

The Genus *Mysidella* (Crustacea, Mysidacea, Mysidae), with Descriptions of Five New Species

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Abstract Five new species of the genus *Mysidella* are described based on the specimens from Japanese waters and Southeast Asian seas. *Mysidella macrophthalma* sp. nov. is characterized by eight peculiar spines on the carpopropodus of the endopod of the first thoracic limb and the telson more than twice as long as broad, *M. mukaii* sp. nov. by the outer lobe of the maxillule armed with distal spines flattened and rounded apically and the telson armed with spines throughout the lateral margin, *M. orientalis* sp. nov. by length/width ratio of the telson and the numbers of spines on the uropodal endopod and telson, *M. sulcata* sp. nov. by the transverse deep groove on the rostrum and the terminal claw armed with two spines directing proximally, and *M. truncata* sp. nov. by the rostrum with truncate frontal margin, the endopod of the first thoracic limb with five peculiar spines on the carpopropodus and the telson with shallow apical sinus armed with one or two spines on either side. All species of the genus *Mysidella* are compared with respect to main morphological characters.

Key words: Mysidae, *Mysidella*, new species, Japanese waters, Southeast Asia.

Introduction

The subfamily Mysidellinae was established by Norman (1892) within the family Mysidae. This subfamily is unique in the family Mysidae in having the labrum, mandible and maxillule which are quite different in shape as compared with those of the other five subfamilies. Nowadays, Mysidellinae contains only one genus, *Mysidella*. The genus *Mysidella* was created for the reception of *M. typica* and *M. typhlops* collected from the northern North Atlantic off Norway by Sars (1872), and 11 species have been reported from the world oceans and seas so far: one species from the Northeast Pacific (Banner, 1948; Gleye, 1981; Daly & Holmquist, 1986; Kathman *et al.*, 1986; Laubitz, 1986), five from the West Pacific (Ii, 1964; Murano, 1970a, 1970b; Wang, 1998), three from the Northeast Atlantic (Sars, 1872, 1879; Holt & Beaumont, 1900; Holt & Tattersall, 1905, 1906; Tattersall, 1909, 1911; Zimmer, 1909, 1915; Colosi, 1929; Bacesco, 1941; Tattersall & Tattersall, 1951; La-

gardère & Nouvel, 1980), one from the tropical West Atlantic (Brattegard, 1973), and one from Bass Strait, Australia (Fenton, 1990).

The present paper deals with nine *Mysidella* species in my possession, with descriptions of five new species. The type specimens are deposited in the National Science Museum, Tokyo (NSMT).

Material and Methods

Most of the present material were collected from neighboring waters of Japan and Southeast Asian seas during cruises of R/Vs *Hakuho Maru* and *Tansei Maru* of the Ocean Research Institute, University of Tokyo. Collections were made with three types of nets. In many cases the material was taken with a rectangular plankton net (mouth opening 30×60 cm) installed in the mouth of a 3-m beam trawl. This net was not equipped with any opening-closing device, so that the exact depth at which the material was collected is not known. However, it is supposed that many of the

present specimens were collected from on or just above the sea-floor, because *Mysidella* specimens were rarely found in plankton net samples collected within the water column in adjacent areas. In this paper, this type of net is called 'Murano's net'. The bottom-net, provided with sleigh in the under side, was also used in the collection on the installation of a closing system. Details are given in Omori (1969). The ORI-net, a conical net with a mouth diameter of 160 cm and a filtering part of 600 cm long, was towed obliquely or horizontally with or without an opening-closing device. The track of the net in water column can be known with a depth-distance meter attached to the net ring. Details of the net have also been reported in Omori (1965).

The body length was measured from the apex of the rostrum to the distal end of the telson except apical spines.

Systematics

Subfamily Mysidellinae Norman, 1892

Mysidellinae Norman, 1892: 148; Hansen, 1910: 13 (in key); Tattersall & Tattersall, 1951: 427; Ii, 1964: 573–574; Fenton, 1990: 437.

Definition. Labrum very aberrant, produced posteriorly into large plate and divided by deep incision into 2 unequal lobes. Mandible anomalous, cutting lobe very expanded, without distinct teeth. Maxillule with outer lobe bent inwards, distally broadened and armed with row of strong spines. Endopod of first thoracic limb with carpopropodus armed with several peculiar spines on outer distal margin and long claw on terminal end. Pleopods of male all rudimentary as in female. Female with 3 pairs of oostegites. Male with genital appendage extremely elongate and directing forwards. Both rami of uropod not segmented and setose all round. Telson with distal cleft furnished with spinules.

Remarks. When Norman (1892) described the subfamily Mysidellinae, he paid attention to the endopod of the first thoracic limb having the last joint with three or more shorter spines and terminating in a very long spine, and to the male

pleopods reduced as in those of female. Hansen (1910) took up the labrum, mandible and maxillule as characteristics of the subfamily, in addition to those mentioned by Norman (1892). Later scientists (Tattersall & Tattersall, 1951; Ii 1964; Fenton, 1990), including the present author, have followed in general the Hansen's diagnosis.

Genus *Mysidella* Sars, 1872

Mysidella Sars, 1872: 266; Sars, 1879: 84–86; Zimmer, 1909: 169; Illig, 1930: 600 (in key); Banner, 1948: 108–109; Tattersall & Tattersall, 1951: 427; Ii, 1964: 574; Kathman *et al.*, 1986: 191; Fenton, 1990: 437.

Diagnosis. Eye well developed or rudimentary. Antennular peduncle with male process represented by small setose lobe. Antennal scale small, lanceolate with rounded apex, slightly curved outwardly, setose on all margins; distal suture present. Endopod of second thoracic limb with carpopropodus not divided into subsegments. Endopod of third to eighth thoracic limbs with carpopropodus divided into 2 or 3 subsegments. Endopod of uropod armed with spines along inner margin.

Type species. *Mysidella typica* Sars, 1872.

Remarks. Ii (1964) noted in the generic diagnosis that the labrum may have a short anterior spiniform process. However, this must be canceled, because the anterior end of the labrum is rounded and not provided with any trace of spiniform process in the majority of the known species.

Mysidella incisa Wang, 1998

(Fig. 1)

Mysidella incisa Wang, 1998: 224–226, 243–244, fig. 12.

Material. One male (2.8 mm), 1 posterior half of body (sex unknown) (NSMT-Cr 14187); Timor Sea (12°17.3'S 129°40.9'E to 12°17.2'S 129°41.8'E), 49–52 m, Murano's net, 24 June 1972, collected by M. Murano. One male (divided into two parts), 2 females (3.2, 3.4 mm) (NSMT-Cr 14188); Timor Sea (12°24.8'S 128°00.1'E to 12°24.8'S 128°00.2'E), 115–

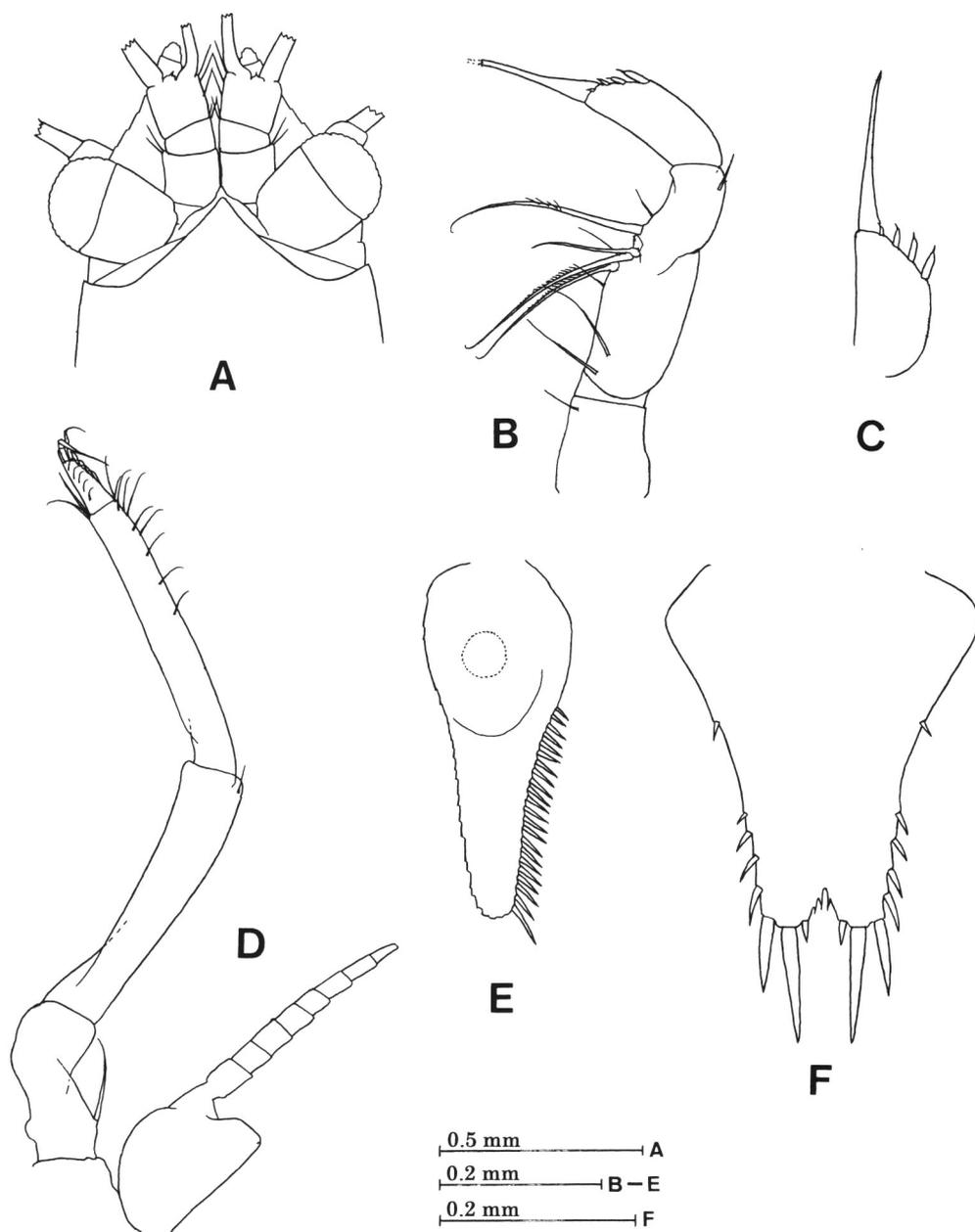


Fig. 1. *Mysidella incisa* Wang, 1998, A–F, adult female (3.0 mm). A, anterior part of body; B, endopod of first thoracic limb; C, extremity of the same; D, second thoracic limb; E, endopod of uropod; F, telson.

115 m, Murano's net, 25 June 1972, collected by M. Murano. Two females (2.7, 3.0 mm) (NSMT-Cr 14189); Timor Sea (12°37.3'S 124°33.9'E to 12°36.0'S 124°36.4'E), 74–78 m, Murano's net, 25–26 June 1972, collected by M. Murano.

Remarks. The present specimens are identi-

fied with *Mysidella incisa* Wang by the small-sized body, the shape of the rostrum, the spine number on the uropodal endopod, and the shape and armature of the telson (Fig. 1A, E, F). However, a slight difference is recognized in the number of the peculiar spines on the carpopropodus

of the endopod of the first thoracic limb, three in the type specimens compared with four in the present specimens, although the distal one is very small (Fig. 1B, C).

A morphological variation is apparent in the armature of the telson. The spine number of the distal spine group on the lateral margin varies from four to five, and that of the proximal spine group from one to two.

Distribution. Known from northern area of the South China Sea (Wang, 1998) and the Timor Sea.

Mysidella macrophthalma sp. nov.

(Figs. 2, 3)

Type series. Holotype (NSMT-Cr 14190), adult female (5.6 mm); allotype (NSMT-Cr 14191), adult male (5.6 mm); paratypes (NSMT-Cr 14192), 3 females (5.5, 6.0, 6.0 mm, one specimen of 6.0 mm dissected for drawings), 2 males (5.2, 5.6 mm, one specimen of 5.6 mm dissected for drawings); northern South China Sea, 21°41.2'N 117°31.1'E to 21°42.7'N 117°33.4'E, 415–437 m, Murano's net, 19 March 1973, collected by S. Ohta.

Description. Carapace produced anteriorly into triangular rostral plate with broadly rounded apex extending to base of antennular peduncles, leaving almost all eyes uncovered (Fig. 2A, B). Anterolateral corner of carapace rounded. Posterior margin emarginate, leaving posterior 2 thoracic somites exposed.

Eye large, globular; cornea expanded, wider than eyestalk; eyestalk without papilliform process (Fig. 2A, B).

Antennular peduncle of female more slender than that of male; first segment longer than third, with anterolateral corner produced laterally and armed with several setae; second segment shortest, inner margin 3 times longer than outer, so that antennular peduncles diverging distally in dorsal view, with 2 setae on inner distal corner; third segment slightly longer than broad, with 1 seta on middle of inner margin and 7 setae on inner distal margin (Fig. 2A). In male, third seg-

ment as long as first and second segments combined, with numerous sensory setae on ventral surface of middle part (Fig. 2B).

