

## Complete Larval Development of *Uca arcuata*(Crustacea, Brachyura, Ocypodidae) Reared in the Laboratory

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농게(갑각강, 게아목, 달랑게과)의 유생발생

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### 적 요

농게 (*Uca arcuata*) (달랑게과, 달랑게아과)의 유생을 부화에서부터 첫번째 계기까지 수온 25°C, 염분농도 33.3‰의 해수에서 사육하고, 각 유생기의 형태적인 특징을 기술 및 도시하였다.

이 종은 5기의 zoea와 1기의 megalopa 유생을 거쳐 첫번째 계기로 변태하였다. 제1 zoea 유생기는 제1소악의 내지에 4개의 말단강모와 제2악각의 기절과 내지에 각각 3개의 수상강모와 0, 0, 5 강모식을 가지고 축각은 B형이었다. 이러한 특징들은 이미 보고된 같은 과의 유생들의 특징들과 잘 일치하고 있다.

Key words: Brachyura, *Uca arcuata*, larval development, Korea.

## INTRODUCTION

*Uca arcuata*(De Haan, 1835) commonly inhabits the mud-flats of inland seas. This species ranges to northern China and the Yellow Sea side of Korea (Kim, 1973) and its larval stages are unknown. Larval descriptions of 30 species are available within the family Ocypodidae: 13 species in the subfamily Ocypodinae, seven species in the subfamily Scopimerinae, and ten species in the subfamily Macrophthalminae. However, many of these descriptions are of first zoeal stages only (e.g. Hyman, 1920; Aikawa, 1929; Crane, 1940; Ramadan, 1940; Rajabai, 1951, 1959; Chhapger, 1956; Wear, 1968; Hashmi, 1968; Feest, 1969; Rice,

1975, 1976; Kim & Lee, 1982; Fielder & Greenwood, 1985b). On the other hand, the complete larval development is known for *Ocypode quadrata* by Diaz and Costlow (1972), *O. stimpsoni*, *Uca lactea lactea* and *Macrophthalmus dilatatus* by Terada (1979), *U. pugilator* by Hyman (1920), *Scorpimera globosa* and *Ilyoplax pusillus* by Terada (1976), *Dotilla sulcata* by Gohar and Al-kholy (1957), and *S. inflata* by Fielder and Greenwood (1985a).

Although the larval stages of many species have been described in the Ocypodidae, there is still a need for detailed re-descriptions in order to make comparisons among the larvae of their species.

The purpose of this paper, therefore, is to provide such details of larval stages of *Uca arcuata* and to discuss the morphological characteristics in comparison to those of the other species larvae within the family Ocypodidae.

## MATERIALS AND METHODS

In June, 1987, crabs of *Uca arcuata* were collected at the mud-flat of the estuary, Chindo, Chöllanam-do, Korea. In the laboratory, they were placed in a sand bottom aquarium (97cm in length x 48 cm in width x 20cm in depth) at a salinity 33.3‰ and a temperature of 25°C in order to obtain larvae. The female crabs of *Uca arcuata* had eggs in late June. As the larvae hatched, some of them were fixed immediately. Larvae showing the greatest activity were separated into 5 groups of 10 larvae per glass bowl, fed on *Brachionus plicatilis* and recently hatched *Artemia* nauplii, and maintained in the culture cabinet at the same conditions of temperature and salinity described above. The larvae were moved into new bowls with freshly filtered sea water and were fed daily.

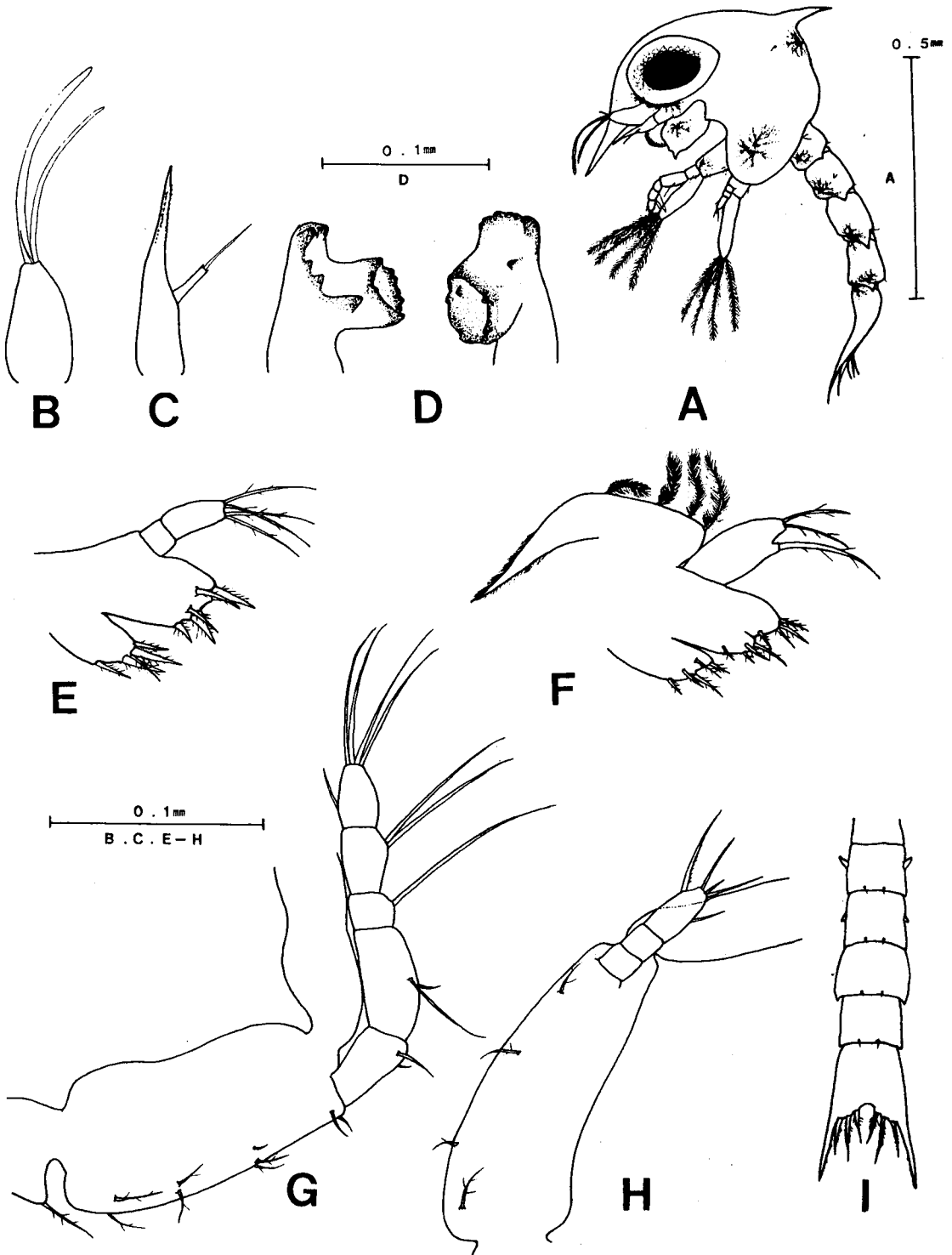
Specimens and exuviae of each developmental stage were preserved in 10% neutral formalin to check setation of appendages and were dissected in 70% alcohol-30% glycerine solution. Drawings were made with the help of a camera lucida and measurements were based on the mean of ten specimens in each zoeal stage. The carapace length of the zoeal stage was measured from the base of the zoeal rostrum between the eyes to posterior margin of the carapace. Details of the appendages were checked with a compound microscope at 400X. The decapod larval terminology used throughout this paper closely follows the nomenclature named by Goy et al. (1981). The chromatophore patterns were determined from the observation of living larvae. All the larval characteristics of *Uca arcuata* were described in this paper and parental female crabs were deposited in the Department of Biology, College of Natural Sciences, Pusan National University. Parental female crab was identified by Dr. Hoon Soo Kim, Department of Zoology, College of Natural Sciences, Seoul National University.

