

A Systematic Study of the Genus *Siriella* (Crustacea: Mysida) from the Pacific and Indian Oceans, with Descriptions of Fifteen New Species

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Abstract Fifty known species and four known varieties of the genus *Siriella* from the Pacific Ocean, the Indian Ocean and their marginal seas are revised. A nominal species, *S. gibba* is ranked in a junior synonym of *S. brevisrostris*, because it is judged to be of an immature stage of female *S. brevisrostris*. Three varieties, *S. japonica* var. *izuensis*, *S. watasei* var. *koreana* and *S. watasei* var. *macropsis*, are abandoned as *nomen nudum*, and proposed afresh as new species under the name of *S. izuensis*, *S. koreana* and *S. macropsis*, respectively. A variety, *S. japonica* var. *sagamiensis* is canceled, because the description of this variety must have made based on immature forms of *S. izuensis*. The validity of *S. robusta* is questionable by reason that the description must have done on immature specimens. *Siriella intermedia* is canceled as *nomen nudum*, because the specific name, *intermedia*, has been preoccupied by a species which is known as *S. armata* at present. The following 12 species, *S. akajimaensis*, *S. amamiensis*, *S. brucei*, *S. chaitiamvongae*, *S. essingtonensis*, *S. iii*, *S. longiarticulilis*, *S. mulyadii*, *S. rimata*, *S. scissilis*, *S. seafdeci*, and *S. tenuiungula*, are fully described herein as new species. Sixty-one nominal species of *Siriella* discussed in this article are classified into nine groups and five subgroups. Key to the species is given.

Key words: taxonomy, Mysida, Mysidae, Siriellinae, *Siriella*, Pacific Ocean, Indian Ocean, new species.

Introduction

Currently, as far as we can determine, the genus *Siriella* Dana, 1850 (Mysida: Mysidae: Siriellinae) is known to comprise as many species, subspecies and varieties as 68 (Table 1), and is the second largest genus in Mysida next to *Heteromysis* Norman, 1892, in which 76 species are known. In the warm-water region of the West Pacific Ocean and the Indian Ocean, *Siriella* is the most popular mysid genus in both shallow coastal regions and the surface layer of the open seas.

The first described species of the genus *Siriella* is *Cynthia* sp., which was reported by Thompson (1829) and falls under *S. thompsonii* at the present time. However, *Cynthia* had already been preoccupied by species of ascidians, so that White (1850) proposed *Cynthilia* instead of *Cynthia*, but his new genus was taxonomically heterogeneous still. Presently used name, *Siriella*, was created by Dana in 1850. Originally, the name *Cynthia* was only applied to the male and *Siriella* to the female (Sars, 1885), until sexual differences were elucidated by

Table 1. List of the nominal species, subspecies and varieties of the genus *Siriella*.

Cosmopolitan species		
<i>S. thompsonii</i> (Milne-Edwards, 1837)		
Pacific and Indian species		
<i>S. aequiremis</i> Hansen, 1910	<i>S. inornata</i> Hansen, 1910	<i>S. quilonensis</i> Pillai, 1961
<i>S. affinis</i> Hansen, 1910	<i>S. intermedia</i> Panampunnayil, 1981	<i>S. robusta</i> Pillai, 1964
<i>S. africana</i> Panampunnayil, 1981	<i>S. japonica</i> Ii, 1964	<i>S. roosevelti</i> W. Tattersall, 1941
<i>S. anomala</i> Hansen, 1910	<i>S. japonica</i> var. <i>izuensis</i> Ii, 1964	<i>S. serrata</i> Hansen, 1910
<i>S. australiensis</i> Panampunnayil, 1995	<i>S. japonica</i> var. <i>sagamiensis</i> Ii, 1964	<i>S. sinensis</i> Ii, 1964
<i>S. australis</i> W. Tattersall, 1927	<i>S. jonesi</i> Pillai, 1964	<i>S. singularis</i> Nouvel, 1957
<i>S. bacescui</i> Udrescu, 1981	<i>S. lingvura</i> Ii, 1964	<i>S. spinula</i> Panampunnayil, 1995
<i>S. brevicaudata</i> Paulson, 1875	<i>S. longidactyla</i> W. Tattersall, 1940	<i>S. tadjourensis</i> Nouvel, 1944
<i>S. brevisrostris</i> Nouvel, 1944	<i>S. longipes</i> Nakazawa, 1910	<i>S. trispina</i> Ii, 1964
<i>S. conformalis</i> Hansen, 1910	<i>S. nodosa</i> Hansen, 1910	<i>S. tuberculum</i> Fukuoka and Murano, 1996
<i>S. denticulata</i> (Thomson, 1880)	<i>S. media</i> Hansen, 1910	<i>S. vincenti</i> W. Tattersall, 1927
<i>S. distinguenda</i> Hansen, 1910	<i>S. okadai</i> Ii, 1964	<i>S. vulgaris</i> Hansen, 1910
<i>S. dollfusi</i> Nouvel, 1944	<i>S. pacifica</i> Holmes, 1900	<i>S. vulgaris</i> var. <i>rostrata</i> W. Tattersall, 1951
<i>S. dubia</i> Hansen, 1910	<i>S. panamensis</i> W. Tattersall, 1951	<i>S. wadai</i> Ii, 1964
<i>S. gibba</i> Nouvel, 1944	<i>S. paulsoni</i> Czerniavsky, 1882	<i>S. watasei</i> Nakazawa, 1910
<i>S. gracilis</i> Dana, 1852	<i>S. pondoensis</i> O. Tattersall, 1962	<i>S. watasei</i> var. <i>koreana</i> Ii, 1964
<i>S. halei</i> W. Tattersall, 1927	<i>S. quadrispinosa</i> Hansen, 1910	<i>S. watasei</i> var. <i>macropsis</i> Ii, 1964
<i>S. hansenii</i> W. Tattersall, 1922		
Atlantic species		
<i>S. armata</i> (Milne-Edwards, 1837)	<i>S. dayi</i> O. Tattersall, 1952	<i>S. macrophthalma</i> Murano, 1986
<i>S. castellabatensis</i> Ariani and Spagnuolo, 1975	<i>S. jaltensis</i> Czerniavsky, 1868	<i>S. melloi</i> da Silva, 1974
<i>S. chessi</i> Murano, 1986	<i>S. jaltensis crassipes</i> (Sars, 1877)	<i>S. mexicana</i> Brattegard, 1970
<i>S. chierchiae</i> Coifmann, 1937	<i>S. jaltensis</i> var. <i>brookii</i> Norman, 1886	<i>S. norvegica</i> Sars, 1869
<i>S. clausii</i> Sars, 1877	<i>S. gracilipes</i> (Nouvel, 1942)	<i>S. wolffi</i> O. Tattersall, 1961

Claus (1884).

This genus is readily distinguished from all other genera of Mysidae by the endopod of the third to eighth thoracic limbs armed with peculiar setae surrounding the dactylus and terminal claw, all the male pleopods with distinctive pseudobranchial rami, the uropodal exopod divided into two segments, and the telson with three small median spines on the posterior margin.

In this paper, the systematic study on the genus *Siriella* from the Pacific Ocean and the Indian Ocean, including 15 new species, are given on the basis of specimens in our possession, specimens stored as Ii's Collection of mysids, and specimens on loan from the Northern Territory Museum, Australia (NTM), and the Zoological Museum of the University of Copenhagen, Denmark (ZMUC).

Materials and Methods

Specimens, used for the systematic study, were personally collected by the present authors, as well as donated for our study by many researchers, and also are in the possession of museums and laboratories. The specimens were captured visually with hand nets during scuba diving in rocky shores and coral reefs. In addition to that, specimens were also collected by towing of various types of plankton nets and sledge nets in coastal and open sea areas.

Dr. Naoyoshi Ii bequeathed numerous specimens of mysids, which is known as Ii's Collec-

tion. One of the authors, M. Murano, inherited those specimens from his family. Among them, reported and not reported *Siriella* specimens in his 'Fauna Japonica, Mysidae (Crustacea)', including type specimens, are contained. These specimens were also studied for this work.

Body length was measured from the anterior tip of the rostrum to the posterior end of the telson, except posterior spines, under the stretched condition of the body. Illustrations were drawn with the aid of a camera lucida. Some appendages, such as the antennal scale, the male pleopods and the uropod, were depicted under the omission of marginal setae.