Antennal scale lanceolate, longer than antennular peduncle, more than 3 times as long as maximum width at proximal third, setose all round, inner margin convex, outer margin slightly concave, distal suture distinct (Fig. 2C). Antennal peduncle slightly shorter than antennular peduncle, extending to middle of antennal scale, 3-segmented, first segment short, third segment equal to second in length (Fig. 2C). Antennal sympod with denticle at outer distal corner (Fig. 2C).

Labrum broadly rounded in front, produced posteriorly into 2 unequal lobes, right lobe broadly rounded posteriorly, with fine teeth on margin, left lobe smaller, rectangular in shape; anterior end of posterior sinus angulate (Fig. 2F). Mandible and maxilla as shown in Fig. 2D and E, respectively.

Endopod of first thoracic limb robust; preischium small, triangular, with 3 long robust setae; ischium longer than merus, furnished with 2 long robust setae on distal part of inner margin, outer distal corner produced anteriorly into spiniform process; merus as long as carpopropodus, with 1 long robust seta at inner proximal end and with 1 spiniform seta near distal end of outer margin; carpopropodus twice as long as broad, armed on distal half of outer margin with 8 peculiar spines, proximal one short and slender, distal 3 small; terminal claw long, straight, 1.5 times as long as carpopropodus, suture indistinct (Fig. 3A).

Endopod of second thoracic limb robustly built compared with those of posterior pairs; merus unarmed, with outer distal end produced into blunt process; carpopropodus not divided into subjoints, with 2 setae at inner distal end; dactylus short, with terminal claw slender (Fig. 3B).

Endopod of fifth thoracic limb rather short; carpopropodus divided into 3 subjoints being subequal in length, first subjoint with 1 long seta, second subjoint with 2 setae, third subjoint with 3 setae and slender terminal claw (Fig. 3C).

Endopod of eighth thoracic limb slender; is-

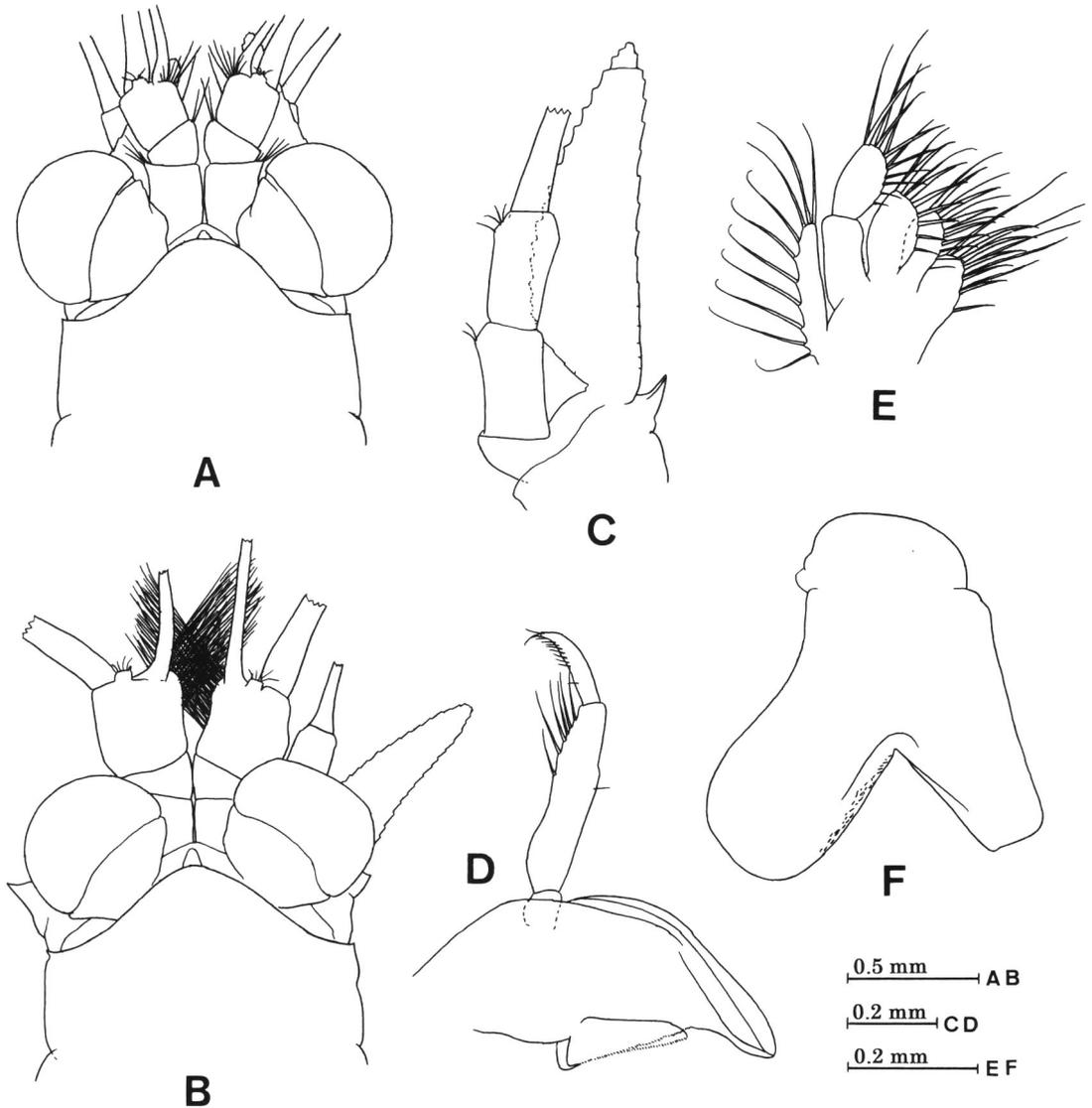


Fig. 2. *Mysidella macrophthalma* sp. nov., A, holotype, B, allotype, C–F, paratype (adult female of 6.0 mm). A, anterior part of body; B, anterior part of body; C, antenna; D, mandible; E, maxilla; F, labrum.

chium with 2 long setae on outer margin; merus longest, inwardly curved, with 4 setae on outer margin and 2 long setae on inner distal margin; carpopropodus divided into 2 subjoints, proximal subjoint 3 times longer than distal one, with 3 long setae on distal margin, distal subjoint with 2 slender setae; dactylus with long claw terminally (Fig. 3D).

Penis somewhat damaged in the present male specimens, extremely elongate, 1.2 times longer

than endopod of eighth thoracic limb, with small apical lobe, lateral margins unarmed (Fig. 3E).

First abdominal somite slightly longer than second, second to fourth somites subequal, fifth somite subequal to first, sixth somite 1.3 times longer than fifth.

Exopod of uropod overreaching distal end of telson for about 1/3 of its length, setose all round (Fig. 3F). Endopod of uropod slightly shorter than exopod, extending beyond apex of telson for

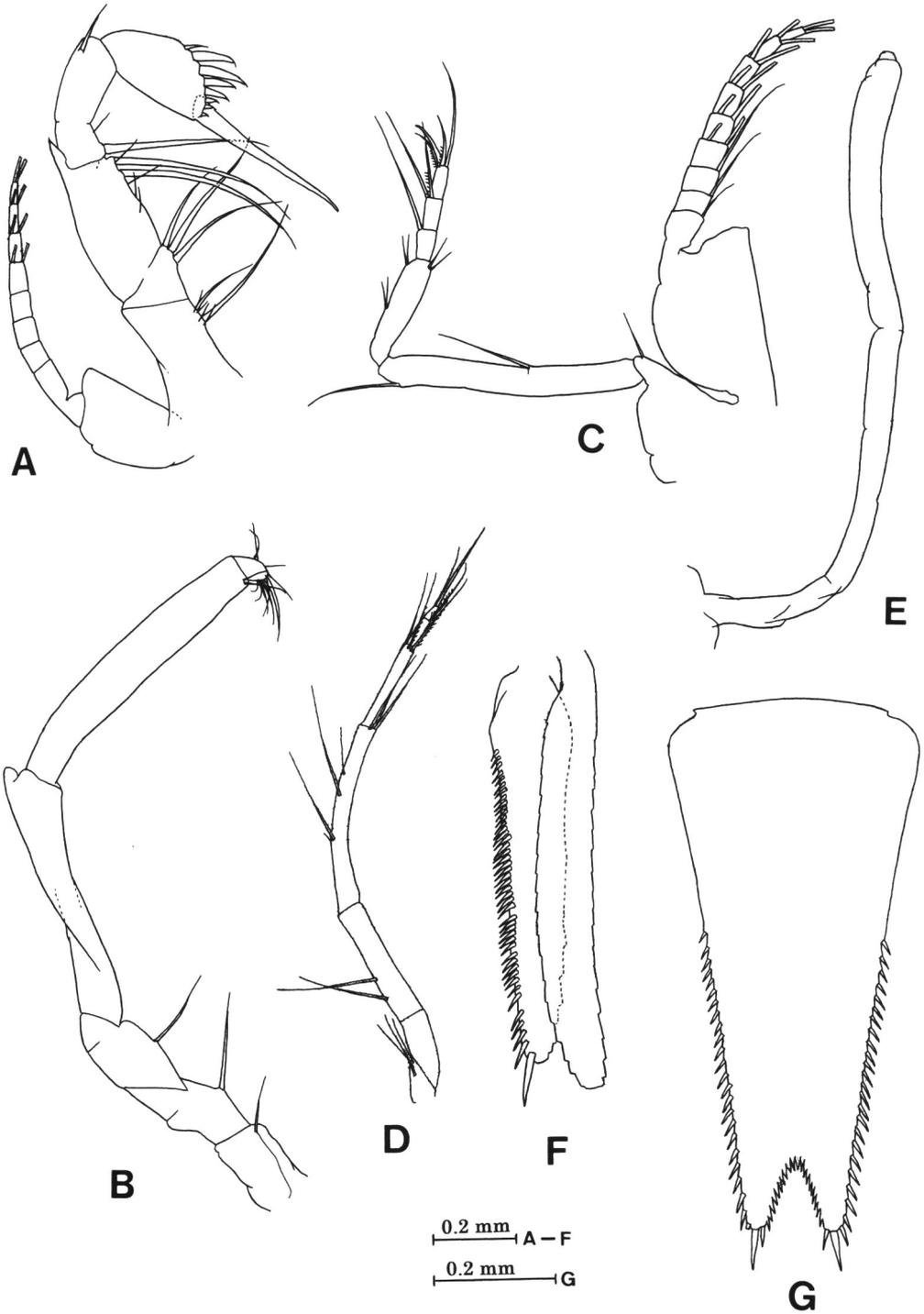


Fig. 3. *Mysidella macrophthalma* sp. nov., A–C, F, paratype (adult female of 6.0 mm), D, E, allotype, G, holotype. A, first thoracic limb; B, endopod of second thoracic limb; C, fifth thoracic limb; D, endopod of eighth thoracic limb; E, penis; F, uropod (statocyst omitted); G, telson.

about 1/4 of its length, armed along inner margin from statocyst region to apex with about 46 spines, proximal 14 spines small, distal one long, nearly twice as long as preceding one (Fig. 3F).

Telson 1.6 times longer than last abdominal somite, more than twice as long as broad at base, becoming gradually narrower distally; lateral margin nearly straight, naked in proximal third, armed with 24 small, same-sized spines on distal 2/3; apical cleft rather shallow, 1/7 as long as telson, rounded at anterior end, armed with 20 spinules on entire margin; apex of distal lobe narrow, with 2 spines, inner spine same as lateral ones in size, outer spine more than twice as long as inner (Fig. 3G).

Etymology. The specific name, *macrophthalmia*, is derived from the big eyes.

Remarks. The remarkable character of this new species is recognized in the endopod of the first thoracic limb in addition to the big eye. The carpopropodus of the endopod is furnished with as many peculiar spines as eight. The maximum number of the peculiar spines in the known species of *Mysidella* is seven in *M. australiana* Fenton, 1990. The new species is clearly different from that species in the size of the eyes, the shape and spine arrangement of the telson and the number of spines on the inner margin of the uropodal endopod.

***Mysidella mukaii* sp. nov.**

(Figs. 4, 5)

Type series. Holotype (NSMT-Cr 14193), adult female (3.5 mm), paratypes (NSMT-Cr 14194), 3 damaged adult males (two of which dissected for drawings), 1 adult female (damaged), 2 near adult females (3.6, 3.7 mm), 1 immature male (3.5 mm), 3 immature females (3.1, 3.3, 3.4 mm), 1 juvenile; Thomson Bay, Rottneest Island, W. Australia, on leaves of sea-grasses, *Posidonia australis* Hook, 1858 and *Amphibolis antarctica*, about 3 m, 15–18 January 1996, hand net, collected by H. Mukai. All the present specimens are in depressed condition because they were suffered some pressure for preservation

within polyethylene bags.