## RESULTS

During the present study, five zoeal stages and one megalopa stage were found and completion of the five zoeal stages required 18 days in *Uca arcuata*. No pre-zoeae were observed. The main characteristics of each larval stage in this species are as follows:

### First Zoea (Fig. 1)

Size. Carapace length 0.35-0.40mm (mean 0.36mm). Tip of dorsal carapace spine to tip of rostral carapace



**Fig. 1.** *Uca arcuata*, first zoeal stage: A, lateral view; B, antennule; C, antenna; D, mandibles; E, maxillule; F, maxilla; G, protopodite and endopodite of first maxilliped; H, protopodite and endopodite of second maxilliped; I, dorsal view of abdomen.

spine 0.51-0.56mm (mean 0.53mm).

Carapace (Fig. 1A). With short rostral and dorsal carapace spines, no lateral carapace spines. Postero-ventro-lateral carapace border naked, cardiac region with a pair of minute simple setae. Eyes sessile.

Antennule (Fig. 1B). With two aesthetascs unequal in length and a small simple seta.

Antenna (Fig. 1C). Spinous process shorter than rostral carapace spine, two rows of spinules on the process increasing in size towards tip. Exopodite with a terminal simple seta, slightly shorter than spinous process. No endopodite.

Mandibles (Fig. 1D). Asymmetrical. Molar process irregularly dentate: join margin of right molar process and incisor process with three teeth, join margin of left molar process and incisor process with a tooth.

Maxillule (Fig. 1E). Endopodite two-segmented: distal segment with four terminal plumodenticulate setae in all zoeal stages, proximal segment naked. Basal and coxal endites both with five plumodenticulate setae.

Maxilla (Fig. 1F). Endopodite two-lobed: upper lobe with two short plumodenticulate setae, lower with a thick and long plumodenticulate seta in all zoeal stages. Basal and coxal endites two-lobed each endite with eight and five plumodenticulate setae, respectively. Scaphognathite bearing four marginal plumose setae and a terminal plumose process.

First maxilliped (Figs. 1A, G). Coxopodite with a plumodenticulate seta. Basipodite with nine plumodenticulate setae, progressing distally 2,2,3 and 2. Endopodite five-segmented with 2,2,1,2 and 4 + 1 plumodenticulate setae, progressing distally. Exopodite with four plumose natatory setae.

Second maxilliped (Figs. 1A, H). Coxopodite unarmed and basipodite with four plumodenticulate setae in all zoeal stages. Endopodite three-segmented with 0,0 and 5 plumodenticulate setae progressing distally in all zoeal stages. Exopodite with four plumose natatory setae.

Abdomen (Figs. 1A, I). Composed of five somites: somites two and three with small lateral knobs, lateral knobs of somite three smaller. Somite four widening. Postero-dorsal border of somites two to five with a pair of small simple setae.

Telson (Figs. 1A, I). Widening, forks unarmed except for two rows of minute spinules basally. Inner margin with three pairs of denticulate setae.

Chromatophores (Fig. 1A) show the pattern of mixed dominant brown series; dark brown near to black or mild brown and yellow or red spots. The majority of dark brown series occur on the base of antennule, antenna, labrum and mandible, ventral to eyes, marginal expansion of carapace, and along abdominal somites and telson. Yellow chromatophores present on marginal expansion of carapace, each abdominal somite and telson. This pattern is unchanged throughout all zoeal stages.

### Second Zoea (Fig. 2)

Size. Carapace length 0.41-0.46mm (mean 0.43mm). Tip of dorsal carapace spine to tip of rostral carapace spine 0.66-0.72mm (mean 0.69mm).

