

Cumacean Fauna of Southern coast and Chejudo Island in Korea

Chang Mok Lee and Kyung Sook Lee

(Biology Major, School of Fundamental Science, Dankook University,
Chönan, Chung-nam 330-714, Korea)

ABSTRACT

Thirteen cumacean species in four families were identified from the southern coast and Chejudo Island in Korea. Three of them, *Campylaspis pumila* Gamö, *Cumella alveata* Gamö, and *Cumella glaberata* Gamö, are recorded newly to Korean fauna. Among them, female of *C. alveata* is described for the first time in the world.

Key words: Cumacea, *Campylaspis*, *Cumella*, Korea

INTRODUCTION

For faunal study on the Korean cumaceans, we examined cumacean specimens collected from the southern coast and Chejudo Island of Korea from 1997 to 1998. As a part of the result, thirteen species in four families were identified. Three of them, *Campylaspis pumila* Gamö, 1960, *Cumella alveata* Gamö, 1964 and *Cumella glaberata* Gamö, 1962 belonging to the family Nannastacidae, were turned out to be new records of Korean fauna. Nannastacid cumaceans were reported by about 307 species of 18 genera in the world (Băcescu, 1992). Since then, more than 20 species of these nannastacid cumaceans have been reported continuously (Petrescu, 1995a, 1995b, 1997; Petrescu *et al.*, 1994; Watling and McCann, 1997). However, in Korea the cumaceans of this family had not been reported, except *Campylaspis orientalis* reported by Calman (1911). Among the three new records, *C. alveata* was described originally only by male from the Japanese waters (Gamö, 1964). New informations on the mouthparts of these three records are also given.

MATERIAL AND METHODS

The specimens were collected mainly using a light-trap from the shallow waters of the Chejudo Island and southern coasts of Korea from 1997 to 1998 (Fig. 1). The specimens were fixed into 80% ethyl alcohol. The specimens were dissected in glycerol on Cobb's aluminium hole slide. Drawings and measurements were performed with the aid of a drawing tube. Measurements for the body length were made from the anterior tip of carapace to the last abdominal somite and for each appendages were made along the mid-line of segment, exclusive of the inflated outer angle. All

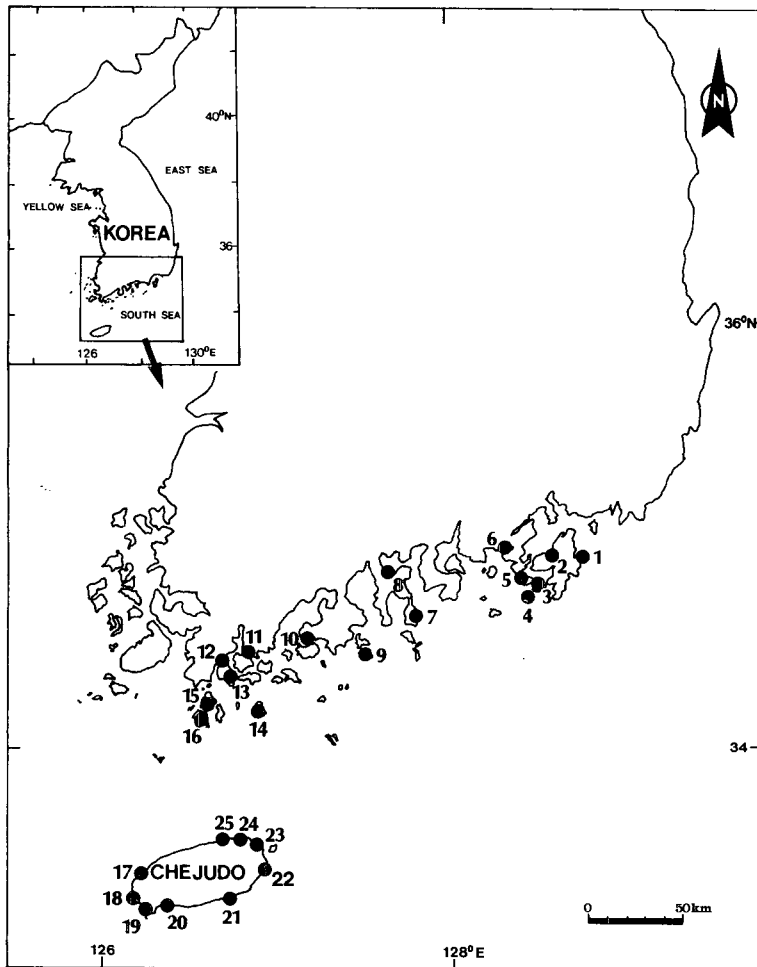


Fig. 1. Sampling localities. 1, Hŭngnam, Kōjedo Is.; 2, Changsŭngp'o, Kōjedo Is.; 3, Ch'ubongdo Is.; 4, Pijindo Is.; 5, Misu, Mirūdo Is.; 6, Pyōngsan; 7, Pangjukp'o, Tolsando Is.; 8, Ch'wijōk; 9, Oenarodo Is.; 10, Toyang; 11, Maryang; 12, Namch'ang; 13, Wando Is.; 14, Ch'ōngsando Is.; 15, Nohwado Is.; 16, Pogildo Is.; 17, Halrim; 18, Sindo; 19, Mosŭlp'o; 20, Hwasun; 21, T'aehŭng; 22, Sinyang; 23, Kujwa; 24, Kimnyōng; 25, Hamdōk.

examined specimens were deposited in the Biology Major, Dankook University.

RESULTS

The species marked with a asterisk (*) are new to Korean fauna. The collectors are referred where the specimens were collected by someone other than authors.

Order Cumacea Kröyer, 1846 올챙이새우 목
Family Bodotriidae Scott, 1901 참올챙이새우 과
Subfamily Bodotriinae Hale, 1944 참올챙이새우 아과
Genus *Bodotria* Goodsir, 1843 참올챙이새우 속

1. *Bodotria biplicata* Gamô, 1964 두줄곰보참올챙이새우

Material examined. 10 ♂♂, 15 ♀♀, Pogildo Is., 22 May 1998.

Distribution. Korea (Yellow Sea, South Sea, Chejudo Is.), China, Japan.

2. *Bodotria parva* Calman, 1907 두줄참올챙이새우

Material examined. 16 ♂♂, Kimnyöng, 12 Aug. 1998, Y.H. Kim; 4 ♂♂, Hamdök, 12 Aug. 1998, Y.H. Kim.

Distribution. Korea (Yellow Sea, South Sea, Chejudo Is.), China, Japan.

3. *Bodotria similis* Calman, 1907 한줄참올챙이새우

Material examined. 4 ♂♂, 10 ♀♀, Pangjukp'o, Tolsando Is., 30 June 1998, Y. Eun.

Distribution. Korea (Yellow Sea, East Sea, South Sea), Japan, Taiwan, Vietnam, India.

Genus *Iphinoe* Bate, 1856 긴허리올챙이새우 속

4. *Iphinoe sagamiensis* Gamô, 1958 이쁜긴허리올챙이새우

Material examined. 1 ♂, Namch'ang, 20 May 1998; 1 ♂, Wando Is., 20 May 1998; 1 ♂, Ch'öngsando Is. 22 May 1998.

Distribution. Korea (Yellow Sea, South Sea), Japan.

Subfamily Vaunthompsoniinae Hale, 1944 배불뚝올챙이새우 아과

Genus *Vaunthompsonia* Bate, 1858 배불뚝올챙이새우 속

5. *Vaunthompsonia cristata* Bate, 1858 민배불뚝올챙이새우

Material examined. 1 ♂, Ch'ubongdo Is., 10 July 1998; 16 ♂♂, Ch'öngsando Is. 22 May 1998; 48 ♂♂, Nohwado Is., 23 May 1998.

Distribution. Korea (South Sea, Chejudo Is.), Japan, South China Sea, British Isles, west coast of France, Atlantic coast of Morocco, Mediterranean.

Family Diastylidae Bate, 1856 긴꼬리올챙이새우 과

Genus *Diastylis* Zimmer, 1920 긴꼬리올챙이새우 속

6. *Diastylis paratricinta* Kang and Lee, 1996 가슴줄긴꼬리올챙이새우

Material examined. 1 ♂, 1 ♀, Pogildo Is., 22 May 1998.

Distribution. Korea (Yellow Sea, South Sea).

Genus *Dimorphostylis* Zimmer, 1920 이형올챙이새우 속

7. *Dimorphostylis asiatica* Zimmer, 1920 보통이형올챙이새우

Material examined. 1♂, 4♀♀, Changsŭngp'o, Kōjedo Is., 3 June 1998; 8♂♂, 15♀♀, Pyōngsan, 1 June 1998, Y.H. Kim; 1♂, 10♀♀, Pangjukp'o, Tolsando Is., June 30, 1998, Y. Eun; 1♂, Oenarodo Is., 22 May 1998, Y. Eun; 3♂♂, 1♀, Toyang, 21 May 1998, Y. Eun; 1♂, 7♀♀, Maryang, 24 May 1998, Y.H. Kim; 10♂♂, 5♀♀, Ch'ōngsando Is. 22 May 1998; 6♂♂, 2♀♀, Nohwado Is., 23 May 1998; 15♂♂, Halrim, 11 Aug. 1998, Y.H. Kim.

Distribution. Korea (Yellow Sea, East Sea, South Sea), west Pacific from southern Kurile to Vietnam.

8. *Dimorphostylis valida* Harada, 1960 벨리다이형올챙이새우

Material examined. 4♀♀, Ch'wijōk-ri, Yōch'ōn-gun, 1 June 1998, Y.H. Kim; 5♂♂, 5♀♀, Ch'ōngsando Is. 22 May 1998; 15♂♂, 2♀♀, Nohwado Is., 23 May 1998; 1♂, Sindo, 14 Aug. 1998, Y.H. Kim; 21♂♂, Hwasun, 8 Aug. 1998, Y.H. Kim; 46♂♂, 22♀♀, Sinyang, 10 Aug. 1998, Y.H. Kim.

