

On the Post-Larval Stage of Two Species of the Swimming Crab

Kensaku MURAOKA

Various kinds of megalopa, the post-larval stage of the crab, can be seen along the rocky beaches or under the sea surface in Sagami Bay during the warmer season. The identification of such megalopa is not so easy, as most of the larval stages of Decapod Crustaceans have not yet been fully investigated.

With regard to the Japanese Portunidae, the zoea and megalopa of five species have already been described, i. e. those of *Portunus pelagicus*, *Portunus sp.* and *Charybdis bimaculata* by Aikawa (1937), of *Charybdis japonica* and *Portunus pelagicus* by Yatsuzuka (1951, 1962).

Recently, the author obtained two kinds of megalopa from Sagami Bay, one by a surface collection from a flock swimming under the surface, in April of 1967 and 1968, and another from algae growing on the rocky beach, in August of 1968. These larvae have been reared in the aquarium, and was successful to get the young crabs. The author identified the one as *Ovalipes punctatus* (de HAAN), and the other as *Thalamita sima* H. MILNE-EDWARDS.

This paper deals with the description and illustration of the larval features of these two kinds of crabs.

The author wishes to acknowledge Professor Dr. T. Sakai of the Yokohama National University for his kind guidance.

1. Megalopa of *Ovalipes punctatus* (de HAAN).

The carapace has no dorsal spine or protuberance, and the dorsal surface is smooth and naked. The rostrum is horizontally projecting forward and triangular in shape. The posterior portion of the carapace is marked with a shallow groove. Length of carapace including the rostral spine is about 4.9 mm and width of same is about 2.8 mm.

The proximal portion of antennule is composed of three segments, of which the second one is slenderer than the others, and furnished with 6 plumose hairs at the distal edge. The endopodite is divided into five segments. Each second to fifth of these segments is furnished with long sensory hairs. The exopodite has five short setae at the distal end. The antenna has a single flagellum, which is divided into 11 distinct segments. Of those segments, the third one is provided

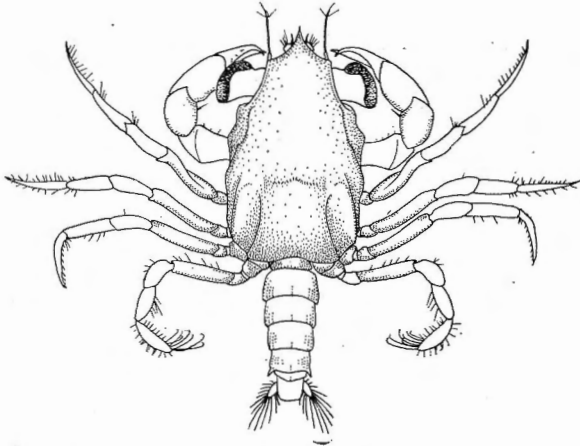


Fig. 1. *Ovalipes punctatus* (de HAAN), dorsal view of the megalopa.

with 2 long plumose hairs and a few setae at the distal portion, the eighth one with two long and a few stiff hairs around its distal margin, and finally, the terminal one with 3 long and 2 short setae at the distal end.

The mandible bears a segmented palp, the distal segment is furnished with 6 plumose setae and 17 short ones along the lateral margin. In the maxillule, the coxopodite and basipodite are provided with numer-

ous strong setae and plumose hairs on the lateral and distal margin. The endopodite is divided into two segments. In the maxilla, there are numerous setae on the lobes of the coxopodite and basipodite. The endopodite bears 6 setae along the outer margin. The scaphognathite is fringed with numerous plumose hairs.

In the first maxilliped, the lobes of coxopodite and basipodite are densely covered with setae on the lateral margin. The endopodite is unsegmented, bearing 12 setae on its outer border near the distal portion, and 5 plumose setae on its inner proximal border. The exopodite is divided into three segments, the proximal one being furnished with 2 plumose hairs near the distal border, and the distal one with 4 plumose ones at the apex. In the second maxilliped, the endopodite and exopodite are well distinguished. The endopodite is divided into five segments, each of which bears setae on the lateral and distal portion. The exopodite is divided into three pieces. The proximal one is provided with 3 short setae on the outer margin, with a plumose hair on the inner margin. The distal one bears 4 plumose hairs at the distal end. In the third maxilliped the endopodite and exopodite are well distinguished. The endopodite is divided into five segments, each of which are provided with numerous stout setae on the lateral margin. The exopodite is divided into three pieces, the proximal one is furnished with a row of short setae on the lateral border and the distal one with two short plumose hairs on the outer border, and 6 same ones at the distal end.