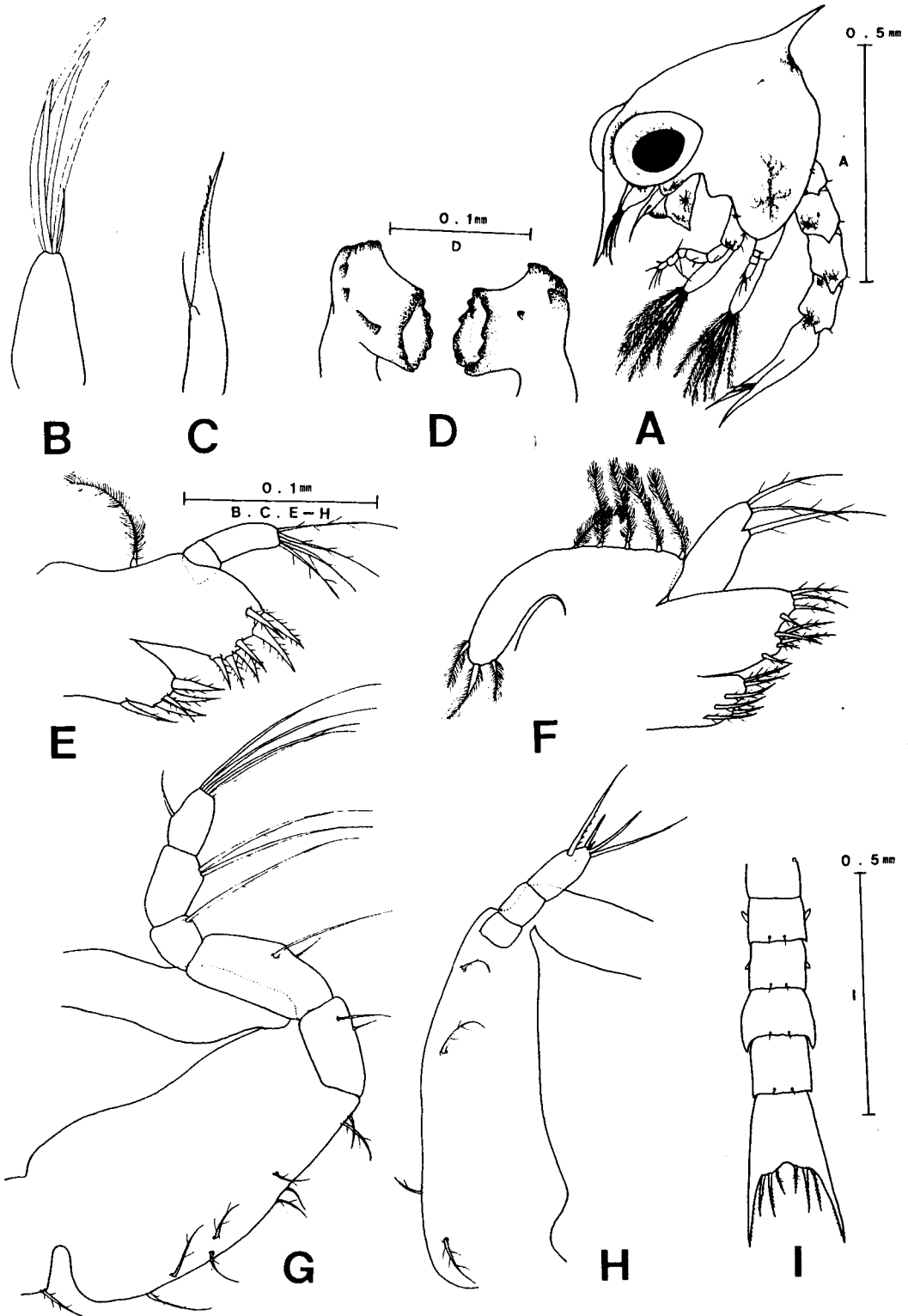
Carapace (Fig. 2A). Similar to that of the first zoeae, with a plumose seta on postero-ventro-lateral carapace border. Eyes stalked.

Antennule (Fig. 2B). With four aesthetascs and a simple seta.

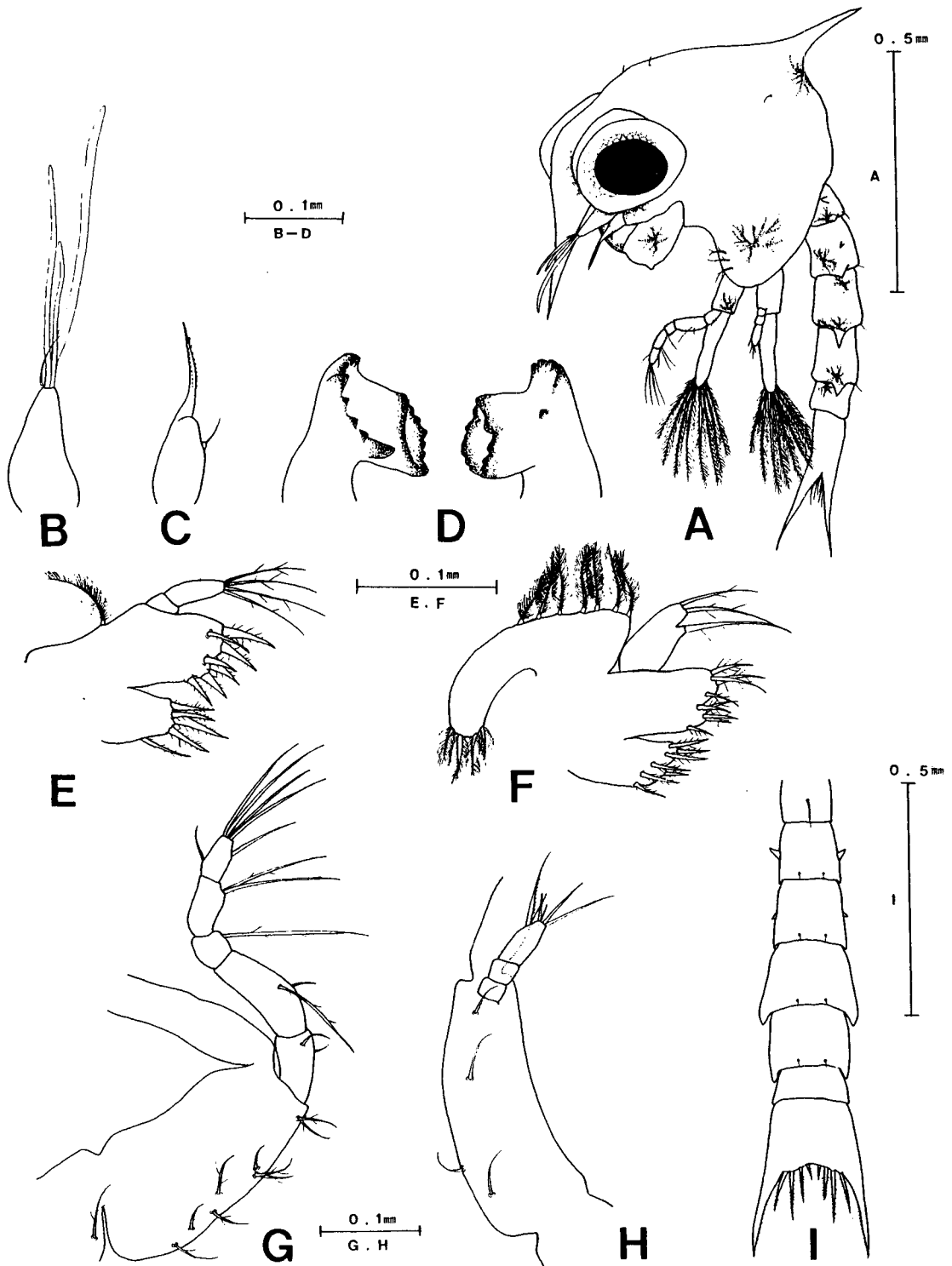
Antenna (Fig. 2C). Exopodite about 1/3 length of spinous process.