The specimens, except those on loan, are lodged in the National Museum of Nature and Science (NSMT).

Taxonomy

Family Mysidae

Subfamily Siriellinae

Tribe Siriellini

Genus *Siriella* Dana, 1850

Cynthia Thompson, 1829: 57.

Siriella Dana, 1850: 129; Sars, 1879: 22–24; Sars, 1885: 204–205; Czerniavsky, 1887: 27; Zimmer, 1909: 68–69;

Hansen, 1910: 27–28; Tattersall and Tattersall, 1951: 141–144; Ii, 1964a: 57–59; Pillai, 1965: 1687–1688.

Cynthilia White, 1850: 46; Norman, 1892: 149.

Promysis Krøyer, 1861: 70.

Pseudosiriella Claus, 1884: 275.

Heterosiriella Czerniavsky, 1887: 38–39.

Diagnosis

Carapace short, leaving posterior 1 or 2, rarely 3, thoracic somites exposed. Eyes normally developed. Antennular peduncle well developed, more slender in female than in male, appendix masculina developed and hirsute. Antennal scale with outer margin naked, terminating in stout denticle; suture marking off small distal joint or frequently obsolete. Labrum longer than broad, produced anteriorly into process. Endopod of third to eighth thoracic limbs subequal in shape, slightly or exceedingly longer in middle pairs than in anterior and posterior pairs; carpopropodus undivided or divided into 2 subsegments, terminating in characteristic brush of stiff, peculiarly serrated setae surrounding dactylus and terminal claw; terminal claw distinct and developed. Female with 3 pairs of oostegites. Male pleopods well developed; first pair with exopod multi-segmented, endopod wanting; second to fifth pairs biramous, both rami multi-segmented; terminal setae on fourth, or third and fourth, or second to fourth pairs sometimes modified; pseudo-branchial rami developed, always nearly straight in first and fifth pleopods and nearly straight or spirally coiled in second to fourth pairs. Female pleopods reduced to small, simple plate. Uropodal exopod divided into 2 segments by obscure articulation; outer margin of proximal segment armed with only spines (except for *Siriella dubia*, in which it is armed with both spines and setae); distal segment setose all round. Uropodal endopod tapering, with spines along inner ventral margin from statocyst region to apex. Telson entire; posterior margin armed with 3 small spines (except for *S. armata* having 3 to 5), 1 to 3 pairs of long spines and pair of plumose setae; lateral margin armed with 1 to 6 spines in proximal part, followed by short unarmed part, then posterior series of many spines.

General morphology

Integument. Not hispid; thoracic somites without ventral sternal process; abdominal somites without transverse grooves, folds or spine rows.

Carapace. In females and immature males of Nodosa- and Brevirostris-subgroups, 1 or 2 protuberances present on dorsal surface along median line. Adult male of Nodosa-subgroup with 1 small protuberance. Rostrum more or less anteriorly produced, or bent downward in rare cases, into triangular plate with pointed or narrowly rounded apex (except for Brevicauda-group and Halei-subgroup, in which it is broadly rounded), generally tending to be longer in females than in males. Anterolateral corners rounded. Posterior margin emarginate, leaving posterior 1 or 2, rarely 3, thoracic somites exposed.

Eyes. Varied from globose to subcylindrical in shape; cornea developed, functionally normal, variable in size; eyestalk without papilliform process.

Antennule. More robust in male than in female; second peduncular segment with a long seta at inner distal corner in female and with or without a long seta on inner dorsal margin in both sexes; third peduncular segment of female with one or several long setae on inner margin and with several long setae on inner distal margin, in males these setae occurring in only immature stages but disappearing with maturation. Inner flagellum of male sometimes dilated, contorted or meandered in proximal 1/3 part. Appendix masculina conical in shape in most species and bilobed or spatulate in several species.

Antenna. Scale extending or not extending to distal margin of antennular peduncle, more slender in male than in female in many species; outer margin straight, naked (except for *S. serrata* and *S. africana*, in which the margin is serrated with several spinules), ending in a strong denticle; inner and apical margins setose; terminal lobe variable in length, usually longer in male than in female. Peduncle shorter than scale in most species, more slender and shorter in female than in male, second segment longest. Sympod with a denticle at outer distal angle in most species.

Labrum. With long frontal process except for Brevicaudata-group, in which the process is very short.

Mandibular palp. Second segment variable in shape; third segment with 6 to 10, usually 7 or 8, long setae in male and 1 to 5, usually 2 or 3, long setae in female on proximal half of outer margin.

Maxillule and maxilla. No special morphological interest.

Thoracic limbs. Endopod of first pair short and robust, terminating in a strong claw. Endopod of second pair much longer than first, terminating in a strong claw. Endopod of third to eighth pairs usually slender, carpopropodus not divided or divided into 2 subsegments by distinct or obscure articulation, ending in a tuft of peculiarly serrated setae, dactylus and terminal claw distinct, variable in length. In some species, middle pairs (fourth to sixth pairs) becoming conspicuously longer than anterior and posterior pairs. Exopod natatory; basal plate with or without small denticle at outer distal corner; flagellum segmented in about 10.

Genital organ of male. Small, cylindrical, slightly curved forwardly in lateral view, with several recurved setae on apex and several plumose setae on anterior margin; posterior margin usually naked.

Marsupium. Composed of 3 pairs of oostegites; oostegite on sixth thoracic limb small and unfunctional, those on seventh and eighth limbs well developed.

Pleopods. Developed to natatorial organ in male; endopod of first pair wanting, exopod of first pair and both rami of second to fifth pairs multi-segmented; terminal setae on only fourth pair, or both third and fourth pairs, or second to fourth pairs, sometimes modified with respective

way of species. Female pleopods reduced to small, unsegmented single lobes. Pseudobranchia of male bilobed; both rami nearly straight in first and fifth pairs, nearly straight or spirally coiled in second to fourth pairs.

Uropod. Exopod longer than endopod in most species, divided into 2 segments by obscure articulation; proximal segment armed on outer margin with only spines (except for *S. dubia*, in which the margin is furnished with both spines and setae); distal segment about half as long as proximal, setose all round. Endopod tapering, with spines along inner ventral margin from statocyst region to apex.

Telson. Elongated linguiform or trapezoid, slightly slender in male than in female in some species; posterior margin with 3 small median spines, 1 to 3 pairs of long spines and a pair of plumose setae; lateral margin with 1 to 6 pairs of stout spines in basal widened part, followed by short naked part, then a distal series of spines.

Remarks

The subfamily Siriellinae Norman, 1892, in which the genus *Siriella* belongs, is readily distinguished from the other subfamilies of Mysida by (1) the endopod of the third to eighth thoracic limbs with the carpopropodus armed with stiff and peculiarly serrated setae surrounding the dactylus and terminal claw, (2) the uropodal exopod divided into two segments, (3) the posterior margin of the telson armed with three small spines. Siriellinae comprises two tribes, Siriellini Murano, 1986, which consists of two genera, *Siriella* and *Hemisiriella* Hansen, 1910, and Metasiriellini Murano, 1986, which contains only one genus, *Metasiriella*. These three genera are distinguished from each other by the characteristics of the third thoracic limb and the pleopods of the male (Table 2).

As pointed out by previous workers (e.g. Ii, 1964), the male of this genus is rather easily distinguishable from the other species by secondary sexual characters such as antennule and pleopods, while in the female morphological differences are frequently hardly perceptible.

Hansen (1910) classified 15 Asiatic species of *Siriella*, which were discussed in his 'the Schizopoda of the Siboga Expedition', into four groups based on the characters of the uropodal exopod, the pleopods of the male, the number of spines on the proximal part of the telson, and the pseudobranchial rami on the male pleopods, as shown in Table 3.

Ii (1964a) proposed a new grouping, which amended that of Hansen (1910) to some extent,

Table 2. Differences among three genera of the subfamily Siriellinae.

