

# ヒメセミアエビの第1期フィロゾーマ幼生(十脚目,セミアエビ科)

誌名	日本プランクトン学会報
ISSN	03878961
著者名	小西,光一 関口,秀夫
発行元	日本プランクトン学会
巻/号	37巻1号
掲載ページ	p. 77-82
発行年月	1990年8月

農林水産省 農林水産技術会議事務局筑波産学連携支援センター  
Tsukuba Business-Academia Cooperation Support Center, Agriculture, Forestry and Fisheries Research Council  
Secretariat



# First-stage Phyllosoma of *Scyllarus cultrifer* (ORTMANN) (Decapoda, Scyllaridae)<sup>1),2)</sup>

KOOICHI KONISHI<sup>3)</sup> AND HIDEO SEKIGUCHI<sup>4)</sup>

*National Research Institute of Aquaculture, Nansei-cho, Mie 516-01, Japan<sup>3)</sup>  
and Faculty of Bioresources, Mie University, Kamihama-cho, Tsu, Mie 514,  
Japan<sup>4)</sup>*

## Abstract

The larvae of the first phyllosoma stage of *Scyllarus cultrifer* (ORTMANN) is first described based on material hatched in the laboratory. The larvae belong to the second group which has four long plumose setae on the distal segment of second maxilla and are distinguished from the first group which is armed with three setae there.

*S. cultrifer* is distinguishable from *S. bicuspidatus*, *S. demani*, *S. sordidus*, *S. modestus* and *S. timidus* in the following points: antennule armed with three aesthetascs, cephalon leaving the bases of third maxilliped uncovered, third maxilliped and first pereiopod lacking coxal spines, exopod of the first and second pereiopods with five pairs of long plumose setae, and undeveloped fourth pereiopod. While, we failed to find any difference from *S. depressus*. *S. bataei*, *S. martensii* and *S. rugosus* cannot be compared with *S. cultrifer* because their description and illustration are brief.

Out of the forty-three *Scyllarus* species of the world, phyllosoma larvae of sixteen species have been described based on laboratory or hauled materials (cf. SEKIGUCHI 1987). From Japan eight species of the *Scyllarus*, i.e. *S. aurora*, *S. bicuspidatus*, *S. brevicornis*, *S. cultrifer*, *S. kitanoviriosus*, *S. longidactylus*, *S. martensii* and *S. rugosus*, have been recorded, and morphological features of the first-stage phyllosoma larvae of these Japanese species have been known only for three species, *S. bicuspidatus* on the larvae hatched in the laboratory (SAISHO 1964) and *S. martensii* and *S. rugosus* found in plankton samples (PRASAD et al. 1975). It is necessary to examine laboratory-hatched material to insure true larva-adult parentage.

The authors describe herein the newly-hatched phyllosoma of *S. cultrifer* which is the most common *Scyllarus* in the Pacific coast of Japan (SEKIGUCHI 1986).

## Materials and Methods

On 30th June 1989, ovigerous females of *Scyllarus cultrifer* were taken with baited traps set on the sea floor (20 m depth) of the coastal water of Kumano-nada on

1) Accepted 11 July 1990

2) ヒメセミエビの第1期フィロゾーマ幼生 (十脚目, セミエビ科)

3) 小西光一, 養殖研究所

4) 関口秀夫, 三重大学生物資源学部

the Pacific coast of central Japan. They were kept alive in an aquarium. Newly-hatched phyllosoma larvae appeared on 7th July. These larvae were immediately fixed in 5% buffered formalin and then preserved in 70% ethanol.

All figures were drawn with the aid of a drawing tube. A scanning electron micrograph of mouth appendages was taken using usual techniques for SEM (QUINTANA & KONISHI 1986). Body length was measured from the anterior margin of the cephalon (forebody) to the posterior end of the hindbody. Measurements were made with an ocular micrometer. The present phyllosoma larvae will be deposited at the National Science Museum in Tokyo after completion of the study.