Description. Carapace produced frontally into triangular rostral plate with obtusely pointed apex and straight lateral margins, leaving eyes exposed (Fig. 4A, B). Anterolateral corner of carapace rounded; posterior margin deeply emarginate, leaving last 3 thoracic somites exposed.

Eye with cornea large, slightly wider than eye-stalk; eyestalk without papilliform process (Fig. 4A, B).

Antennular peduncle much more robust in male than in female. In female, first segment longest, with anterolateral corner slightly produced and armed with several setae; second segment shortest, with 1 seta at distal end of inner margin; third segment broadened distally, with 3 setae on inner distal margin (Fig. 4A). In male, first segment with anterolateral corner strongly produced anteriorly and tipped with several setae; third segment longest and broadest (Fig. 4B).

Antennal scale slightly overreaching distal end of antennular peduncle (Fig. 4A, B), lanceolate with rounded apex, setose all round, 3 times as long as broad, external margin straight, internal margin convex, distal suture distinct (Fig. 4C). Antennal peduncle extending to distal third of antennal scale, 3-segmented with distal segment longest; sympod with outer distal corner not produced into spiniform process (Fig. 4C).

Cutting lobe of mandible finely serrated (Fig. 4E). Second segment of mandibular palp with 8 naked long setae on distal half of outer margin and 1 short seta at distal end; third segment 2/5 as long as second (Fig. 4D). Outer lobe of maxillule armed with 15 spines, distal 3 spines long and blunt, proximal 12 broad, decreasing in length proximally, flattened and rounded at apex (Fig. 4F). Inner lobe of maxilla with 3 long barbed setae on apical margin and 1 short simple seta near distal end of inner margin (Fig. 4F). Labrum with frontal margin narrowly rounded (Fig. 4G).

Endopod of first thoracic limb rather slender; ischium armed distally with 2 long setae on inner margin; merus short, 1.5 times as long as broad,

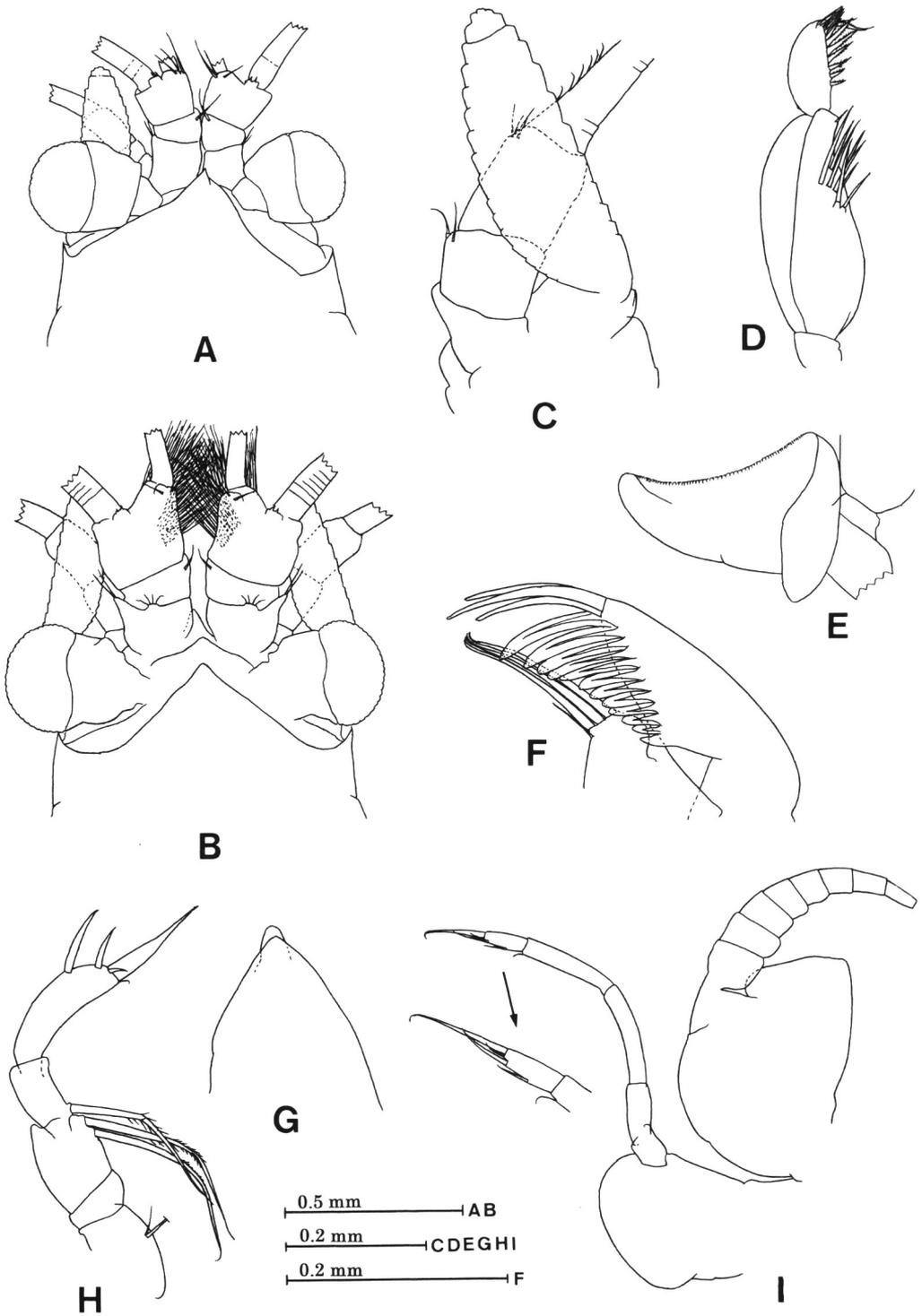


Fig. 4. *Mysidella mukaii* sp. nov., A, paratype (near-adult female), B–I, paratypes (adult males). A, anterior part of body; B, anterior part of body; C, antenna; D, mandibular palp; E, cutting lobe of mandible; F, maxillule; G, anterior half of labrum; H, endopod of first thoracic limb; I, second thoracic limb.

with 1 long seta at proximal end of inner margin; carpopropodus less than 3 times as long as broad, inner margin with 1 small seta at distal end, outer margin armed on distal third with 3 widely spaced, rather slender spines becoming smaller distally; terminal claw shorter than carpopropodus, thick in proximal half and slender in distal half, suture indistinct (Fig. 4H).

Endopod of second thoracic limb short and slender; merus slightly curved inwardly, 6 times as long as broad, inner and outer margins unarmed; carpopropodus slightly shorter than merus, not divided into subsegments, somewhat broadened distally, with 1 short seta at distal end of inner margin; dactylus 2.5 times as long as broad, with 3 naked setae on inner margin, terminal claw slender (Fig. 4I).

Endopod of third thoracic limb slender; merus longest, with 5 long setae on distal half of outer margin; carpopropodus divided into 2 subsegments by oblique articulation, first subsegment twice longer than second, inner margin with 1 short seta at middle and 2 barbed setae at distal end, second subsegment with 1 barbed seta at inner distal end; dactylus with terminal claw short and stout (Fig. 5A).

Fifth to seventh thoracic endopods short and robust, increasing in length towards posterior pairs (Fig. 5B, C, D). Ischium in these 3 endopods unarmed, shorter than combined length of merus and carpopropodus in fifth and sixth endopods, slightly longer in seventh endopod. Merus increasing in length towards posterior pairs. Carpopropodus divided into 3 subsegments, first subsegment with 1 long seta in fifth endopod, 2 short setae in sixth, and 1 short seta in seventh; second and third subsegments with 2 and 3 long setae, respectively. Thoracic exopods with flagellipart 8-segmented (Figs. 4I, 5D).

Abdominal somites with length ratio as: 83 : 67 : 73 : 67 : 68 : 100.

Uropod rather short and broad, setose all round; exopod overreaching distal end of telson for 0.4 of its length; endopod overreaching distal end of telson for 0.3 of its length, furnished on inner ventral margin from statocyst region to

near distal end with about 16 spines, these spines arranged densely in proximal half and sparsely in distal half, gradually increasing in length distally (Fig. 5F).

Telson almost as long as last abdominal somite, 1.3 times as long as broad at base (Fig. 5G). Lateral margin of telson slightly concave, armed along whole length with 7–9 stout, somewhat irregular-sized spines. Distal sinus shallow, only 1/15 of telson length, with only 1 spine on each side. Each apex with 2 spines, outer spine stout, twice longer than inner, slightly less than 1/4 as long as telson, inner one rather slender.

Etymology. Named in honor of the collector, Prof. H. Mukai of the Akkeshi Marine Biological Laboratory, Hokkaido University.

Remarks. *Mysidella mukaii* sp. nov. is considerably different morphologically from the other species of the genus in the telson, maxillule and possibly in the labrum. The telson in *M. mukaii* is armed with spines throughout the lateral margin, while in the other species of the genus, the telson is armed with spines on distal 2/3 to 1/2 of the lateral margin. Spines arming the outer lobe of the maxillule in *M. mukaii*, except for distal three, are broad, flattened and rounded apically, whereas those of the other species of the genus are all pointed sharply. The frontal margin of the labrum is triangular with narrowly rounded apex in *M. mukaii*, while broadly rounded in the other species of the genus. I failed to observe the posterior portion of the labrum. The labrum of *M. mukaii* may have not provided the prolonged posterior lobes which are one of the most characteristic feature of the subfamily Mysidellinae. If it is true, the diagnosis of the subfamily Mysidellinae needs to be amended.

Professor Mukai, who collected the present specimens, informed me with respect to their habitat and behavior. These mysids move smoothly on leaves of the sea-grasses, *Posidonia australis*, *Amphibolis antarctica* and *A. griffithii*, taking hold of both margins of a leaf using their legs.

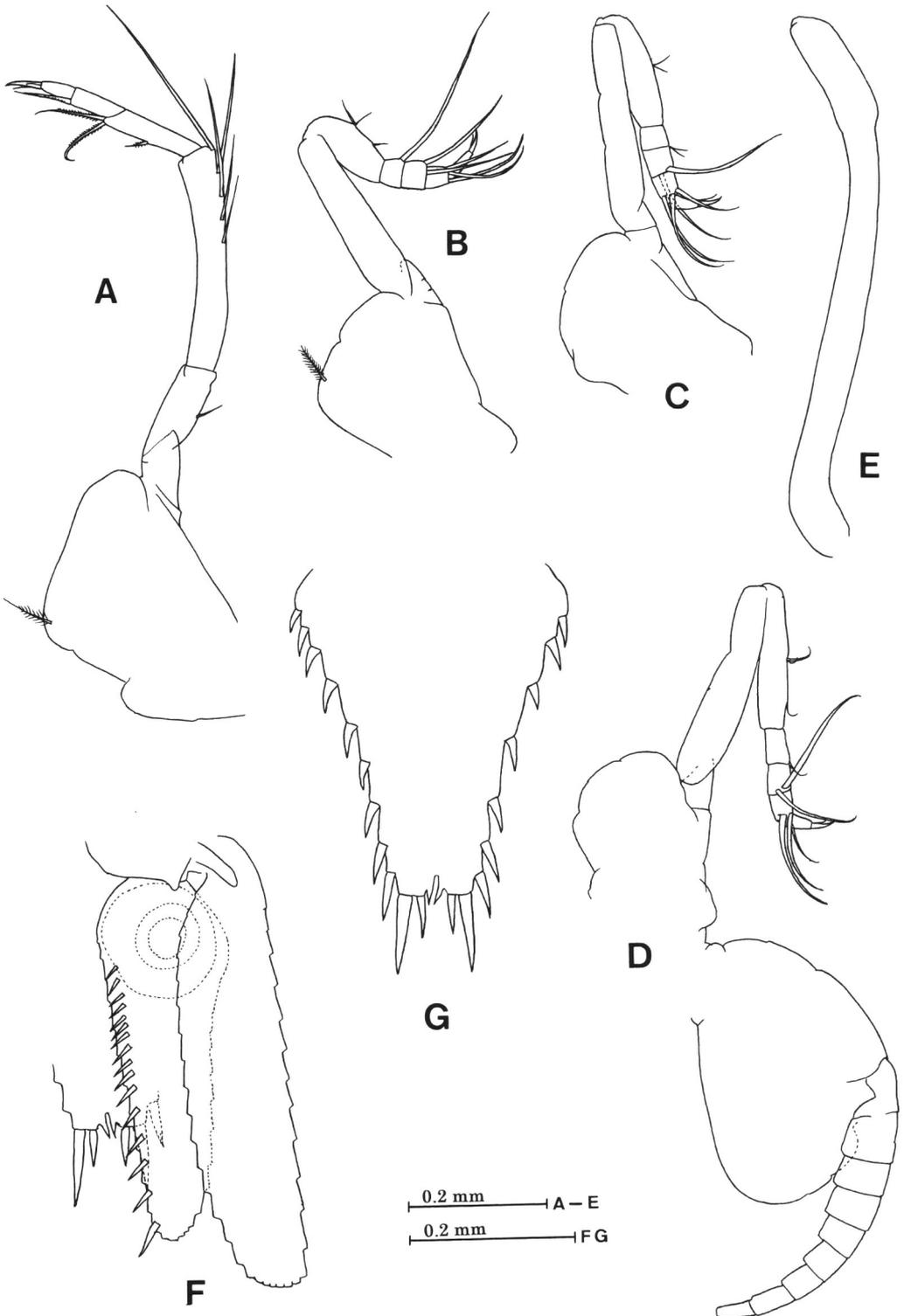


Fig. 5. *Mysidella mukaii* sp. nov., A–E, paratypes (adult males), F, G, holotype. A, endopod of third thoracic limb; B, endopod of fifth thoracic limb; C, endopod of sixth thoracic limb; D, seventh thoracic limb; E, penis; F, uropod, ventral view; G, telson.