	Tribe Siriellini		Tribe Metasiriellini
	Genus <i>Siriella</i>	Genus <i>Hemisiriella</i>	Genus <i>Metasiriella</i>
Pleopods of male	Endopod of first pair wanting, exopod of first pair and both rami of second to fifth pairs biramous and multi-segmented	Endopod of first pair wanting, exopod of first pair and both rami of second to fifth pairs biramous and multi-segmented	First, second, third and fifth pairs rudimentary as seen in female, fourth pair biramous and multi-segmented
Pseudobranchia of male	Bilobed in all pleopods; straight in first and fifth pleopods, spirally coiled or straight in second to fourth pleopods	Bilobed in all pleopods; straight in first and fifth pleopods, spirally coiled in second to fourth pleopods	Uni-lobed and rectangular in fourth pleopod; lacking in first, second, third and fifth pleopods
Endopod of third thoracic limb	As in following limbs	Extremely elongated, dactylus rudimentary and rounded conical in shape	As in following limbs

Table 3. Grouping of 15 Asiatic species of *Siriella* by Hansen (1910).

	Group 1	Group 2	Group 3	Group 4
Spines on proximal segment of uropodal exopod	Restricted to distal half	Extending proximally considerably beyond middle of outer margin	Extending proximally beyond middle of outer margin	Several spines present among many plumose setae
Number of spines on basal part of telson	1 or 2 pairs	3 pairs	3 pairs	2 pairs
Pleopods of male	Without modified setae	With modified setae on both rami of 4th pair	With modified setae on endopod of 4th pair	(Not described)
Pseudobranchial rami on 2nd to 4th male pleopods	Spirally coiled	Spirally coiled	Straight	(Not described)
Species included	<i>S. affinis</i> , <i>S. gracilis</i> , <i>S. nodosa</i> , <i>S. quadrispinosa</i> , <i>S. thompsonii</i> , <i>S. vulgaris</i>	<i>S. inornata</i> , <i>S. media</i> , <i>S. plumicauda</i> , <i>S. serrata</i>	<i>S. aequiremis</i> , <i>S. anomala</i> , <i>S. conformalis</i> , <i>S. distinguenda</i>	<i>S. dubia</i>

arranging 48 nominal species, subspecies and varieties at that time to six groups and two subgroups, as mentioned below.

Thompsoni-group. Corresponding to Hansen's Group 1. It is divided into two subgroups, Thompsoni-subgroup and Armata-subgroup, based on the arrangement of spines furnished on the outer margin of the proximal segment of the uropodal exopod. The former subgroup comprises the Pacific and Indian species and the latter does the Atlantic species.

Inornata-group. Corresponding to Hansen's Group 2.

Dubia-group. Corresponding to Hansen's Group 4.

Pacifica-group. Newly established. It is characterized by having modified setae on both rami of both third and fourth male pleopods.

Aequiremis-group. Out of Hansen's Group 3, species having modified setae on only the fourth male pleopod are contained.

Anomala-group. Out of Hansen's Group 3, species having modified setae on endopod of both third and fourth male pleopods are contained.

The characters and species included in these groups and subgroups are summarized in Table 4.

More than 40 years have passed since Ii (1964a) reported the grouping of species within the genus *Siriella*. During that period, many species were added to this genus by some workers. There are some species, which do not match with any of the category of Ii's groups, and also some species, which may be needed to be assigned in a new group. Therefore, on the basis of Ii's categories, we propose a revised grouping composed of nine groups and five subgroups within *Siriella* inhabiting the Pacific Ocean and the Indian Ocean. Diagnoses of groups and subgroups are given in each section. Groups, subgroups and their components are as follows.

Aequiremis-group. Corresponding to Ii's Aequiremis-group. Nominal species: *S. aequiremis*, *S. conformalis*, *S. distinguenda*.

Anomala-group. Corresponding to Ii's Anomala-group. Nominal species: *S. anomala*.

Dubia-group. Corresponding to Ii's Dubia-group. Nominal species: *S. dubia*.

Inornata-group. Corresponding to Ii's Inornata-group. Nominal species: *S. inornata*, *S. media*, *S. plumicauda*, *S. serrata*, *S. africana*.

Australiensis-group. Newly established group to include *S. australiensis*. Nominal species:

Table 4. Grouping of 48 species and varieties of *Siriella* by Ii (1964). Abbreviations: g, group; sg, subgroup.

	Thompsoni-g.					
	Thompsoni-sg	Armata-sg.	Inornata-g.	Dubia-g.	Pacifica-g.	
Pseudobranchial rami on 2nd to 4th male pleopods	Spirally coiled	Spirally coiled	Spirally coiled	Spirally coiled	Spirally coiled	Straight
Terminal setae of 3rd male pleopod	Not modified	Not modified	Not modified	Endopod: modified	Both rami: modified	Not modified
Terminal setae of 4th male pleopod	Not modified	Not modified	Both rami: modified	Endopod: modified	Both rami: modified	Endopod: modified
Outer margin of proximal segment of uropodal exopod	With spines mostly confined to distal half	With spines clearly extending to proximal half	With spines clearly extending to proximal half	With both spines and setae	With spines clearly extending to proximal half	With spines clearly extending to proximal half
Species included	*Noted in the bottom	<i>S. armata</i> , <i>S. clausii</i> , <i>S. dayi</i> , <i>S. frontalis</i> , <i>S. jaltensis</i> , <i>S. jaltensis</i> var. <i>brookii</i> , <i>S. norvegica</i>	<i>S. inornata</i> , <i>S. media</i> , <i>S. plumicauda</i> , <i>S. serrata</i>	<i>S. dubia</i>	<i>S. pacifica</i> , <i>S. chierchiaie</i> , <i>S. panamensis</i> , <i>S. roosevelti</i>	<i>S. aequiremis</i> , <i>S. conformalis</i> , <i>S. distinguenda</i> , <i>S. anomala</i>

* *S. thompsoni*, *S. affinis*, *S. australis*, *S. brevicaudata*, *S. denitculata*, *S. gracilis*, *S. halei*, *S. hanseni*, *S. japonica*, *S. japonica* var. *izuensis*, *S. japonica* var. *sagamensis*, *S. longidactyla*, *S. longipes*, *S. lingvura*, *S. nodosa*, *S. okadai*, *S. pondoensis*, *S. quadrispinosa*, *S. sinensis*, *S. singularis*, *S. trispina*, *S. vincenti*, *S. vulgaris*, *S. vulgaris* var. *rostrata*, *S. watasei*, *S. watasei* var. *koreana*, *S. watasei* var. *macropsis*, *S. wadai*

S. australiensis.

Pacifica-group. Corresponding to Ii's Pacifica-group. Nominal species: *S. pacifica*, *S. paulsoni*, *S. roosevelti*, *S. panamensis*, *S. dollfusi*, *S. tadjouensis*.

Singularis-group. Newly established group to include *S. singularis*. Nominal species: *S. singularis*.

Brevicaudata-group. Newly established. Ii (1964a) included these nominal species of this group within Thompsoni-group. Nominal species: *S. brevipdata*, *S. hansenii*, *S. vincenti*, *S. lingvura*, *S. spinula*.

Thompsonii-group. Corresponding to Ii's Thompsoni-group. It is further classified to five subgroups, Halei-subgroup, Nodosa-subgroup, Brevirostris-subgroup, Trispina-subgroup, and Thompsonii-subgroup, by the characters of the rostrum, the dorsal surface of the carapace, the third segment of the antennular peduncle, the endopod of the third to eighth thoracic limbs, the spine arrangement of the inner margin of the uropodal endopod, and the spine number of the proximal widened part of the telson. For details, see Table 5.

Aequiremis-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of first to fifth male pleopods nearly straight. Endopod of fourth male pleopod with remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson more than 2.5 times as long as broad at base.

1. *Siriella aequiremis* Hansen, 1910

Siriella aequiremis Hansen, 1910: 40–41, pl. 3, fig. 4a–c, pl. 4, fig. 1a–l; 1912: 194–195; W. Tattersall, 1912: 122–123; Colosi, 1919: 6; 1920: 236; Coifmann, 1937a: 3; 1937b: 18–19, pl. 6, fig. 10a, b; W. Tattersall, 1943: 65; 1951: 78–79; O. Tattersall, 1955: 86–87; Gordan, 1957: 377 [catalogue]; Ii, 1964a: 135–141, figs. 36, 37; Pillai, 1965: 1692; 1973: 47, figs. 15, 16; Mauchline and Murano, 1977: 76 [catalogue]; Murano, 1983: 82; Cai, 1984: 207–208, pl. 2, figs. 1–9; Müller, 1993: 41 [catalogue]; Wang and Liu, 1994: 73–76, fig. 6; Vereshchaka, 1995: 1646; Wittmann and Stagl, 1996: 160; Wang and Liu, 1997: 202; Liu and Wang, 2000: 91–93, fig. 14; Panampunnayil, 2002: 373, fig. 2A, B; Keable *et al.*, 2003: 465 [catalogue]; Price, 2004: 57 [catalogue].