### Results

All of the newly-hatched larvae were at the first-stage phyllosoma. No larvae of free-swimming naupliosoma or prephyllosoma stage were observed. Morphological features of the larvae are described below.

#### *The first-stage phyllosoma* (Figs. 1-3)

Body length ranged 1.06 to 1.13 mm, 1.11 mm in average; cephalon length ranged 0.55 to 0.61 mm, 0.59mm in average; cephalon slightly wider than long, nearly twice wider than hindbody, leaving the bases of third maxilliped exposed; abdomen slightly longer than 1/3 of hindbody length, narrow, not tapering much posteriorly, with a short spine and three small setae at each posterolateral angle; eye not stalked, shorter than antennule, antennule unsegmented and uniramous with three aesthetascs at apex plus a small spine at inner distal angle and with a small seta on inner margin slightly beyond middle of its length; antenna unsegmented and uniramous, about 1/5 length of antennule, with a terminal spine and a small seta at each side near distal end; mandible of scoop-shaped blade concealed under upper and lower labra, with two strong spines (incisor process) at the ventral angle followed by about six smaller, closely spaced teeth along the cutting edge of the blade separated by a narrow gap from the blunt projection surrounded by corneous teeth (molar process) at the dorsal end; first maxilla (Fig. 3) biramous and unsegmented without palp, coxal endite with a stout, elongated terminal seta and two shorter but similar subterminal setae, basal endite with two strong terminal and two small subterminal spines plus a small seta proximally near anterior margin; second maxilla consists of two segments, basal segment elongated, bearing a small seta on outer margin near distal end, distal segment small, narrow, with four long, plumose setae; first maxilliped wanting; second and third maxillipeds five-segmented without exopod, first segment of third maxilliped with a short spine and a small seta; first to third pereopods well developed with a relatively short spine plus a small seta on first segment and an elongated, stout terminal claw on endopod, the first two pereopods each with a stout subexopodal spine on endopod at base of exopod, exopod bearing five pairs of natatory setae, the third pereopod with exopod as a small bud near middle of its second segment; fourth and fifth pereopods wanting; pleopod and uropod wanting.

### Discussion

Out of forty-three *Scyllarus* species in the world (SEKIGUCHI 1987) the first-stage phyllosoma has been described on eight species (*S. americanus*, *S. bicuspidatus*, *S. demani*, *S. depressus*, *S. modestus*, *S. planorbis*, *S. sordidus* and *S. timidus*) based on the larvae hatched in the laboratory (PRASAD & TAMPI 1960, SAISHO 1964, ROBERTSON 1968, 1971, 1979 SANKOLLI & SHENOY 1973, RITZ 1977) and on three species (*S. batei*, *S. martensii*, *S. modestus*) based on those in plankton

