

On the Megalopa and First Crab Stages of a Species  
of the Family Xanthidae (Crustacea, Brachyura)  
from Japanese Waters

By

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**Abstract** A descriptive note on the megalopa and early crab stages of a species of the family Xanthidae is presented herein. The species probably belongs to *Xanthias elegans* (STIMPSON) which has been sometimes referred to the genus *Paraxanthias*. The megalopa is characteristic in having the subquadrate carapace with two lateral horns in the front.

### Introduction

When the senior author was studying the systematics and distributional ecology of crab larvae from Tosa Bay, southern Japan, he collected many alive planktonic samples. Most of them moulted to the first crab stages by rearing in the laboratory.

The present report is a part of the results of the above study, describing the detailed morphology of the megalopa and first crab stages of a species of the family Xanthidae. Although in general the identification of the first crab having no easily recognizable characters is much difficult, the species in question probably belongs to *Xanthias elegans* (STIMPSON, 1858) which ranges from central Japan to Australia. It has been sometimes referred to the genus *Paraxanthias*.

### Descriptions of the Stages

#### Megalopa

*Measurements:* C.L. 1.15 mm; C.W. 1.0 mm (maximum width). (2 specimens measured).

*Carapace* (Fig. 1 A, B). Subquadrate, almost smooth. Hepatic and meso-branchial regions expanded laterally. Frontal area medially depressed, with 2 anterolateral horns, slightly curved inwards at tips; rostrum well developed, obliquely

directed downwards. Eyes extend beyond lateral margins of carapace.

Mandible (Fig. 1 C). Mandibular plate broad, subtriangular, slightly concave. Palp 2-segmented, distal segment with 11 setae on outer margin.

Maxillule (Fig. 1 D). Endopod indistinctly 2-segmented, with 5 setae. Basial endite with 22–23 spines/setae. Coxal endite with 17 spines/setae. Protopod with 1 seta.

Maxilla (Fig. 1 E). Endopod subtriangular, with 4 setae on outer basal margin. Basial endite bilobed, with 6+10 setae. Coxal endite bilobed, with 7+7 setae. Scaphognathite fringed with 49 plumose setae.

First maxilliped (Fig. 1 F). Exopod 2-segmented, basal segment with 2 setae, distal segment with 5 long, plumose setae. Endopod unsegmented, curved inwards, with 2 setae on outer margin. Basial endite broad, with 17 setae. Coxal endite with 10 setae. Epipod with 6 long, naked setae distally.

Second maxilliped (Fig. 1 G). Exopod 2-segmented, distal segment with 6 long, plumose setae. Endopod 4-segmented, setation 4, 1, 5, 10 spines/setae.

Third maxilliped (Fig. 1 H). Exopod 2-segmented, basal segment with 2 setae, distal segment with 5 long distal setae. Endopod 5-segmented, each segment profusely setose; ischium and merus broad, flattened. Epipod with 7 basal, plumose setae and 5 long, naked setae.

Pereiopods (Fig. 2 A–E). Cheliped stout, with 1 recurved basi-ischial hook ventrally; merus with 1 short spine distally. Fingers curved at tips. Pereiopods 2–5 subcylindrical, with dactyli acute on tips; pereiopod 5 with 3 long setae on dactylus.

Abdomen (Figs. 1 A, 2 G). Somites sparsely covered with short setae. Pleopods present ventrally on somites 2–5, with 11–12, 12–13, 13, 12 long plumose setae on each exopod. Uropod (Fig. 2 G) uniramous, 2-segmented, distal segment with 7–8 plumose setae.

Telson (Fig. 2 G). Broader than long, posterior margin almost straight, with 2 setae marginally and 4 setae disto-medially.

### First Crab

*Measurements:* C.L. 1.33 mm; C.W. 1.43 mm (1 specimen measured).

Carapace (Fig. 2 H). Subovate, slightly broader than long. Front broad (about 1/2 C.W.), separated into two wide lobes by a notch. Dorsal surface of carapace slightly convex, with minute granules not uniformly distributed and scarce hairs. Regions slightly defined by shallow grooves. Anterolateral border demarcated by 4 lobes or broad teeth, each minutely granulated, without hairs. Antenna folded obliquely. Orbital margin minutely granulated. Eye large, extending laterally to reach the maximum width of carapace.