Type locality. Malay Archipelago sea area.

Material examined. [Western Pacific Ocean] One adult male (NSMT-Cr 12625), 37°04.2'N 142°37.8'E, 29–30 September 1966, surface tow with ORI net at night, coll. M. Murano. One adult male and 1 adult female (NSMT-Cr 12626), 36°05.3'N 142°19.0'E, 1 October 1966, surface tow with ORI net at night, coll. M. Murano. Five adult males, 6 adult females, 3 immature males, 4 immature females and 5 juveniles (NSMT-Cr 12627), 00°03.9'N 148°38.8'E, 25 December 1967, surface tow with ORI net at night, coll. M. Murano. One adult male, 1 immature male and 1 immature female (NSMT-Cr 12628), 01°28.2'S 158°23.4'E, 4 January 1968, surface tow with ORI net at night, coll. M. Murano.

[Central Pacific Ocean] One immature male (NSMT-Cr 12629), 18°12.2'N 174°34.9'W, 17 January 1968, surface tow with ORI net at night, coll. M. Murano. One adult male (NSMT-Cr 12630), 14°01.0'N 174°40.6'W, 18 January 1968, surface tow with ORI net at night, coll. M. Murano. Four adult males (9.5 mm) and 1 adult female (9.5 mm) (NSMT-Cr 12668), 14°56.2'N

Table 5. Diagnostic characters of five subgroups within Thompsonii-group.

	Halei-subgroup	Thompsonii-subgroup	Trispina-subgroup	Nodosa-subgroup	Brevirostris-subgroup
Rostrum	Broadly rounded, not produced anteriorly	Produced anteriorly into triangular plate	Produced anteriorly into triangular plate	Produced anteriorly into triangular plate	Produced anteriorly into triangular plate
Dorsal surface of carapace in female	Smooth	Smooth	Smooth	With 2 large humps	With 1 small protuberance
Inner margin of 3rd segment of female antennular peduncle	With 5 or 6 long setae	With 1 seta	With 1 seta	With 1 seta	With 1 seta
Appendix masculina on male antennule	Conical	Conical, rarely bilobed distally	Conical	Spatulate	Conical
Inner flagellum of male antennule	Normal	Normal, dilated or meandering in proximal part	Normal	Normal	Normal
Endopod of middle pairs of 3rd to 8th thoracic limbs	Slightly longer than anterior and posterior pairs	Slightly longer than anterior and posterior pairs	Much longer than anterior and posterior pairs	Much longer than anterior and posterior pairs	Much longer than anterior and posterior pairs
Spines on inner margin of uropodal endopod	Arranged alternately with longer and shorter spines; distal several spines recurved	Arranged alternately with longer and shorter spines; distal several spines not recurved	Becoming gradually longer posteriorly; distal several spines not recurved	Becoming gradually longer posteriorly; distal several spines not recurved	Becoming gradually longer posteriorly; distal several spines not recurved
Number of spines on proximal widened part of telson	2	2, rarely 4	3 to 5	1	2
Species included	<i>S. halei</i>	* Noted in the bottom	<i>S. trispina</i> , <i>S. denticulata</i>	<i>S. nodosa</i>	<i>S. brevisrostris</i> , <i>S. jonesi</i> , <i>S. tuberculum</i>

* *S. thompsonii*, *S. gracilis*, *S. quadrispinosa*, *S. vulgaris*, *S. affinis*, *S. watasei*, *S. longipes*, *S. australis*, *S. longidactyla*, *S. quilonensis*, *S. pondoensis*, *S. wadai*, *S. sinensis*, *S. okadai*, *S. japonica*, *S. izuensis*, *S. koreana*, *S. macropsis*, *S. bacescui*.

169°56.9'W, 24 January 1968, surface tow with ORI net at night. Five males (4.8–7.5 mm) and 3 females (8–10 mm) (NSMT-Cr 12632), 14°06.5'N 154°59.8'W, 20 September 1969, surface tow with ORI net at night, coll. M. Murano. One adult female (8.0 mm) and 2 immature females (NSMT-Cr 15644), 10°37.9'N 154°58.8'W, 21 September 1969, surface tow with ORI net, coll. M. Murano. One male (5.8 mm) and 4 females (6.6–9.5 mm) (NSMT-Cr 12633), 06°29.3'N 154°50.2'W, 27 September 1969, surface tow with ORI net at night, coll. M. Murano. Two females (4.5, 8.5 mm) (NSMT-Cr 12634), 04°57.0'S 155°06.4'W, 3 October 1969, surface tow with ORI net at night, coll. M. Murano. One male (7.1 mm) and 4 females (8.9–10.4 mm) (NSMT-Cr 12635), 08°33.5'S 154°59.2'W, 4 October 1969, surface tow with ORI net at night, coll. M. Murano. One male (4.4 mm) and 1 female (4.0 mm) (NSMT-Cr 12636), 12°53.3'S 152°51.4'W, 6 October 1969, 910–0 m oblique tow with ORI net at night, coll. M. Murano. Six males (5.5–8.2 mm) and 3 females (4.9–11.0 mm) (NSMT-Cr 12637), 12°53.3'S 152°51.4'W, 6 October 1969, surface tow with ORI net at night, coll. M. Murano. Two females (3.3, 8 mm) (NSMT-Cr 12638), 15°04.5'S 155°16.6'W, 19 October 1969, surface tow with ORI net at night, coll. M. Murano. Eleven males (3.5–9 mm) and 8 females (6.5–8.7 mm) (NSMT-Cr 12639), 09°02.3'S 176°43.0'W, 27 October 1969, surface tow with ORI net at night, coll. M. Murano. One female (7.5 mm) (NSMT-Cr 12640), 05°29.4'S 179°32.9'E, 28 October 1969, surface tow with ORI net at night, coll. M. Murano.

[Philippine Sea] One adult male (NSMT-Cr 12631), 21°55.5'N 125°14.7'E, 28 May 1968, surface tow with ORI net at night, coll. M. Murano. One adult male (9.1 mm) and 1 immature female (5.6 mm) (NSMT-Cr 12647), 14°58.8'N 131°56.0'E, 16 May 1972, surface tow with ORI net, coll. M. Murano. One immature male (7.1 mm) (NSMT-Cr 12648), 15°N 132°E, 16 May 1972, surface tow with ORI net, coll. M. Murano. One adult male (8.6 mm) and 1 adult female (8.3 mm) (NSMT-Cr 12649), 05°02.6'N 130°34.8'E, 20 May 1972, 2300–0 m oblique tow with ORI net, coll. M. Murano. One adult female (NSMT-Cr 12643), 09°03.0'N 129°53.3'E, 28 October 1981, 1550–0 m oblique tow with ORI net.

[South China Sea] One adult female (9.3 mm) (NSMT-Cr 12655), 11°58.0'N 114°31.6'E, 28 June 1972, surface tow with ORI net, coll. M. Murano. One adult male (9.4 mm) (NSMT-Cr 12659), 11°58.0'N 114°29.2'E, 28 June 1972, 900–0 m oblique tow with ORI net, coll. M. Murano. Two females (5.4, 6.4 mm) (NSMT-Cr 12656), 08°00.8'N 109°32.7'E, 11 July 1972, 210–0 m oblique tow with ORI net, coll. M. Murano. Two males (8.1, 8.8 mm) (NSMT-Cr 12657), 08°00.9'N 109°33.0'E, 11 July 1972, surface tow with ORI net, coll. M. Murano. Seven males and 3 females (NSMT-Cr 12661), 11°00.2'N 112°59.8'E, 15 July 1972, surface tow with ORI net, coll. M. Murano. Four males and 9 females (NSMT-Cr 12660), 10°54.9'N 112°49.5'E, 16 July 1972, surface tow with ORI net, coll. M. Murano. One adult male (9.3 mm) (NSMT-Cr 12654), 14°31.8'N 115°38.0'E, 18 July 1972, 880–0 m oblique tow with ORI net, coll. M. Murano. Five males (5.7–7.5 mm) and 5 females (5.4–8.1 mm) (NSMT-Cr 12658), 20°52.0'N 121°17.2'E, 27 July 1972, surface tow with ORI net, coll. M. Murano. One immature female (NSMT-Cr 12641), 18°08.5'N 117°05.0'E, 27 September 1981, 939–0 m oblique tow with ORI net. One adult female (NSMT-Cr 12642), 09°41.6'N 112°38.2'E, 6 October 1981, 1200–0 m oblique tow with ORI net.