Distribution. Korea (Yellow Sea, East Sea, South Sea), Japan.

9. *Dimorphostylis acroplicata* Harada, 1960 큰이형올챙이새우

Material examined. 4♂♂, 1♀, Misu, Mirūdo Is., 11 July 1998; 4♂♂, Kujwa, 12 Aug. 1998, Y.H. Kim; 20♂♂, Kimnyōng, 12 Aug. 1998.

Distribution. Korea (East Sea, South Sea, Chejudo Is.), Japan.

Family Lampropidae Sars, 1878 삼꼬리올챙이새우 과

Genus *Hemilamprops* Sars, 1883 가시삼꼬리올챙이새우 속

10. *Hemilamprops californicus* Zimmer, 1936 한줄가시삼꼬리올챙이새우

Material examined. 15♂♂, 10♀♀, Hŭngnam, Kōjedo Is., 3 June 1998; 1♂, Changsŭngp'o, Kōjedo Is., 3 June 1998.

Distribution. Korea (Yellow Sea, East Sea, South Sea), Japan, California.

Family Nannastacidae Bate, 1866 꼬마올챙이새우 과

Genus *Campylaspis* Sars, 1865 꼬마올챙이새우 속

***11. *Campylaspis pumila* Gamō, 1960** 점박이꼬마올챙이새우 (신칭) (Figs. 2-4)

Campylaspis pumila Gamō, 1960, p. 158, figs. 5, 6; 1963, p. 87; 1967b, p. 257; Băcescu, 1992, p. 192.

Material examined. 4♂♂, Pijindo Is., 9 July 1998; 4♂♂, Wando Is., 20 May 1998; 2♂♂, Nohwado Is., 23 May 1998.

Description. Adult male: Body (Fig. 2B) about 2 mm long, excluding uropods. Carapace (Figs. 2A, B) smooth, about 2/5 of body length, about 1.5 times as long as its width and 2.18 times as long as its depth, with about 10-11 pairs of pellucid spots on antero-dorsal portion and numerous short hairs on surface, 4 pairs of darkish spots and a narrow, curved furrow on each side. Pseudorostral lobes (Fig. 2B) broadly truncated, slightly shorter than length of ocular lobe. Ocular lobe (Fig. 2A) round, with 3 lenses.

All free thoracic somites (Figs. 2A, B) slightly longer than a half of carapace length and about 1/4.5 of body length. First somite very short; fourth somite largest, slightly shorter than combined

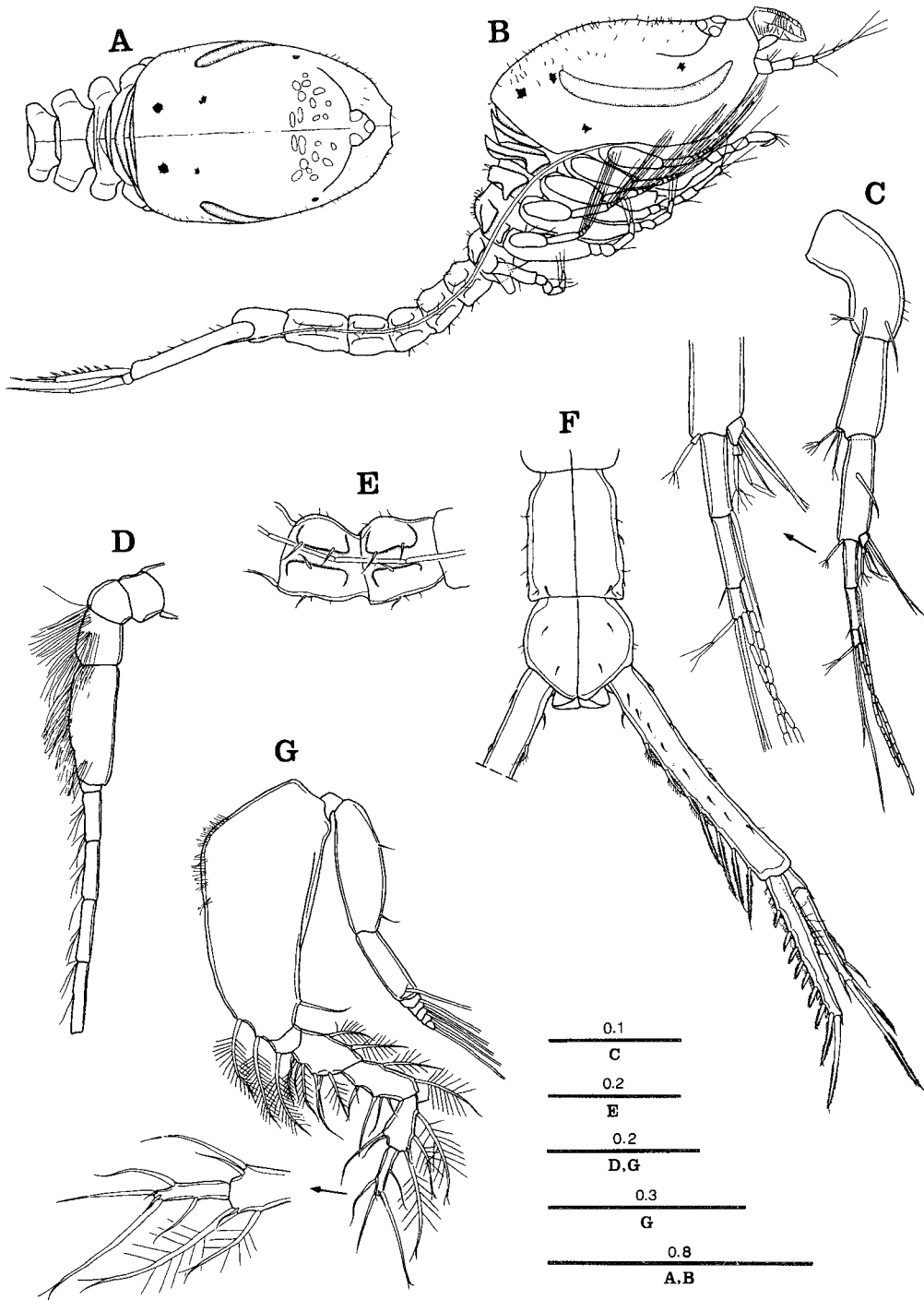


Fig. 2. *Campylaspis pumila* Gamô, 1960, male: A, cephalothorax, dorsal; B, habitus, lateral; C, antennule; D, antenna; E, second and third segments of abdomen, lateral; F, uropods and last abdominal somite, dorsal; G, first paeopod. Unit of scales in mm.

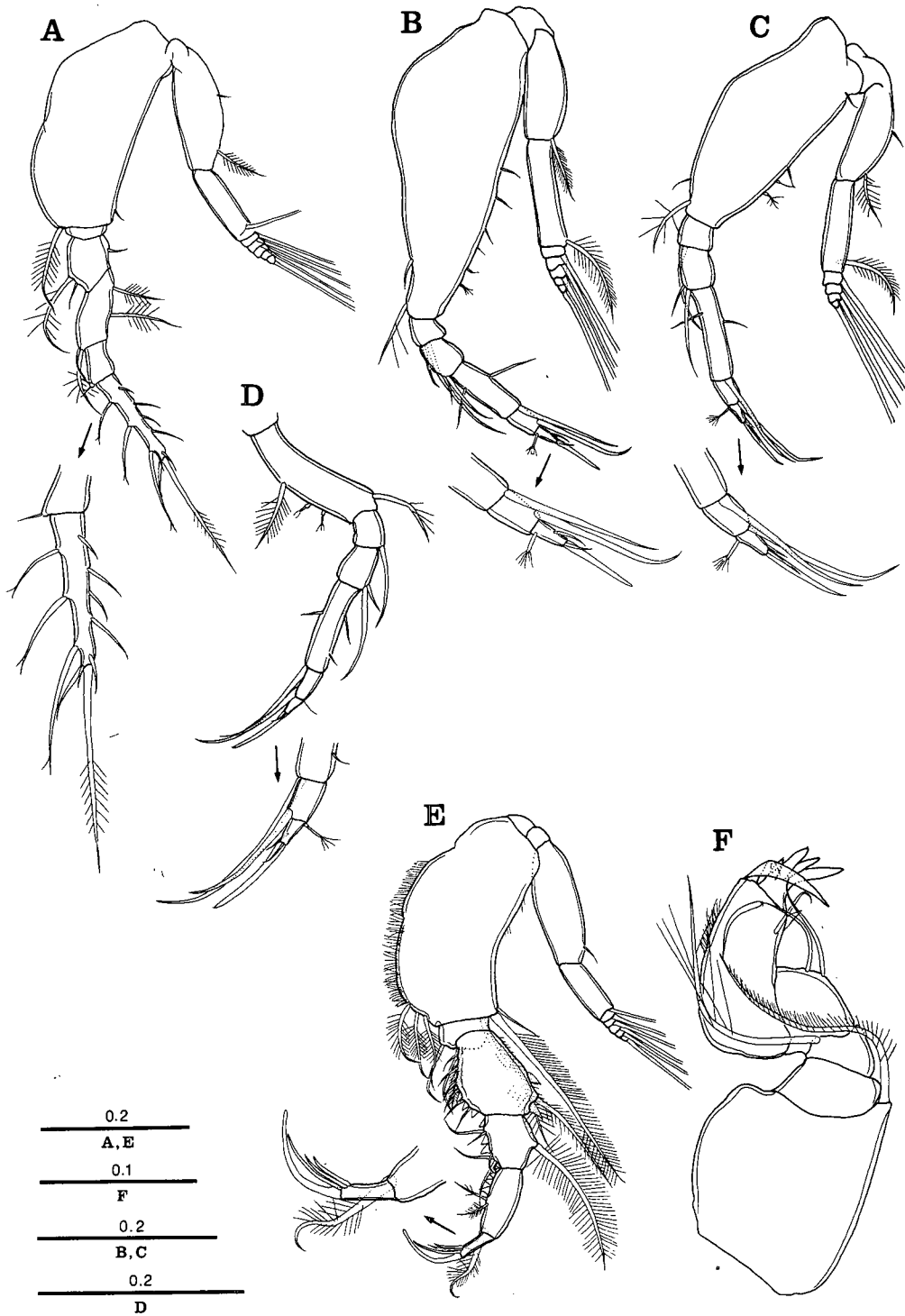


Fig. 3. *Campylaspis pumila* Gamô, 1960, male: A, second pereopod; B, third pereopod; C, fourth pereopod; D, fifth pereopod; E, third maxilliped; F, second maxilliped. Unit of scales in mm.