Most of appendages (mouthparts) morphologically similar to those of megalopal stage, but now profusely setose on each endite. Carpus of third maxilliped (Fig. 2 I) joints the anterolateral angle of merus; ischium broad. Exopod 2-segmented, proxi-

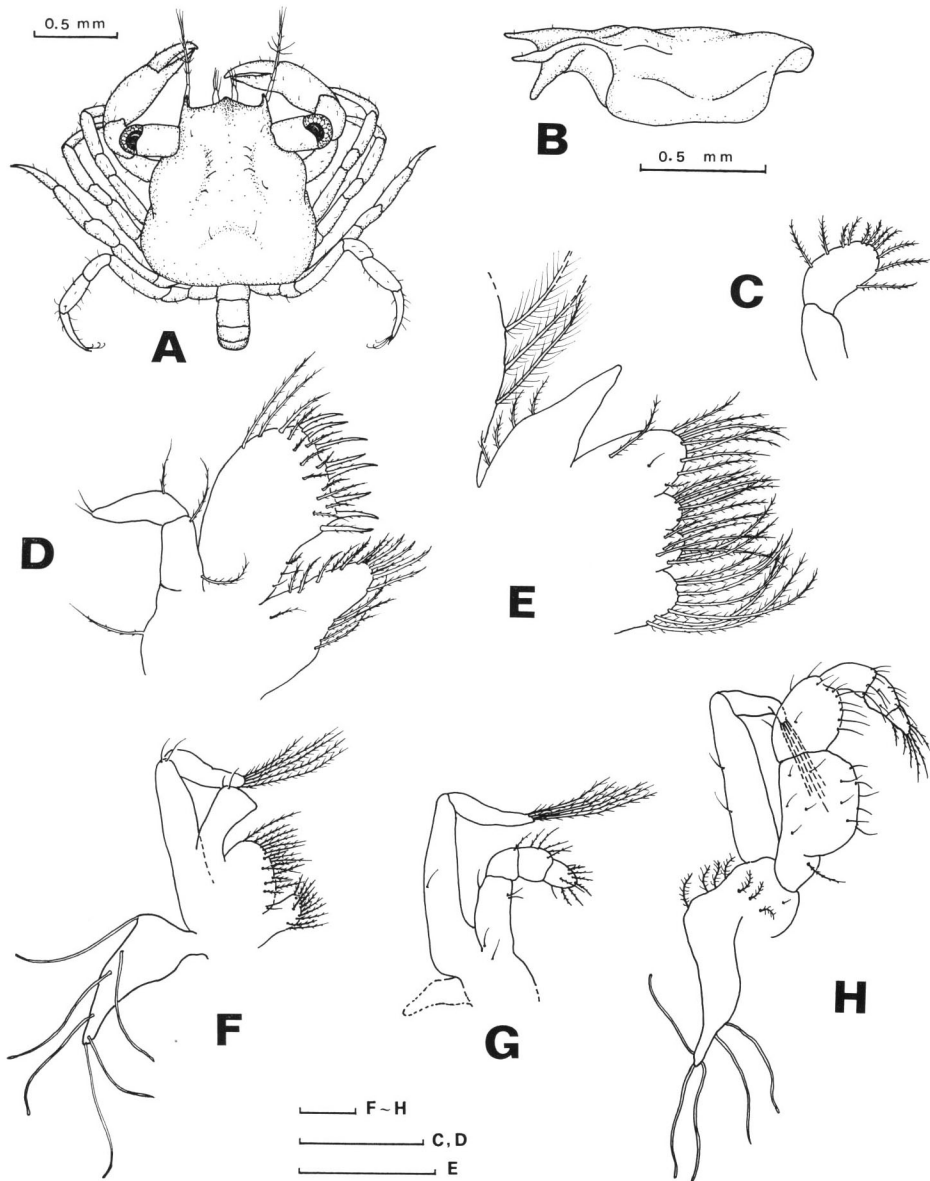


Fig. 1. *Xanthias elegans* (STIMPSON), megalopa. A, Complete specimen, dorsal view; B, carapace, lateral view; C, mandibular palp; D, maxillule; E, maxilla (scaphognathite partially drawn); F-H, first to third maxillipeds. Scale bars=0.1 mm, except for A and B.

mal segment with 5–6 setae; distal segment with 4 plumose setae.