Chelipeds are nearly equal; the ischium is marked with a hooklet on the lateral border; the entire surface of the carpus and propodus is sparingly covered with fine hairs. The immovable finger is provided with 3 teeth in the middle

portion of the prehensile edge.

Ambulatory legs are very slender. The dactylus of the first to third pairs is longer than the propodus, and curved inwards. In the last pair, the dactylus is elongate oval in outline, similar to that of the adult specimen. The outer margin of this segment has a few setae. The inner margin is furnished with 16-17 fine setae, of which 8 or 9 curled and found near the distal end.

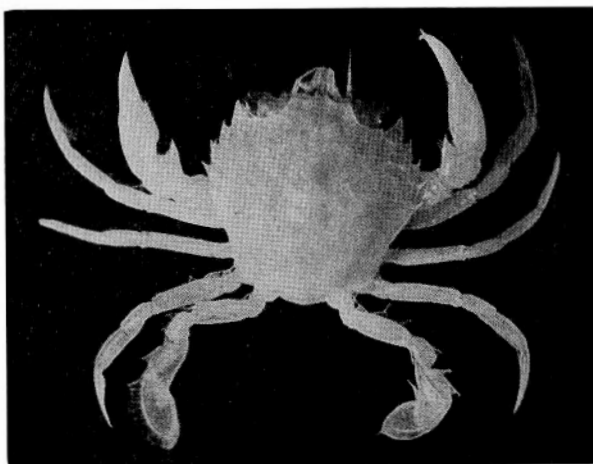


Fig. 2. Carapace in the 1st crab-stage of *Ovalipes punctatus* (de HAAN).

The abdomen is divided into seven distinct segments. The second to fifth segments are respectively provided with a pair of biramous pleopods. The exopodite of those pleopods is furnished with 31-40 plumose hairs on the lateral margin, and the endopodite with 7 small hooks along the inner margin. The six segment is provided with a pair of small uropods, which is divided into two segments. The proximal one is furnished with 3 plumose hairs on the outer margin, and the distal one with 22 plumose hairs on the lateral margin.

1st crab-stage: Carapace is similar to that of the adult specimen. Length of carapace is about 5.3 mm and width of same is about 6.2 mm.

2. Megalopa of *Thalamita sima* H. MILNE-EDWARDS

The carapace has no dorsal spine or protuberance, its dorsal surface is naked. The rostrum is horizontally projecting forward, which is slender and triangular in outline. The posterior portion of the carapace is somewhat depressed. The length of carapace including the rostral spine is about 2 mm and width of same is about 1.2 mm.

In the antennule, the proximal portion is composed of three segments. The endopodite is provided with 4 setae, three of which are found at the top. The exopodite is composed of four distinct segments, of which the second to terminal ones are provided with long sensory hairs. Moreover, the terminal segment has a long seta at the distal portion. The antenna has a single flagellum, which is divided into 11 segments. Of these segments, the third one bears 2 long plumose

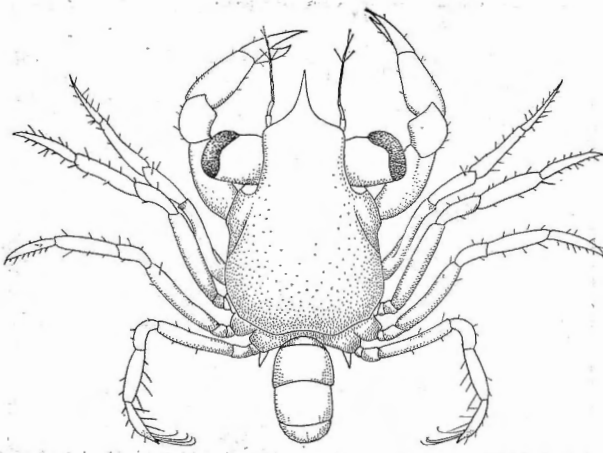


Fig. 3. *Thalamita sima* H. MILNE-EDWARDS,
dorsal view of the megalopa.