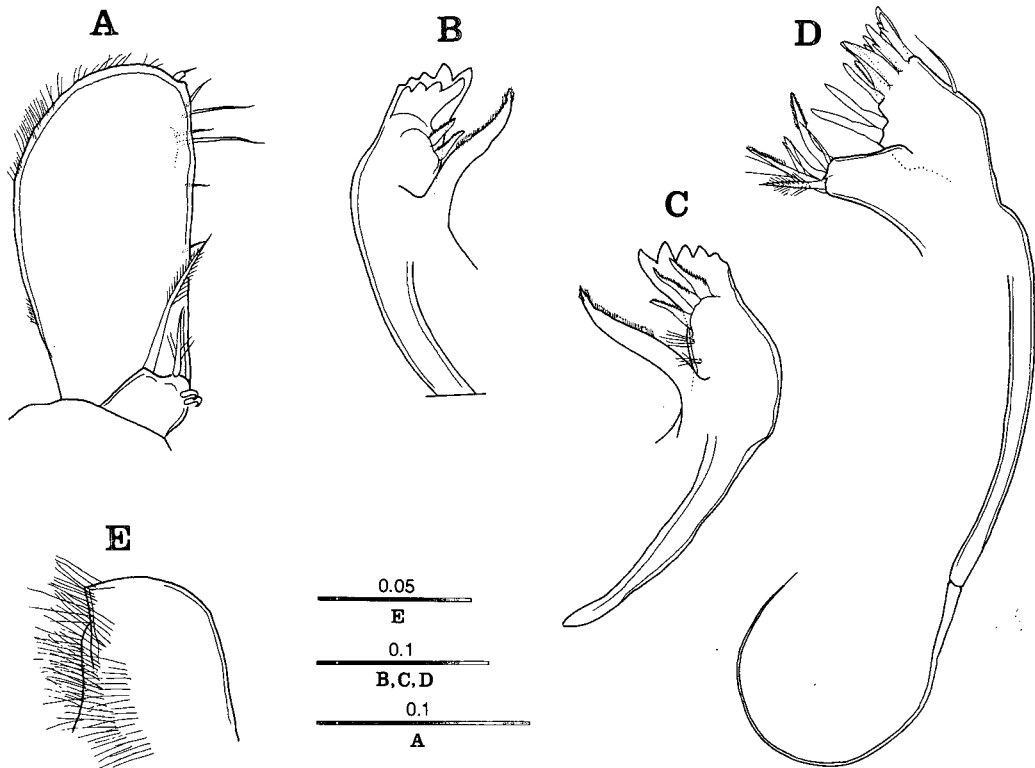


Fig. 4. *Campylaspis pumila* Gamô, 1960, male: A, first maxilliped omitted branchial apparatus and siphon; B, left mandible; C, right mandible; D, first maxilla; E, labium. Unit of scales in mm.

length of first, second and third somites; fifth somite shorter than fourth one. Abdomen (Figs. 2B, E, F) about 2/3 of cephalothorax length; first to fifth segments with 3 pairs of setae on each sides. Fifth somite longest. Sixth somite slightly shorter than fifth one.

Peduncle of antennule (Fig. 2C) 3-segmented; first segment about 0.62 times as long as remaining segments combined, with a sensory seta and 2 simple setae at distal part; second segment with a simple seta and 2 sensory setae on inner angle; third segment slightly longer than second one. Main flagellum 3-segmented; second segment slightly shorter than first one, with a aesthetasc on outer angle; third segment very short, with a aesthetasc, a sensory seta and 2 distal setae (one of them long and the other short). Accessory flagellum very minute, with 2 sensory setae and 3 distal setae (one of them very short and the others long, subequal to each other). Antenna (Figs. 2B, D) long, reached to peduncle of uropod; peduncle 5-segmented.

Peduncle of uropod (Fig. 2F) about 2.5 times as long as last abdominal segment; with a simple seta, 3 plumose setae and 4 pectinated setae on inner margin, but some specimen with 5 pectinated setae; with several simple setae on ventral and dorsal surface. Endopod of uropod unsegmented, slightly longer than 1/2 of peduncle length, with 7 spines interspaced with serrations and numerous hairs on inner margin, but some specimen with 7 spines; with 7-8

sensory hairs on outer margin; with a very short terminal seta and 2 terminal pectinated setae. Exopod of uropod 2-segmented, about 0.8 times as long as endopod; first segment about 1/4.5 of second segment length; second segment with a simple inner seta, 3 simple outer setae and 2 terminal pectinated setae.

Basis of first peraeopod (Fig. 2G) slightly shorter than remaining segments combined in length, with 2 plumose setae distally on inner margin and a simple seta distally on outer margin. Ischium very short, about 1/3 of merus, with a plumose seta on inner margin. Merus about 0.8 times as long as carpus with 3 plumose and 4 simple setae on inner margin and 2 plumose setae on outer margin. Carpus about 1.2 times as long as propodus, with 5 simple setae on inner margin and 2 plumose setae on outer margin. Propodus slightly longer than dactylus, with 2 simple setae on inner margin; with 2 simple setae and 3 plumose setae on outer margin. Dactylus with a simple inner seta, a simple outer seta and 4 simple terminal setae (two of them very short).

Basis of second peraeopod (Fig. 3A) about 0.8 times as long as remaining segments combined, with a plumose on inner angle and a short, simple seta on outer margin distally. Ischium very short, about 1/4 times as long as merus. Merus about 0.7 times as long as carpus, with a simple and a plumose setae on inner angle and a simple seta on outer margin. Carpus about 1.8 times as long as propodus, with a simple and a plumose setae on inner angle and 2 plumose setae on outer margin. Propodus slightly longer than 1/3 of dactylus, with a short, simple seta on inner angle. Dactylus with 3 simple inner setae, 4 simple outer setae and 4 terminal setae (one long plumose seta and the others short simple setae).

Basis of third peraeopod (Fig. 3B) about 1.7 times as long as remaining segments combined. Basis of fourth peraeopod (Fig. 3C) about 1.1 times as long as remaining segments combined. Basis of fifth peraeopod (Fig. 3D) about 0.6 times as long as remaining segments combined.

Basis of second maxilliped (Fig. 3F) subequal to its width, with a long plumose seta on inner angle; dactylus with 4 spine-like teeth on distal margin. Basis of third maxilliped (Fig. 3E) about 0.8 times as long as remaining segments combined, a little expanded distally and with numerous hairs on inner margin, 3 plumose setae on inner angle and 3 plumose setae (one very short and the others long) on outer angle. Ischium slightly shorter than 1/3 of merus, with a plumose and 2 simple setae on inner angle. Merus about 1.5 times as long as carpus, with 6 simple setae and 6 teeth on inner margin, and a plumose seta and 2 teeth on outer margin. Carpus about 0.85 times as long as propodus, with 5 simple setae, 4 teeth and numerous hairs on inner margin, and a long plumose seta on outer margin. Propodus about 2 times as long as dactylus, with 2 plumose setae and 4 teeth on inner margin, and a plumose seta on inner angle. Dactylus with 3 simple setae on inner angle and a terminal seta having round tip. Exopod well developed.

Labium (Fig. 4E) with numerous hairs on inner margin. Left mandible (Fig. 4B) with 2 spine-like setae between lacinia mobilis and pars molaris; pars incisiva with 5 flattened short teeth; lacinia mobilis with 4 flattened short teeth; pars molaris sharp, styliiform characteristic for this genus. Right mandible (Fig. 4C) with 3 spine-like setae between pars incisiva and pars molaris; pars incisiva same as in left one. Protopod of first maxilla (Fig. 4D) with 3 spines and about 6 bipid spines; endite with a plumose spine, a bipid spine, a simple seta and 2 pectinated spines; palp long, with a filament. Protopod of first maxilliped (Fig. 4A) with 6 simple setae on inner margin; distal segment very small, with only a short terminal seta; endite with 2 plumose setae on distal margin and 2

hook-like spines on inner margin.

Remarks. This species is distinguished from other congeners (having carapace furnished with curved furrow) in having the carapace with 4 pairs of darkish spots on each side, the dactylus of second peraeopod with a long plumose seta and the distal segment of first maxilliped with only a short terminal seta. They seem to be the important characteristics of this species.

Our specimens are well accorded with the original description of *Campylaspis pumila* by Gamô (1960) from Japanese waters. However, a few differences are found between ours and Gamô's male specimen: (1) in our specimens the pseudorostral lobe is slightly shorter than the length of ocular lobe, while it is equal in Gamô's specimen; (2) the uropodal peduncle bears several setae on the ventral and dorsal surfaces, and the uropodal endopod with about 7-8 sensory hairs on the outer margin in our specimens, but Gamô did not mention about them.

Distribution. Korea (South Sea), Japan (Tanabe Bay).

Genus *Cumella* Sars, 1865 옆올챙이새우 속 (신칭)

*12. *Cumella alveata* Gamô, 1964 두줄곰보옆올챙이새우 (신칭) (Figs. 5-9)

Cumella alveata Gamô, 1964, p. 23, figs. 1, 2; 1967b, p. 252; Băcescu, 1992, p. 213.

Material examined. 1 ♂, Ch'ubongdo Is., 10 July 1998; 5 ♂♂, 2 ♀♀, Pijindo Is., 9 July 1998; 2 ♂♂, 2 ♀♀, Ch'öngsando Is., 20-22 May 1998; 1 ♂, Mosŭlp'ö, 8 Aug. 1998, Y.H. Kim; 2 ♂♂, Hwasun, 8 Aug. 1998, Y.H. Kim; 1 ♀, Sinyang, 10 Aug. 1998, Y.H. Kim; 6 ♂♂, Kujwa, 12 Aug. 1998, Y.H. Kim.

