls), Sicily (Palermo) and the Adriatic (Rovinj and Dubrovnik, Yugoslavia). *Galathea bolivari* is now reported for the first time from Israel waters.

## Porcellanidae

**Pisidia longimana** (Risso, 1816)

Apollonia, Israel; 28 May 1963; Ch. Lewinsohn. — 1 specimen.

As stated by Holthuis (1961: 43) the Israel material listed by Holthuis & Gottlieb (1958: 43) as *Porcellana longicornis* (L.) actually belongs to *Pisidia longimana* (Risso), which species therefore is the only one of the genus to be known from the Israelian coast of the Mediterranean.

*Pisidia longimana* inhabits the entire Mediterranean and the Black Sea. Due to the fact that it has frequently been confused with other species of the genus, its exact range is not known.

## BRACHYURA

## Latreilliidae

**Latreillia elegans** P. Roux, 1830

Mersin Bay, Turkey; depth 35 m; 1956; Israel fishermen; NS. 553. — 1 specimen.

The specimen has a carapace length of 12 mm; though it is somewhat damaged and misses a few legs, it is still in rather good shape.

This is the first record of the species from the eastern Mediterranean. *Latreillia elegans* was originally described from Sicily, later it was found

also in other parts of the western Mediterranean (Algeria, east coast of Spain, Adriatic). Outside the Mediterranean it is known from the eastern Atlantic (Azores to Cape Verde Islands) and from East American waters (Massachusetts to the West Indies). The recorded depth from which the species is taken ranges from 95 to 405 m. It seems to be nowhere common, though Karlovac (1952) had a fairly extensive series from the Adriatic.

Monod (1956: 78) and Rathbun (1937: 73) are mistaken when they state that the holotype of *Latreillia elegans* is preserved in the Natural History Museum at Marseilles, France. Actually this specimen is in the collection of the Rijksmuseum van Natuurlijke Historie in Leiden, where it is found under the registered number Crust. D. 17773. De Haan (1839: 108) already mentioned the presence in the Leiden Museum of this type specimen: "Latreillia elegans, Roux ..... cujus specimen femineum ab laudato auctore descriptum, ex ipsius collectione in Museo adest...". The specimen which is preserved dry, is still in a rather good condition.

#### Leucosiidae

##### **Leucosia signata** Paulson, 1875

Acre, Israel; 0-3 m deep; 10 July 1963; Hebrew University, Jerusalem. — 1 ovigerous female.

Haifa Bay; about 10 fathoms; 11 June 1963; Ch. Lewinsohn. — 1 male (damaged).

The first record of this species from Israel waters (Holthuis & Gottlieb, 1958: 81) is based on a single dead specimen found washed ashore near Tel-Aviv. The present findings show beyond doubt, that this species, although not common, belongs to the permanent Decapod fauna of the Israel Mediterranean coast.

The ovigerous female (cl. 24 mm) was collected from under a stone and the male (cl. 17 mm) was dredged from a gravelly bottom.

The distribution of the species has been dealt with by Holthuis & Gottlieb (1958).

#### Raninidae

##### **Notopus dorsipes** (Linnaeus, 1758)

N've-Yam, near Atlit, Israel; found washed up on the shore; July 1962; Sch. Suarez. — 1 specimen.

The specimen (cl. 18 mm) was collected in a rather fresh condition, the colour pattern being still partly visible. In the lateral part of each half the carapace shows a roundish brown spot in the anterior area. This spot is also clearly shown in Sakai's (1937: pl. 16 fig. 1) coloured figure of the species.

*Notopus dorsipes* is known from an area that extends from the Red Sea and East Africa to Japan and the Malay Archipelago, but seems to be nowhere common. The Red Sea records are those by Laurie (1915: 429) from Khor Dongonab at 21° 11' N 20° 50' E, and by Monod (1938: 101) from the Gulf of Aqaba. The species is not only new to Israel, but had not before been reported from either the Mediterranean or the Suez Canal.

#### Pirimelidae

##### ***Sirpus zariquieyi* Gordon, 1953**

Gesher-Haziv, north of Nahariya, Israel; 0-2 m deep; 26 June 1961; Ch. Lewinsohn, NS. 557. — 1 specimen.

Apollonia, 2 km north of Herzliya; 0-2 m deep; 20 September 1960; Ch. Lewinsohn, NS. 558. — 1 specimen.