provided with numerous stout setae on the lateral and distal margin. The endopodite is divided into two segments, the proximal one being provided with 3 long setae along the lateral margin, and the distal one with 2 short setae at the apex. In the maxilla, the coxopodite and basipodite are furnished with numerous setae and plumose hairs. The endopodite is provided with 3 setae on the external margin. The scaphognathite is fringed with plumose hairs around the entire margin.

In the first maxilliped, the coxopodite and basipodite are densely covered with setae near the distal portion. The endopodite bears 3 setae on the outer margin of the distal portion. The exopodite is divided into three pieces, the proximal one being furnished with a plumose hair near the distal end, and the distal one with 5 long plumose hairs near the distal end. In the second maxilliped, the endopodite is provided with setae on the outer and inner border. The exopodite is divided into three pieces, the proximal one

hairs and a seta at the distal portion. There are a few short setae at the distal portion of each sixth to tenth segment, exclusive of the eighth segment, which has two long setae at the distal portion. The last segment has 3 short setae at its distal end.

The mandible has a segmented palp, its distal portion is furnished with 8 setae and 3 plumose setae on the lateral margin. In the maxillule the coxopodite and basipodite are

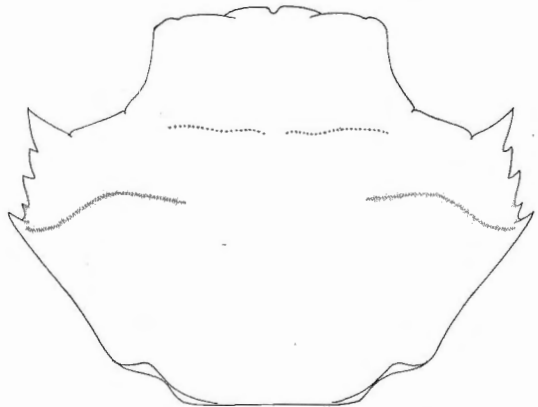


Fig. 4. Carapace in the 1st crab-stage of
Thalamita sima H. MILNE-EDWARDS.

is long, while the distal one furnished with 5 plumose hairs near the distal end. In the third maxilliped, the endopodite is furnished with numerous stout setae on the lateral margin, and also with a long setae and numerous short ones at the distal end. The exopodite bears 5 plumose hairs near the distal end.

Chelipeds are slender and nearly equal. The ischium has no hooklet on the lateral margin; the carpus and propodus are sparingly furnished with short setae on the lateral margin. The movable finger is armed with 3 blunt teeth on the prehensile edge; the immovable finger also with 3 teeth of a triangular shape in the middle portion of the same edge.

The ambulatory legs are very slender. In the first leg, the propodus is furnished with a long stout seta at the distal end, and the dactylus with 7 short stout setae on the inner margin. In the last leg, the propodus is furnished with 3 long plumose hairs and a few short setae along the inner margin. The dactylus bears 5 short stout setae on the outer margin, 3 long plumose hairs, and one short and three long feelers on the inner margin.

The abdomen is divided into seven distinct segments. The second to fifth segments are provided with a pair of biramous pleopods. The exopodite of these pleopods are furnished with a number of plumose hairs on the lateral margin. The number of hairs are 21 in the first pair, 22 in the second and third pairs, and 19 in the last pair. The endopodite bears 3 small hooked spines on the inner margin. The sixth segment is provided with a pair of small uropods, which is divided into two segments. The proximal segment is furnished with a plumose hair on the outer margin, and distal one with 11 same hairs on the lateral margin.

1st crab-stage: Carapace is somewhat similar to that of the adult specimen. Length of carapace is about 2.4 mm and width of same is about 3.3 mm.

The features of these two kinds of megalopa were compared with those of the Japanese Portunidae already reported (Table I).