[Sulu Sea] Nine adult males (8.4–9.5 mm), 5 adult females (8.5–9.0 mm), 2 immature males (6.6, 7.0 mm) and 1 immature female (6.9 mm) (NSMT-Cr 12650), 08°47.4'N 121°45.6'E, 2 June 1972, 1200–0 m oblique tow with ORI net, coll. M. Murano. Two adult males (8.5, 8.8 mm), 2 adult females (7.5, 8.5 mm) and 1 immature female (5.3 mm) (NSMT-Cr 12651), 08°46.7'N 121°45.8'E, 2 June 1972, surface tow with ORI net, coll. M. Murano. One adult male (8.6 mm)

(NSMT-Cr 12652), 07°30.2'N 121°31.3'E, 4 June 1972, surface tow with ORI net, coll. M. Murano.

[Celebes Sea] Two adult males (9.4 mm), 3 adult females (8.8 mm), 4 immature males and 8 immature females (NSMT-Cr 12667), 04°35.0'N 122°54.4'E, 12 June 1972, surface tow with ORI net, coll. M. Murano.

[Philippines] One adult male (9.2 mm), 22 immature males, 25 immature females and 31 juveniles (NSMT-Cr 12644), Batbatan, Panay Is., 23 March 1979, surface tow with larva net, coll. SEAFDEC. Eleven adult males (9.2–10.3 mm) and 58 adult females (7.8–10.3 mm) (NSMT-Cr 12645), Batbatan, Panay Is., 23–24 March 1979, midnight tow, coll. SEAFDEC. One adult male (8.5 mm) and 1 immature male (NSMT-Cr 12646), Batbatan, Panay Is., 25 April 1979, 06:30, coll. SEAFDEC.

[Eastern Indian Ocean] One adult male (9.6 mm) (NSMT-Cr 12653), 11°58.0'S 114°31.2'E, 28 June 1972, 1286–0 m oblique tow with ORI net, coll. M. Murano. One immature male (NSMT-Cr 12662), 14°28.7'S 119°01.1'E, 23 January 1985, surface tow with larva net, coll. T. Fukushima. One adult male and 1 adult female (NSMT-Cr 12663), 15°00.8'S 121°01.8'E, 26 January 1985, surface tow with larva net, coll. T. Fukushima. One adult male and 1 adult female (NSMT-Cr 12664), 15°28.9'S 116°01.2'E, 3 February 1985, surface tow with larva net, coll. T. Fukushima. One adult female (NSMT-Cr 12665), 15°28.7'S 114°00.7'E, 7 February 1985, surface tow with larva net, coll. T. Fukushima.

[Central Indian Ocean] One adult male (8.4 mm) (NSMT-Cr 12666), 00°01.4'S 86°55.0'E, 8 February 1977, 700–0 m oblique tow with ORI net.

Body length. Adult male, 8.4–10.3 mm; adult female, 7.5–10.3 mm.

Remarks. *Siriella aequiremis* is commonly collected by night tows using plankton nets at the surface of offshore areas in the tropical and subtropical regions of the Pacific and Indian Oceans.

Distribution. Known from Indonesia (Hansen, 1910; Colosi, 1919; W. Tattersall, 1951); the Philippines (Hansen, 1910; W. Tattersall, 1951; present study); the eastern Pacific (Hansen, 1912; W. Tattersall, 1943); the central Pacific (present study); the western Pacific (W. Tattersall, 1943; Ii, 1964a; Murano, 1983; present study); the Sulu Sea (present study); the Celebes Sea (present study); the Arafura Sea (Colosi, 1920); the South China Sea (Ii, 1964a; Wang and Liu, 1994; present study); the East China Sea (Wang and Liu, 1997); the Indian Ocean (W. Tattersall, 1912; O. Tattersall, 1955; Pillai, 1973; Vereshchaka, 1995; present study); the Andaman Sea (Panampunnayil, 2002); the Red Sea (Coifmann, 1937b; Wittmann and Stagl, 1996); the Arabian Sea (Coifmann, 1937a).

2. *Siriella conformalis* Hansen, 1910

Siriella conformalis Hansen, 1910: 43–44, pl. 5, fig. 3a, b; Gordan, 1957: 379 [catalogue]; Ii, 1964a: 143; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 45 [catalogue]; Keable *et al.*, 2003: 466 [catalogue].

Type locality. 06°02'S 123°58'E, west coast of Binongka, Indonesia.

No specimen in the present study.

Distribution. Known from Indonesia (Hansen, 1910) and the Great Barrier Reef (Carleton and Hamner, 1989).

3. *Siriella distinguenda* Hansen, 1910

Siriella distinguenda Hansen, 1910: 42–43, pl. 5, fig. 2a–e; W. Tattersall, 1943: 66; 1951: 79; Gordan, 1957: 379 [cata-

logue]; Ii, 1964a: 142; Mauchline and Murano, 1977: 76 [catalogue]; Băcescu, 1979: 143; Müller, 1993: 41 [catalogue].

Type locality. 07°33'S 117°31'E and 07°25'S 117°50.5'E, Flores Sea.

No specimen in the present study.

Distribution. Known from Indonesia (Hansen, 1910); Samoa (W. Tattersall, 1943); the Great Barrier Reef (Băcescu, 1979; Carleton and Hamner, 1989); the Philippines (W. Tattersall, 1951).

Anomala-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of first to fifth male pleopods nearly straight. Endopod of both third and fourth male pleopods with remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson more than 2.5 times as long as broad at base.

4. *Siriella anomala* Hansen, 1910

(Fig. 1)

Siriella anomala Hansen, 1910: 41–42, pl. 5, fig. 1a–l; W. Tattersall, 1936: 146; 1951: 79; Gordan, 1957: 378 [catalogue]; Ii, 1964a: 143–148, figs. 38, 39; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 41–42 [catalogue]; Fukuoka and Murano, 1997: 523, fig. 3A–D; Keable *et al.*, 2003: 465 [catalogue].

Type locality. 07°33'S 117°31'E, 07°33'S 117°51'E and 07°25'S 117°50.5'E, Flores Sea.

Material examined. [Okinawa, Japan] Three immature females (up to 8.6 mm) (NSMT-Cr 16320), Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Two adult males (9.2, 10.2 mm) (NSMT-Cr 16318), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. Two adult males (9.3, 10.6 mm), 1 gravid female (9.8 mm), 8 immature males (up to 8.4 mm), 11 immature females (up to 7.4 mm) and 23 juveniles (NSMT-Cr 16319), Port Aka, Akajima Is., 12 November 1990, hand net under electric light, coll. M. Murano.

[Philippines] Abundant adult males, 5 adult females and 3 immature males (NSMT-Cr 16314), Batbatan, Panay Is., 23–24 March 1979, midnight, coll. SEAFDEC. Three gravid females (8.2–9.0 mm) (NSMT-Cr 16315), Batbatan, Panay Is., 14 April 1979, 07:07, coll. SEAFDEC. Fifteen adult males (8.5–9.6 mm), 5 adult females (8.7–9.8 mm) and 5 immature females (up to 8.6 mm) (NSMT-Cr 16316), Batbatan, Panay Is., 25 April 1979, midnight, coll. SEAFDEC. One adult male (9.4 mm) (NSMT-Cr 16317), Batbatan, Panay Is., 10 May 1979, 05:58, coll. SEAFDEC.

Body length. Adult male, 8.5–10.6 mm; adult female, 8.2–9.8 mm.

Remarks. *Siriella anomala*, in the male, is easily identified by the peculiar antennal scale (Fig. 1B) and the modified setae on the endopod of the third and fourth pleopods (Fig. 1D–G). In the female, however, it is sometimes difficult to be distinguished from those of related species.