Pereiopods. Chelipeds (Fig. 2 J) robust, heavy, granulated on surface, almost glabrous. Fingers robust, with 4–5 blunt teeth on inner borders. Pereiopods 2–5 (Fig. 2 K) similar in size and setation, each with acute dactylus; no granules on surface.

Abdomen (Fig. 2 L). Dorso-ventrally flattened, flexed beneath the thorax, third somite greatly expanded laterally. Pleopods (Fig. 2 M, N) rudimentary, uniramous. Telson almost twice broader than long, margin subcircular, with sparse setae on surface.

### Discussion

There is no doubt that the present megalopa larva from Tosa Bay belongs to the family Xanthidae *s. str.* The first crab obtained in the laboratory from the megalopa has a subquadrate carapace, with the two-lobed broad front separated from the supraorbital border, and with three marginal granulated lobes or broad teeth behind the first lobe confluent with the external orbital angle. Such formation of the carapace indicates the systematic position of this species in the subfamily Xanthinae. According to the key to the genera of the Xanthinae prepared by SERÈNE (1984), in which 13 genera are incorporated, this species based only on the first crab stage is referred to *Xanthias* RATHBUN or *Paraxanthias* ODHNER. According to SAKAI (1976) and some additional papers such as TAKEDA and MIYAKE (1968, 1969) and TAKEDA (1977), the genus *Xanthias* is represented in Japan by *X. canaliculatus* RATHBUN, 1906, *X. cherbonnieri* GUINOT, 1964, *X. gilbertensis* BALSS, 1938, *X. lamarckii* (H. MILNE EDWARDS), *X. latifrons* (DE MAN, 1888), *X. lividus* (LAMARCK, 1818) and *X. maculatus* SAKAI, 1961. The genus *Paraxanthias* is represented by *P. elegans* (STIMPSON, 1858), *P. notatus* (DANA, 1852) and *P. parvus* (BORRADAILE, 1900).

The general structure of the carapace, chelipeds and ambulatory legs of the present species is closest to that of *Paraxanthias elegans* among the species enumerated above. The narrow carapace and the seven-segmented abdomen are without doubt referred to the juvenile stage of the specimen. This species was referred to *Paraxanthias* by ODHNER (1925), SAKAI (1939, 1965, 1976) and GUINOT (1968, 1971), but to *Xanthias* by FOREST and GUINOT (1961), GUINOT (1964), GRIFFIN (1972) and SERÈNE (1984). In this paper the present authors follow the last author who considered the difference in the first male pleopod (with or without long hairs) as one of the generic features.

A detailed discussion on xanthid postlarvae including recent literature from Japan was given by QUINTANA (1986). According to the most recent study on the megalopa of xanthids (MARTIN, 1987), the only account of the genera *Xanthias* and *Paraxanthias* is that of KNUDSEN (1959) on *P. taylori* (STIMPSON). Unfortunately, however, several characters of the megalopal stage were not described by the author and therefore are not adequate for comparative purposes.