Table I. Number of segment, feeler and plumose hair in the megalopa of Japanese Portunidae.

species	carapace length (mm.)	segments of antennal flagellum	feelers	plumose hairs of the uropod		
				exopod.	prox. seg.	
<i>P. pelagicus</i>	2.08	—	5	11~12	1	YATSUZUKA
<i>P. pelagicus</i>	—	11	4	—	—	AIKAWA
<i>P. sp.</i>	—	11	—	8?	—	AIKAWA
<i>C. japonica</i>	3.0	—	3	14	—	YATSUZUKA
<i>C. bimaculata</i>	3.57	12	4	—	—	AIKAWA
<i>O. punctatus</i>	4.9	11	8~9	22	3	
<i>T. sima</i>	2.0	11	4	11	1	

Summary

Two kinds of megalopa were obtained from Sagami Bay, in April of 1967 and also in August of 1967 and 1968. These were reared in the aquarium until they reach the young crab stage. The author confirmed that the one as *Ovalipes punctatus* and the other as *Thalamita sima*. Comparison was made between the features of those two larvae.

a. In the megalopa of *Ovalipes punctatus* the carapace is apparently longer than that of *Thalamita sima*.

b. In *O. punctatus* the ischium of cheliped has a hooklet on the lateral margin, while in *T. sima* it has none.

c. In *O. punctatus* the exopodite of the uropod has 22 plumose hairs on the external margin, while in *T. sima*, it has only 11 same ones on the same margin.

Literature

- Aikawa, H. 1937. Further notes on brachyuran larvae. Rec. Oceanogr. Wks., 9: 87-162.
- Churchill, E. P. 1918. Life history of the blue crab. U. S. Bull. B. F. 36: 95-128.
- Costlow, J. D. & C. G. Bookhout, 1959. The larval development of *Callinectes sapidus* RATHBUN reared in the laboratory. Biol. Bull., 116: 373-396.
- Gurney, R. 1942. Larvae of decapod Crustacea. 1-306, Ray Soc. London.
- Hart, J. 1935. The larval development of British Columbia Brachyura. Canad. J. Res., 12: 411-432.
- Lebour, M. V. 1928. The larval stages of the Plymouth Brachyura. Proc. zool. Soc. London, 473-560.
- Rathbun, M. J. 1923. The brachyuran crabs collected by the U. S. Fisheries steamer Albatross in 1911, chiefly on the west coast of Mexico. Bull. Amer. Mus. Nat. Hist., 48: 619-637.
- Sakai, T. 1939. Studies on the crabs of Japan. IV. Tokyo.
- Yatsuzuka, K. 1951. The metamorphosis and growth of the larva of *Charybdis japonica*. Bull. Jap. Soc. Sci. Fish., 17: 353-358.
- . 1962. Studies on the artificial rearing of the larval brachyura, especially of the larval blue-crab, *Neptunus pelagicus* L.. Rep. Usa Mar. Biol. St., 9: 1-88.

ワタリガニ科のカニ類2種の後期幼生について

村岡健作

1967年から1968年の両年にわたって相模湾から蟹類2種のメガロパを得ることができた。これらのメガロパは、ワタリガニ科のヒラツメガニ *Ovalipes punctatus* (de HAAN) とフタバベニツケガニ *Thalamita sima* H. MILNE-EDWARDS で、いずれも飼育し、第1幼蟹に変態させた。

上記2種のメガロパについて、若干の知見を得たので報告するとともに、すでに報告されている本邦産ワタリガニ科4種のメガロパとも、あわせて比較観察をおこなった。

Explanation of Plates

Plate 1 Appendages, megalopa of *Ovalipes punctatus* (de HAAN)

A: antennule. B: antenna. C: mandible. D: maxillule. E: maxilla.
F: first maxilliped. G: second maxilliped. H: third maxilliped. I: che-
liped J: fourth ambulatory leg. K: uropod.

(The bar scales represent 1 mm.)

Plate 2 Appendages, megalopa of *Thalamita sima* H. MILNE-EDWARDS

A: antennule. B: antenna. C: mandible. D: maxillule. E: maxilla.
F: first maxilliped. G: second maxilliped H: third maxilliped. I: che-
liped. J: first ambulatory leg. K: fourth ambulatory leg. L: telson.
M: uropod.