Description. Adult male: Body (Fig. 5A) about 1.7-1.9 mm long, excluding uropods; its surface pitted, with numerous alveolate sculptures. Carapace (Fig. 5A) about 1/3 of body length, about 1.86 times as long as its depth; lateral surfaces with 2 pairs of longitudinal ridges (upper and lower). Upper and lower ridges somewhat curved, almost parallel to each other; 2 short branch ridges of lower ridge running upward and reached to upper ridge. Dorso-median carina well marked over whole carapace. Antennal notch shallowly concaved. Pseudorostral lobes (Fig. 5A) serrated. Ocular lobe (Fig. 5A) broadly round, with 7 lenses. All free thoracic somites (Fig. 5A) slightly shorter than 2/3 of carapace length and about 1/5 of body length. Fifth somite largest; first and second somites subequal to each other; third somite slightly longer than second one; fourth somite slightly shorter than fifth one. Abdomen (Fig. 5A) slightly short than cephalothorax; first to fifth segments with a pair of setae on each sides. Fifth somite longest; sixth somite slightly shorter than fifth one, about 1.28 times as long as its width.

Basis of first peraeopod (Fig. 5B) about 0.8 times as long as remaining segments together, with a plumose seta and numerous hairs on inner margin; with 2 hyaline flattened tooth, a simple seta and a plumose seta on outer margin. Ischium about 0.8 times as long as merus, with numerous hairs on inner margin. Merus about 1/2 of carpus length. Carpus about 2.28 times as long as propodus. Propodus about 1.46 times as long as dactylus, with a simple seta on inner angle and 2 simple setae on outer angle. Dactylus with a simple terminal seta and a terminal spine.

Peduncle of uropod (Fig. 5C) subequal to last abdominal segment in length; inner and outer margin serrated respectively; with a spine and numerous hairs on inner margin. Endopod of uropod unsegmented, about 0.8 times as long as peduncle; inner and outer margin serrated respectively; with numerous hairs on inner margin and with 2 terminal spines. Exopod of uropod

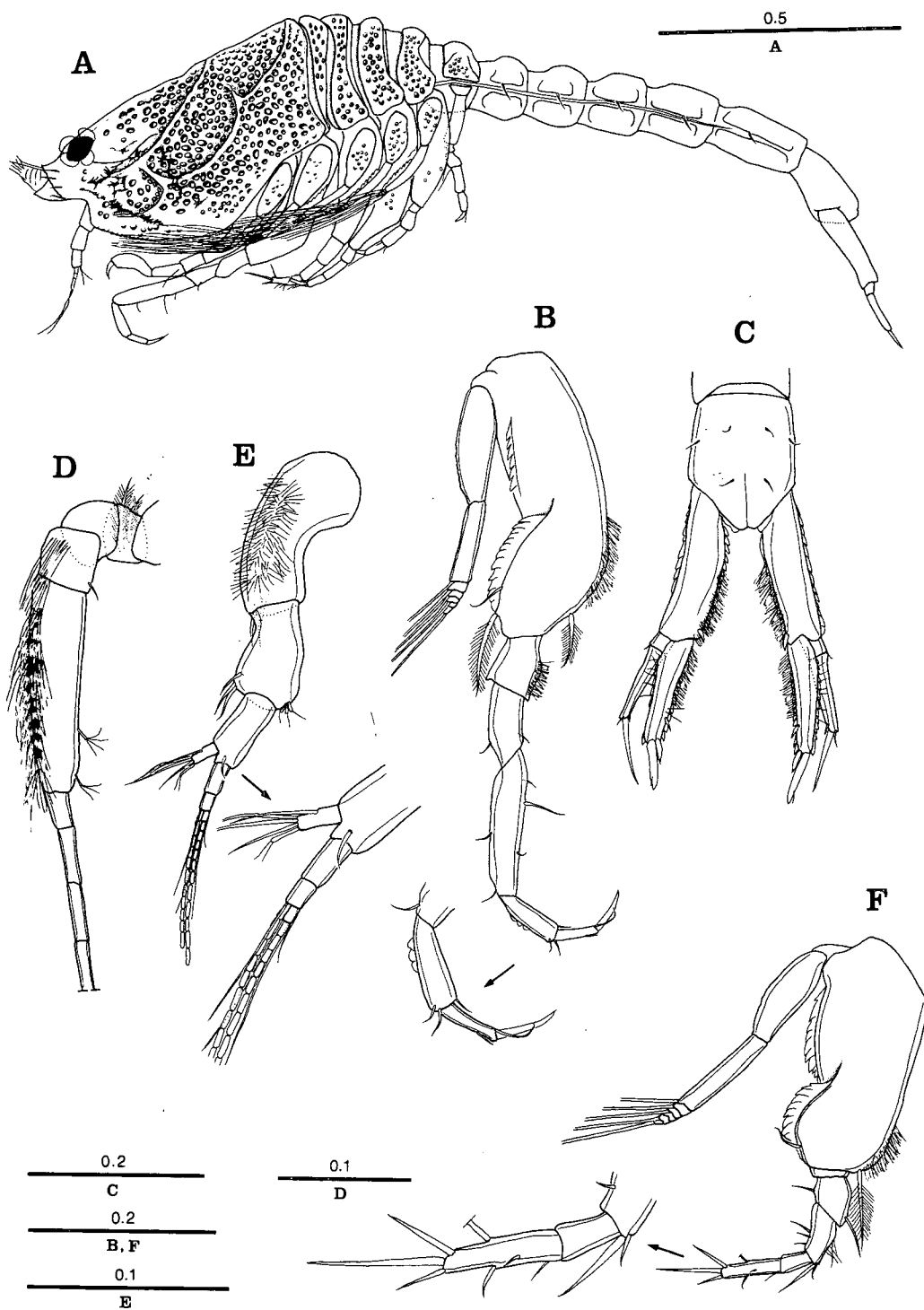


Fig. 5. *Cumella alveata* Gamô, 1964, male: A, habitus, lateral; B, first peraeopod; C, uropods and last abdominal somite, dorsal; D, antenna; E, antennule; F, second peraeopod. Unit of scales in mm.

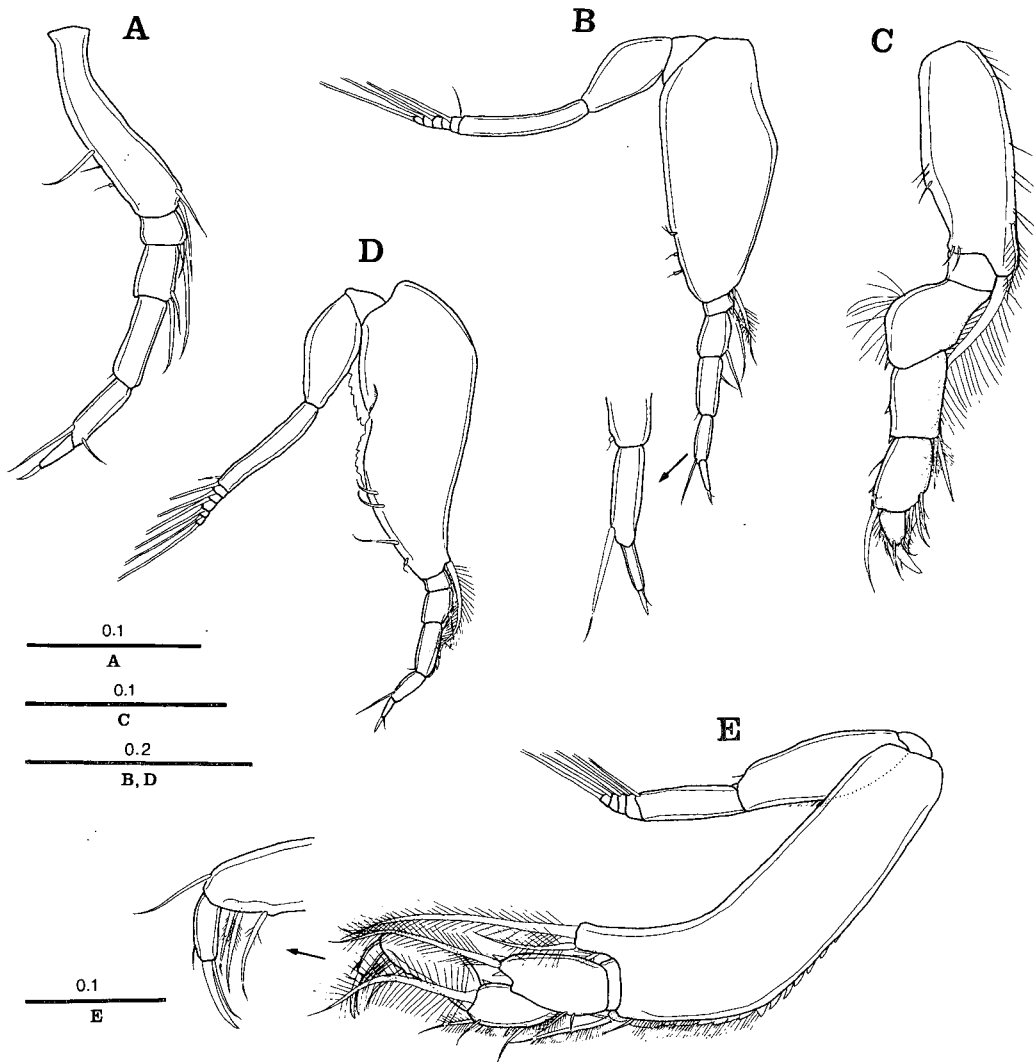


Fig. 6. *Cumella alveata* Gamô, 1964, male: A, fifth pereopod; B, fourth pereopod; C, second maxilliped; D, third pereopod; E, third maxilliped. Unit of scales in mm.

2-segmented, about 0.8 times as long as endopod; first segment about $1/5$ of second segment length; second segment with 2 very short terminal setae and a terminal spine.