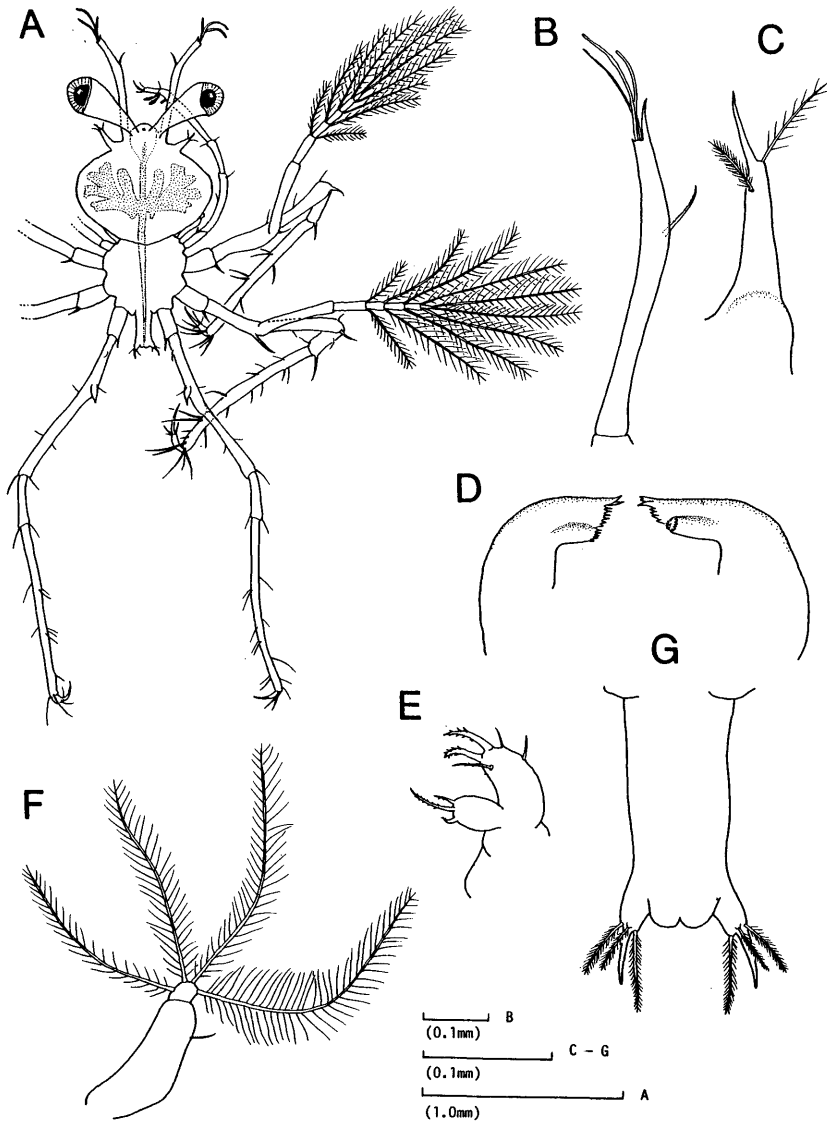


Fig. 1. *Scyllarus cultrifer* (ORTMANN). A: dorsal view of whole body, B: antennule, C: antenna, D: mandible, E: first maxilla, F: second maxilla, G: abdomen.

samples (JOHNSON 1971, PRASAD et al. 1975). These larvae are very similar in morphology each other. The first stage larvae of the present species also have common features with the above-mentioned species in the first and second antennae, second maxilla, second and third maxillipeds and so on.

First-stage phyllosoma larvae of *Scyllarus* are separated into two groups by the number of long plumose setae on the apical segment of second maxilla (SEKIGUCHI 1987), three in *S. americanus* and *S. planorbis* (first group), and four in *S. bicuspidatus*, *S. demani*, *S. depressus*, *S. modestus*, *S. sordidus* and *S. timidus* (second group). ROBERTSON (1979) described first-stage phyllosoma larvae of *S. planorbis* with second maxilla bearing three setae on the apical segment in the first stage, although he illustrated four setae in the same paper. As to *S. sordidus*, SANKOLLI & SHENOY (1973) illustrated and described second maxilla