Mandibles (Fig. 2D). Unchanged.

Maxillule (Fig. 2E). Basal and coxal endites each with seven and five plumodenticulate setae, respective-



**Fig. 2.** *Uca arcuata*, second zoeal stage: A, lateral view; B, antennule; C, antenna; D, mandibles; E, maxillule; F, maxilla; G, protopodite and endopodite of first maxilliped; H, protopodite and endopodite of second maxilliped; I, dorsal view of abdomen.



**Fig. 3.** *Uca arcuata*, third zoeal stage: A, lateral view; B, antennule; C, antenna; D, mandibles; E, maxillule; F, maxilla; G, protopodite and endopodite of first maxilliped; H, protopodite and endopodite of second maxilliped; I, dorsal view of abdomen.

ly. Disto-lateral margin with a plumose seta.

Maxilla (Fig. 2F). Basal and coxal endites each with nine and six plumodenticulate setae, respectively. Scaphognathite bearing five marginal and three terminal plumose setae.

First and second maxillipeds (Figs. 2A, G, H). Unchanged, but exopodites now with six plumose natatory setae.

Abdomen and telson (Figs. 2A, I). As in the first stage.

### Third Zoea (Fig. 3)

Size. Carapace length 0.52-0.58mm (mean 0.56mm). Tip of dorsal carapace spine to tip of rostral carapace spine 0.80-0.94mm (mean 0.90mm).

Carapace (Fig. 3A). A pair of minute simple setae above eyes. Three plumose setae on postero-ventro-lateral carapace border.

Antennule (Fig. 3B). With three aesthetascs and a simple seta.

Antenna (Fig. 3C). Endopodite now present as small protuberance.

Mandibles (Fig. 3D). Right molar process with three small and a larger teeth which join margin of incisor process.

Maxillule (Fig. 3E). Unchanged.

Maxilla (Fig. 3F). Basal and coxal endites each with nine and seven plumodenticulate respectively. Scaphognathite bearing seven marginal and four terminal plumose setae.

First maxilliped (Figs. 3A, G). Endopodite setation now with 2,2,1,2 and 4 + 1 + 1, progressing distally. Exopodite with eight plumose natatory setae.

Second maxilliped (Fig. 3A). Exopodite with eight plumose natatory setae.

Abdomen and telson (Figs. 3A, I). Abdomen composed of six somites; somite one with a dorsal seta, somite four wider than that of previous stage. Telson bearing four pairs of denticulate setae on inner margin.

### Fourth Zoea (Fig. 4)

Size. Carapace length 0.60-0.68mm (mean 0.65mm). Tip of dorsal carapace spine to tip of rostral carapace spine 1.04-1.14mm (mean 1.08mm).

Carapace (Fig. 4A). With six plumose setae on postero-ventro-lateral carapace border. Buds of thoracic appendages visible through carapace.

Antennule (Fig. 4B). With three terminal, a subterminal aesthetascs and a simple seta.

Antenna (Fig. 4C). Endopodite much larger, about half length of spinous process. Exopodite unchanged.

Mandibles (Fig. 4D). Similar in form to the previous stage.

Maxillule (Fig. 4E). Basal and coxal endites each with ten and five plumodenticulate setae, respectively.

Maxilla (Fig. 4F). Basal and coxal endites each with ten and eight plumodenticulate setae, respectively. Scaphognathite bearing nine marginal and five terminal plumose setae.

First maxilliped (Figs. 4A, G). Endopodite setation now with 2,3,1,2 and 4 + 1 + 1, progressing distally. Exopodite with nine plumose natatory setae. Setae on coxopodite and basipodite unchanged.

Second maxilliped (Fig. 4A). Exopodite with ten plumose natatory setae.

Abdomen and telson (Figs. 4A, I). Pleopod buds on somites two to six. Acute postero-lateral spines on somite four more pronounced than those of previous stage. Telson unchanged.