Distribution. Previously known from Indonesia (Hansen, 1910); the Great Barrier Reef (W. Tattersall, 1936); Caroline Is., Marshall Is. and Palau Is., Micronesia (W. Tattersall, 1951; Ii, 1964a); the Philippines (W. Tattersall, 1951; present study); Okinawa (Ryukyu), Japan (Fukuoka

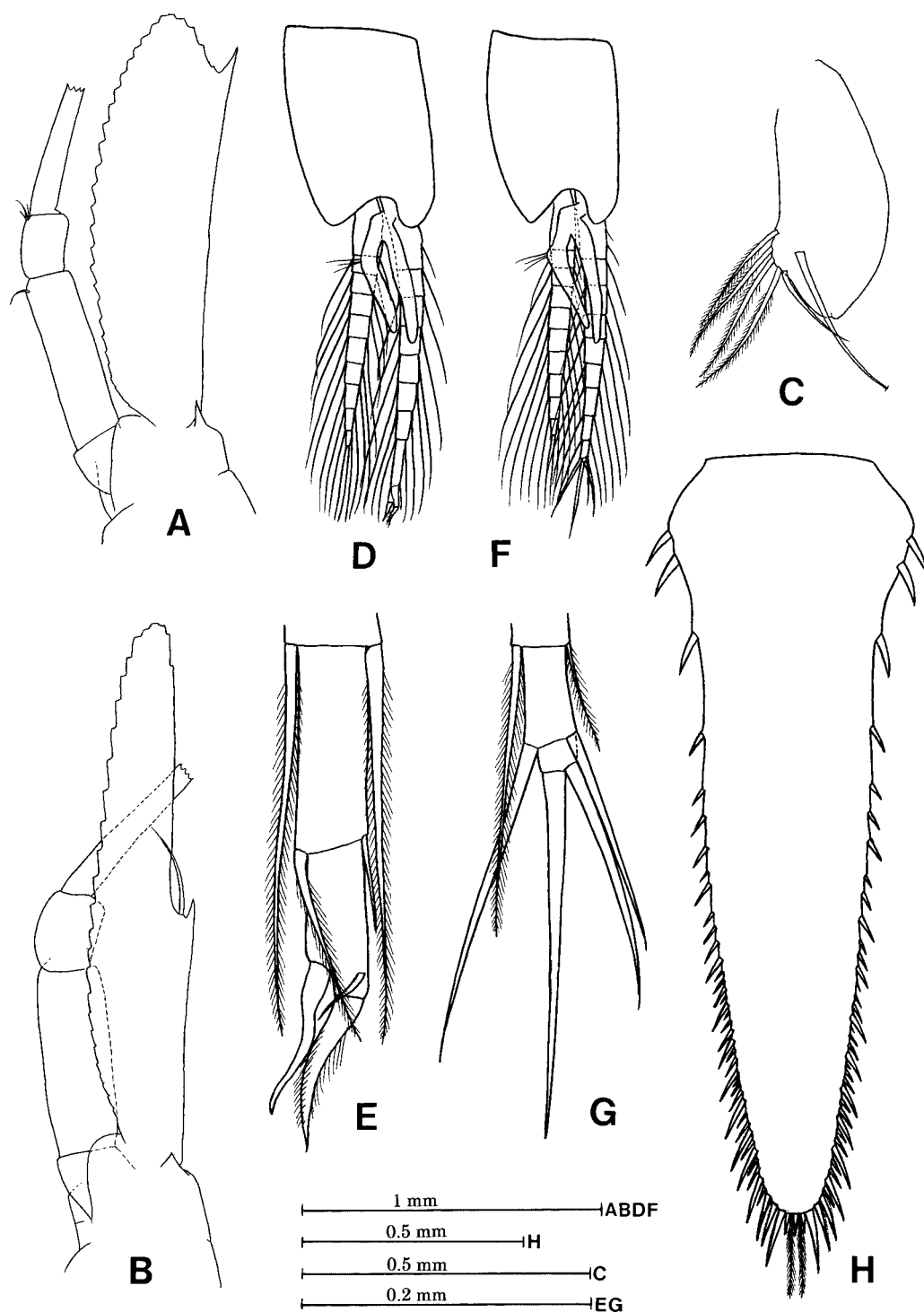


Fig. 1. *Siriella anomala* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 16314); A, H, adult female (10.6 mm); B–G, adult male (10.3 mm). A, B, antenna; C, genital organ; D, third pleopod; E, extremity of endopod of third pleopod; F, fourth pleopod; G, extremity of endopod of fourth pleopod; H, telson.

and Murano, 1997). The present occurrences fall within the known distribution range of this species.

Dubia-group

Definition. Anterior margin of carapace produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Endopod of both third and fourth male pleopods with remarkably modified setae. Proximal segment of uropodal exopod armed with both spines and setae on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson more than 2.5 times as long as broad at base.

5. *Siriella dubia* Hansen, 1910

(Fig. 2)

Siriella dubia Hansen, 1910: 44–45, pl. 5, fig. 4a–e; W. Tattersall, 1922: 455–456, fig. 5a, b; 1936: 146–147, fig. 1; 1951: 79–80; Gordan, 1957: 379 [catalogue]; Ii, 1964a: 131–135, fig. 35; Pillai, 1964: 7–8, fig. 2; O. Tattersall, 1965: 77–78; Pillai, 1965: 1688–1689, fig. 8; 1973: 42–47, figs. 13, 14; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 46 [catalogue]; Wang and Liu, 1994: 76–78, fig. 7; Vereshchaka, 1995: 1648; Liu and Wang, 2000: 93–95, fig. 15; Fukuoka and Murano, 2002: 58; Keable *et al.*, 2003: 466 [catalogue].

Type locality. 01°20'S 127°38'E, off Laiwui, Obi, Indonesia.

Material examined. [Amami, Japan] One adult male (8.4 mm) (NSMT-Cr 16322), 28°10.5'N 129°03.5'E, off Amami-Oshima Is., 22 April 1970, 20:05–20:38, 138–141 m, bottom-net, coll. M. Murano. One adult male (7.6 mm) and 1 adult female (8.8 mm) (NSMT-Cr 16323), 28°10.3'N 129°13.8'E, off Amami-Oshima Is., 24 April 1970, 13:53–14:13, 67–68 m, bottom-net, coll. M. Murano.

[Philippines] One adult male (6.6 mm) (NSMT-Cr 16321), 11°35.3'N 123°22.5'E, 24 April 1979, coll. SEAFDEC.

[South China Sea] One adult male (7.6 mm), 1 immature male (6.4 mm) and 1 immature female (6.4 mm) (NSMT-Cr 15648), 04°33.4'N 106°26.4'E to 04°33.9'N 106°26.6'E, 9 July 1972, surface tow with ORI net at night, coll. M. Murano.

[Timor Sea] One gravid female (7.8 mm) (NSMT-Cr 15647), 12°17.3'S 129°40.9'E to 12°17.2'S 129°41.8'E, 24 June 1972, 49–52 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Body length. Adult male, 6.6–8.4 mm; adult female, 7.8–8.8 mm.

Remarks. A couple of specimens from the neighboring waters of Amami-Oshima Island shows a sexual dimorphism in the telson (Fig. 2D, E). It is more slender in the male than in the female. Four pairs of long spines on the posterior margin are more slender in the female than in the male, and as discussed by Pillai (1973), the innermost pair of the long spines of the female is slightly shorter than the next one while in the male it is slightly longer, although the difference is not so notable compared to Pillai's fig. 13C and I. Posterior four or five pairs of the lateral spines on the telson of the female are densely arranged and much longer than those of the male.