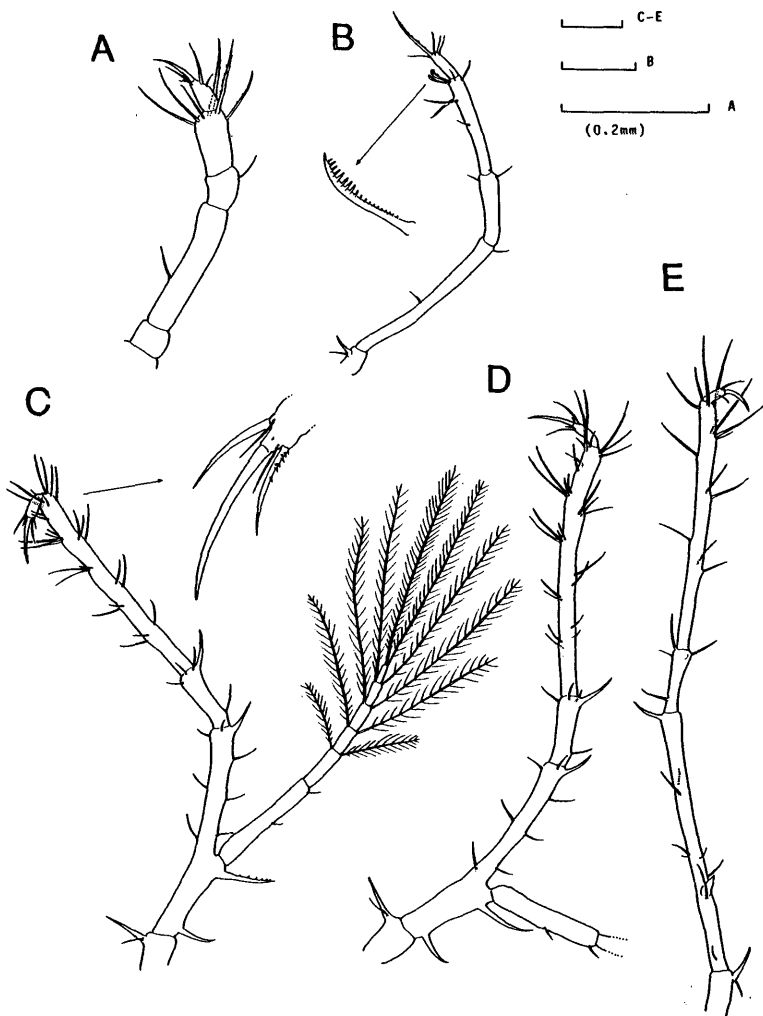


Fig. 2. *Scyllarus cultrifer* (ORTMANN). A: second maxilliped, B: third maxilliped, C: first pereiopod, D: second pereiopod, E: third pereiopod.

to bear two long plumose setae on the apical segment, while PRASAD & TAMPI (1960) and RITZ (1977) confirmed four setae, based on the examination on hatched larvae in the laboratory. The present authors adopt that *S. sordidus* bears second maxilla with four setae on the apical segment, because the apical segment with two plumose setae is an abnormal feature in this genus.

The present species belongs to the second group in having four long plumose setae on the apical segment of the second maxilla. From some species belonging to the second group this species is distinguishable as follows.

*S. bicuspidatus*, which is the most closely allied species to *S. cultrifer* in size and external features, has four aesthetascs at apex of antennule, cephalon covering the bases of third maxilliped, and third maxilliped and first pereopod lacking coxal spines. *S. demani* has six or seven pairs of natatory setae on the first and second pereopods, non-setose exopod on the third pereopod, and the bud-like fourth pereopod as long as abdomen (RITZ 1977). *S. sordidus* has a unique shaped second antenna and seven pairs of natatory setae on the first and second pereopods (PRASAD & TAMPI 1960). *S. modestus* and *S. timidus* have first and second pereopods bearing six pairs of natatory setae (JOHNSON 1971, RITZ 1977).

The present species is difficult to be separated from *S. depressus* (ROBERTSON 1971). The first-stage phyllosoma of *S. batei*, *S. martensii* and *S. rugosus* were reported by PRASAD et al. (1975). However, we cannot compare the present species with the three species mentioned above because their description is very brief and the illustration is so small that the number of plumose setae on the apical segment of second maxilla cannot be confirmed.