Peduncle of antennule (Fig. 5E) 3-segmented; first segment slightly shorter than length of remaining segments together; second segment with 3 simple setae on outer angle and 3 sensory setae on inner angle; third segment slightly short than second one. Main flagellum 3-segmented; second segment about $1/2$ of first segment length, with a aesthetasc and a long simple seta on outer angle, and with a simple seta on inner angle; third segment very short, with a sensory seta, a aesthetasc and 2 distal setae. Accessory flagellum unsegmented, with a simple seta at middle part and a sensory seta, 3 simple setae on distal margin. Antenna (Figs. 5A, D) long, not exceeding fifth

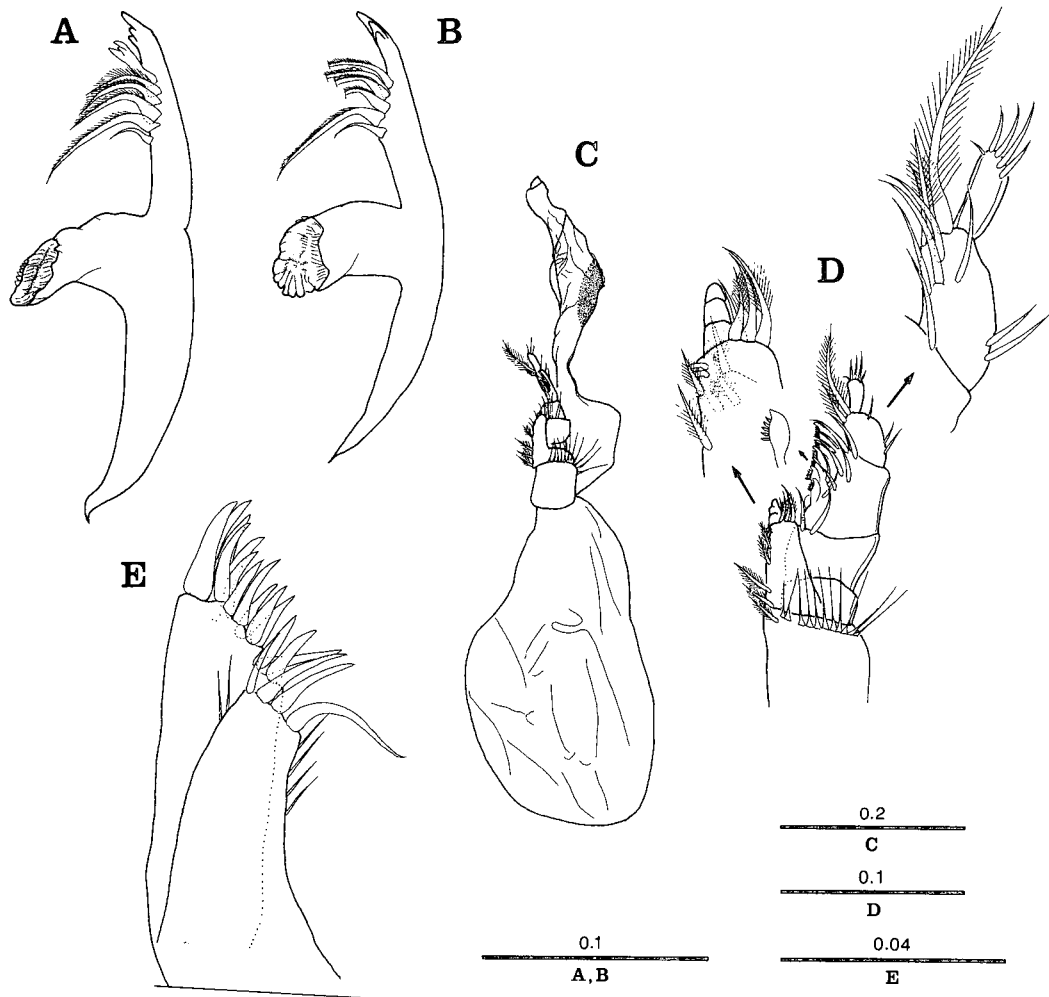


Fig. 7. *Cumella alveata* Gamô, 1964, male: A, left mandible; B, right mandible; C, first maxilliped; D, first maxilliped omitted branchial apparatus and siphon; E, first maxilla. Unit of scales in mm.

segment of abdomen. Peduncle 5-segmented; second segment with 2 plumose setae; fifth segment 2 sensory setae on inner margin.

Basis of second pereopod (Fig. 5F) about 1.3 times as long as remaining segments together, with a plumose and numerous hairs on inner angle; with 2 hyaline flattened teeth and a simple seta on outer margin. Ischium very short. Merus about 0.77 times as long as carpus, with a simple seta on inner angle and a simple seta on outer margin. Carpus about 1.6 times as long as propodus, with several hairs on inner margin; with 2 simple setae on inner angle and 3 simple setae on outer margin. Propodus about 1/2 of dactylus. Dactylus with a simple seta on surface, a simple seta on inner and outer margin respectively; with 3 terminal spines (one of them long).

Basis of third pereopod (Fig. 6D) about 1.9 times as long as remaining segments together; with

2 hyaline flattened teeth, a sensory seta and 3 simple setae on outer margin. Basis of fourth peraeopod (Fig. 6B) about 1.35 times as long as remaining segments together. Basis of fifth peraeopod (Fig. 6A) about 0.7 times as long as remaining segments together.

Basis of second maxilliped (Fig. 6C) about 0.7 times as long as remaining segments together. Basis of third maxilliped (Fig. 6E) about 1.34 times as long as remaining segments together, with numerous hairs on serrated inner margin; with a plumose seta and 2 simple setae on inner angle. Outer angle of basis inflated, reaching to about 1/4 of merus and with 3 plumose setae (one of them very long). Ischium very short. Merus longer than carpus; its outer angle somewhat inflated, with a long plumose seta. Carpus about 0.6 times as long as propodus; with a plumose seta, 2 simple setae and numerous hairs on inner margin; with a long plumose seta on outer margin. Propodus about 3.2 times as long as dactylus, with 3 plumose setae on inner margin. Dactylus with a simple outer seta, a simple terminal seta and a terminal spine; terminal spine slightly longer than propodus. Exopod well developed.

Left mandible (Fig. 7A) with a short simple seta and 4 plumose setae between lacinia mobilis and pars molaris; pars incisiva and lacinia mobilis with 3 teeth respectively; pars molaris truncated. Right mandible (Fig. 7B) with a short simple seta and 5 plumose setae between pars incisiva and pars molaris; pars incisiva same as in left one. Protopod of first maxilla (Fig. 7E) with 14 spines; endite with 4 spines. Branchial apparatus of first maxilliped (Figs. 7C, D) with a lobule; carpus with 5 serrated flattened spines on inner margin; dactylus with 5 simple setae; endite with 7 plumose setae and 2 spines having round tip on inner margin.

Adult female: Body (Fig. 8B) about 1.7 mm long, excluding uropods; its surface (Fig. 8C) same as in male. Carapace (Figs. 8B, D) slightly longer than 1/3 of body length, about 1.4 times as long as its depth and 1.53 times as long as its width; its shape triangular in dorsal view. Upper and lower ridges same as in male. Antennal notch shallowly concaved. Pseudorostral lobes (Fig. 8D) serrated. Ocular lobe (Fig. 8D) broadly round, with 7 lenses.

All free thoracic somites (Figs. 8B, D) about 1/2 of carapace length and slightly shorter than 1/5 of body length. Fifth somite largest; first and second somites subequal to each other; third somite slightly longer than second one; fourth somite slightly shorter than fifth one. Abdomen (Figs. 8B, F) about 0.8 times as long as cephalothorax length. Fifth somite longest; sixth somite subequal to fifth somite length, about 1.34 times as long as its width.

Peduncle of antennule (Fig. 8A) 3-segmented; first segment slightly shorter than length of remaining segments together, with numerous hairs and a simple seta on outer margin; second segment about 0.58 times as long as first one, with a simple seta; third segment slightly shorter than second one. Main flagellum 3-segmented; second segment about 1/2 of first segment length, with a aesthetasc and 2 simple setae; third segment very short, with a aesthetasc and a simple seta. Accessory flagellum unsegmented, slightly longer than first segment length of main flagellum; with 2 sensory setae and 2 simple setae.

Basis of first peraeopod (Fig. 8E) about 0.56 times as long as remaining segments together; with a plumose seta, 2 simple setae and numerous hairs on inner margin; with a hyaline flattened tooth and numerous hairs on outer margin. Ischium about 0.7 times as long as merus. Merus slightly shorter than 1/2 of carpus, with a simple seta on inner margin and numerous hairs. Carpus about 2.13 times as long as propodus, with 3 simple setae on inner margin; with a simple seta and