Distribution. Known from the Obi Is., Indonesia (Hansen, 1910); the Philippines (W. Tattersall, 1951; present study); the South China Sea (Ii, 1964a; Wang and Liu, 1994; present study); Amami-Oshima Is., Japan (present study); the Great Barrier Reef (W. Tattersall, 1936); the Malacca Strait (O. Tattersall, 1965); the Andaman Sea (Fukuoka and Murano, 2002); the An-

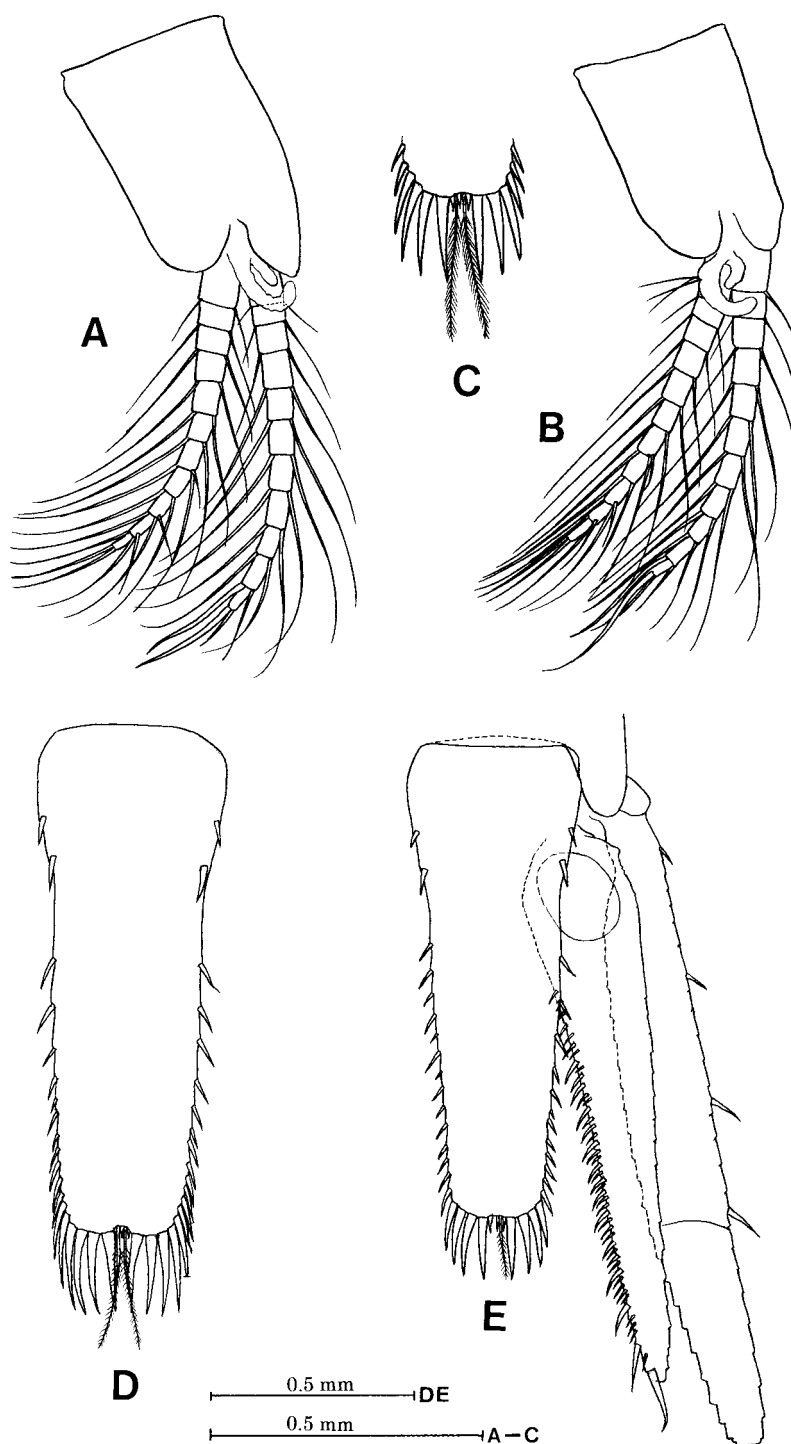


Fig. 2. *Siriella dubia* Hansen, 1910; A–C, from Panay Island, Philippines (NSMT-Cr 16321), adult male; D, E, from off Amami-Oshima Island, Japan (NSMT-Cr 16323), D, adult female, E, adult male. A, third pleopod; B, fourth pleopod; C, posterior part of telson; D, telson; E, uropod and telson.

damans Islands (W. Tattersall, 1922); the Arabian Sea off India (Pillai, 1964, 1973); Madagascar (Vereshchaka, 1995); Mozambique (Vereshchaka, 1995). The present occurrence from Amami-Oshima Is., Japan, extends northeastward the distribution range of this species. *Siriella dubia* is widely distributed in the warm-water region of the Indo-West Pacific.

Singularis-group

Definition. Anterior margin of carapace slightly produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Endopod of second to fourth male pleopods with remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson more than 2.5 times as long as broad at base.

6. *Siriella singularis* Nouvel, 1957

(Fig. 3)

Siriella singularis Nouvel, 1957: 317–322, figs. 1–18; O. Tattersall, 1960: 167; Ii, 1964a: 578; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 54 [catalogue].

Type locality. Sidoardjo, near Surabaya, East Java, Indonesia.

Material examined. [Gulf of Thailand] Five adult females (6.8 mm) (NSMT-Cr 15674), Don Sak River, 14 April 1987, 4 m, 30 ppt, coll. S. Chaitiamvong. Seven males (up to 6.9 mm), 14 gravid females (6.8–7.3 mm) and 12 adult females (6.8–7.4 mm) (NSMT-Cr 15673), Klong Don Sak, Surat Thani, 24 June 1987, 5 m, coll. S. Chaitiamvong. One adult male (6.4 mm) and 2 adult females (6.9, 7.0 mm) (NSMT-Cr 15675), Don Sak River, 11 March 1993, 32 ppt, coll. S. Chaitiamvong. Twenty-four adult males (5.5–6.6 mm), 26 adult females (6.0–7.6 mm), 1 immature male and 2 immature females (NSMT-Cr 15676), Don Sak River, 20 April 1993, 3.5 m, 30 ppt, coll. S. Chaitiamvong. Four adult females (6.2–6.7 mm) (NSMT-Cr 15677), Don Sak River, 20 April 1993, coll. S. Chaitiamvong.

Body length. Adult male, 5.5–6.9 mm; adult female, 6.0–7.6 mm.

Remarks. Nouvel (1957) described a prominent lobe on the distomedial part of the third segment of the male antennular peduncle, but such a lobe was not observed in the present specimens. The present specimens well agree with the original description with an exception mentioned above.

Distribution. This species has previously been collected from fish-breeding pools in the eastern Java, Indonesia (Nouvel, 1957) and a prawn pond in the Singapore Island (O. Tattersall, 1960), and the present material is collected from the estuary of Don Sak River adjacent to the Gulf of Thailand. These collection records indicate that *S. singularis* prefers brackish water.

Known from the eastern Java, Indonesia (Nouvel, 1957) and the Singapore Island (O. Tattersall, 1960). The present occurrence from the Gulf of Thailand extends northward the distribution range of this species.

Inornata-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate.

