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Description of the Zoea of *Chirostylus dolichopus* (Anomura, Galatheoidea, Chirostylidae)

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Abstract

Zoeal stage of *Chirostylus dolichopus* (Chirostylidae) was figured and described. Larvae hatched with nearly all appendages were well developed. The first zoea has a total number of about 47 carapace spines, and prominent three dorsal spines on the third to fifth abdominal somites. Within the family Chirostylidae, only three species of larvae hitherto known, each species has aberrant larval form and differed each other distinctly (Table 1).

Introduction

The family Chirostylidae occupies about 9 percent of all the Anomuran species in Japan, its value becomes more than 28 percent when including the Galatheid (MIYAKE, 1983; MURAOKA and KONISHI, 1989). But, until now there has been no larval information about the family Chirostylidae found in Japan.

The senior author found a walking female *Chirostylus dolichopus* ORTMANN [Japanese name: Mugiwara-ebi] carrying eye-bearing eggs on a sponge at 10 m depth, November 10, 1985, at Miyake-jima, one of the Izu Islands situated south of the Izu Peninsula. This specimen was brought to our laboratory for rearing, but died after releasing incompletely hatched larvae.

This paper is the first to describe the larva of the genus *Chirostylus*, though based on incomplete specimens, but provides important information for larval affinities in the Chirostylidae.

Material examined

An ovigerous female released 12 larvae, but unfortunately they all died during the following two days. Released larvae still encased in a prezoeal membrane, and fell to the bottom of a 50 ml rearing plastic bottle. The larvae often slowly flexed and extended their abdomens. However, since they hatched with a soft flaccid and mucous surface, their bodies adhered to the bottom of the plastic bottle, thus preventing molting. Removal of this membrane with a dissecting needle enabled two specimens to attain the first zoea, though incomplete conditions.

The drawings and descriptions are based on observations of 10 larvae completely dissected. Two larval specimens are deposited in the National Science Museum, Natural History, Tokyo.

Description

Total length: 4.7 mm, tip of rostrum to posterior extremity of telson margin.

Carapace length: 1.6 mm, Rostral length equal

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frontal spine (Fig. 1 a).

Color: Transparent, yellowish chromatophores present at the base of the maxillipeds and spines.

Carapace: Divided three parts, triangular frontogastric region and two broad rounded lobes posterolaterally (Fig. 1 b). Triangular frontgastric region with about 7 spines, lobes each with about 20 spines. All carapace spines spinulose. Eyes sessile.

Antennule: Peduncle indistinctly segmented. Outer ramus 2-segmented with 2, 3 + 5(6); inner ramus an unarmed segment (Fig. 1c).

Antenna: Endopod arising from distal point of the peduncle, incompletely divided 4 unarmed segments. Exopod spinules without setae (Fig. 1 d).

Mandible: With conspicuous molar process, a large unsegmented palp with corneous teeth (Fig. 1e).

Maxillule: With 4 conical processes each on the coxal and basal endites, endopod unsegmented(Fig. 1f).

Maxilla: Scaphognathite with 17 to 19 plumose marginal setae, except at the truncated end of the posterior lobe. The coxal and basal endites bilobate, no setae, endopod lobe well developed without setae (Fig. 1g).

Maxilliped 1: Coxa naked, basis with 1 corneous spine at the anterior region. Endopod indistinctly 4-segmented, arising from midway along the basis. Exopod 2-segmented with 4 plumose setae (Fig. 1h).

Maxilliped 2: Coxa and basis naked. Endopod indistinctly 3-segmented, as long as basis without spine, arising from distal point of basis. Exopod 2-segmented with 4 plumose setae (Fig. 1i).

Maxilliped 3: Endopod indistinctly 4-segmented without setae. Exopod incompletely 2-segmented with 4 terminal setae (Fig. 1 j).

Pereopods: Indistinctly segmented, 1 st to 4th pereopod buds essentially the same length, with terminal spines, 1 st pereopod chelate. Fifth pereopod shorter than others and unarmed (Fig. 2a-e). Gill buds present but not differentiated into lamellae (Fig. 2f).