***Mysidella nana* Murano, 1970**

Mysidella nana Murano, 1970a: 264–267, figs. 48–61; 1970b: 148; Mauchline & Murano, 1977: 65 (catalogue); Müller, 1993: 282 (catalogue).

Material. Four adult males (3.2, 3.4, 3.6, 3.8 mm), 2 adult females (3.4, 3.7 mm), 1 immature male (3.2 mm), 3 immature females (3.1, 3.6, 4.0 mm), 1 juvenile (2.7 mm) (NSMT-Cr 14195); Suruga Bay, 34°53.9'N 138°26.0'E to 34°53.8'N 138°25.6'E, 32–44 m, bottom-net, 13 May 1969, collected by M. Murano. Three adult males (3.5, 3.6, 4.3 mm), 1 gravid female (4.2 mm) (NSMT-Cr 14196); Oomura Bay, Nagasaki Prefecture, Japan, ca. 18 m, sledge net, 6 July 1977, collected by Y. Kamaga.

Distribution. Known from Suruga Bay (Murano 1970a), Tateyama Bay (Murano 1970b) and Oomura Bay, Japan.

***Mysidella orientalis* sp. nov.**

(Figs. 6–8)

Type series. Holotype (NSMT-Cr 14197), gravid female (4.9 mm), paratypes (NSMT-Cr 14198), 1 gravid female (5.2 mm), 1 adult female (5.2 mm, dissected for drawings); eastern East China Sea, 31°15.7'N 128°20.6'E to 31°17.5'N 128°22.1'E, 364–369 m, Murano's net, 5 August 1974, collected by S. Ohta.

Other material. One immature female (4.6 mm) (NSMT-Cr 14199); eastern East China Sea, 31°19.2'N 128°21.3'E to 31°16.5'N 128°21.3'E, 347–365 m, Murano's net, 5 August 1974, collected by S. Ohta.

Description. Carapace produced frontally into triangular rostrum with rounded apex and covering basal part of eyestalks (Fig. 6A). Anterolateral corner of carapace rounded. Posterior margin emarginate, leaving last thoracic somite exposed.

Eye large, cornea expanded, wider than eyestalk, well pigmented; eyestalk without papilliform process on dorsal surface (Fig. 6A).

Antennular peduncle of female small; first segment longest, outer distal corner somewhat produced and armed with several setae; second seg-

ment shortest, inner margin much longer than outer, with 1 seta distally; third segment as long as broad, with 1 short and 3 long setae on inner distal margin (Fig. 6A).

Antennal scale lanceolate with rounded apex, slightly curved outwardly, setose all round, overreaching distal margin of antennular peduncle by distal 1/3 to 1/4, more than 3 times as long as maximum breadth at proximal third, distal suture marked off at about distal 1/12 (Fig. 6B). Antennal peduncle shorter than antennal scale, third segment longest; sympod with outer distal corner obtusely angulated. (Fig. 6B).

Labrum, mandibular, mandible palp, maxillule and maxilla as shown in Fig. 6C to G, respectively.

Endopod of first thoracic limb robust (Fig. 6H). Basis with 1 long and 1 short setae on inner margin; preischium small, with 4 setae of variable length on inner margin; ischium with 7 setae of variable length on inner margin; merus narrow, with 2 long setae on proximal part of inner margin. Carpopropodus 1.3 times as long as merus, more than twice as long as broad, outer margin with 3 peculiar spines restricted in distal part, these spines terminating in plumed seta, inner margin with 2 small setae distally; terminal claw straight, 1.5 times longer than carpopropodus, suture indistinct.

Endopod of second thoracic limb slender (Fig. 7A). Merus slightly curved inwardly, 2.5 times longer than ischium, 8 times as long as broad, inner margin naked, outer margin with 1 seta at distal end and 2 setae at about proximal third. Carpopropodus not divided into subsegments, slightly shorter than merus, inner margin naked, outer margin with 5 short setae on distal half. Dactylus short, with about 8 barbed and 1 simple setae; terminal claw long and slender.

Endopods of third and fourth thoracic limbs with merus longer than ischium (Fig. 7B, C). Carpopropodus of these endopods divided into 2 subsegments, proximal subsegment 2.5 times longer than distal one, armed with 3 barbed setae on inner margin, 1 simple seta on outer margin, 2 barbed setae at inner distal end and 1 simple and

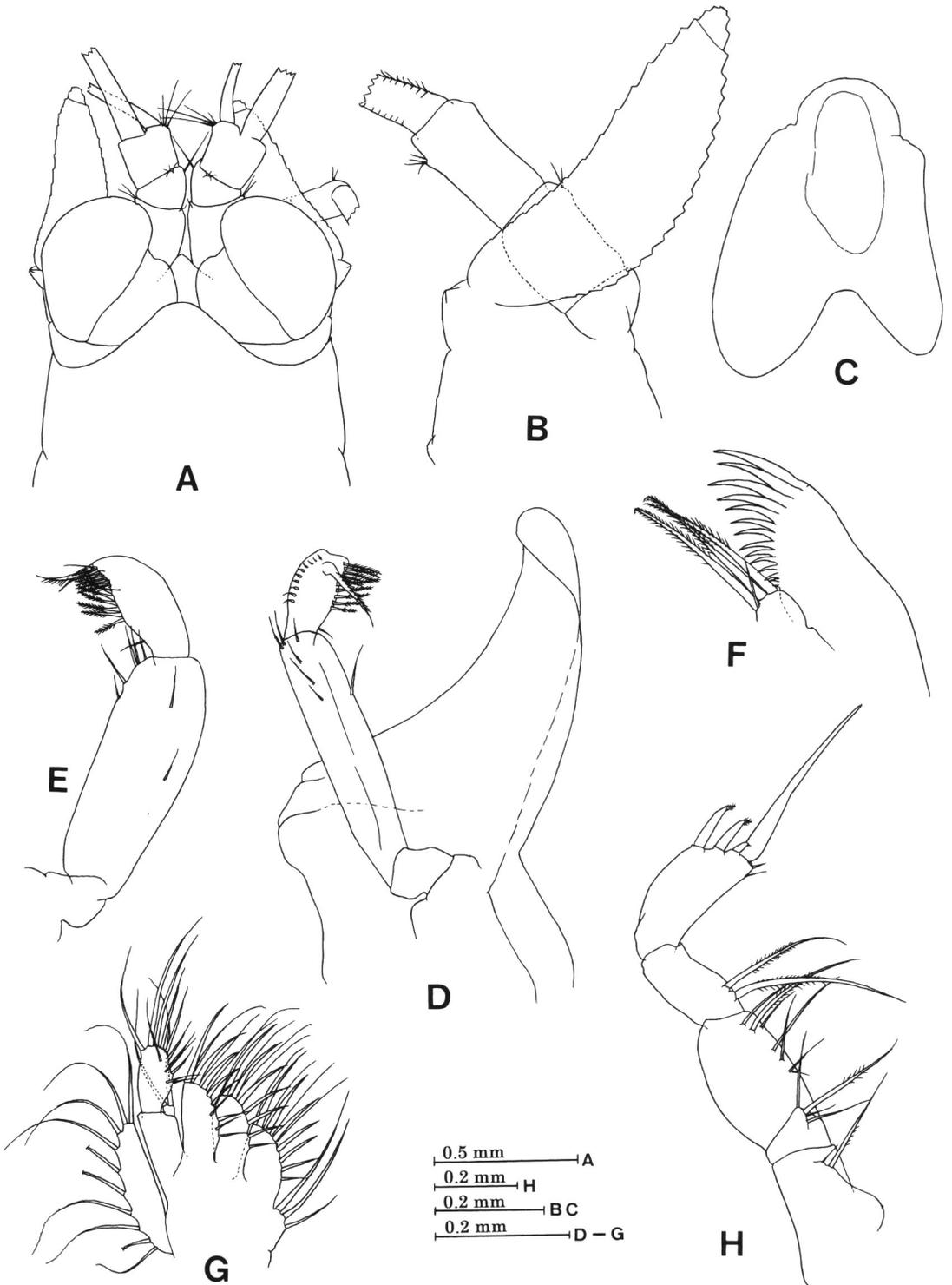


Fig. 6. *Mysidella orientalis* sp. nov., A, holotype; B-H, paratype (adult female of 5.2 mm). A, anterior part of body; B, antenna; C, labrum; D, mandible; E, mandibular palp; F, maxillule; G, maxilla; H, endopod of first thoracic limb.

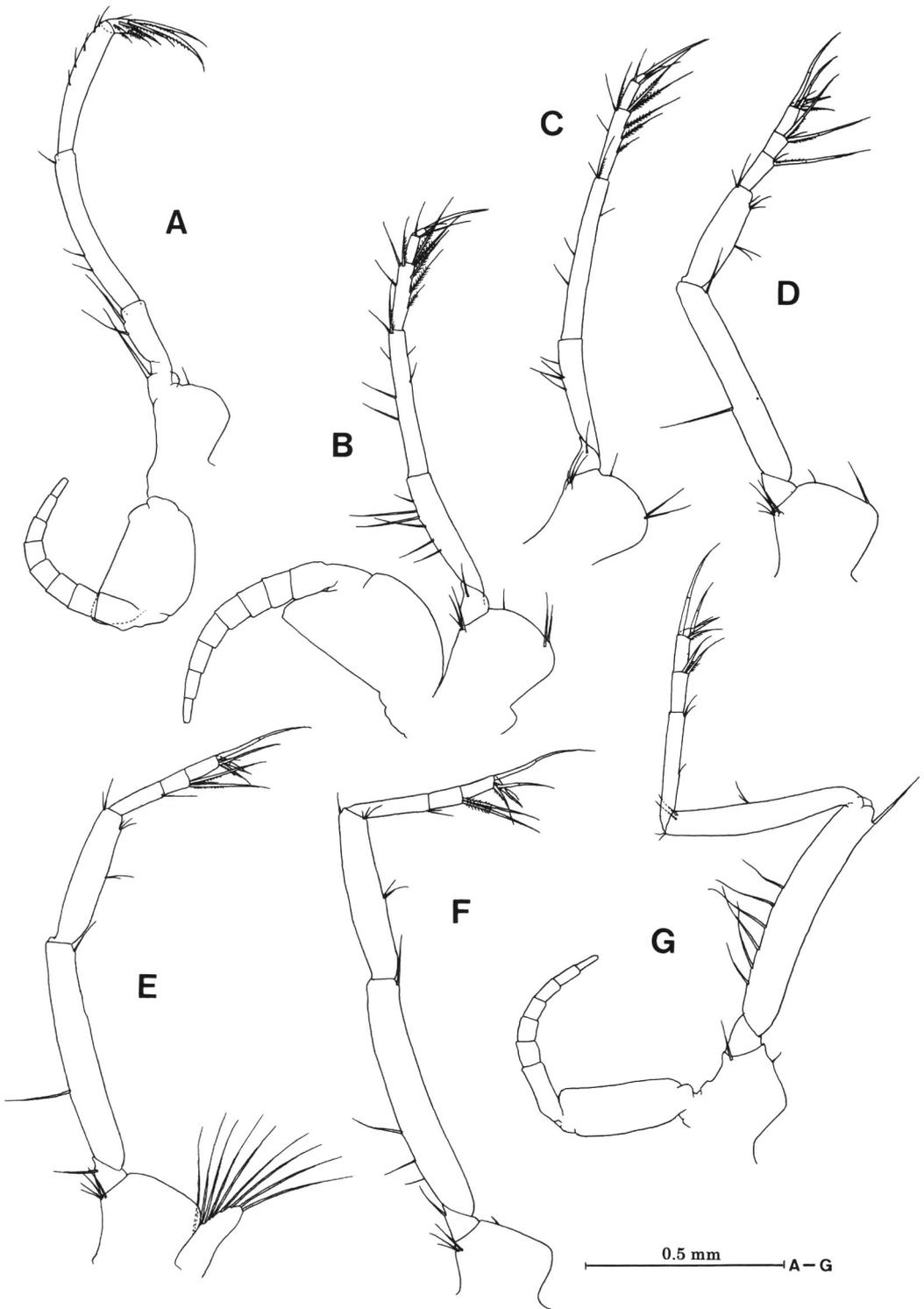


Fig. 7. *Mysidella orientalis* sp. nov., A–G, paratype (adult female of 5.2 mm). A, second thoracic limb; B, third thoracic limb; C, endopod of fourth thoracic limb; D, endopod of fifth thoracic limb; E, endopod of sixth thoracic limb with brood lamella; F, endopod of seventh thoracic limb; G, eighth thoracic limb.