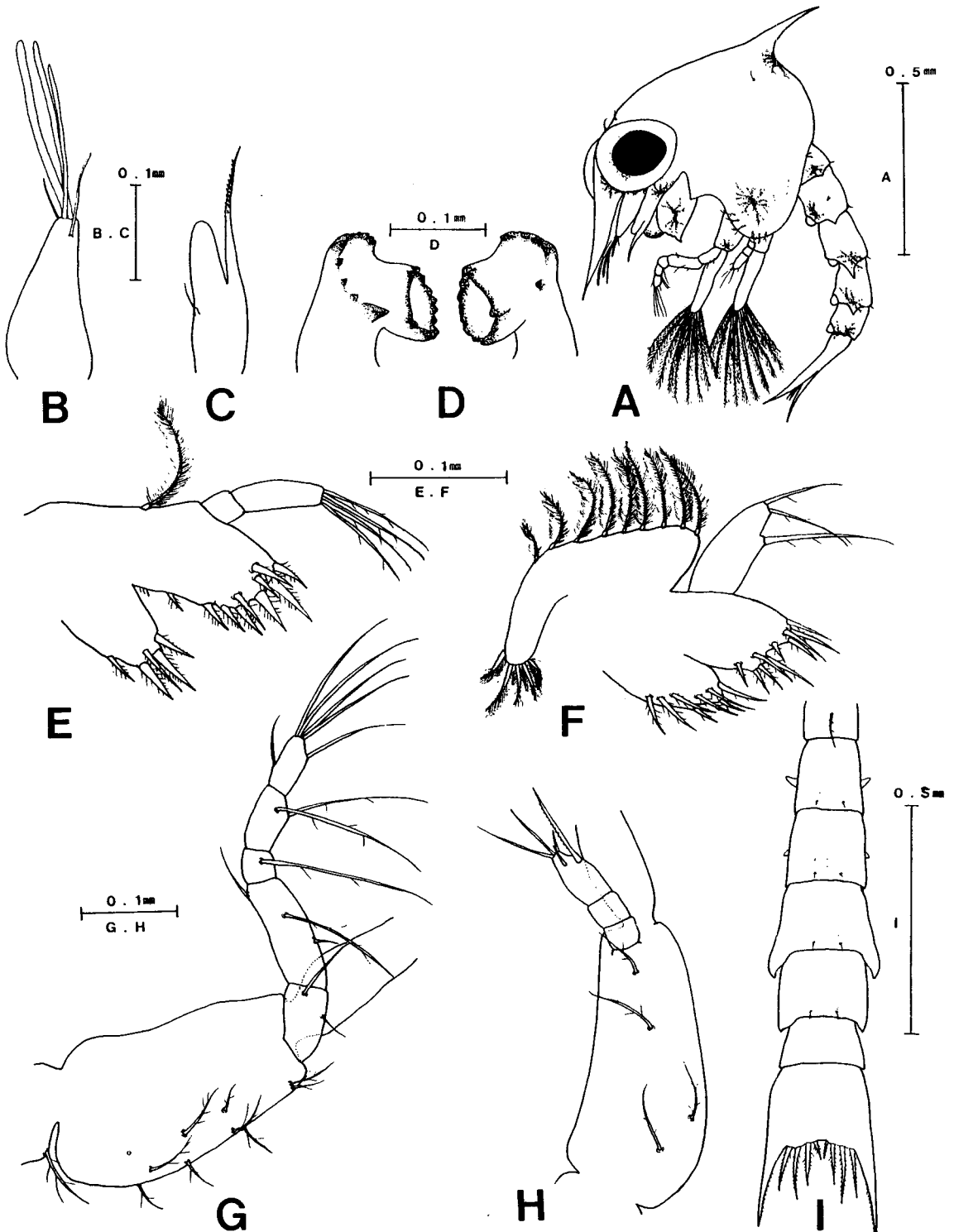


Fig. 4. *Uca arcuata*, fourth zoeal stage: A, lateral view; B, antennule; C, antenna; D, mandibles; E, maxillule; F, maxilla; G, protopodite and endopodite of first maxilliped; H, protopodite and endopodite of second maxilliped; I, dorsal view of abdomen.



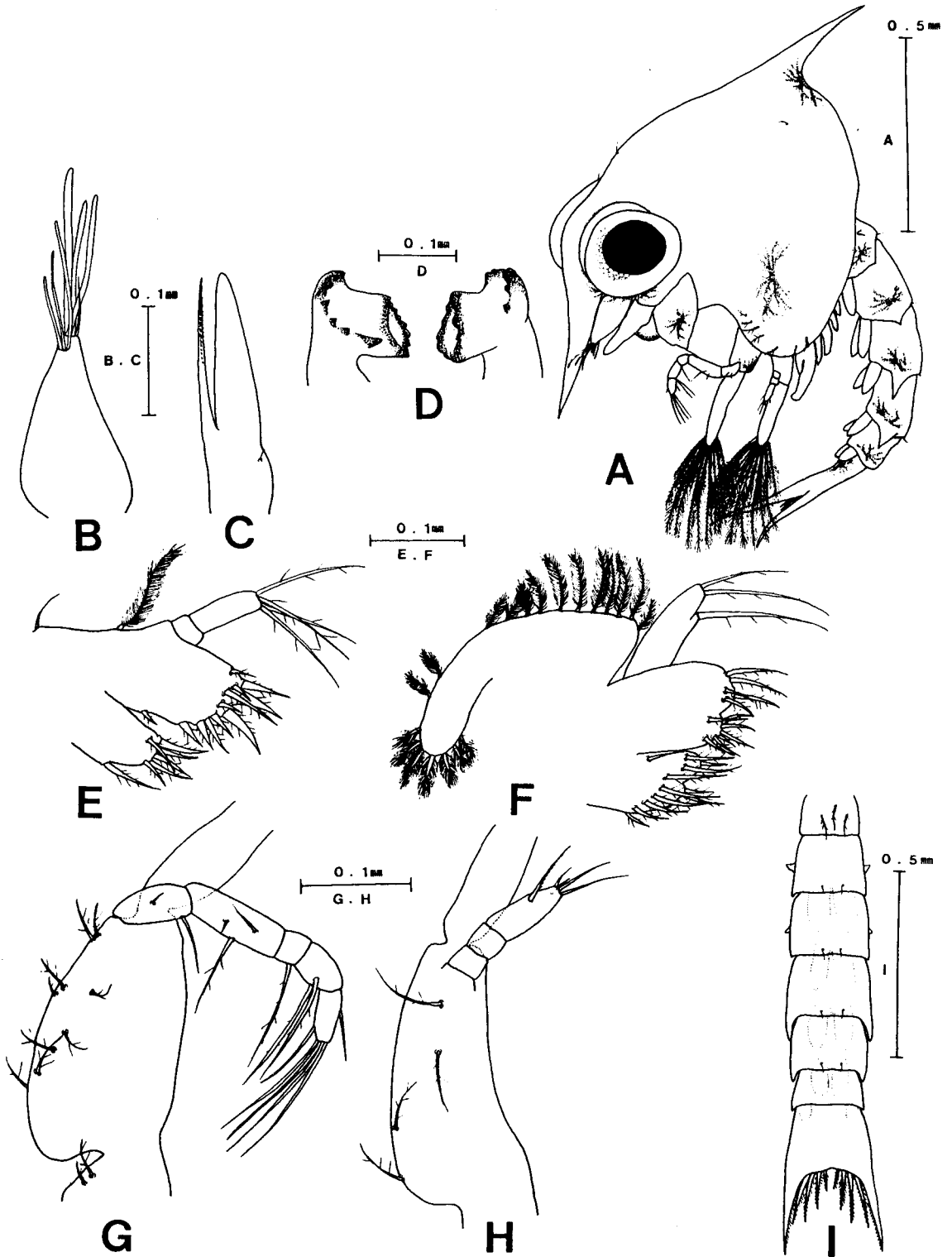


Fig. 5. *Uca arcuata*, fifth zoeal stage: A, lateral view; B, antennule; C, antenna; D, mandibles; E, maxillule; F, maxilla; G, protopodite and endopodite of first maxilliped; H, protopodite and endopodite of second maxilliped; I, dorsal view of abdomen.

### Fifth Zoea (Fig. 5)

Size. Carapace length 0.80-0.88mm(mean 0.83mm). Tip of dorsal spine to tip of rostral carapace spine 1.32-1.44mm(mean 1.36mm).

Carapace (Fig. 5A). With seven plumose setae on postero-ventro-lateral carapace border. Thoracic appendages enlarged and chela prominent.

Antennule (Fig. 5B). With three terminal, three subterminal aesthetascs and a small simple seta.

Antenna (Fig. 5C). Endopodite longer than that of previous stage, about equal length of spinous process. Exopodite unchanged.

Mandibles (Fig. 5D). Similar in form to previous stage, join margin of left molar process and incisor process with two small acute teeth.

Maxillule (Fig. 5E). Basal and coxal endites each with 12 and seven plumodenticulate setae, respectively. A seta now present on proximo-lateral margin.

Maxilla (Fig. 5F). Basal and coxal endites both with 12 plumodenticulate setae. Scaphognthite bearing 20 plumose setae.