Abdomen: 6 somites and telson. Somite 2 with a long and spinulose spine posterodorsally, somite 3 to 5 with 3 spinulose spines posterodorsally, no lateral spines (Fig. 2g). Pairs of biramous pleopod buds on somite 2 to 5, exopod much longer than endopod with 5 to 6 marginal setae (Fig. 2h). A pair of biramous uropods without setae on somite 6 (Fig. 2i).

Telson: Forked with 10 setae on each side, 1 st seta arising somewhat anteriorly to lateral margin, 2nd and 3rd setae from lateral region, 4th seta stout, arising from a posterolateral angle, 5th to 10th setae arising from margin of telson fork interior. All setae spinulose (Fig. 2j).

Remarks

Untill now, only two species of zoea of the family Chirostylidae have been reported from New Zealand waters: *Gastroptychus novaezelandiae* and *Uroptychus tomentosus* (PIKE and WEAR, 1969). This paper adds a third species of zoea of Chirostylidae. The three species of zoea have distinguishing characteristics from each other, and they have no resemblance in the carapace from and its spine arrangement, abdominal spine arrangement, or telson form (Table 1).

Larva of *Chirostylus dolichopus* resemble to some extent those of the aberrant zoeae *Dorhynchus thomsoni* (Majidae) and *Cymnomus bathamae* (Cymnomidae) with respect to carapace and abdominal spine arrangements (WILLIAMSON, 1960; 1982a, WEAR and BATHAM, 1975). WILLIAMSON (1982a; 1982b) commented on the zoea of *G. novaezelandiae* in regard to carapace spine arrangement and broad telson without anomuran hair, pointing out the remarkable resemblance to early zoea of Homolidae, and those of *U. tomentosus* with respect to carapace spines, noting the occurrence of a similar pattern in the late zoeal stages of Homolidae.

Though more developed larvae are needed to be certain, aberrant zoea of *Chirostylus dolichopus* put a question as to the systematic position of

