The First Zoea of *Pseudopinnixa carinata* Ortmann (Crustacea, Brachyura, Pinnotheridae)

Kensaku MURAOKA

ウモレマメガニ（かくれがに科）の第１期ゾエアについて

ウモレマメガニは干潟に穴を掘って生活するかくれがに科，まめがに亜科に属するカニである。酒井（1976）によれば，本種は１属１種のカニで，これまでに，犬吠埼，東京湾（月島，金沢八景），大阪湾でその生息が確認されている。しかし，筆者の知るかぎりこれらの地域以外からはまだ採集されていない。また，この幼生についての観察報告も皆無である。

今回，本種が東京湾の湾口に近い横須賀市走水の干潟に生息しているのを見いだし，1984年７月30日に雌雄各二個体を採集することができた。このうち，雌はいずれも抱卵していた。これらの雌を室内で飼育したところ，卵は孵化し第１期ゾエアを得ることができたので，この幼生の外部形態を観察し，図示した。さらに，すでに報告されている日本の沿岸種で東京湾にも多数出現するかくれがに科，まめがに亜科のラスバンマメガニ *Pinnixa rathbuni* Sakai の第１ゾエア期幼生とも比較観察を行なった。（村岡健作）

Introduction

The pea crab, *Pseudopinnixa carinata* Ortmann, is usually found in burrows on the muddy or sandy beach near the low tidal zone. According to Sakai (1976), this crab is very rare and known only from Inubo-zaki, Tokyo Bay and Osaka Bay, and included in family Pinnotheridae, subfamily Pinnothereliinae. In the this subfamily, the larval descriptions are presently available for 4 species in one genus; *Pinnixa sayana* Stimpson (Faxon, 1879 and Hyman, 1924), *P. longipes* (Lockington) (Bousquette, 1980), *P. cheatopterana* Stimpson (Faxon, 1879 and Smith, 1880), and *P. rathbuni* Sakai. Of these species, the larva of *P. rathbuni* has been reported by several authors; Aikawa (1933) described the unidentified larva (designated as Dissodactylozoea) attributed to *P. rathbuni*; Sekiguchi (1978) and Muraoka (1979) described the larvae obtained from the coastal waters in Japan. Konishi (1983) mentioned as *P.* aff. *rathbuni* for the larvae from Hokkaido. But, so far as the genus *Pseudopinnixa* belonging to the same subfamily is concerned, no information is available on its larva.

The present paper deals with details of the first zoea hatched from the ovigerous females of *Pseudopinnixa carinata* Ortmann. These results are compared with previous descriptions of zoea of *Pinnixa rathbuni*.

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Materials and Methods

The materials, two ovigerous females, were obtained from sandy-mud flats of intertidal zone at Hashirimizu coast in Yokosuka, near the mouth of Tokyo Bay, on July 30 th, 1984. Those were kept in a small plastic aquarium until hatching to the zoea. The eggs hatched on August 1 st, 1984 and the broods were reared in small glass vessels. The larvae lived for 4-5 days, but they died before reaching the next stage.

Results

Description of zoea (Fig. 1)

Dimension: Tip of dorsal to tip of rostral spines: about 1.2 mm. Proximal to distal portions of lateral spine: about 0.2 mm.

The carapace has a dorsal spine which curves caudally. The rostral spine is slightly shorter than the dorsal spine, and a pair of lateral ones is shorter (Fig. 1A). The eyes are not stalked.

The antennule is a thumb-like process and bears 2 long aesthetascs and 2 short setae on its apex (Fig. 1B).

The antenna has a spinous peduncle. It bearing a row of fine microscopic setae along the distal half and a bristle-like spinule stouter than the other spines on the middle portion (C_1-type, according to Aikawa, 1933) (Fig. 1C).

The maxillule consists of the coxal and basal endites and endopod. The bi-segmented endopod is furnished with 1 seta on the first segment and 4 terminal and 1 median setae on the second segment (Fig. 1E).

The maxilla consists of the coxal and basal endites, endopod and scaphognathite. The bilobed coxal and basal endites bear 2 or more setae on the distal portion respectively. The bilobated endopod bears 2 setae on each lobe and its margin is covered with numerous fine hairs. The scaphognathite bears 4 soft plumose hairs on the external margin (Fig. 1F).

The first maxilliped consists of the endopod and exopod. The setation of the five-segmented endopod is 2, 2, 1, 2, 5 from the proximal to terminal. The exopod bears 4 plumose hairs on its apex (Fig. 1G).

The second maxilliped has a short endopod and a long exopod. The two-segmented endopod has a setation of 1, 4. The exopod bears 4 plumose natatory hairs on the distal part (Fig. 1H).

The abdomen consists of five segments and a telson. The second and third abdominal segments bear a pair of short lateral knobs. The telson is bifurcated; the inner lateral margin of furca with three pairs of spines along the proximal portion (B-type according to Aikawa, 1929) (Fig. 1I).