First maxilliped (Figs. 5A, G). Coxopodite with two plumodenticulate setae. Exopodite with ten plumose natatory setae.

Second maxilliped (Figs. 5A, H). Exopodite with ten plumose natatory setae. Setae on coxopodite and basipodite unchanged.

Abdomen and telson (Figs. 5A, I). Abdominal somite one with three dorsal setae. Pleopod on somites two to five, each with well developed exopodite and rudimentary endopodite. Somite six with uniramous pleopod. Telson unchanged.

### Megalopa (Figs. 6,7)

Size. Carapace length 0.80-1.10mm(mean 0.94mm). Carapace width 0.64-0.78mm(mean 0.68mm).

Carapace (Fig. 6A). Longer than abdomen, in dorsal view about 1.5 times longer than width, subquadrate with frontal region rectangular. Rostrum small, acute and bending obliquely. With two anterior-gastric-lateral carapace tubercles, two posterior-gastric-lateral carapace tubercles, and a posterior-median tubercles.

Abdomen (Fig. 6A). Composed of six somites plus telson. Somites three and four with acute postero-lateral spines.

Antennule (Fig. 6B). Peduncle three-segmented: basal segment with two plumodenticulate setae, second with three short simple setae, third with three distal setae. Upper ramous three-segmented: first segment unarmed, second with five aesthetascs plus a simple seta, third with four aesthetascs plus two simple setae.

Antenna (Fig. 6C). Composed of 11 segments with setation proceeding distally 1,1,1,0,0,3,0,4,1,1 and 2.

Mandible (Fig. 6D). Consisting of sharp cutting edge which projects to ventral side. Palp incompletely three-segmented with three setae on distal segment.

Maxillule (Fig. 6E). Endopodite bearing a terminal, two lateral setae. Basal and coxal endites each with 19 and 17 setae, respectively.

Maxilla (Fig. 6F). Endopodite unsegmented. Basal endite two-lobed, proximal lobe with six and distal lobe with eight setae, respectively. Coxal endite two-lobed, proximal lobe with 14 and distal lobe with seven

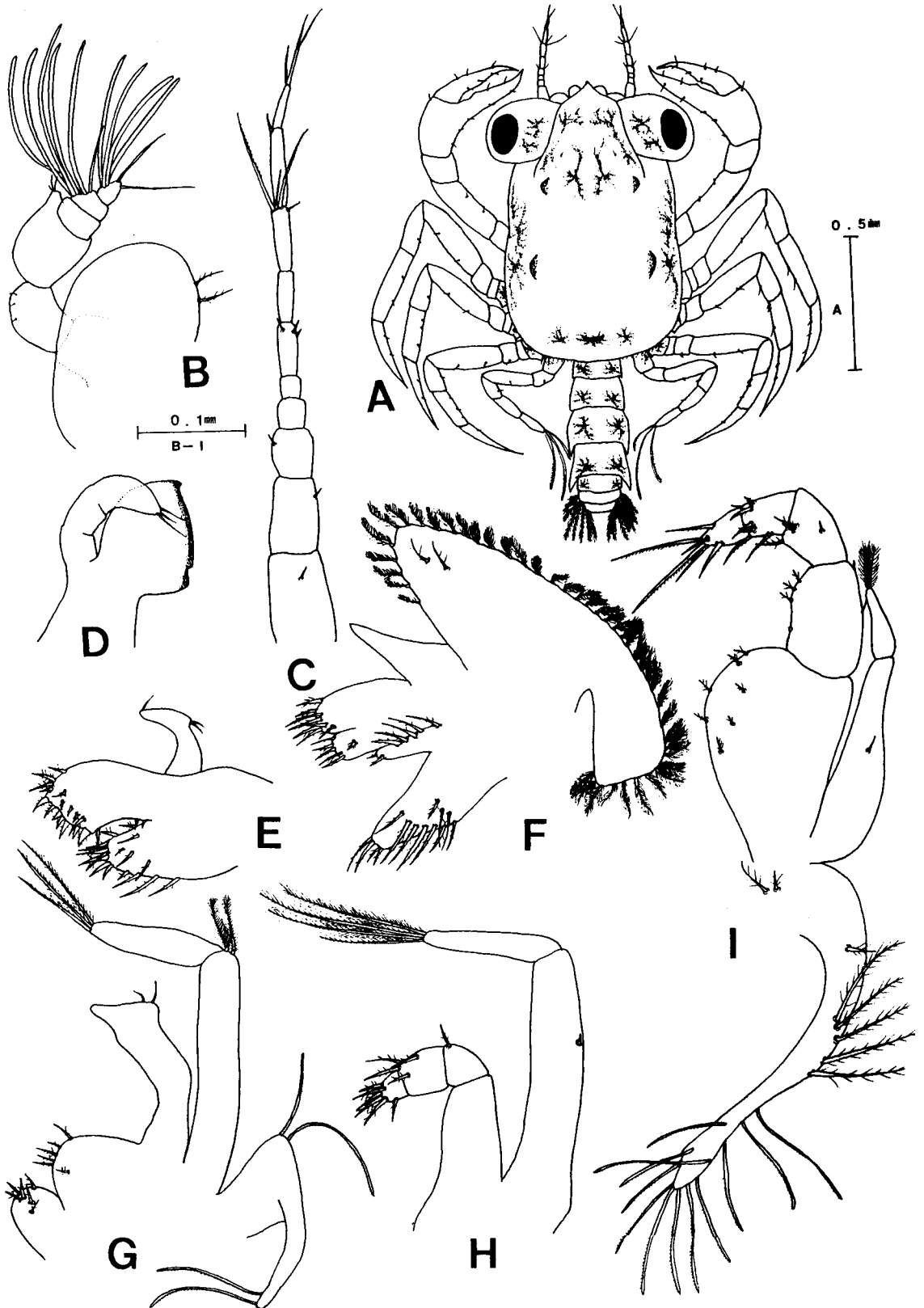


Fig. 6. *Uca arcuata*, megalopa stage: A, dorsal view; B, antennule; C, antenna; D, mandible; E, maxillule; F, maxilla; G, first maxilliped; H, second maxilliped; I, third maxilliped.