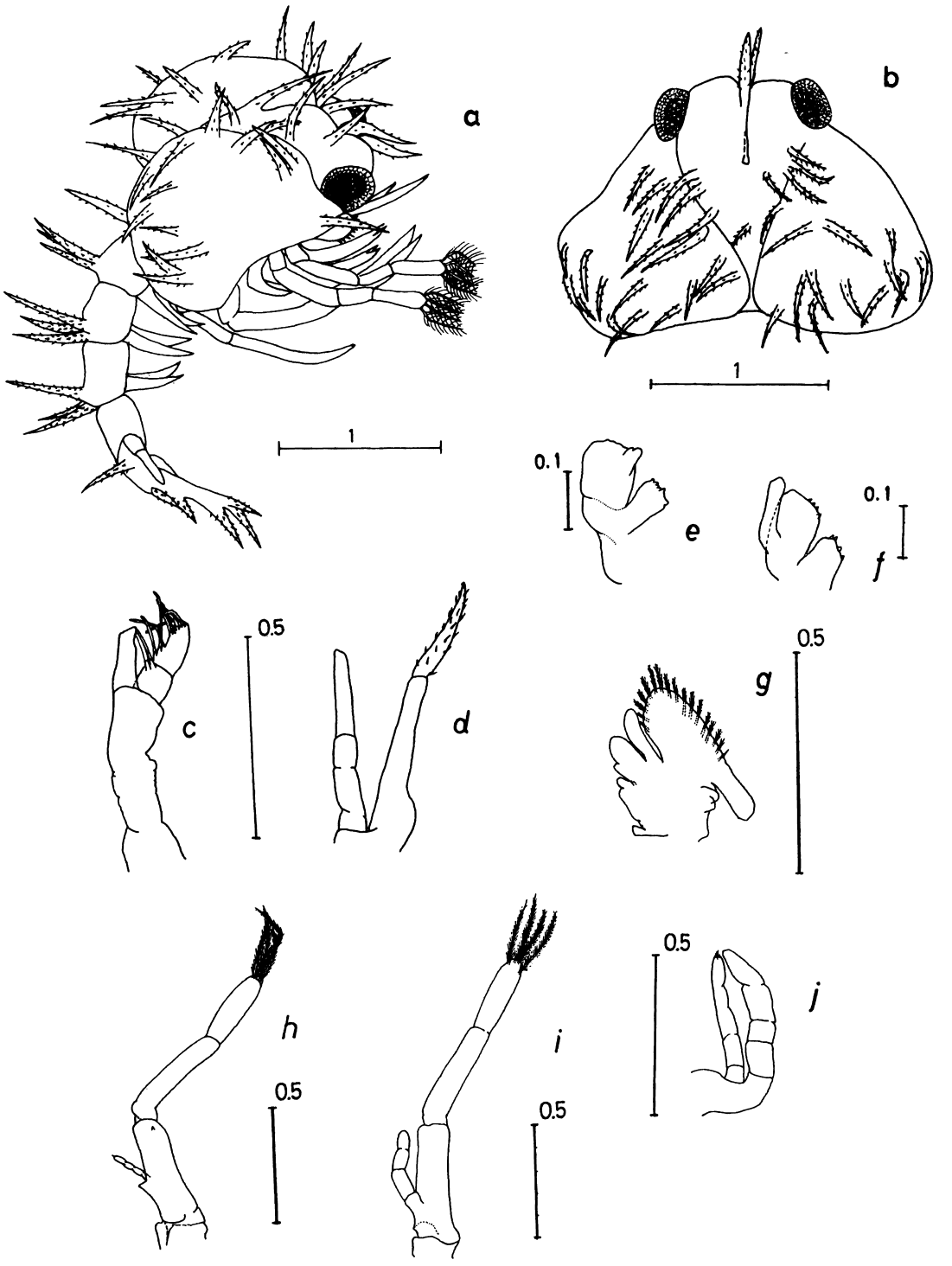

Fig. 1. *Chirostylus dolichopus* : a, 1st zoea, lateral view; b, carapace, dorsal view; c, antennule; d, antenna; e, mandible; f, maxillule; g, maxilla; h, 1st maxilliped; i, 2nd maxilliped; j, 3rd maxilliped. Scales in mm.