Remarks

The comparison between the first zoeae of *Pseudopinnixa carinata* and those of

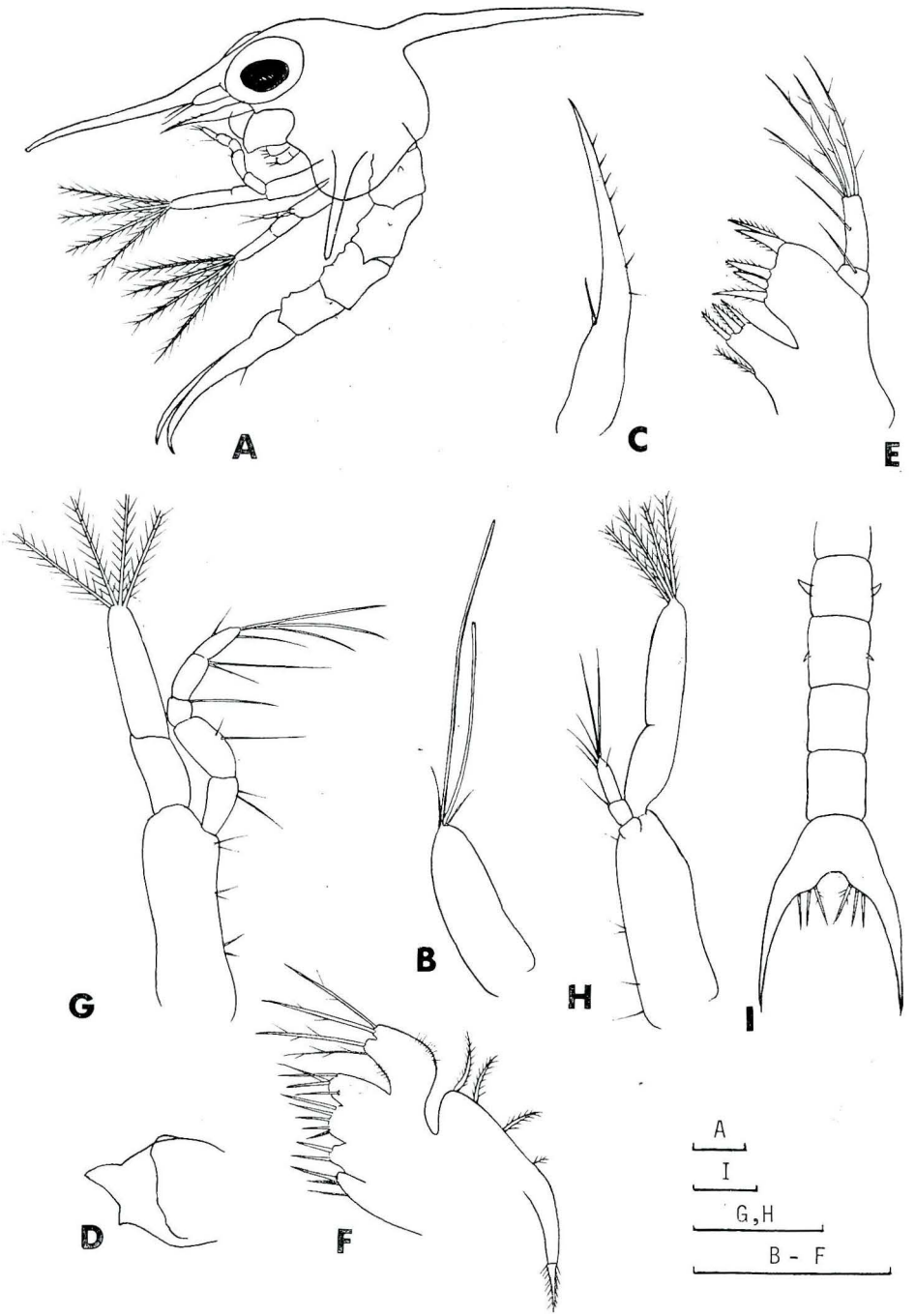

Fig. 1, *Pseudopinnixa carinata* Ortmann, first zoeal stage (A–I).
A, zoea, lateral view ; B, antennule ; C, antenna ; D, mandible ; E, maxillule ; F, maxilla ; G, first maxilliped ; H, second maxilliped ; I, abdomen. Bar scales represent 0, 1 mm.

Table 1. Comparison of main characteristics in the first zoeal stage of two pinnotherid crabs, *Ps. carinata* and *Pi. rathbuni*

Reference:	*Ps. carinata*	*Pi. rathbuni*	
	Present work	Konishi(1983)	Sekiguchi(1978)
Antennule	2, 2	2, 1	2, 1
Antenna	C type	D type	D type
Maxillule			
endopod	1, 5	0, 4	0, 4
Maxilla			
endopod	4	3	3
First maxilliped			
endopod	2, 2, 1, 2, 5	2, 2, 1, 2, 5	2, 2, 1, 1, 4*
exopod	4	4	4
Second maxilliped			
endopod	1, 4	0, 4	0, 5*
exopod	4	4	4
Fifth abdominal seg.	cylindrical	expandable	expandable
Telson	B type	B type	B type

* According to illustrations

Pinnixa rathbuni can be made through the descriptions reported by Sekiguchi (1978) and Konishi (1983). The main comparison is summarized in Table 1.

The present zoea has some features which has previously been described for the first zoea of *P. rathbuni* related to this species: 1) general appearance and the number of carapace spines; 2) type of telson considered as the important characters by Aikawa; 3) setation of endopod of first maxilliped (excepting the setation described by Sekiguchi).

On the other hand, the main differences of morphological characteristics were found between these two kinds of zoeae: 1) type of antenna (Aikawa, 1933); 2) setation in endopods of the maxillule, maxilla and second maxilliped. Furthermore, the appearance of abdominal segment is very different. In the zoea of *Pinnixa rathbuni*, the fifth abdominal segment is expanded laterally like a pair of wings, while in *Pseudopinnixa, carinata*, it is rectangular. Thus it is possible to distinguish the zoea of two species from these characteristics.

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