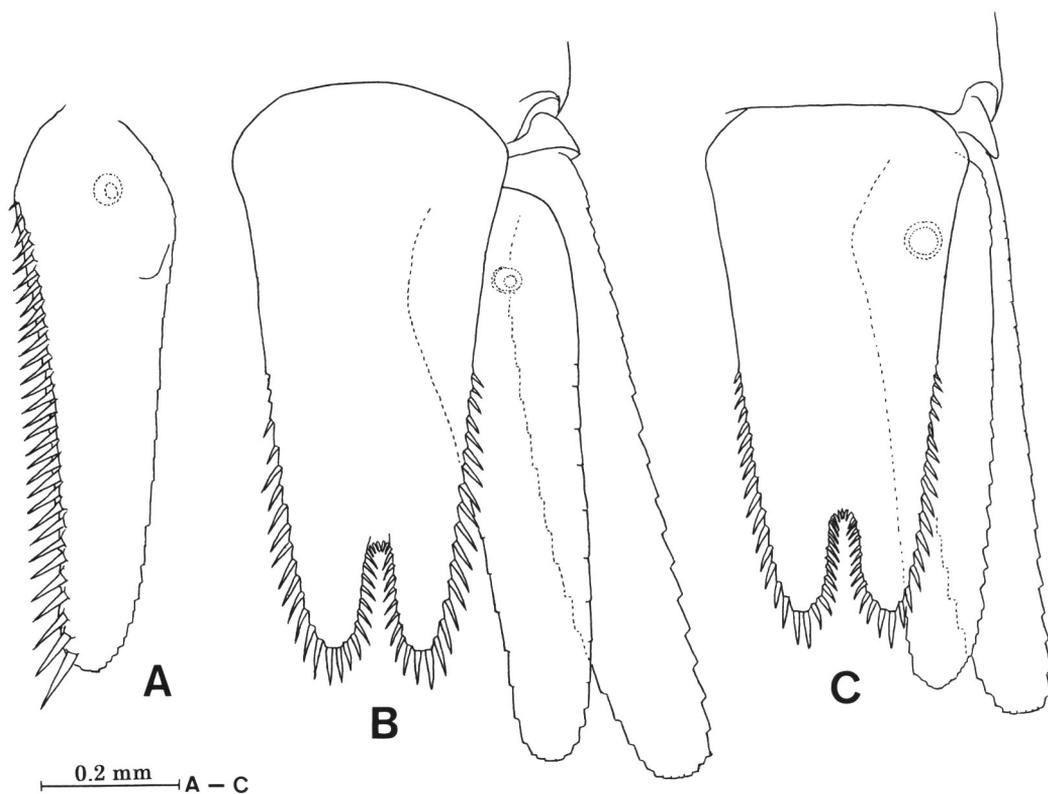


Fig. 8. *Mysidella orientalis* sp. nov., A, B, holotype; C, immature female (4.6 mm). A, endopod of uropod; B, uropod and telson; C, uropod and telson.

1 barbed setae at outer distal end, distal subsegment with 2 simple setae on distal margin. Dactylus small, with long and slender claw distally.

Endopods of fifth to eighth thoracic limbs slender, increasing in length posteriorly (Fig. 7D–G). Merus shorter than ischium. Carpopodius divided into 3 subsegments, proximal subsegment longest, armed at inner distal corner with 1 or 2 setae, of which 1 seta in fifth endopod is strong and barbed; middle subsegment shortest in fifth to seventh endopods and slightly longer than distal one in eighth endopod, with 2 stout, barbed setae at inner distal corner; distal subsegment with 2 long setae on distal margin. Dactylus short, with short claw terminally. Brood lamella on sixth endopod small, with long setae along margin (Fig. 7E).

Exopods of thoracic limbs with 7- or 8-seg-

mented flagellipart, outer distal corner of basal plate obtusely angulated (Fig. 7A, B, G).

Length ratios of first to sixth abdominal somites as: 70 : 71 : 71 : 77 : 73 : 100.

Endopod of uropod extending beyond distal end of telson by 1/5 of its length, inner margin slightly concave, armed along whole length with about 30 acute spines gradually becoming longer distally (Fig. 8A, B). Exopod of uropod slightly longer than endopod (Fig. 8B).

Telson 1.5 times longer than last abdominal somite, twice as long as broad at base, gradually narrowing towards bilobed distal end (Fig. 8B); lateral margin naked in proximal half, armed with 16 spines on distal half; terminal lobe with 2 spines on apex, spines equal in size to those on lateral margins; cleft 1/5 as long as telson, armed with 24 spines, 6 spines on anterior end relatively small and not articulated at base.

Table 1. Comparison of main morphological characters among the 16 valid species of the genus *Mysidella*.

	No. of peculiar spines on carpoproodus of 1st thoracic endopod	No. of spines on inner margin of uropodal endopod	Length/width ratio in telson	Number of spines on lateral margin of telson	Distal cleft/total length in telson (%)	No. of marginal spines on distal cleft of telson	Distribution
<i>M. americana</i> Banner, 1948	3	35	2	25 on distal 0.6	17	20	British Columbia to S. California ²⁾
<i>M. australiana</i> Fenton, 1990	7	27	1.5	10 on distal 1/2 and 3-4 proximally	4	6	Bass Strait ³⁾
<i>M. biscayensis</i> Lagardère & Nouvel, 1980	3	46	2.4	24-28 on distal 2/3	14	13	Bay of Biscay ⁴⁾
<i>M. incisa</i> Wang, 1998	3-4	24	<1.5	4-5 on distal 2/5 and 1-2 at basal 1/3	Quite shallow	2-3	Northern S. China Sea ⁵⁾ , Timor Sea ⁶⁾
<i>M. macrophthalma</i> sp. nov.	8	46	>2	24 on distal 2/3	14	20	Northern S. China Sea ⁶⁾
<i>M. minuta</i> Brattegard, 1973	3	24-25	1.5	6-7 on distal 1/2	12.5	9 on proximal 1/2	Caribbean coast of Colombia ⁷⁾
<i>M. mukaii</i> sp. nov.	3	16	1.3	7-9 on whole length	7	2	W. Australia ⁶⁾
<i>M. nana</i> Murano, 1970	5	35	<2	20 on distal 1/2	<25	20	Japan ^{6),8)}
<i>M. orientalis</i> sp. nov.	3	30	2	16 on distal 1/2	20	24	Eastern E. China Sea ⁹⁾
<i>M. rotundincisa</i> Wang, 1998	4	36	<2	14-17 on distal 2/3	9	8	Northern S. China Sea ⁵⁾
<i>M. sulcata</i> sp. nov.	3	47	2.6	26-27 on distal 3/5	20	36	Timor Sea, Sulu Sea ⁶⁾
<i>M. tanakai</i> Ii, 1964	3	48	2.3	25-27 on distal 1/2	20	34-36	Japan ^{6),9)}
<i>M. tenuicauda</i> Wang, 1998	5	29	<1.5	11-12 on distal 1/2	22	12	Northern S. China Sea ⁵⁾
<i>M. truncata</i> sp. nov.	5	25	1.3	8 on distal 1/2	7	2-4	SW Japan ⁶⁾
<i>M. typhlops</i> Sars, 1872 ¹⁾	Unknown	20	1.5	12 on distal 1/2	Quite shallow	2	Norway ¹⁰⁾
<i>M. typica</i> Sars, 1872	3	30-32	1.75-2	17-18 on distal 1/2	12.5-13.2	6-14	Norway to Bay of Biscay, Mediterranean ¹¹⁾

1) Eyes reduced in spindle-shape without visual elements. 2) Daly & Holmquist, 1986. 3) Fenton, 1990. 4) Lagardère & Nouvel, 1980. 5) Wang, 1998.

6) Present data. 7) Brattegard, 1973. 8) Murano, 1970. 9) Ii, 1964. 10) Zimmer, 1909. 11) Tattersall & Tattersall, 1955.

Etymology. The specific name, *orientalis*, refers to the locality where the specimens were collected.

Remarks. *Mysidella orientalis* sp. nov. is allied to *Mysidella americana* Banner, 1948, *M. tanakai* Ii, 1964, and *M. biscayensis* Lagardère et Nouvel, 1980, in three peculiar spines on the carpopropodus of the endopod of the first thoracic limb and the deep apical cleft of the telson. *M. orientalis*, is however, distinguished from the latter three species by the length/width ratio of the telson, the number of spines on the lateral margin of the telson, and the number of spines on the inner margin of the uropodal endopod (Table 1).

***Mysidella sulcata* sp. nov.**

(Figs. 9, 10)

Type series. Holotype (NSMT-Cr 14200), immature female with half-grown marsupium (8.2 mm, dissected partly for drawings); allotype (NSMT-Cr 14201), immature male (6.6 mm, dissected partly for drawings); paratypes (NSMT-Cr 14202), 3 immature females (6.3, 6.2, 6.1 mm) and 3 juveniles (4.7, 4.4, 4.2 mm); Timor Sea, 12°42.2'S 123°07.6'E to 12°42.0'S 123°08.5'E, 535–547 m, Murano's net, 26 June 1972, collected by M. Murano.

Other material. One adult female (8.2 mm) (NSMT-Cr 14203); Sulu Sea, 08°20.8'N 118°19.8'E to 08°20.6'N 118°18.8'E, 730–738 m, Murano's net, 27 May 1972, collected by M. Murano. One adult female (posterior half of body) (NSMT-Cr 14204); Timor Sea, 09°27.0'S 127°58.6'E to 09°28.5'S 127°56.1'E, 610–690 m, Murano's net, 18–19 June 1972, collected by M. Murano.

Description. Carapace produced anteriorly into low triangular rostrum with narrowly rounded apex extending beyond base of antennular peduncles (Fig. 9 A, B). Deep groove running transversely in mid-dorsal part of rostrum (Fig. 9C). Anterolateral corner of carapace rounded. Posterior margin deeply emarginate, leaving last thoracic somite uncovered. Pseudorostral plate just below rostrum rectangular in dorsal view

(Fig. 9A, B).

Eye rather small; cornea well pigmented and occupying distal third of whole organ; eyestalk without papilliform process on dorsal surface (Fig. 9A, B).

Antennular peduncle of female more slender than that of male; first segment longest, with anterolateral corner produced laterally and tipped with several setae; second segment shortest, wider than long, inner margin twice longer than outer, with 2 setae on distal corner; third segment longer than wide, inner margin 0.7 as long as outer, with about 5 setae at distal corner (Fig. 9A). In male, first segment shorter than wide, third segment about as long as second and third segments combined (Fig. 9B).

Antennal scale setose all round, overreaching distal margin of antennular peduncle by 1/4 of its length, more than 3 times as long as maximum width at proximal third, slightly curved outwards, suture marked off at about distal 1/18 (Fig. 9A, B, D). Antennal peduncle slightly shorter than antennular peduncle, middle segment longest; antennal sympod with denticle at outer distal corner (Fig. 9A, B).

Mandibular palp small, second segment with 6 setae on distal part of outer margin, third segment armed on outer margin with 1 seta at proximal fifth and about 10 barbed setae on distal half (Fig. 9G). Cutting lobe of mandible with anterior margin finely serrated (Fig. 9F). Labrum, maxillule and maxilla as shown in Fig. 9E, H–J.