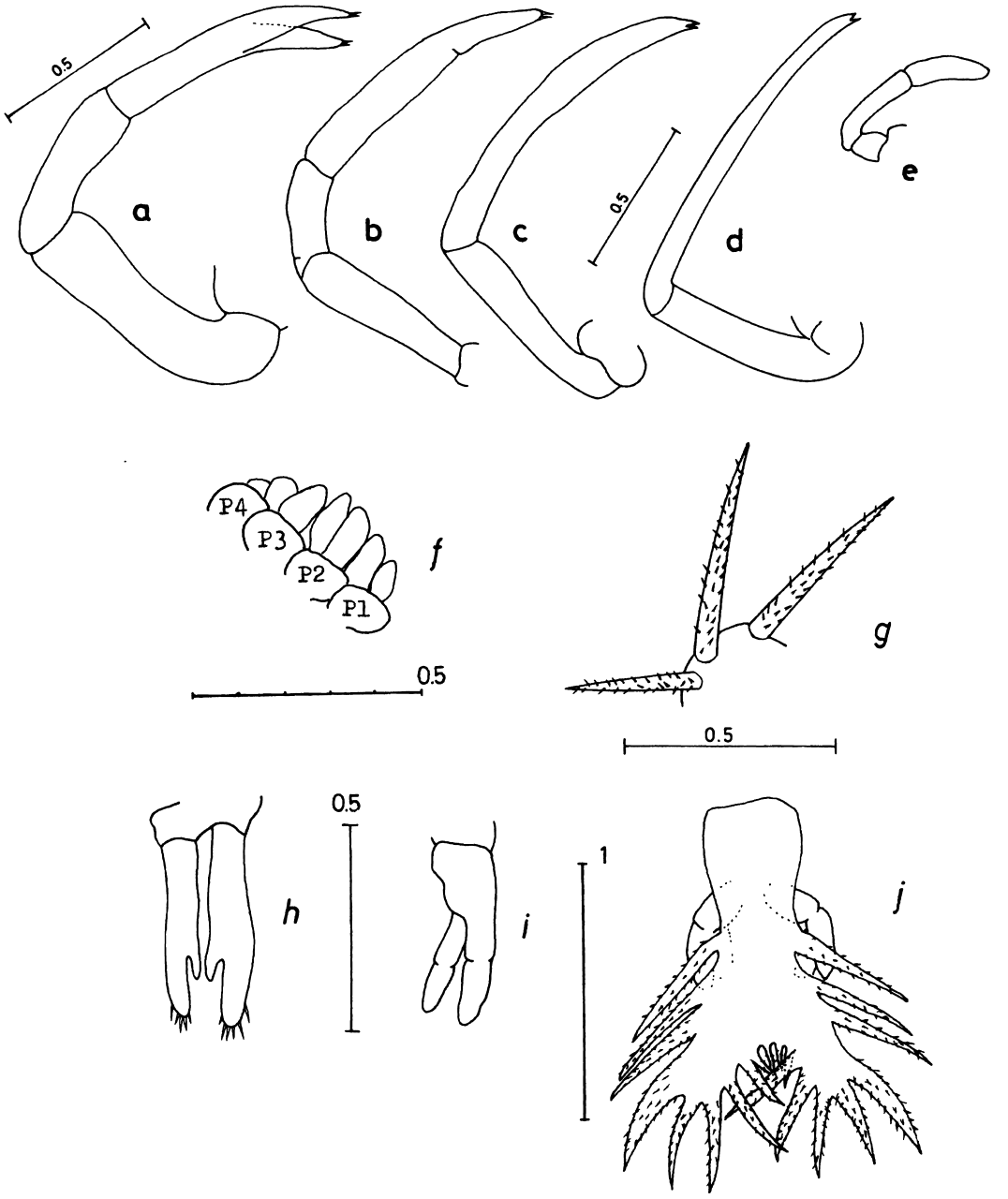

Fig. 2. *Chirostylus dolichopus* first zoea: a, 1st pereopod; b, second pereopod; c, 3rd pereopod; d, 4th pereopod; e, 5th pereopod; f, gill buds, P1-P4: 1st to 4th pereopods; g, dorsal spines of 5th abdominal somite; h, pleopods of 5th abdominal somite; i, uropod of 6th abdominal somite; j, telson. Scales in mm.

Table 1. Comparison of zoeal charaders in the three species of chirosty lidae

Characters	*Gastroptychus** *novaezelandiae*	*Uroptychus** *tomentosus*	*Chirostylus dolichopus*
Eyes	Stalked	Stalked	Sessile
Carapace :			
rostrum	Shorter than carapace	Almost as long as carapace	Shorter than carapace
no. of spines	1 (frontal) and 【18-20】** (lateral)	3 (frontal), 3 (median) and 6 (posterior)	47± 3
Antennule :			
aesthetascs	【9】**	【10】**	10-11
Antenna :			
exopod setae	6	8	Absent
Mandible :			
palp	?	Present	Present
Maxillule :			
coxal endite	?	?	4 processes
basal endite	?	?	4 processes
endopod	?	?	Unsegmented
Maxilla :			
coxal endite	?	?	Processen or setae absent
basal endite	?	?	Processen or setae absent
endopod	?	?	Processen or setae absent
scaphognathite	?	?	17-19 setae
Mxp. 1 :			
exopod	4 setae	8 setae	4 setae
Mxp. 2 :			
exopod	4 setae	8 setae	4 setae
Mxp. 3 :			
exopod	Absent	6 setae	4 setae
Abdomen :			
dorsal spines	Absent	Absent	Present
lateral spines	Present	Present	Absent
pleopod setae	Absent	Absent	5 - 6
uropod setae	【12】**exopod	【10】**exopod	Absent
Telson :			
setae	28+28	10+10	10+10

* PIKE and WEAR (1969)

** Data in 【 】 interporated from illustrations of PIKE and WEAR (1969).

? No specific description given.

Chirostylidae on the basis of larval characters.

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ムギワラエビ *Chirostylus dolichopus* のゾエアの記載

小川数也・松崎加奈恵

1985年11月，三宅島大久保浜において採集したワラエビ科ムギワラエビ *Chirostylus dolichopus* の雌1個体が放出した未完熟のゾエアを解剖・検鏡し記載すると共に，既に報告されているニュージーランド産のワラエビ科 *Gastroptychus, Uroptychus* のゾエアとの比較を行った．本幼生は頭胸甲に約47本の棘を備え，既知種とはその形態が全く異なり，極めて特異的である。本幼生と既知2種の幼生とはそれぞれ著しい相異がみられた（Table 1）．

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