This material shows that *Sirpus zariquieyi* Gordon, which genus and species were described as recently as 1953, does occur in the eastern Mediterranean. The specimens are submitted to Dr. Isabella Gordon for a further study. We are very thankful to Dr. Gordon for permitting us to record these finds before the publication of her additional account of the species in which the present material also will be dealt with.

*Sirpus zariquieyi* was originally described from the north-eastern coast of Spain and has been found since in several other localities of the western Mediterranean. So far it had not been reported from the eastern Mediterranean. The very small size of the species is evidently the cause that it has been overlooked for so long a time.

#### Portunidae

##### ***Charybdis longicollis* Leene, 1938**

The story of the immigration of *Charybdis longicollis* Leene into Israel waters is quite an interesting one. This species, which originally inhabited the Red Sea and the Persian Gulf, was reported for the first time from the Mediterranean in 1961 (cf. Holthuis, 1961: 47, fig. 14, 15). The rather extensive material (22 specimens) then reported upon was collected in April and May 1959 in two localities on the south coast of Turkey. Holthuis (1961) expressed his surprise to find this Red Sea species in fairly large numbers off the Turkish coast, while the intensive explorations along the Israel coast so far had failed to produce it. That *Charybdis longicollis* was in Turkish waters already before 1959 is shown by several specimens, now in the collections of the Rijksmuseum van Natuurlijke Historie and the Tel-Aviv University, which were taken in 1954 by Israel fishermen in Mersin Bay, Turkey (depth 60-75 fathoms). The species was found for

the first time in Israel waters in the summer of 1961, when Dr. E. Gilat during an investigation of the Israel coastal waters south of Tel-Aviv collected material at depths of about 20 fathoms. Dr. Gilat's monthly exploration of these waters in the summer and autumn of 1961 proved that *Charybdis longicollis* occurred there in great numbers near the 20 fathoms line. Also ovigerous females were taken. The species became so abundant in southern Israel coastal waters that it now must be considered a true pest: the fishermen complain that their nets are filled with these crabs. Farther north along the Israel coast the species is still less abundant. That it does occur there, however, is proved by the find of a dead female specimen on the beach south of Acre (30 April 1962, E. Gilat and L. B. Holthuis).

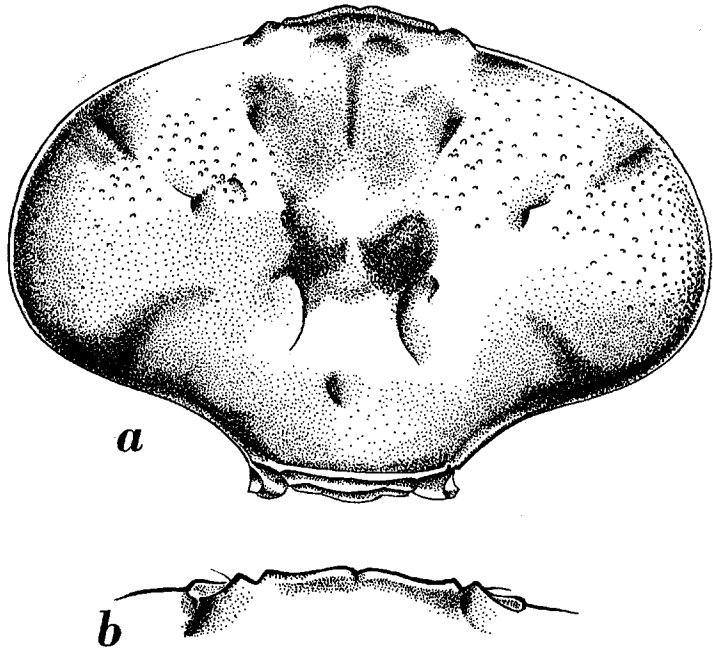


Fig. 4. *Atergatis roseus* (Rüppell), Mediterranean coast of Israel. a, carapace in dorsal view; b, front.

#### Xanthidae

#### ***Atergatis roseus* (Rüppell, 1830)**

Gesher-Haziv, north of Nahariya, Israel; 0-2 m deep; 24 June 1962; L. Fishelson, NS. 610. — 1 male, 1 female. 0-2 m deep; 27 June 1963; Ch. Lewinsohn, NS. 864. — 1 juvenile.

Acre; 0-3 m deep; 10 July and August 1963; Hebrew University, Jerusalem. — 3

males, 3 females (1 ovigerous female collected in August).

Caesarea; 0-2 m deep; 31 July 1963; Ch. Lewinsohn, NS. 865. — 1 male.

Mikhmoreth; summer 1961; U. Zafriel, NS. 860. — 1 male.