Endopod of first thoracic limb robust; preischium small, with 6 slender setae; ischium as long as merus, armed with 10 setae of variable length along inner margin; merus as long as carpopropodus, more than twice as long as broad, armed with 2 strong setae at proximal third of inner margin; carpopropodus less than twice as long as broad, armed on distal third of outer margin with 3 robust peculiar spines decreasing in size distally and 1 tiny seta at end of inner margin; terminal claw 1.5 times as long as carpopropodus, with suture at proximal third, proximal segment armed with 2 small spines directed posteriorly near proximal end, proximal spine big-

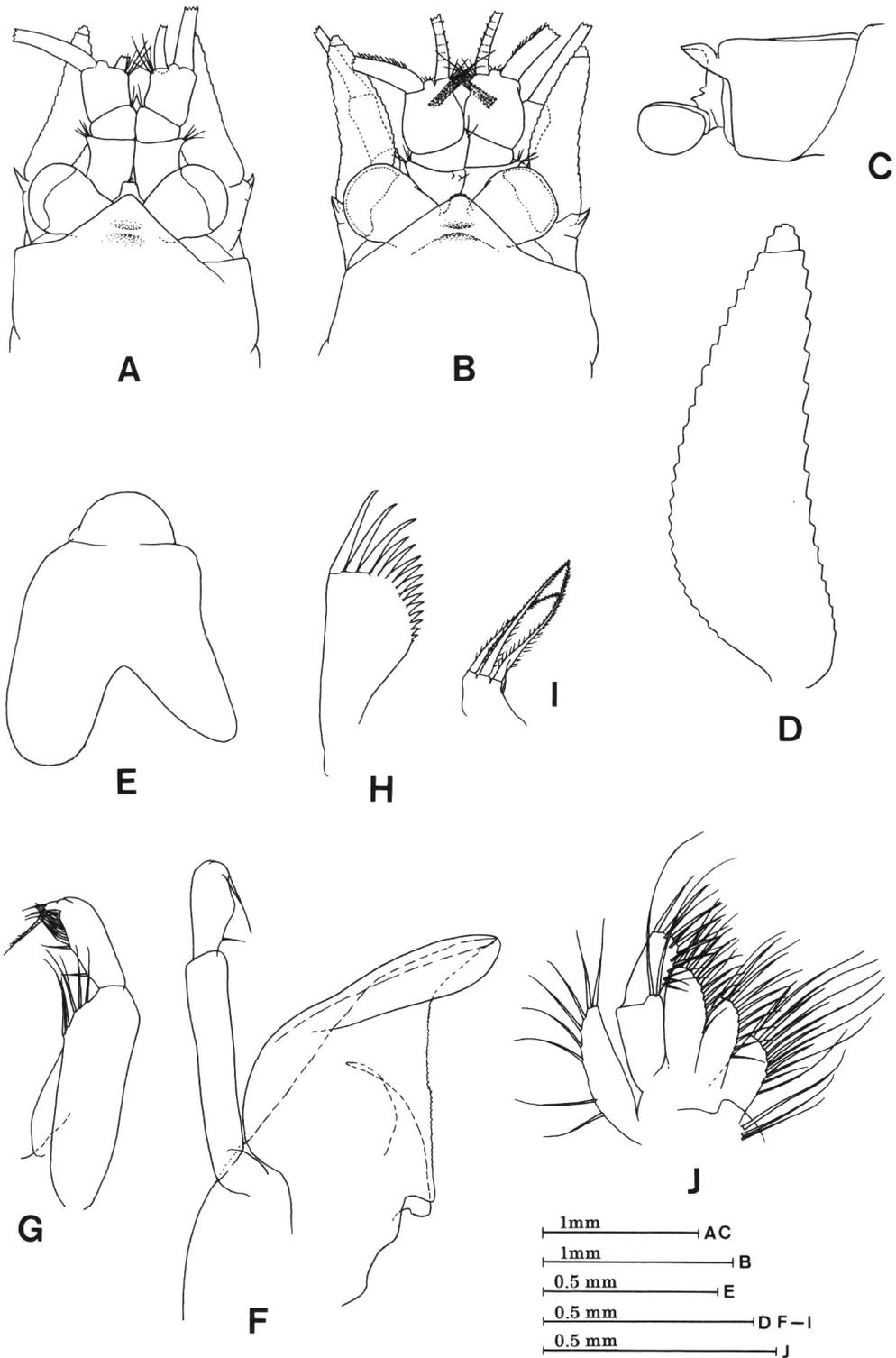


Fig. 9. *Mysidella sulcata* sp. nov., A, C–J, holotype; B, allotype. A, anterior part of body; B, anterior part of body; C, anterior part of body, lateral view; D, antennal scale; E, labrum; F, mandible; G, mandibular palp; H, outer lobe of maxillule; I, inner lobe of maxillule; J, maxilla.

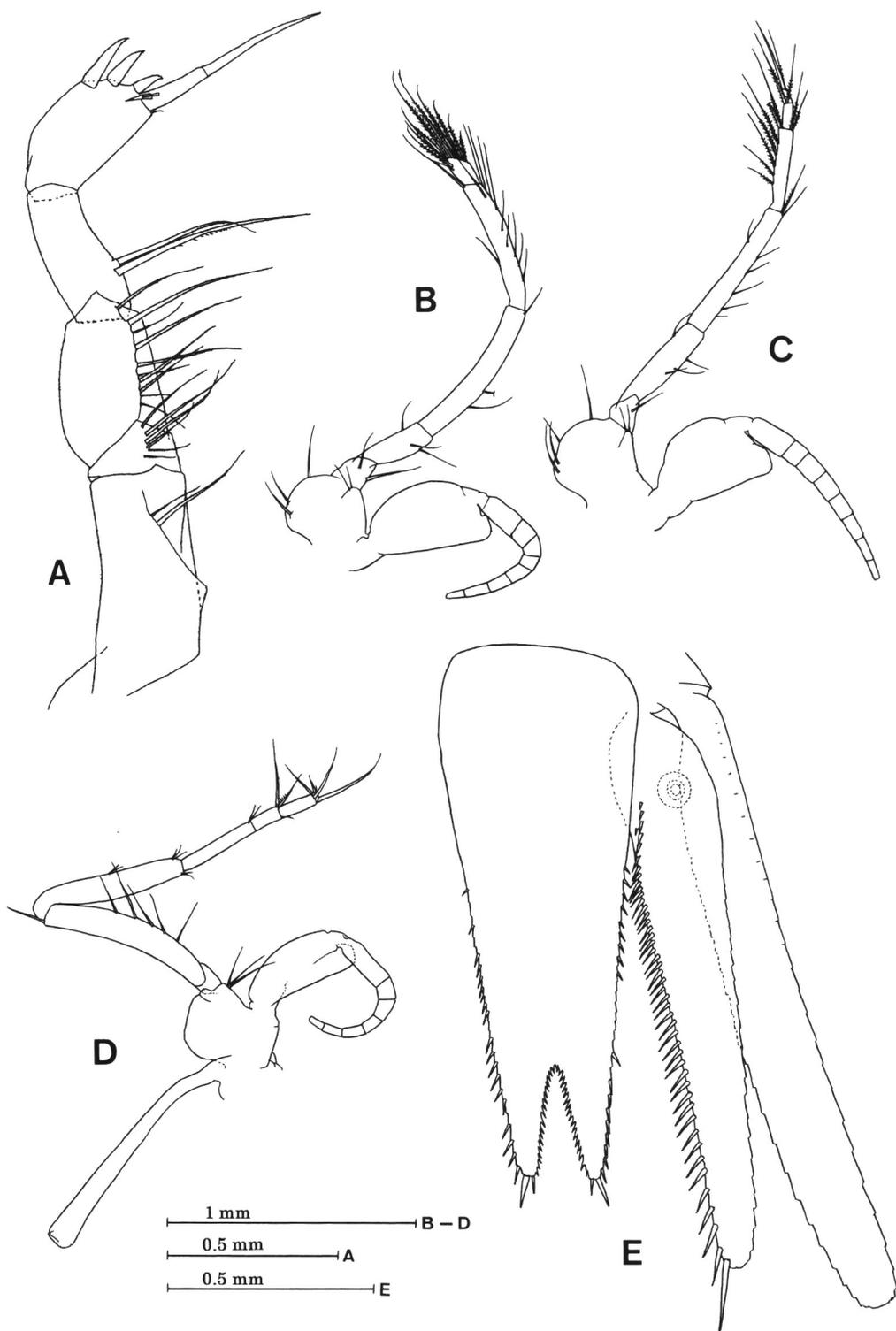


Fig. 10. *Mysidella sulcata* sp. nov., A–C, E, holotype; D, allotype. A, endopod of first thoracic limb; B, second thoracic limb; C, third thoracic limb; D, eighth thoracic limb with penis; E, uropod and telson.

ger (Fig. 10A).

Endopod of second thoracic limb slender; merus slightly curved inwardly, more than 6 times as long as broad, outer margin with 1 seta at distal end and 2 setae on proximal half, inner margin naked; carpopropodus not divided into subsegments, slightly shorter than merus, outer margin with about 10 setae along entire length, inner margin with 1 seta at distal end and 1 seta at proximal third; dactylus slightly less than twice as long as broad, with 6 barbed setae on distal half of outer margin and 2 barbed and 1 simple setae on distal third of inner margin; terminal claw slender (Fig. 10B).

Endopod of third thoracic limb slender; merus longer than combined length of carpopropodus and dactylus, outer margin with 5 setae along entire length and 2 setae at distal end, inner margin with 1 seta at distal fourth; carpopropodus divided into 2 subsegments, proximal subsegment 3 times longer than distal one, with 7 barbed setae on inner margin and 2 barbed setae at distal end of outer margin, distal subsegment with 2 barbed setae on distal margin; dactylus small, with 1 seta in addition to slender terminal claw (Fig. 10C).

Endopod of fourth thoracic limb with 2-segmented carpopropodus. Endopods of fifth to seventh thoracic limbs with 3-segmented carpopropodus. Endopod of eighth thoracic limb with ischium armed with 5 setae on outer margin and 1 seta at inner distal end; merus shorter than ischium; carpopropodus divided into 3 subsegments, proximal subsegment longer than succeeding 2 subsegments together, with 2 short setae at distal end of inner margin, middle subsegment shortest, with 2 long setae at distal end of inner margin and 1 short seta at outer distal corner, distal subsegment with 2 long setae on distal margin; dactylus very small, with terminal claw short (Fig. 10D). Exopods of thoracic limbs with 7- or 8-segmented flagellipart, basal plate with outer distal corner rounded (Fig. 10B, C, D).

Penis in immature male elongated, cylindrical, extending anteriorly to base of pair of first thoracic limbs, gradually becoming thicker distally,

specialized structure invisible on apex, margins unarmed (Fig. 10D).

Abdomen with first 4 somites subequal, fifth somite 1.3 times longer than fourth, sixth somite 1.3 times longer than fifth.

Endopod of uropod slender, overreaching distal end of telson by 1/6 of its length, furnished on inner margin from statocyst region to apex with about 47 spines, proximal about 10 spines becoming shorter proximally, middle 30 spines equal in size, and distal several spines increasing in length distally, distalmost spine twice as long as preceding one (Fig. 10E). Exopod of uropod extending beyond distal end of telson by 1/4 of its length, setose all round (Fig. 10E).

Telson elongate triangular, 1.3 times as long as last abdominal somite, 2.6 times as long as broad at base, apical cleft about 1/5 as long as telson; lateral margin straight, armed with 26 or 27 spines on distal 3/5; terminal lobe triangular, twice as long as broad, with 2 spines on narrow apex, outer spine twice longer than inner; apical cleft with 18 spinules on either side (Fig. 10E).

Etymology. The specific name, *sulcata*, is derived from the transverse deep groove on the rostrum.

Remarks. *Mysidella sulcata* sp. nov. is easily distinguished from the other species of the genus by the deep transverse groove in the mid-dorsal part of the rostrum. Another specific character is found in the endopod of the first thoracic limb with the terminal claw provided with two small spines directed proximally. This character is also never seen in the other known species of *Mysidella*.

Mysidella tanakai Ii, 1964

(Fig. 11)

Mysidella tanakai Ii, 1964: 574–577, fig. 153; Murano, 1970b: 147; Mauchline & Murano, 1977: 65 (catalogue); Müller, 1993: 282 (catalogue).

Type series. Neotype (NSMT-Cr 14205), 1 adult male (6.4 mm); Suruga Bay, 34°45.0'N 138°22.8'E, 540–660 m, bottom-net, 24 January 1971, collected by M. Murano.