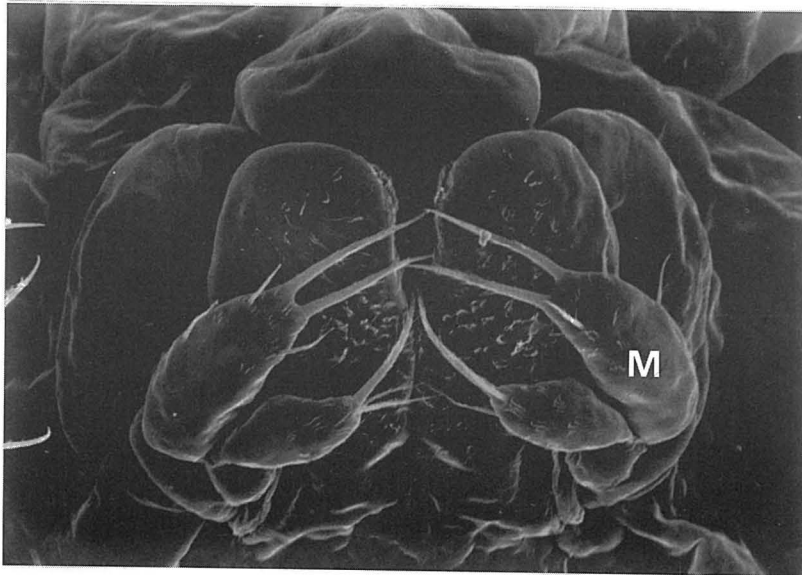


Fig. 3. *Scyllarus cultrifer* (ORTMANN). Scanning electron micrograph of first maxilla (M). ( $\times 410$ )

### Acknowledgment

This work was supported in part by a Grant-in-Aid (Bio Cosmos Program) from the Ministry of Agriculture, Forestry and Fisheries.

### Literature Cited

- JOHNSON, M. W., 1971. The phyllosoma larvae of slipper lobsters from the Hawaiian Islands and adjacent areas. *Crustaceana*, **20**: 77-103.
- PRASAD, R. R. & P. R. S. TAMPI, 1960. On the newly hatched phyllosoma of *Scyllarus sordidus* (STIMPSON). *J. mar. biol. Ass. India*, **2**: 250-252.
- PRASAD, R. R., P. R. S. TAMPI & M. J. GEORGE, 1975. Phyllosoma larvae from the Indian Ocean collected by the Dana Expedition 1928-1930. *J. mar. biol. Ass. India*, **17**: 56-107.
- QUINTANA, R. & K. KONISHI, 1986. On the prezoéal stage: observation on three *Pagurus* species (Decapoda, Anomura). *J. nat. Hist.*, **20**: 837-844.
- RITZ, D. A., 1977. The larval stages of *Scyllarus demani* HOLTHUIS, with notes on the larvae of *S. sordidus* (STIMPSON) and *S. timidus* HOLTHUIS (Decapoda, Palinuridea). *Crustaceana*, **32**: 229-240.
- ROBERTSON, P. B., 1968. The complete larval development of the sand lobster, *Scyllarus americanus* (SMITH), (Decapoda, Scyllaridae) in the laboratory, with notes on larvae from the plankton. *Bull. mar. Sci.*, **18**: 294-342.
- ROBERTSON, P. B., 1971. Biological results of the University of Miami: Deep-sea expeditions 84. The larvae and postlarva of the scyllarid lobster *Scyllarus depressus* (SMITH). *Bull. mar. Sci.*, **21**: 841-865.
- ROBERTSON, P. B., 1979. Larval development of the scyllarid lobster *Scyllarus planorbis* Holthuis reared in the laboratory. *Bull. mar. Sci.*, **29**: 320-328.
- SAISHO, T., 1964. Notes on the first stage phyllosoma of scyllarid lobster, *Scyllarus bicuspidatus*. *Mem. Fac. Fish. Kagoshima Univ.*, **13**: 1-4.
- SANKOLLI, K. N. & S. SHENOY, 1973. On the laboratory hatched six phyllosoma stages of *Scyllarus sordidus* (STIMPSON). *J. mar. biol. Ass. India*, **15**: 218-226.
- SEKIGUCHI, H., 1986. Spatial distribution and abundance of phyllosoma larvae in the Kumano-nada and Enshu-nada seas north of the Kuroshio Current. *Bull. Japan. Soc. Fish. Oceanogr.*, **50**: 289-297.
- SEKIGUCHI, H., 1987. Life histories of the scyllarid and palinurid lobsters-12. *Kaiyo to Seibutsu (Aquabiology)*, **9**: 415-419. (In Japanese)