Ein-Hatchelet, 2 to 3 km north of Natanya; 0-2 m deep; 14 October 1962; M. Fraenkel, NS. 862. — 1 female.

Apollonia, 2 km north of Herzliya; 0-2 m deep; 28 May 1963; Ch. Lewinsohn, NS. 863. — 1 juvenile.

Tel-Aviv; April 1961; Ch. Lewinsohn, NS. 575. — 1 carapace (washed ashore).

Bat-Yam; 0-1 m deep; 17 June 1962; Ch. Lewinsohn, NS. 861. — 1 juvenile.

The first find of this species was that of an empty carapace near Tel-Aviv (NS. 575) in April 1961. The first living specimen was encountered shortly afterwards during the summer of 1961 near Mikhmoreth (NS. 860). Since then some 12 specimens have been added to our collections among which are several adults (up to cl. 47 mm), including one ovigerous female (cl. 40 mm).

It is obvious that during recent years *Atergatis roseus* became more and more abundant here; its distribution extends now throughout the rocky habitats along the Israel Mediterranean shore, from Bat-Yam in the south to the Lebanon border in the north.

All our specimens were found under and among stones and rocks, whereas Ruppell (1830: 14) stated: "Sie scheint mehr schlammige Buchten als felsigen Grund zum Aufenthalt zu lieben".

In our material there is a marked difference in colouration of the youngest specimens and that of the adults. Adults have a uniform reddish-brown carapace. The brown colour is more pronounced among the largest specimens. Our smallest specimens (cl. 13 mm) have a pale orange carapace, whose frontal and lateral margins are white; on the posterior part of the carapace these white bands widen to form a patch.

The specimens were compared with two syntypes of Ruppell's *Carpilius roseus* which form part of the collection of the Rijksmuseum van Natuurlijke Historie.

Until now the species was known only from the Indo-West Pacific area (Red Sea and Natal to the Malay Archipelago and Fiji). It evidently entered the eastern Mediterranean by way of the Suez Canal; it has not been reported before from either the Mediterranean or the Suez Canal.

### **Micropanope rufopunctata** (A. Milne Edwards, 1869)

Bat-Yam, Israel; 5 October 1949; G. Haas. — 1 female.

The specimen has a carapace breadth of 11.5 mm and thus is much larger than the juvenile male reported upon by Holthuis & Gottlieb (1958: 94,

fig. 15). It agrees so well with Monod's (1956: 313, fig. 386-392) account of *Micropanope rufopunctata*, that we cannot but assign it to that species. The median incision of the front is somewhat deeper and wider in the present specimen than is figured by Monod.

The right half of the front and part of the legs are covered by the calcareous tubes of Serpulid worms.

The juvenile male reported upon by Holthuis & Gottlieb was collected in Haifa Bay, while the juveniles mentioned by Forest & Guinot (1958: 12, fig. 8, 9) from Caesarea and Atlit as *Micropanope* sp. probably also belong here. The species thus seems to be not very rare on the Israel coast, and it is hoped that more material may turn up, to definitely settle the question whether or not the Mediterranean and West African forms actually are conspecific.

#### Grapsidae

#### **Planes minutus** (Linnaeus, 1758)

Haifa Bay, Israel; 11 June 1963; Ch. Lewinsohn. — 1 specimen.

Since the only former report of this species from the Mediterranean coast of Israel (Holthuis & Gottlieb, 1958: 102) is based on a specimen lacking definite locality data, the present is the first reliable record of this species from Israel waters.

The specimen at hand is a very large ovigerous female (cl. 20 mm). It was found among algae and *Lepas anatifera* L. on a floating life-belt.

The geographic distribution of the species has been dealt with by Holthuis & Gottlieb (1958).

#### **Brachynotus sexdentatus** (Risso, 1827)

Tel-Aviv, Israel; 0-1 m deep; 13 May 1961; D. Popper. — 24 males, 19 females (9 ovigerous).

In the list of Israel Mediterranean Decapoda Holthuis & Gottlieb (1958: 102) mentioned an undescribed species of *Brachynotus* as "*Brachynotus sexdentatus* (Risso, 1827) ssp.". This species, which will soon be described by Dr. R. Zariquiey Alvarez of Barcelona, is quite common along the Israel coast and since the publication of the just mentioned paper it has been taken at various additional localities (Geshher-Haziv, Tantura, Caesarea, Apollonia) as well as at the localities listed by Holthuis & Gottlieb. In the mean time, however, also the true *Brachynotus sexdentatus* (Risso) turned up in Israel waters. The above 43 specimens (cl. 7-11 mm) were collected near Tel-Aviv.