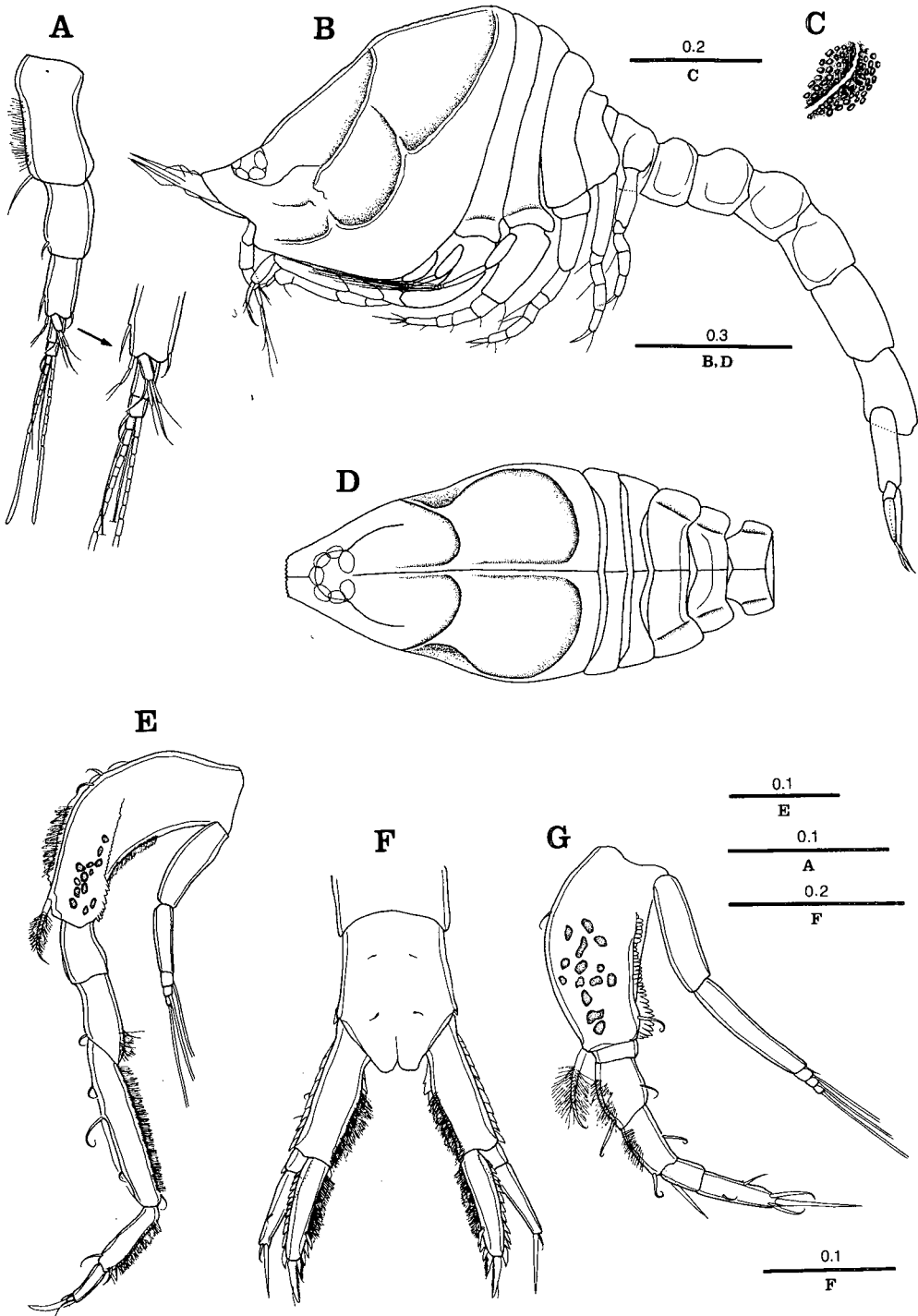


Fig. 8. *Cumella alveata* Gamô, 1964, female: A, antennule; B, habitus, lateral; C, integument of carapace; D, cephalothorax, dorsal; E, first pereopod; F, uropods and last abdominal somite, dorsal; G, second pereopod. Unit of scales in mm.

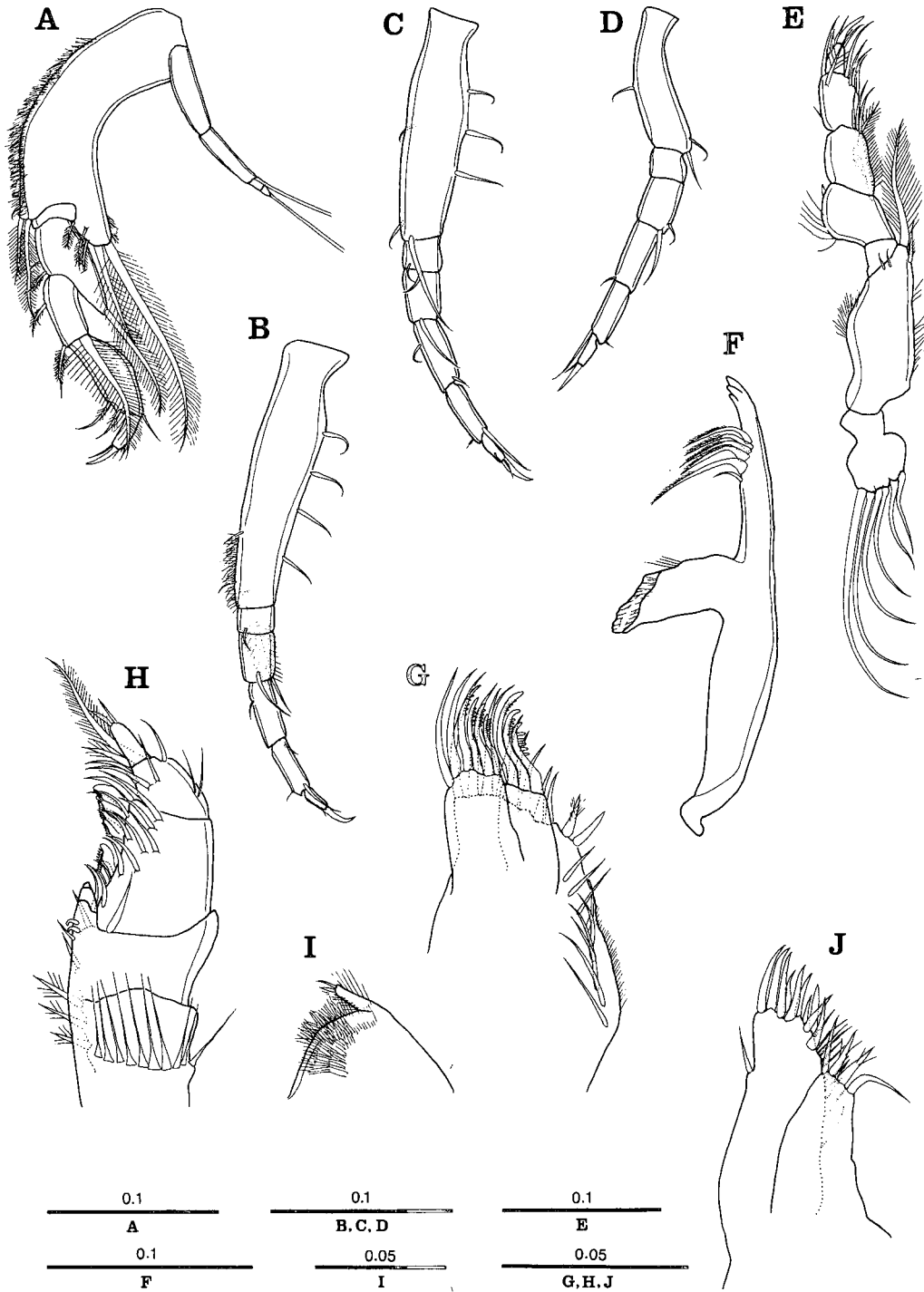


Fig. 9. *Cumella alveata* Gamô, 1964, female: A, third maxilliped; B, third pereopod; C, fourth pereopod; D, fifth pereopod; E, second maxilliped; F, right mandible; G, second maxilla; H, first maxilliped omitted branchial apparatus and siphon; I, labium; J, first maxilla. Unit of scales in mm.

numerous hairs on outer margin. Propodus about 1.8 times as long as dactylus, with a simple seta on inner margin; with 2 simple setae and numerous hairs on outer margin. Dactylus with 3 simple terminal setae and a terminal spine.

Peduncle of uropod (Fig. 8F) about $\frac{3}{4}$ of last abdominal segment in length; inner and outer margin serrated respectively; with numerous hairs on inner margin. Endopod of uropod unsegmented, about 0.88 times as long as peduncle; inner and outer margin serrated respectively; with numerous hairs on inner margin and with 2 terminal spines. Exopod of uropod 2-segmented, about 0.9 times as long as endopod; first segment about $\frac{1}{4}$ of second segment length; second segment with a very short terminal seta and a terminal spine.

Basis of second peraeopod (Fig. 8G) about 0.77 times as long as remaining segments together, with a plumose seta on inner angle; with a hyaline flattened tooth and a simple seta on outer margin. Ischium very short. Merus subequal to carpus length, with a simple seta and numerous hairs on inner margin; with a simple seta on outer margin. Carpus about 1.7 times as long as propodus, with numerous hairs on inner margin; with 2 simple setae on inner angle and a simple seta on outer margin. Propodus slightly shorter than $\frac{1}{2}$ of dactylus length. Dactylus with a simple seta on surface, a simple seta on outer margin; with 4 terminal spines (one of them long).

Basis of third peraeopod (Fig. 9B) about 1.23 times as long as remaining segments together. Basis of fourth peraeopod (Fig. 9C) about 0.94 times as long as remaining segments together. Basis of fifth peraeopod (Fig. 9D) about 0.6 times as long as remaining segments together.

Labium (Fig. 9I) with numerous hairs on inner margin. Right mandible (Fig. 9F) with a short simple seta and 5 plumose setae between pars incisiva and pars molaris; pars incisiva with 3 teeth; pars molaris truncated. Protopod of first maxilla (Fig. 9J) with 10 spines and 12 simple setae on inner margin; endite with 4 spines. Endites of second maxilla (Fig. 9G) exceeding protopod. Carpus of first maxilliped (Fig. 9H) with 6 serrated flattened spines on inner margin; dactylus with 2 simple setae; endite with 7 plumose setae and 2 spines having round tip on inner margin. Basis of second maxilliped (Fig. 9E) about 0.6 times as long as remaining segments together. Basis of third maxilliped (Fig. 9A) about 0.9 times as long as remaining segments together, with numerous hairs on inner margin; with 2 plumose setae and a simple seta on inner angle. Outer angle of basis inflated, reaching to about $\frac{1}{3}$ of merus and with 5 long plumose setae (one of them very long). Ischium very short. Merus slightly shorter than carpus; its outer angle inflated, with a long plumose setae. Carpus about 0.68 times as long as propodus, with a plumose seta on inner margin and a plumose seta on inner angle; with a long plumose seta on outer angle. Propodus about 2.5 times as long as dactylus, with 2 plumose setae on inner margin and a seta on outer angle. Dactylus with a simple outer seta, 2 simple terminal setae and a terminal spine; terminal spine subequal to propodus length. Exopod well developed.