(The bar scales represent 0.5 mm.)

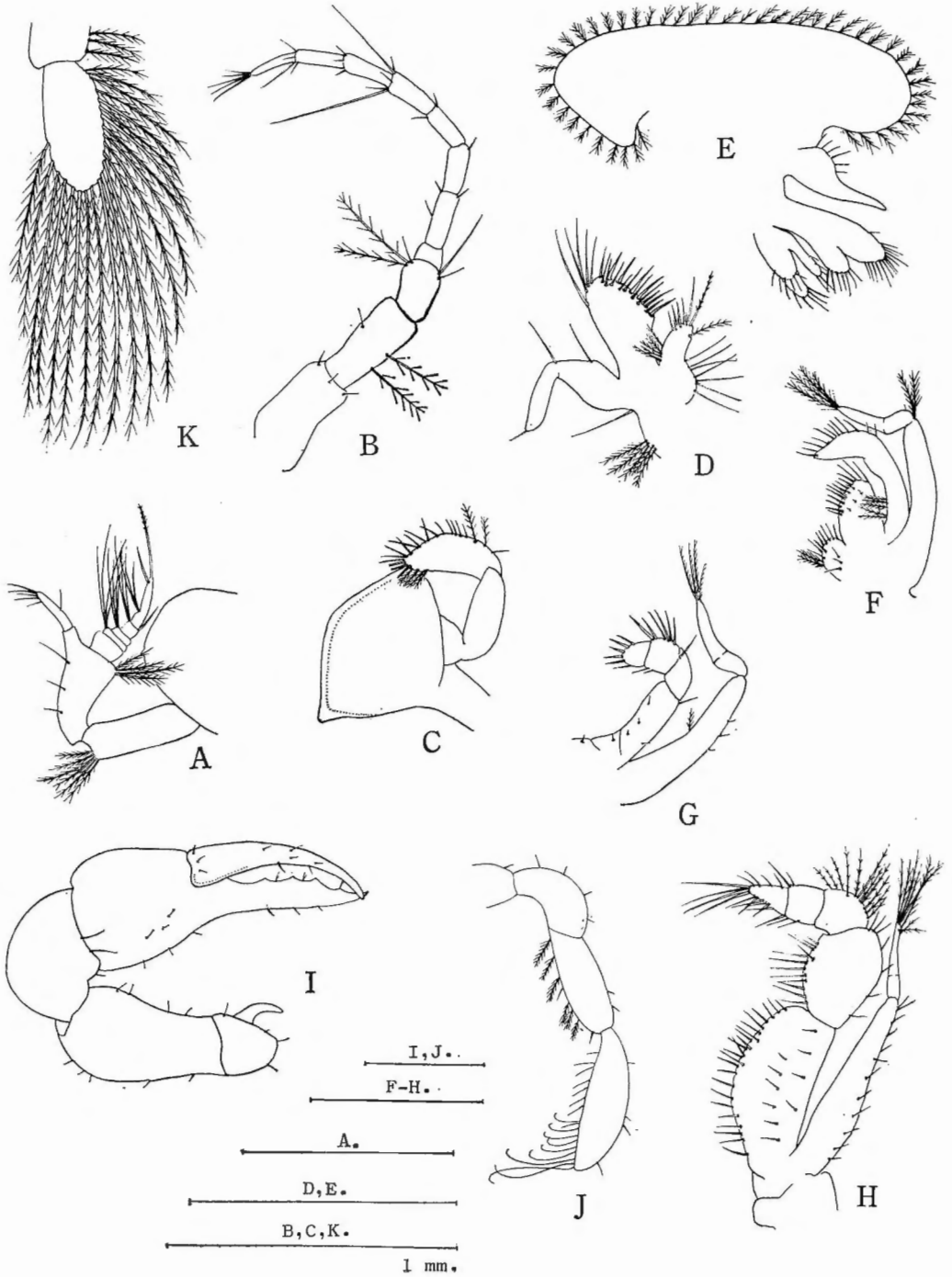


Plate II