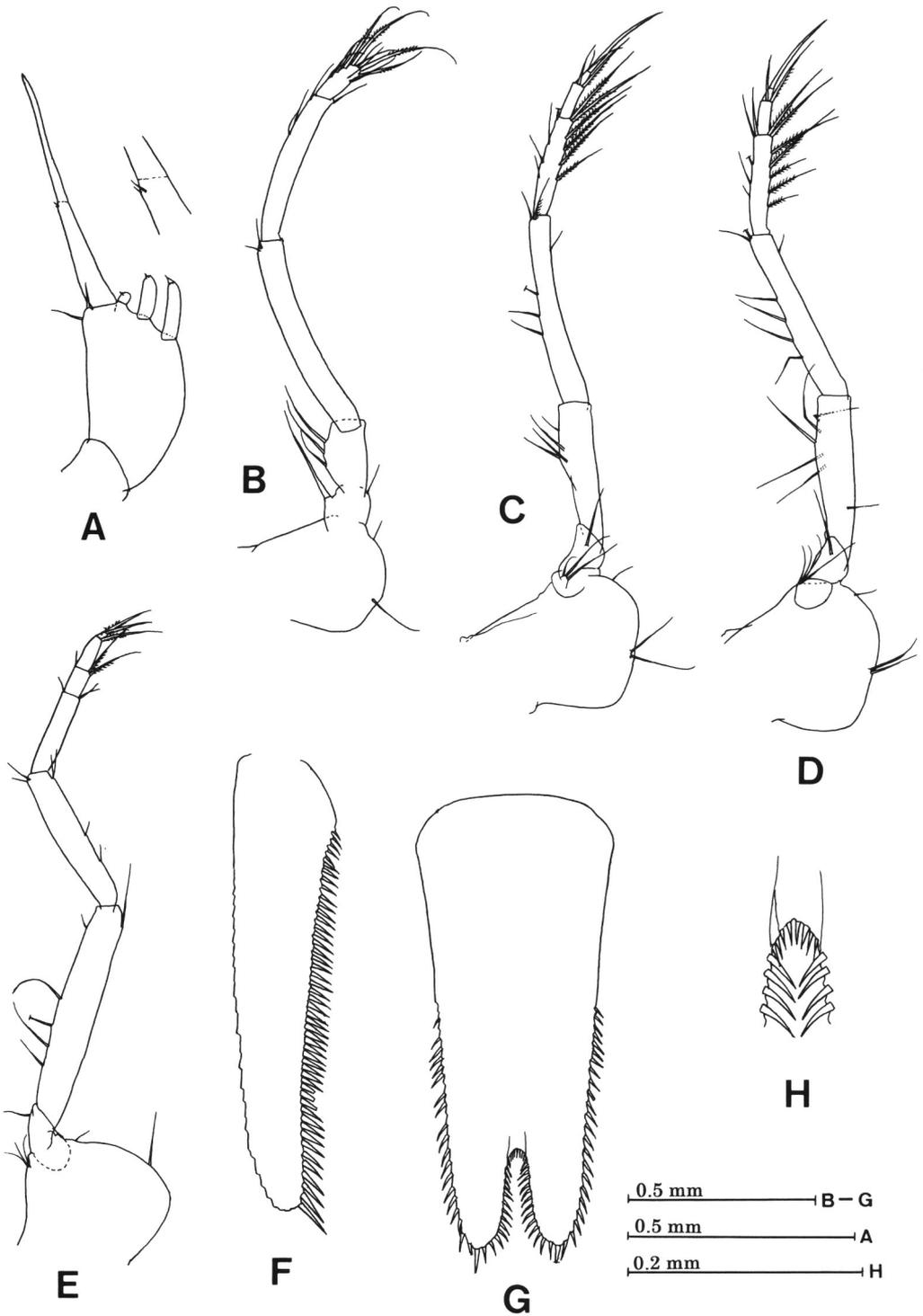


Fig. 11. *Mysidella tanakai* Ii. A, extremity of endopod of first thoracic limb; B, endopod of second thoracic limb; C, endopod of third thoracic limb; D, endopod of fourth thoracic limb; E, endopod of seventh thoracic limb; F, endopod of uropod; G, telson; H, anterior part of telson cleft.

Other material. One female (7 mm) (NSMT-Cr 14206); Sagami Bay, 34°44.8'N 139°08.5'E, 0–480 m oblique tow, ORI net, 18 October 1966, collected by M. Murano. Sixteen males (5.5–8.0 mm), 2 females (5.9, 6.0 mm) (NSMT-Cr 14207), collection data same as Neotype. Two males (5.0 mm) (NSMT-Cr 14208); Suruga Bay, 35°06.2'N 138°40.0'E to 35°06.3'N 138°40.6'E, accidentally touched with bottom at 280 m during oblique haul using ORI-net, 13 August 1971, collected by M. Murano.

Remarks. *Mysidella tanakai* was established by Ii (1964) based on a single male specimen collected from Suruga Bay in 1937, and he designated it to the type specimen (Ii's Coll. No. 339). This type specimen, however, seems to be lost because it does not exist among the Ii's collection which was given from his survivors to me after his death in 1993. Therefore, a male specimen from Suruga Bay, where Ii's type specimen was collected, is designated as a neotype.

The present specimens well agree with the original description and illustrations by Ii (1964), but some minor differences are present as follows. The terminal claw of the endopod of the first thoracic limb in the present specimens was observed to have a suture, although it is very feeble, and two minute setae on the inner margin of the proximal segment near the suture (Fig. 11A), while Ii (1964) observed neither a suture nor minute setae. Ii (1964) illustrated the distalmost spine on the endopod of the uropod to be shorter than preceding ones, but distal about 10 spines in the present specimens become longer distally, as seen in other species of the genus (Fig. 11F). About eight spinules arming the anterior end of the distal cleft of the telson are smaller and more slender than those on the lateral sides of the cleft (Fig. 11G, H).

Endopods of the second to eighth thoracic limbs, which were missing in Ii's specimen, are described below.

Endopod of second thoracic limb slender; ischium twice as long as broad, outer margin swollen, with 3 setae; merus longest, slightly curved inwardly, with 2 short setae near distal

end of outer margin; carpopropodus not divided into subsegments, with 1 seta at distal end of inner margin and 3 setae on distal third of outer margin; dactylus nearly 3 times as long as broad, with about 5 barbed long setae and several simple setae (Fig. 11B).

Endopods of third and fourth thoracic limbs slender; merus longest, longer than combined length of carpopropodus and dactylus; carpopropodus divided into 2 subsegments, proximal subsegment 3 times longer than distal one, armed on inner margin with 6 barbed setae in third endopod and 7 in fourth, distal subsegment with 2 setae on distal margin; dactylus small, less than half as long as distal subsegment of carpopropodus, with long claw on terminal end (Fig. 11C, D). Endopod of seventh thoracic limb somewhat robustly built than those of third and fourth thoracic limbs; ischium longest; merus 2/3 length of ischium; carpopropodus as long as merus, divided into 3 subsegments, proximal subsegment longer than succeeding 2 subsegments together, middle subsegment shorter than distal one, with 2 barbed setae at inner distal corner, distal subsegment with 2 barbed setae overreaching tip of terminal claw (Fig. 11E). Exopods of thoracic limbs with flagellipart segmented into 7 in first and eighth limbs and 8 in second to seventh limbs.

A small median spine on the front margin of the labrum, which was described by Ii (1964), was confirmed in the present specimens. He thought it to be one of generic characters but it has not been observed in other species of the genus. It should be a noticeable specific character.

Distribution. *Mysidella tanakai* is only known from three neighboring bays, Suruga Bay, Sagami Bay and Tateyama Bay, in central Japan. Most of the present specimens were collected from on or just above the seafloor at 220–660 m with the bottom-net equipped with a closing device.

Mysidella truncata sp. nov.

(Figs. 12, 13)

Type series. Holotype (NSMT-Cr 14209), adult male (4.0 mm); east of Amami-oshima Is., southwestern Japan, 28°10.5'N 129°10.0'E, 138–141 m, bottom-net, 22 April 1970, collected by M. Murano.

Description. Rostrum truncate in front, covering basal part of eyestalks (Fig. 12A). Anterolateral corner of carapace rounded, posterior margin emarginate, leaving last thoracic somite uncovered.

Eye developed, cornea well-pigmented, globular, wider than eyestalk, eyestalk without papilliform process (Fig. 12A).

Antennular peduncle of male short and robust; first segment with anterolateral corner produced and tipped with several setae; second segment shortest, with 2 setae at distal end of inner margin; third segment wider than long, inner margin with 1 seta at middle and 2 setae at distal end (Fig. 12A).

Antennal scale extending beyond distal margin of antennular peduncle for 1/3 of its length, 3 times as long as broad, setose all round; outer margin slightly concave, inner margin convex, distal suture distinct (Fig. 12A, B). Antennal peduncle slightly shorter than antennular peduncle, first segment shortest, second and third segments subequal in length. Antennal sympod with anterolateral corner produced laterally.

Maxillule and maxilla as shown in Fig. 12C and D, respectively.

Endopod of first thoracic limb robust; ischium with outer distal corner pointed, inner margin armed distally with 2 barbed long setae, 1 naked seta and 3 short setae; merus rectangular in shape, 1.6 times as long as broad, inner margin with 1 barbed long seta at proximal end and 1 short seta at proximal fourth, outer margin with 1 seta near distal end; carpopropodus elliptical, twice as long as broad, outer margin armed on distal half with 1 short seta and 5 peculiar spines, these spines becoming shorter distally and provided with plumed flagellipart distally; inner

margin with 1 short seta at distal end; terminal claw without suture, nearly twice as long as carpopropodus, with 1 short seta at proximal fourth (Fig. 12E).

Endopod of second thoracic limb rather slender; merus slightly narrowing distally, more than 4 times as long as broad, with 1 short seta at distal end of outer margin; carpopropodus more than half as long as merus, not divided into subsegments, with 2 setae on distal margin, 1 seta at distal end of inner margin and 1 seta near distal end of outer margin; dactylus 1/3 length of carpopropodus, with 2 barbed setae on inner margin, 1 short seta on outer margin and 2 setae on distal margin; terminal claw long and slender (Fig. 12F).

Endopod of fourth thoracic limb with 3-jointed carpopropodus shorter than merus, first joint with 2 short setae at inner distal end, second joint with 2 long setae on inner distal margin, third joint with 1 long, 2 moderate and 1 short setae on distal margin; terminal claw long and stout (Fig. 12G).

Endopod of fifth thoracic limb same with fourth in feature but more slender (Fig. 12H). Endopods of other thoracic limbs broken off.

Exopods of thoracic limbs with 8- or 9-segmented flagellipart.

Abdominal somites with length ratios as: 90 : 69 : 72 : 86 : 76 : 100.

Endopod of uropod tapering, setose all round, overreaching distal margin of telson by 1/4 of its length, armed on inner margin from statocyst region to near distal end with 25 spines increasing in length distally, distal 2 spines very long, more than twice as long as distal third spine (Fig. 13A, B). Exopod of uropod setose all round, overreaching distal end of telson by 2/5 of its length (Fig. 13A, B).

Telson 1.4 times longer than sixth abdominal somite, 1.3 times as long as broad at base, rapidly narrowing towards middle, then gradually towards distal end; apical sinus quite shallow (about 1/14 of telson length), with 1 or 2 non-articulated minute spines on either side; apex of distal lobe armed with 2 spines, outer spine long

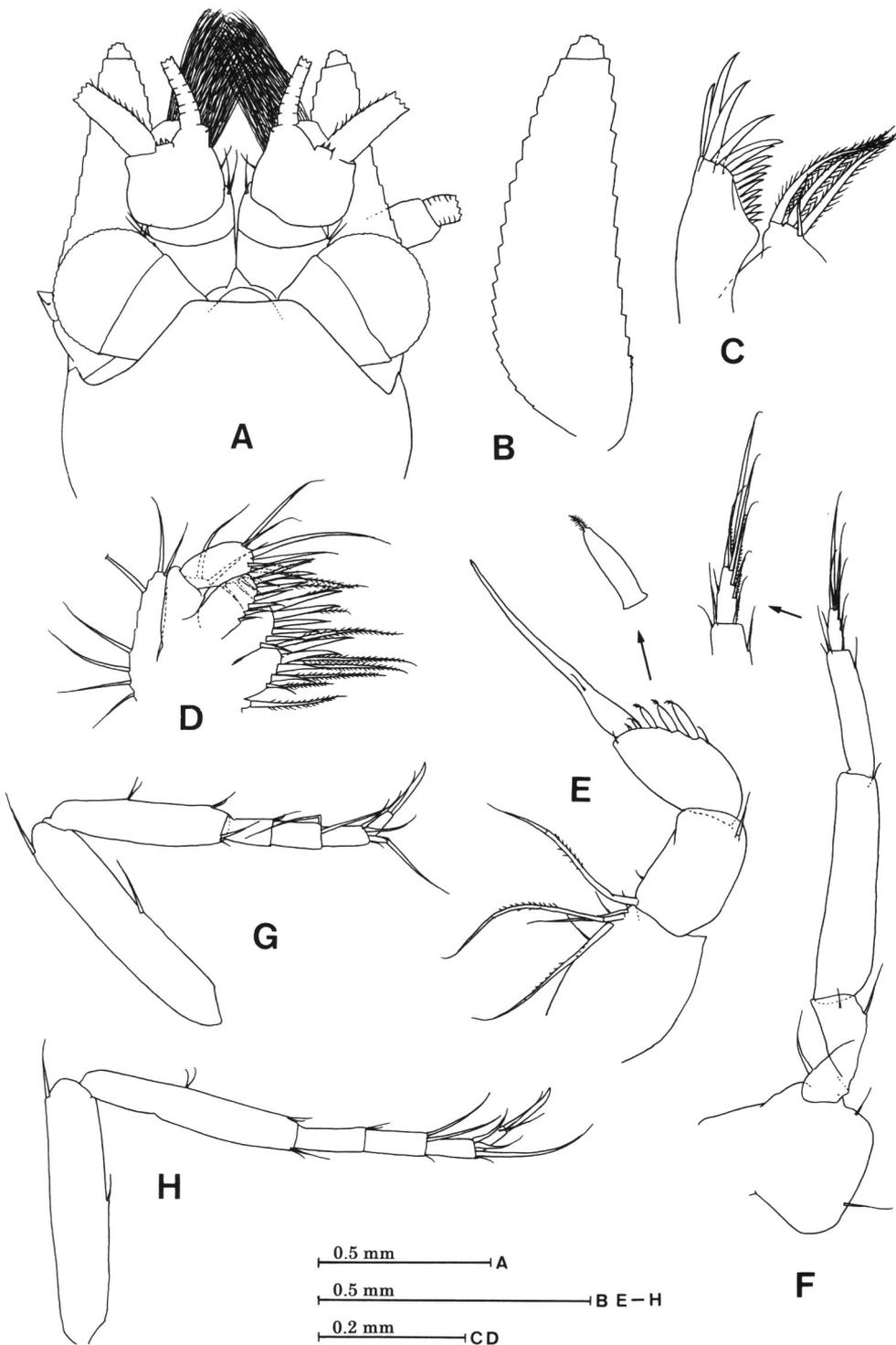


Fig. 12. *Mysidella truncata* sp. nov., A–H, holotype. A, anterior part of body; B, antennal scale; C, maxillule; D, maxilla; E, endopod of first thoracic limb; F, endopod of second thoracic limb; G, endopod of fourth thoracic limb; H, endopod of fifth thoracic limb.