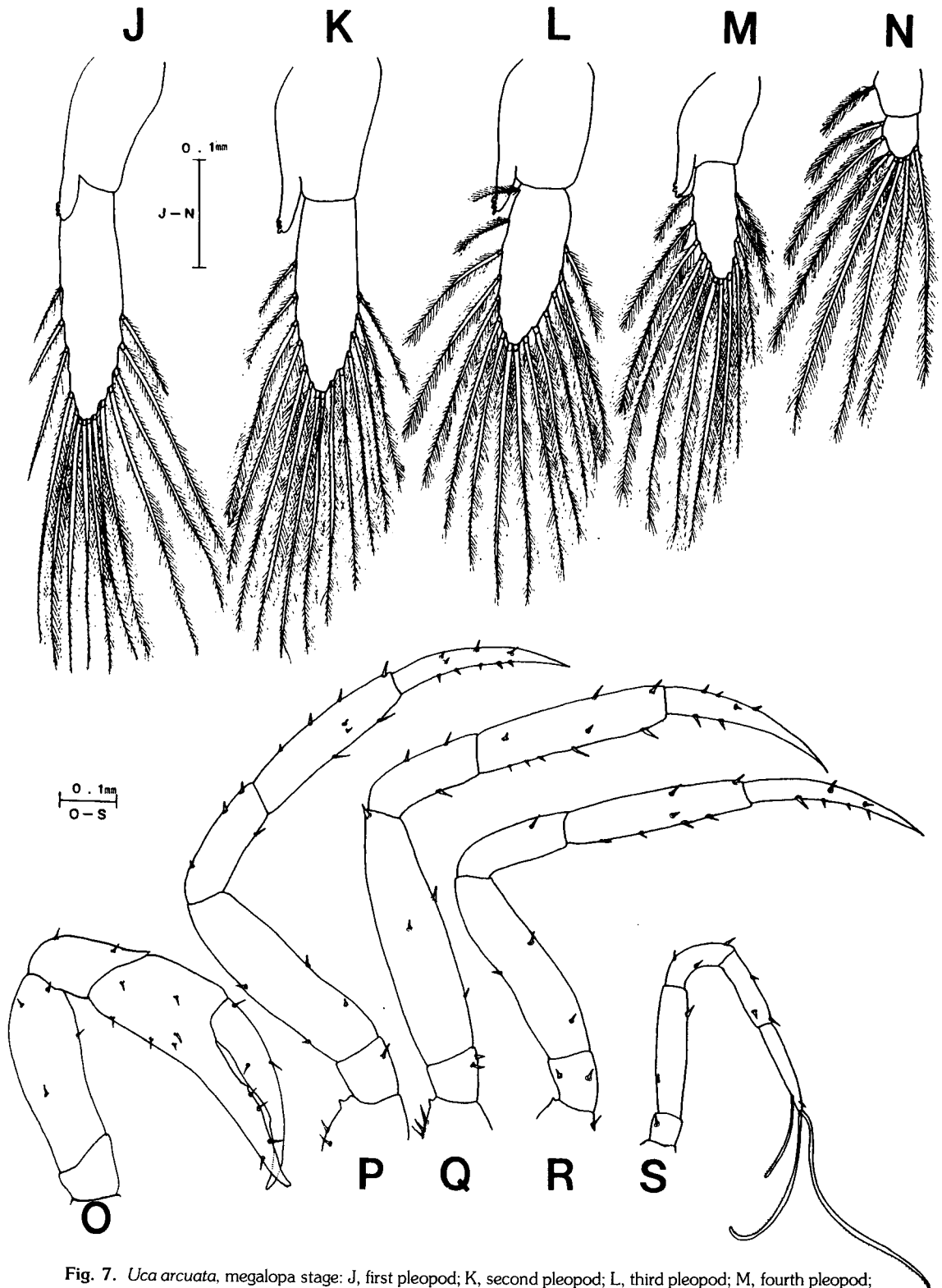


Fig. 7. *Uca arcuata*, megalopa stage: J, first pleopod; K, second pleopod; L, third pleopod; M, fourth pleopod; N, fifth pleopod; O, chela; P, second pereiopod; Q, third pereiopod; R, fourth pereiopod; S, fifth pereiopod.

setae, respectively. Scaphognathite bearing 43 marginal plumose setae and two plumodenticulate setae on surface.

First maxilliped (Fig. 6G). Endopodite unsegmented with two terminal simple setae. Exopodite two-segmented with two short plumose setae on proximal segment and three longer plumose setae on distal segment. Basal and coxal endites both with six plumodenticulate setae. Epipodite with four long curved simple setae and triangular in shape.

Second maxilliped (Fig. 6H). Endopodite four-segmented with 0,1,4 and 6 plumodenticulate setae, progressing distally. Exopodite two-segmented with a short seta on proximal segment, three long and a short plumose setae on terminal segment. Epipodite absent.

Third maxilliped (Fig. 6I). Endopodite five-segmented with 7,5,4,7 and 6 plumodenticulate setae, progressing distally. Exopodite two-segmented with a small seta on proximal segment, two terminal plumose setae on distal segment. Epipodite with two short on proximal portion, a short and five long plumodenticulate setae on medial portion, 12 simple setae on distal portion.

Pleopods (Figs. 7J-N). Progressing decreasing in size on somites two to six with 14,14,14-15,12-13 and 7-8 plumose setae on each exopodite. Endopodites present on pleopods one to four with appendix interna.

Chela and pereopods two to four (Figs. 7 O-S). Chela curved with short setae, as illustrated: proposed with few small teeth on cutting edge, tip slightly hooked, crossing dactylus when closed. Pereiopod five with three brachyuran feelers.

Chromatophores (Fig. 6A) show the pattern of mainly brown series and yellowish-organge, distributing on eye stalks, mid-lateral, postero-lateral, posterior and gastric region of carapace, each abdominal somite and pereopods.

## DISCUSSION

Aikawa (1937) studied the first zoeal larvae belonging to the genera *Macrophthalmus*, *Uca*, *Ilyoplax* and *Scopimera* and could recognize several groups corresponding to the subfamilies on the basis of the presence or absence of lateral carapace spines, the types of antenna and telson, and setation of maxilla and second maxilliped.

Wear (1968) reexamined the larval description in the Ocypodidae and knowledge on the larvae of seven genera including 14 species. He separated these larvae into two major groups according to the primary significance to the presence of lateral carapace spines and secondary significance to the expansion of the fourth and fifth abdominal segments and the degree of development of the exopod of the second antenna but could not obtain any information on the relationship between Ocypodidae larvae corresponding to the adult classification.