The present observations confirm that some characters, such as the anterolateral

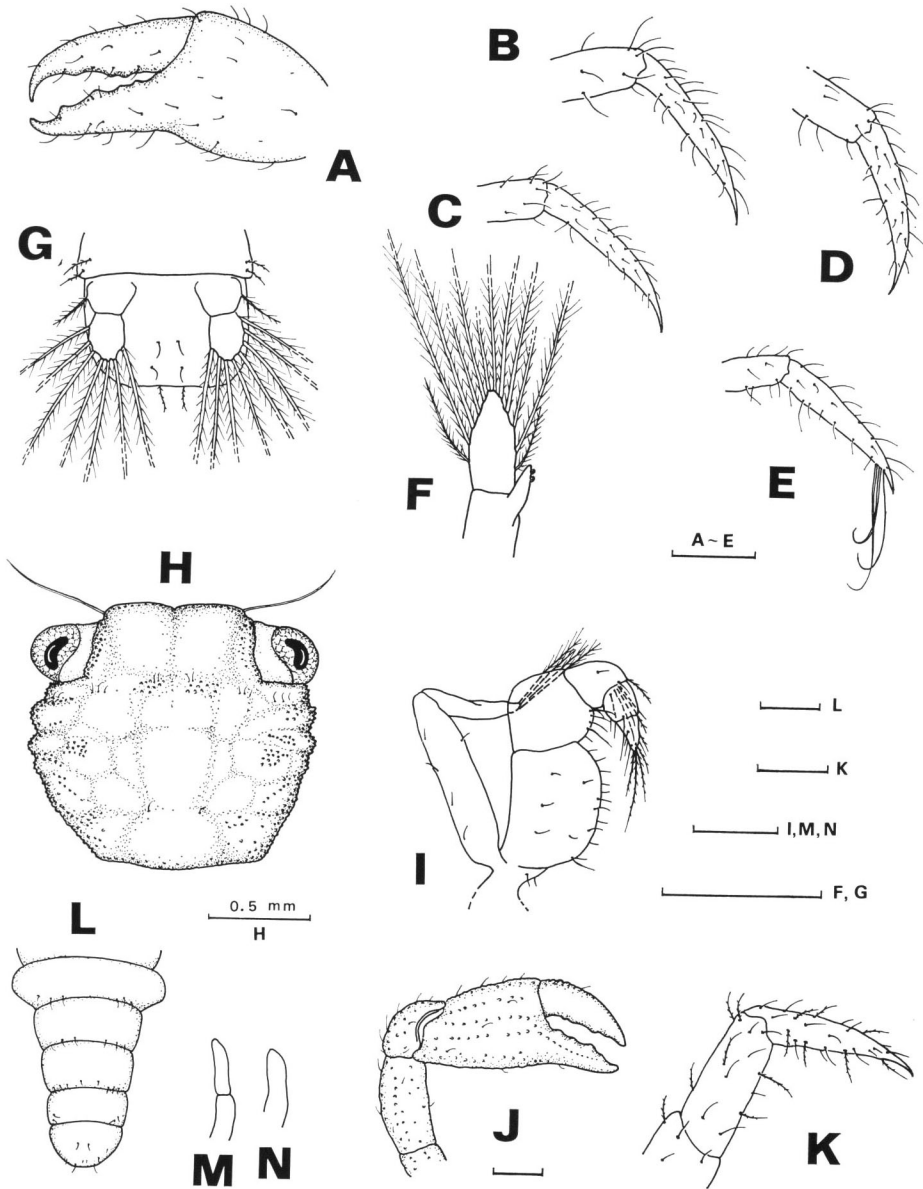


Fig. 2. *Xanthias elegans* (STIMPSON). Megalopa (A-G) and first crab (H-N). A, Left chela; B-E, pereopods 2-5 (propodus and dactylus); F, fourth (=last) pleopod; G, telson and uropods (ventral view); H, carapace of 1st crab, dorsal view; I, third maxilliped (epipod omitted); J, right cheliped; K, fifth pereopod (propodus and dactylus); L, abdomen, dorsal view; M, N, first and second pleopods respectively. Scale bars=0.2 mm, except for H.

projections of the carapace, setation of mandibular palp, maxillule and maxilla and presence of recurved spine(s) on the cheliped ischium are variable among xanthid species (see also SABA *et al.*, 1978; GORE *et al.*, 1981; MARTIN, 1984, 1987).

The presence of anterolateral horns on the carapace is not a generalized pattern in the xanthid megalopas. Within the genus *Paraxanthias* the megalopa stage of *P. taylori* exhibits a broad frontal region with rounded anterolateral margins (see KNUDSEN, 1959), in contrast with the well-developed horns in the present material (see Fig. 1 A, B). There is a group of species (*e.g.*, *Eurypanopeus depressus*, *Panopeus turgidus*, *Rhithropanopeus harrissi* and *Neopanope sayi*) (see MARTIN *et al.*, 1984) without anterolateral horns (see other examples in ANDRYSZAK and GORE, 1981).

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