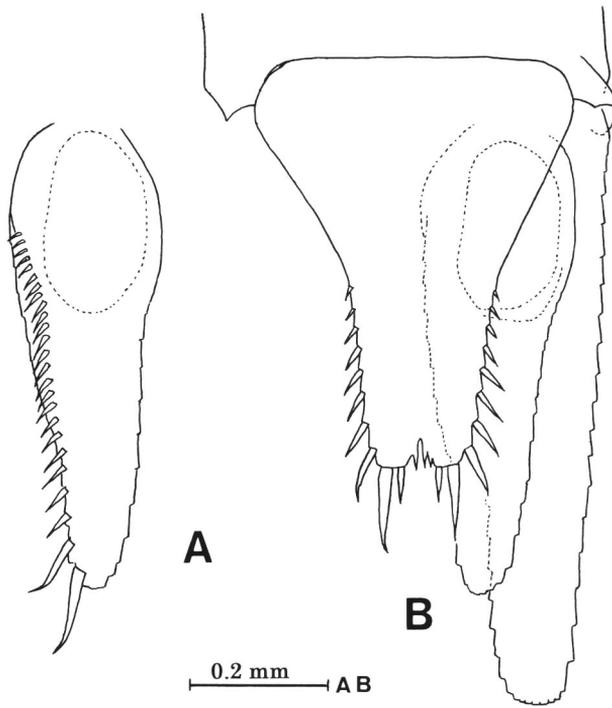


Fig. 13. *Mysidella truncata* sp. nov., A, B, holotype. A, endopod of uropod, ventral view; B, uropod and telson.

and stout, 1/5 as long as telson, inner spine less than half as long as outer; lateral margin naked in proximal half, armed on distal half with 8 spines increasing in length distally (Fig. 13B).

Etymology. The specific name, *truncata*, refers to the shape of the rostrum.

Remarks. *Mysidella truncata* sp. nov. is easily distinguished from the other species of the genus by the following characteristics: the frontal margin of the carapace is broad and truncate; the carpopropodus of the first thoracic endopod is armed with 1 seta and 5 peculiar spines on the distal half of the outer margin; the terminal claw of the first thoracic endopod is very long and provided with a short seta at proximal fourth; the apical sinus of the telson is quite shallow and furnished with only 1 or 2 spines on either side.

***Mysidella* sp.**

(Fig. 14)

Material. One adult male (divided into two

parts, estimated B. L. 5 mm), 1 immature male (3.7 mm) (NSMT-Cr 14210); Sulu Sea, 08°12.7'N 117°59.6'E to 08°11.8'N 117°58.4'E, 285–306 m, Murano's net, 26 May 1972, collected by M. Murano.

Remarks. *Mysidella* sp. closely resembles *Mysidella macrophthalmia* sp. nov. in the endopod of the second thoracic limb built robustly as compared with those of the third to eighth thoracic limbs (Fig. 14B) and in the telson more than twice as long as broad (Fig. 14D). This species, is however, differentiated from the latter in: the endopod of the first thoracic limb is armed on the carpopropodus with eight spines in *M. macrophthalmia* as compared with one seta and five spines in this species (Fig. 14A), and the apical cleft of the telson is V-shaped and 1/7 of the telson length in *M. macrophthalmia*, while U-shaped and 1/5 of the telson length in this species (Fig. 14D).

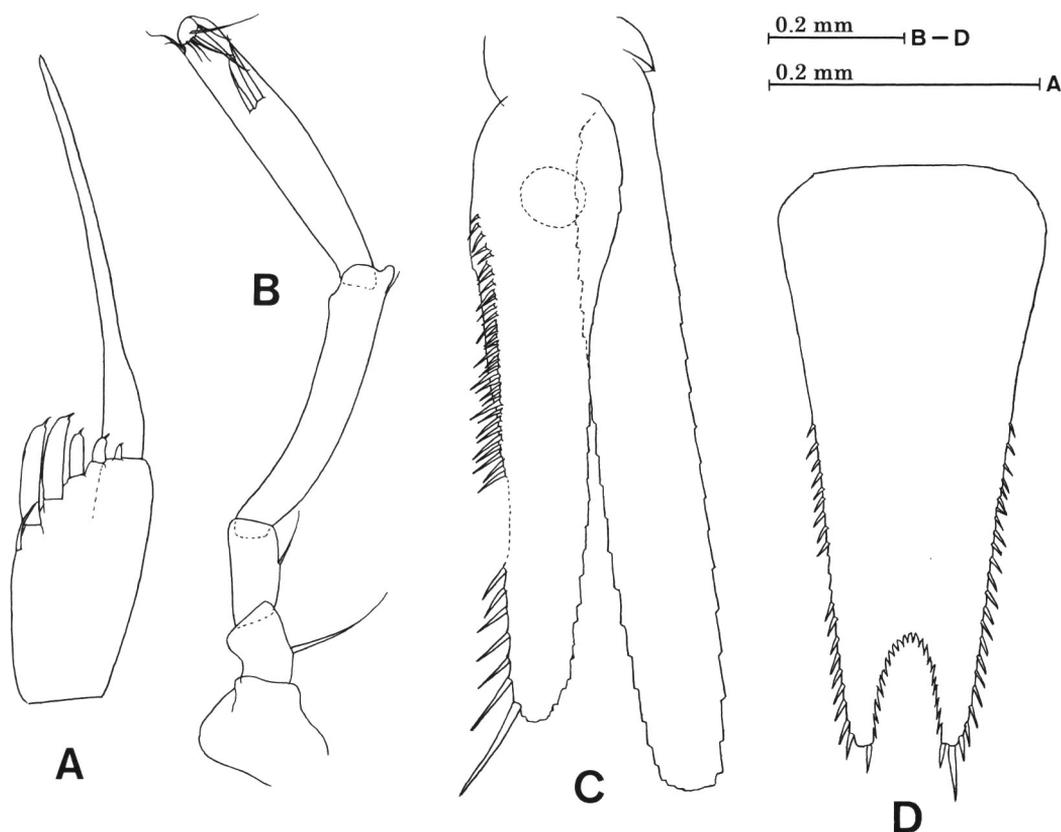


Fig. 14. *Mysidella* sp., A, B, immature male; C, D, adult male. A, extremity of endopod of first thoracic limb; B, endopod of second thoracic limb; C, uropod; D, telson.

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References

- Bacesco, M., 1941. Les Mysidacés des eaux méditerranéennes de la France (spécialement de Banyuls) et des eaux de Monaco. *Bull. Inst. Océanogr.*, (795): 1–46.
- Banner, A. H., 1948. A taxonomic study of Mysidacea and Euphausiacea (Crustacea) of the northeastern Pacific. *Trans. Roy. Can. Inst.*, **27**: 65–124, 7 pls.
- Brattegard, T., 1973. Mysidacea from shallow water on the Caribbean coast of Colombia. *Sarsia*, **54**: 1–66.
- Colosi, G., 1929. I Misidacei del Golfo di Napoli. *Publ. St. Zool. Napoli*, **9**: 405–441.
- Daly K. L. & C. Holmquist, 1986. A key to the Mysidacea of the Pacific northwest. *Can. J. Zool.*, **64**: 1201–1210.
- Fenton, G. E., 1990. *Mysidella australiana* sp. nov. from Bass Strait, Australia (Crustacea: Mysidae: Mysidellinae). *Mem. Mus. Victoria*, **50**: 437–441.
- Gleye, L. G., 1981. *Acanthomysis nephrophthalma* and *Mysidella americana* (Mysidacea, Mysidae) along the coast of southern California. *Crustaceana*, **40**: 220–221.
- Hansen, H. J., 1910. The Shizopoda of the Siboga Expedition. *Siboga-Exped.*, **37**, 123 pp., 16 pls.
- Holt, E. W. L. & W. I. Beaumont, 1900. Report on the Crustacea Schizopoda of Ireland. *Sci. Trans. Roy. Dublin Soc.*, (2), **7**: 221–252, 1 pl.
- Holt, E. W. L. & W. M. Tattersall, 1905. Schizopodous Crustacea from the north-east Atlantic slope. *Ann. Rep. Fish. Ireland, 1902–3*, **2**: 99–152, 11 pls.
- Holt, E. W. L. & W. M. Tattersall, 1906. Schizopodous Crustacea from the north-east Atlantic slope. Supplement. *Fisheries, Ireland, Sci. Invest.*, 1904, **5**: 179–226,

- 5 pls.
- Ii, N., 1964. *Fauna Japonica, Mysidae (Crustacea)*. Biogeographical Society of Japan, Tokyo, 610 pp.
- Illig, G., 1930. Die Schizopoden der Deutschen Tiefsee Expedition. *Wiss. Ergeb. Deutsch. Tiefsee Exped.*, **22**, 400–625.
- Kathman, R. D., W. C. Austin, J. C. Saltman & J. D. Fulton, 1986. Identification manual to the Mysidacea and Euphausiacea of the Northeast Pacific. *Can. Spec. Publ. Fish. Aquat. Sci.*, **93**: 1–411.
- Lagardère, J.-P. & H. Nouvel, 1980. Les Mysidacés du talus continental du golfe de Gascogne. II. Familles des Lophogastridae, Eucopiidae et Mysidae (Tribu des Erythropini exceptée). *Bull. Mus. Natn. Hist. Nat.*, Paris, (4), **2**, (A, 3): 845–887.
- Laubitz, D. R., 1986. Synopsis speciorum. Crustacea: Euphausiacea et Mysidacea. *Bibliographa invertebratorum aquaticorum canadensium*, **6**: 1–28, 51–67.
- Mauchline, J. & M. Murano, 1977. World list of Mysidacea, Crustacea. *J. Tokyo Univ. Fish.*, **64**: 39–88.
- Müller, H.-G., 1993. *World catalogue and bibliography of the recent Mysidacea*. Laboratory for Tropical Ecosystems Research and Information Service, Wetzlar, 491 pp.
- Murano, M., 1970a. A small collection of benthic Mysidacea from coastal waters in Suruga Bay, Japan. *Crustaceana*, **18**: 251–268.
- Murano, M., 1970b. Systematic and ecological studies on Mysidacea collected by the bottom-net. *J. Oceanogr. Soc. Japan*, **26**: 137–150.
- Norman, A. M., 1892. On British Mysidae, a family of Crustacea Schizopoda. *Ann. Mag. Nat. Hist.*, (6), **10**: 143–166.
- Omori, M., 1965. A 160 cm opening-closing plankton net—I. Description of the gear. *J. Oceanogr. Soc. Japan*, **21**: 212–220.
- Omori, M., 1969. A bottom-net to collect zooplankton living close to the sea-floor. *J. Oceanogr. Soc. Japan*, **25**: 291–293.
- Sars, G. O., 1872. Undersøgelser over Hardangerfjordens fauna. *Forh. VidenskSelsk. Krist.*, **1871**: 246–286. (Not seen.)
- Sars, G. O., 1879. Carcinologiske Bidrag til Norges Fauna. *Monographie over de ved Norges Kyster forekommende Mysider*, **3**: 1–131. (Not seen.)
- Tattersall, W. M., 1909. The Schizopoda collected by the Maia and Puritan in the Mediterranean. *Mitt. Zool. St. Neapel*, **19**: 117–143, 1 pl.
- Tattersall, W. M., 1911. Schizopodous Crustacea from the north-east Atlantic slope. Second supplement. *Fishes, Ireland, Sci. Invest.*, 1910, **2**: 1–77, 8 pls.
- Tattersall, W. M. & O. S. Tattersall, 1951. *The British Mysidacea*. Ray Society, London, 460 pp.
- Wang S., 1998. On new and rare species of Mysidacea (Crustacea) from the northern South China Sea. *Stud. Mar. Sinica*, **40**: 199–244. (In Chinese with English abstract.)
- Zimmer, C., 1909. Die nordischen Schizopoden. *Nordisches Plankton*, **6**: 178 pp.
- Zimmer, C., 1915. Zur Kenntnis der Schizopodenfauna Neapels. *Mitt. Zool. St. Neapel*, **22**: 313–327.