Remarks. This species has almost same formal carapace furnished with two pairs of ridges and covered with numerous alveolate sculptures in both sexes. But, they have the following sexual dimorphism: (1) the bases of each peraeopod in female are much shorter than male; (2) the uropodal peduncle in female is about $\frac{3}{4}$ of the last abdominal somite in length, while it is subequal in male. In addition, the uropodal peduncle of male has a spine on the inner margin, whereas it is absent in female.

The female of *Cumella alveata* closely resembles *Cumella sadoensis* Gamô, 1967 in having

carapace pitted and covered with numerous alveolate sculptures. But, the ridge (or carina) pattern of the carapace and the form of the uropod differ greatly each other.

Our specimens are well accorded with the original description of *Cumella alveata* by Gamô (1964) from Japanese waters. However, a few differences are found between ours and Gamô's male specimen: (1) in our specimens the antenna reaches 1/4 of fifth abdominal somite, while that of Gamô's specimen extends to its posterior end; (2) in our specimens the basis of the third maxilliped is serrated on the inner margin, unlike in Gamô's specimen. Also, in the original description both the uropodal peduncle and the endopod are furnished with only serrations on the inner margins, while ours are furnished with a spine in addition to serrations.

Distribution. Korea (South Sea, Chejudo Is.), Japan (Sagami Bay).

*13. *Cumella glaberata* Gamô, 1962 두드럭옆올챙이새우 (신칭) (Figs. 10-12)

Cumella glaberata Gamô, 1962, p. 189, figs. 26, 27; 1963, p. 80, 86, pl. 14 fig. 18; 1967a, p. 27, pl. 1 fig. 12, 13; Băcescu, 1992, p. 218.

Cumella glabera Gamô, 1967b, p. 251.

Material examined. 21 ♂♂, Nohwado Is., 23 May 1998; 1 ♂, Sinyang, 10 Aug. 1998, Y.H. Kim; 1 ♂, T'aehŭng, 10 Aug. 1998, Y.H. Kim.

Description. Adult male: Body (Fig. 10B) about 2.5-2.8 mm long, excluding uropods; its surface with numerous small tubercles. Carapace (Figs. 10B, C) short than 1/3 of body length, about 1.5 times as long as its width and 1.8 times as long as its depth; dorsal surface with numerous small tubercles and several sensory hairs. Antennal notch shallowly concaved. Pseudorostral lobes (Fig. 10C) round, serrated and slightly shorter than length of ocular lobe. Ocular lobe (Fig. 10C) broadly round, with 7 lenses.

All free thoracic somites (Figs. 10B, C) about 2/3 of carapace length and about 1/5 of body length. First somite very short; fifth somite largest; second somite subequal to third one; fourth somite slightly shorter than fifth one. Abdomen (Figs. 10B, F) slightly short than cephalothorax length. Fifth somite about 3/4 of combined length of third and fourth somites. Sixth somite slightly shorter than fifth somite length, slightly short than twice as long as its width.

Peduncle of antennule (Fig. 10A) 3-segmented; first segment about 0.7 times as long as remaining segments together; second segment with 2 simple setae on outer angle and 3 sensory setae on inner angle; third segment slightly short than second one. Main flagellum 3-segmented; second segment about 2/3 of first segment length, with 2 aesthetascs and 2 long simple setae on outer angle; third segment very short, with a sensory seta and 2 distal setae (one long and the other short). Accessory flagellum very minute, with 2 sensory setae and 2 distal setae. Antenna (Figs. 10B, E) long, not exceeding fifth segment of abdomen, but some specimen reaching only to the end of the fourth one; peduncle 5-segmented.

Basis of first peraeopod (Fig. 10D) about 0.9 times as long as remaining segments together, with a simple seta and numerous hairs on inner margin; with 2 hyaline flattened teeth, a simple seta and a plumose seta on outer margin. Ischium subequal to merus length, with a plumose seta on inner margin. Merus slightly longer than 1/3 of carpus length, with a simple seta on inner and outer margins respectively. Carpus about 1.7 times as long as propodus, with 2 simple setae on inner and outer margins respectively. Propodus about twice of dactylus length, with 2 simple setae on inner margin and 3 simple setae on outer margin. Dactylus with a simple inner seta and 2 simple

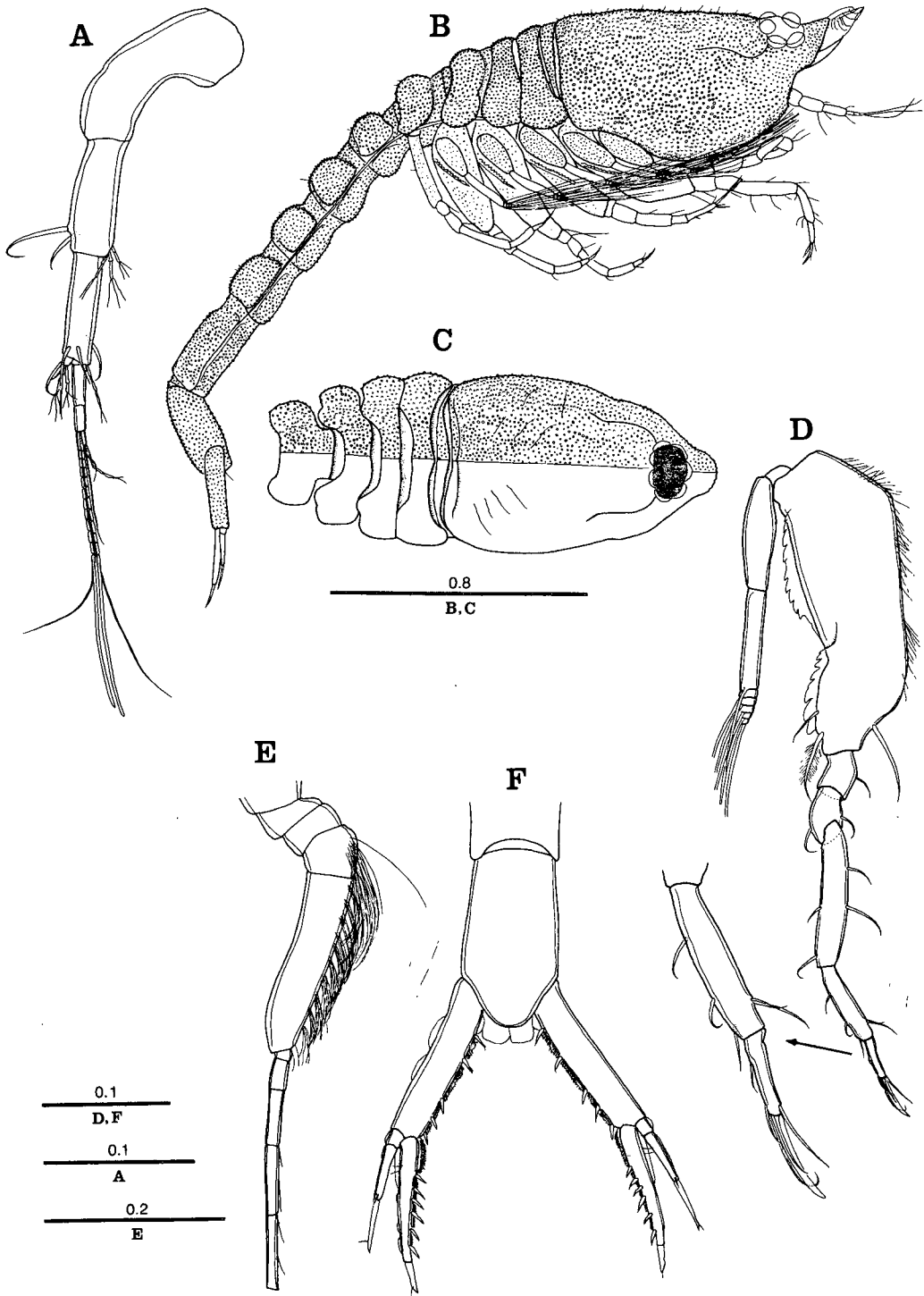


Fig. 10. *Cumella glaberata* Gamô, 1962, male: A, antennule; B, habitus, lateral; C, cephalothorax, dorsal; D, first peraeopod; E, antenna; F, uropods and last abdominal somite, dorsal. Unit of scales in mm.