The two species seem to occupy quite distinct habitats: the typical *Brachy-*



*notus sexdentatus* lives dug in in the sand, while the new species was found on and under stones. Both live in shallow water.

The distribution of the two species has been dealt with by Holthuis & Gottlieb (1958).

### Majidae

#### ***Pisa tetraodon*** (Pennant, 1777)

Gesher-Haziv, north of Nahariya, Israel; 0-2 m deep; 27 June 1960; Ch. Lewinsohn, NS. 562. — 1 specimen.

The specimen is a juvenile with cl. 12 mm. It proves to be a typical *Pisa tetraodon*, a species so far not known from Israel waters. Holthuis & Gottlieb (1958: 106, 107) discussed the status of the three species, *Pisa muscosa* (L.), *P. tetraodon* (Pennant) and *P. corallina* (Risso), which by previous authors generally were considered to belong to a single variable species. Also the distribution of the three species is discussed by them. The only certain record of the present species from the eastern Mediterranean known to us is the one by Holthuis (1961: 60) from the south coast of Turkey.

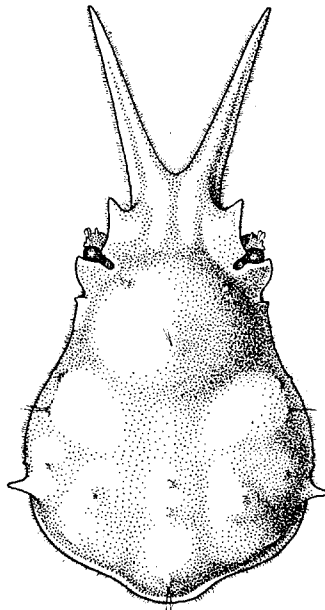


Fig. 5. *Hyastenus hilgendorfi* De Man, specimen from off the Israel coast, E. Gilat, A. 513. Carapace in dorsal view,  $\times 6$ .

**Hyastenus hilgendorfi** De Man, 1887

Off the Israel coast between Bat-Yam and Ashdod; 8-20 fathoms; 26 October 1960; E. Gilat, A. 513. — 1 specimen.

Though the present specimen is a juvenile female (cl. 13 mm) and moreover is incomplete (all the legs, but one of the chelipeds and one of the walking legs, are missing), it is confidently identified here with De Man's species, as it agrees so well with the published descriptions. Also the known range of distribution of *Hyastenus hilgendorfi* makes the identity of our specimen with it more likely than with any of the other species of the genus.

*Hyastenus hilgendorfi* was originally described from the Mergui Archipelago and has since been reported from the western Indo-West Pacific region (Red Sea to the Malay Archipelago). It is the only species of Oxyrhynch crab so far reported from the Suez Canal; it was found throughout the full length of the Canal from Port Said (km 4-5) in the north to Suez in the south (cf. Holthuis, 1956: 328, for an enumeration of the known Suez Canal localities of the species). The present specimen is the first of the species to be reported from the Mediterranean.

**Achaeus gordonae** Forest & Zariquiey, 1955

Tantura, Israel; 0-2 m deep; July 1956; Ch. Lewinsohn, NS. 624. — 1 ovigerous female. 0-2 m deep, rock pools; fish poisoning; 3 May 1962; A. Ben-Tuvia, E. Gilat and L. B. Holthuis. — 1 male, 1 female.

Tel-Aviv; 18 May 1963; D. Popper. — 1 ovigerous female.

Bat-Yam; 5 October 1945; G. Haas. — 1 ovigerous female. 29 July 1961; D. Popper. — 1 female.

Forest & Zariquiey (1955) straightened out the systematics and nomenclature of the Mediterranean species of *Achaeus*. They showed that what most authors had named *Achaeus cursor* A. Milne Edwards & Bouvier actually is *A. cranchii* Leach, and that the species that in the Mediterranean was usually indicated as *A. cranchii* represented a new form, which they named *A. gordonae*. *Achaeus cranchii* is a form from deeper water (20-100 m), while *A. gordonae* is found much closer to the coast (0.5-20 m).

*Achaeus gordonae* is now known from the entire Mediterranean. The only previous record of the species from the eastern Mediterranean is the one by Holthuis (1961: 61) from the south coast of Turkey. Due to the confusion between this species and the true *A. cranchii*, older records of the latter species from the eastern Mediterranean may, partly or entirely, pertain to *A. gordonae*.

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