Rice(1975), using the setation of the endopodite of maxillule, maxilla and second maxilliped, could somewhat clearly classify ocypodid larvae at the generic level. Thus, the following six characters were adopted in separating the larvae into groups: 1) the setation of endopodite of maxillule 2) the setation of endopodite of maxilla 3) the setation of basipodite of second maxilliped 4) the setation of endopodite of second maxilliped (especially in basal and medial segments) 5) the type of antenna and 6) the presence or absence of lateral carapace spines. The greatest significance was given to the characters of 1),2),3) and 4) for the identification of zoeae in the subfamilial or generic levels because they are consistent throughout all zoeal

stages. The lesser significance was given to the characters of 5) and 6) because they are changable in successive zoeal stages. For example, the type of antenna could be changed by the presence of an endopodite, and lateral carapace spines observed from the second zoeal stage in *Pachygrapsus crassipes* (see Schlotterbeck, 1976) and *Cyclograpsus cinereus* (see Costlow & Fagetti, 1969).

In Table 1, the characteristics of the subfamily Ocypodinae larvae are found to be very uniform group which corresponds with the accepted subfamily based on the adult morphology: the endopodite of maxillule is always two-segmented and bearing four terminal plumodenticulate setae, the proximal segment naked; the endopodite of maxilla is always two-lobed and bearing three plumodenticulate setae; the basipodite of the second maxilliped usually bears four plumodenticulate setae (rarely three in *Ocypode platytarsis*); the endopodite of the second maxilliped three-segmented, the basal and medial segments are always naked; the antenna is always B-type. One difference between the genera of *Ocypode* and *Uca* is the presence or absence of the lateral carapace spines. Consequently, the first zoeal larva of *Uca arcuata* as present material shows the characteristics which are correspond well with those of Ocypodinae larvae.

Rice (1980) reported that the mouthpart setations of the subfamily Ocypodinae are very similar to those in the Pinnotheridae. Also, Wear (1968) found that the ocypodid zoeae appeared to be closely related with those of Hymenosomidae, Pinnotheridae and Grapsidae. Thus, Table 2 shows the comparison of the first zoeal larvae in the families Pinnotheridae, Ocypodidae and Grapsidae. In Table 2, the Ocypodinae zoeae have the endopodites of the maxillule and the maxilla bearing 0,4 and 1,2(3) setae, the basipodite of the second maxilliped bearing four setae, and only the distal segment of the endopodite of the second maxilliped is bearing setae as in the Pinnotheridae. Thus, it can be concluded that the subfamily Ocypodinae within the family Ocypodidae has the closest affinities with the family Pinnotheridae.

**Table 1.** Distinguishing characteristics of first zoea larvae in the family Ocypodidae.

	Maxillule	Maxilla		Maxilliped 2	Antenna	Lateral carapace spines	Source
	end.	end.	bas.				
<b>OCYPODINAE</b>							
<i>Ocypode quadrata</i>	0,4	1,2(3)	4	0,0,5	B	+	Diaz & Costlow, 1972
<i>Ocypode platytarsis</i>	?	1,2(3)	3	0,0,4	B	+	Rajabai, 1951
<i>Ocypode gaudichaudii</i>	0,4	1,2(3)	?	0,0,5	B	+	Crane, 1940
<i>Ocypode stimpsoni</i>	0,4	1,2(3)	4	0,0,5	B	+	Terada, 1979
<i>Uca annulipes</i>	0,4	1,2(3)	4	0,0,4	B	-	Hashmi, 1968
<i>Uca marionis</i>	0,4	1,2(3)	4	0,0,5	B	-	Hashmi, 1968
<i>Uca pugilator</i>	0,4	1,2(3)	4	0,0,4	B	-	Hyman, 1920
<i>Uca pugnax</i>	0,4	1,2(3)	?	0,0,4	B	-	Hyman, 1920
<i>Uca minax</i>	0,4	1,2(3)	?	0,0,4	B	-	Hyman, 1920
<i>Uca triangularis</i>	0,4	1,2(3)	?	0,0,4	?	-	Feest, 1969
<i>Uca lactea lactea</i>	0,4	1,2(3)	4	0,0,5	B	-	Terada, 1979
<i>Uca arcuata</i>	0,4	1,2(3)	4	0,0,5	B	-	Present paper

According to Aikiwa (1933), exopodite of antenna about half length of peduncle is called B-type and exopodite of antenna unarmed or reduced to a seta is called C-type. (+) and (-) = the presence and absence. (?) = no description. (end.) = endopodite. (bas.) = basipodite.

**Table 2.** Comparison of characteristics of first zoea larvae between the family Ocypodidae and the families of Pinnotheridae and Grapsidae.

	Maxillule	Maxilla		Maxilliped 2	Antenna	Lateral carapace	Source
	end.	end.	bas.	end.	type	spines	
PINNOTHERIDAE							
<i>Pinnotheres taylori</i>	0,4	1,2(3)	4	0,5	C	-	Hart, 1935
<i>Pinnotheres sinensis</i>	0,4	1,2(3)	4	0,4	C	-	Konishi, 1983
<i>Pinnotheres pholadis</i>	0,4	1,2(3)	4	0,5	C	+	Konishi, 1983
<i>Pinnaxodes mutuensis</i>	0,4	1,2(3)	3	0,5	C	+	Konishi, 1981
OCYPODIDAE							
OCYPODINAE							
<i>Ocypode quadrata</i>	0,4	1,2(3)	4	0,0,5	B	+	Diaz & Costlow, 1972
<i>Uca arcuata</i>	0,4	1,2(3)	4	0,0,5	B	-	Present paper
SCOPIMERINAE							
<i>Scopimera globosa</i>	0,4	2,3(5)	3	0,1,6	C	+	Terada, 1976
MACROPHTHALMINAE							
<i>Macrophthalmus depressus</i>	1,5	2,2(4)	4	0,1,5	B	-	Rice, 1975
GRAPSIDAE							
<i>Leptograpsus variegatus</i>	1,5	2,2(4)	4	0,1,5	C	-	Wear, 1970
<i>Hemigrapsus sinensis</i>	1,5	2,2(4)	4	0,1,6	B	+	Kim & Moon, 1987
<i>Helice tridens sheni</i>	1,5	2,2(4)	4	0,1,6	B	+	Kim & Ko, 1984

## ABSTRACT

Larvae of *Uca arcuata* are reared in the laboratory at 25°C in temperature and 33.3‰ in salinity. Five zoeal stages and one megalopa stage are found in the complete larval development, and these are described and illustrated. The first zoeal larva of *Uca arcuata* is bearing four terminal plumodenticulate setae on the endopodite of maxillule, three plumodenticulate setae on the basipodite of second maxilliped, 0,0,5 setation on the endopodite of second maxilliped, and the B-type of antenna. Thus, this species shows the characteristics which coincide with those of the subfamily Ocypodinae zoeae.

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