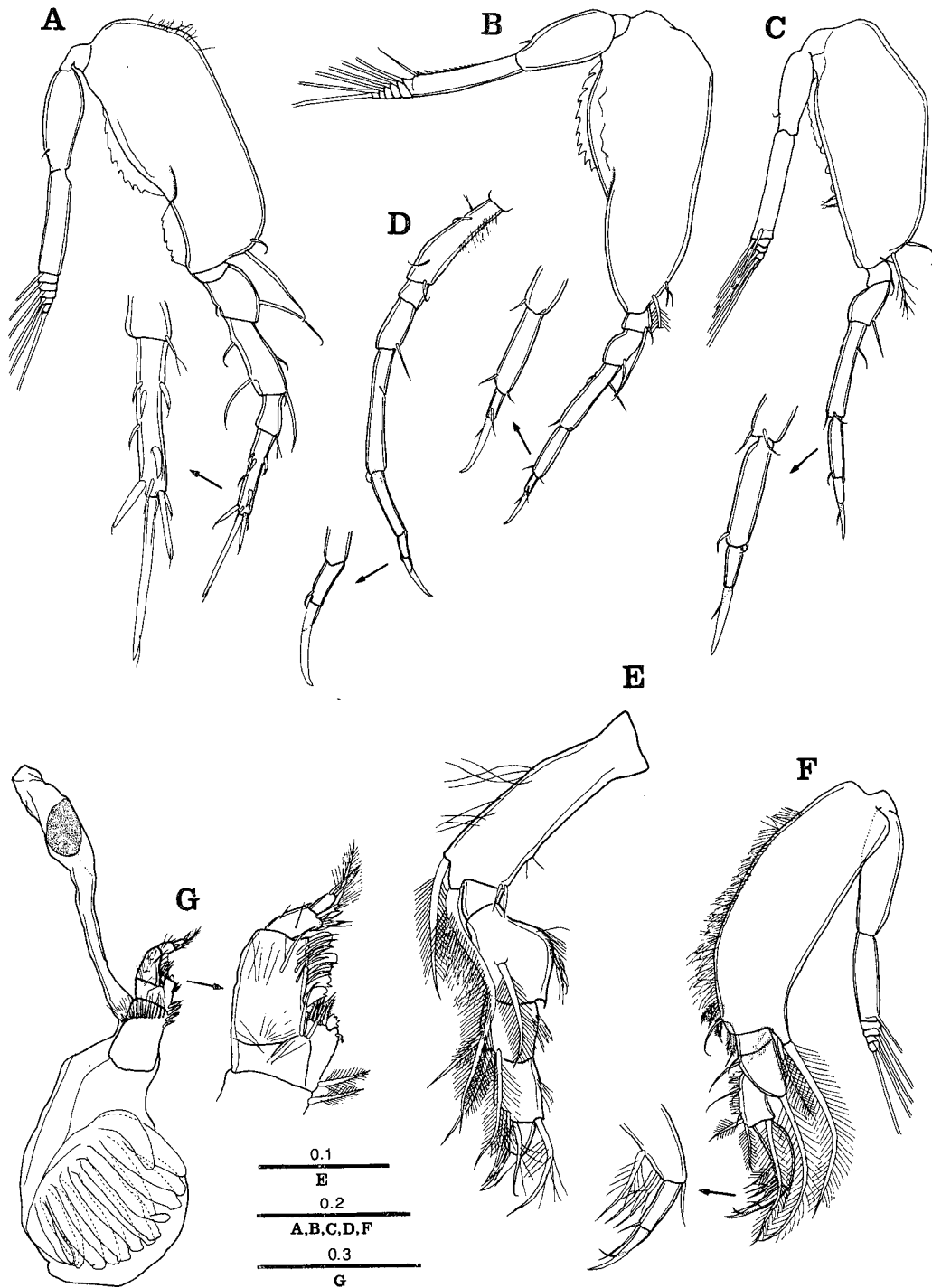


Fig. 11. *Cumella glaberata* Gamô, 1962, male: A, second pereopod; B, third pereopod; C, fourth pereopod; D, fifth pereopod; E, second maxilliped; F, third maxilliped; G, first maxilliped. Unit of scales in mm.

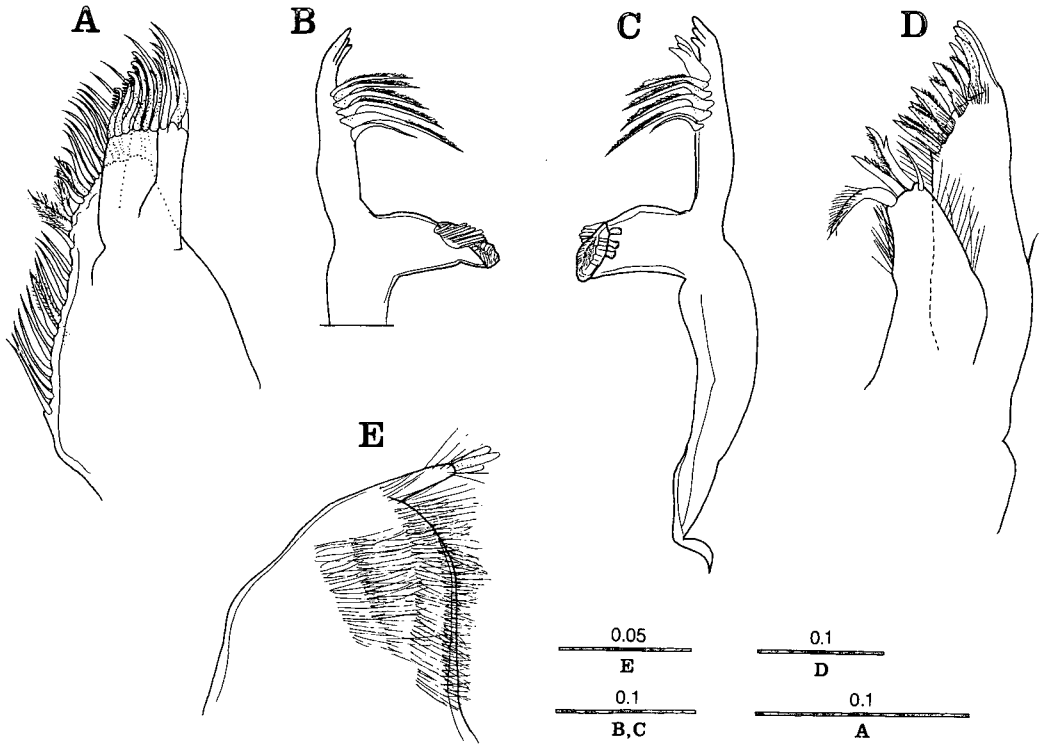


Fig. 12. *Cumella glaberata* Gamô, 1960, male: A, second maxilla; B, right mandible; C, left mandible; D, first maxilla; E, labium. Unit of scales in mm.

outer setae; with 2 simple terminal setae and a terminal spine.

Peduncle of uropod (Fig. 10F) shorter than last abdominal segment in length; with 5 spines and numerous hairs on inner margin, but some specimen with 4 spines. Endopod of uropod unsegmented, 0.8 times as long as peduncle, with 6 spines and numerous hairs on inner margin; with a terminal spine. Exopod of uropod 2-segmented, slightly longer than 1/2 of endopod length; first segment about 1/3 of second segment length; second segment with a very short terminal seta and a terminal spine.

Basis of second pereopod (Fig. 11A) about as long as remaining segments together, with 2 simple on inner angle and 2 hyaline flattened teeth on outer margin. Ischium very short, about 1/4 times as long as merus. Merus about 0.7 times as long as carpus, with a simple seta on inner angle and a simple seta on outer margin. Carpus about 2.1 times as long as propodus, with a simple seta on inner margin and 2 simple setae on inner angle; with 2 simple setae on outer margin. Propodus shorter than 1/2 of dactylus length, with a sensory seta on inner angle. Dactylus with 7 spines on surface and 3 terminal spines (one of them long).

Basis of third pereopod (Fig. 11B) about 1.4 times as long as remaining segments together, with a plumose seta and 2 simple setae on inner angle; with a hyaline flattened tooth on outer margin. Basis of fourth pereopod (Fig. 11C) about as long as remaining segments together, with a plumose seta and a simple seta on inner angle; with a hyaline flattened tooth and 2 sensory setae

on outer margin. Basis of fifth pereopod (Fig. 11D) about 0.4 times as long as remaining segments together.

Branchial apparatus of first maxilliped (Fig. 11G) with 15 lobules; carpus with 5 bipid flattened spines on inner margin; endite with 4 plumose setae and a tooth having serrated tip on distal margin, and 2 hook-like spines on inner margin. Basis of second maxilliped (Fig. 11E) about 0.7 times as long as remaining segments together, with 2 plumose setae on inner angle and 2 short simple setae on outer angle. Basis of third maxilliped (Fig. 11F) about 1.4 times as long as remaining segments together, with numerous hairs on inner margin; with a simple seta and 7 plumose setae on inner angle. Outer angle of basis inflated, reaching to about 1/5 of merus and with a spine-like plumose seta and 2 plumose setae (one of them very long). Ischium about 0.4 times as long as merus. Merus subequal to carpus length; its outer angle somewhat inflated, with a long plumose seta. Carpus about 0.7 times as long as propodus, with 3 simple setae and numerous hairs on inner margin; with 2 plumose setae on inner angle and a long plumose seta on outer margin. Propodus about 2.2 times as long as dactylus, with a plumose seta on inner margin. Dactylus with a simple inner seta, 2 simple terminal setae and a terminal spine; terminal spine subequal to propodus length. Exopod well developed.

Labium (Fig. 12E) with numerous hairs on inner margin. Left mandible (Fig. 12C) with a short simple seta and 4 plumose setae between lacinia mobilis and pars molaris; pars incisiva and lacinia mobilis with 3 teeth respectively; pars molaris truncated, with a spine-like tooth bundle on inner margin. Right mandible (Fig. 12B) with a short simple seta and 5 plumose setae between pars incisiva and pars molaris; pars incisiva same as in left one; pars molaris with a spine-like tooth bundle on outer margin. Protopod of first maxilla (Fig. 12D) with 13 spines; endite with a plumose spine, a simple seta and 2 bipid spines. Endites of second maxilla (Fig. 12A) exceeding protopod.

Remarks. Our specimens are well accorded with the original description. However, a few differences are found between our specimens and type specimens: (1) in ours the last abdominal somite is slightly shorter than the fifth, while it is longer than the fifth somite in Gamô's specimen; (2) according to Gamô's description the antenna reaches the end of the second abdominal somite, but in ours it reaches extends beyond the end of the fourth one; (3) in ours the uropodal peduncle is furnished with 4 or 5 spines on the inner margin, rather than 6 spines in Gamô's specimen.

Distribution. Korea (South Sea, Chejudo Is.), Japan (Tanabe Bay).

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제주도와 남해 해역의 한국산 올챙이새우류

이 창 목 · 이 경 숙
(단국대학교 기초과학부 생물학전공)

요 약

1997년부터 1998년 사이에 제주도를 포함한 남해연안의 25개 지점에서 채집된 올챙이새우류를 동정한 결과 4과 13종이 동정되었다. 그들 중 Nannastacidae (꼬마 올챙이새우) 과에 속하는 3 한국미기록종, *Campylaspis pumila* Gamô, 1960, *Cumella alveata* Gamô, 1964 그리고 *Cumella glaberata* Gamô, 1962가 확인되어 보고한다. 이들 가운데에, *C. alveata*의 암컷에 관한 기재는 학계에 처음으로 보고되는 것이다. 또한, 이들 3종의 구기부에 관한 새로운 정보를 추가한다.