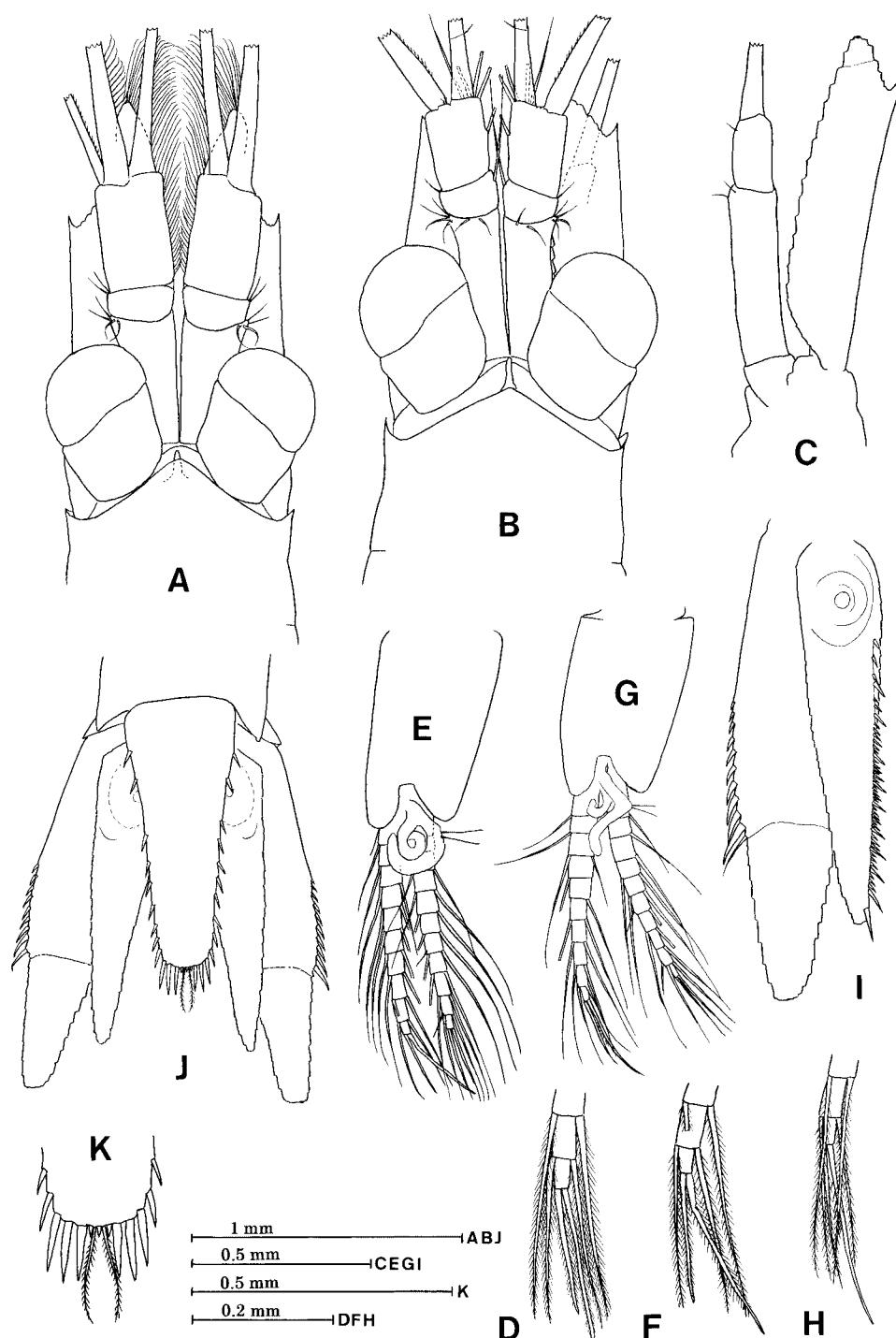


Fig. 3. *Siriella singularis* Nouvel, 1957; from Gulf of Thailand (NSMT-Cr 15676); A, C–K, adult male (6.6 mm); B, adult female (7.2 mm). A, B, anterior part of body; C, antenna; D, extremity of endopod of second pleopod; E, third pleopod; F, extremity of endopod of third pleopod; G, fourth pleopod; H, extremity of endopod of fourth pleopod; I, uropod; J, posterior part of body; K, posterior part of telson.

Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Both rami of fourth male pleopod with remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson more than 2.5 times as long as broad at base.

7. *Siriella inornata* Hansen, 1910

Siriella inornata Hansen, 1910: 36–38, pl. 4, fig. 2a–k; W. Tattersall, 1928: 106, fig. 28; 1936: 146; 1951: 65; Gordan, 1957: 379 [catalogue]; Ii, 1964a: 123–124; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 48 [catalogue]; Fukuoka and Murano, 1997: 520; Keable *et al.*, 2003: 467 [catalogue].

Type locality. 07°33'S 117°31'E, 07°33'S 117°51'E, 07°25'S 117°50.5'E, Flores Sea, and 06°07.5'N 120°26'E, Sulu Archipelago.

Material examined. [Amami, Japan] Abundant males and females (NSMT-Cr 16395), Kise Fishing Port, Kasari, Amami-Oshima Is., 25 July 2003, hand net under electric light, coll. K. Fukuoka.

[Okinawa, Japan] Four immature males, 5 immature females and 14 juveniles (NSMT-Cr 16384), Port Aka, Akajima Is., 23 June 1990, hand net under electric light, coll. M. Murano. Two adult males (8.2 mm), 1 gravid female (10.3 mm), 2 immature males (4.5 mm), 14 immature females (up to 9.5 mm) and 19 juveniles (NSMT-Cr 16393), Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Three adult females (8.8 mm), 1 immature male (9.4 mm) and 1 immature female (NSMT-Cr 16385), Port Aka, Akajima Is., 24 June 1990, light trap at 1 m deep, coll. M. Murano. Four immature males (up to 7.6 mm) and 2 immature females (up to 7.2 mm) (NSMT-Cr 16386), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano. Three adult males (8.4–9.4 mm), 10 gravid females (9.0–11.5 mm), 1 adult female, 28 immature males (up to 8.3 mm), 21 immature females (up to 9.4 mm) and abundant juveniles (NSMT-Cr 16392), Port Aka, Akajima Is., 13 November 1990, hand net under electric light, coll. M. Murano. One adult male (9.6 mm), 3 immature males (up to 7.2 mm), 11 immature females (up to 7 mm) and 7 juveniles (NSMT-Cr 16391), Port Aka, Akajima Is., 15 March 1991, 21:30, hand net under electric light, coll. M. Murano. One adult male (10.1 mm) and 7 immature females (up to 6.6 mm) (NSMT-Cr 16390), Port Aka, Akajima Is., 5 May 1991, hand net under electric light, coll. M. Murano. Twelve adult males (9.5–10.1 mm), 4 gravid females (8.6–10.9 mm), 5 immature males (up to 8.3 mm) and 10 immature females (up to 8.5 mm) (NSMT-Cr 16394), Port Aka, Akajima Is., 1 January 1995, hand net under electric light. One adult male (9.9 mm), 5 gravid females (9.0–10.1 mm), 1 adult female (8.8 mm), 18 immature males, 35 immature females and 8 juveniles (NSMT-Cr 16396), Ibaruma, Ishigaki Is., 5 November 2002, hand net under electric light, coll. K. Fukuoka. One adult male (10.7 mm) and 2 gravid females (9.1, 9.5 mm) (NSMT-Cr 17967), Ibaruma, Ishigaki Is., 21 May 2005, 20:00–20:40, hand net under electric light, coll. K. Fukuoka.

[Gulf of Thailand] Seven adult males, 9 adult females, 14 immature males and 11 immature females (NSMT-Cr 16387), Pha Ngan Is., Surat Thani Province, on seagrass bed, 15 August 1992, coll. S. Chaitiamvong. One adult male (NSMT-Cr 16388), Pha Ngan Is., Surat Thani Province, 0.75 m, 33‰, 16 August 1992, coll. S. Chaitiamvong. Twenty-five adult males (up to 6.6 mm), 16 adult females (up to 6.8 mm), 4 immature males and 9 immature females (NSMT-Cr 16389), Pha Ngan Is., Surat Thani Province, on seagrass bed, 16 August 1992, coll. S. Chaitiamvong.

[Philippines] Seventy-nine adult males (up to 10.2 mm), 123 adult females (up to 10.6 mm), 22 immature males and 37 immature females (NSMT-Cr 16380), Batbatan, Panay Is., 23–24 March 1979, midnight, coll. SEAFDEC. One adult male (9.6 mm) (NSMT-Cr 16381), Batbatan, Panay Is., 5 April 1979, coll. SEAFDEC. Four adult males (8.7–10.3 mm), 2 gravid females (8.8, 10.3 mm) and 1 adult female (9.8 mm) (NSMT-Cr 16382), Batbatan, Panay Is., 14 April 1979, coll. SEAFDEC. Fourteen adult males (8.3–10.7 mm), 27 adult females (8.5–10.6 mm) and 1 immature male (7.4 mm) (NSMT-Cr 16383), Batbatan, Panay Is., 25 April 1979, midnight, coll. SEAFDEC.

Body length. Adult male, 6.6–10.7 mm; adult female, 6.8–11.5 mm.

Remarks. The male of *S. inornata* is easily identified by the modified terminal setae on both the exopod and endopod of the fourth male pleopod. In the female, however, this species is difficult to be distinguished morphologically from a related species, *S. media*, as already noted by Ii (1964a).

Specimens taken from a prawn pond in Singapore and identified doubtfully with *S. inornata* by O. Tattersall (1960) seem to be appropriate to be referred to *Siriella paulsoni* or its related species, judging from the third and fourth pleopods of the male.

Distribution. Known from Indonesia (Hansen, 1910; W. Tattersall, 1951); Queensland, Australia (W. Tattersall, 1928); the Great Barrier Reef (W. Tattersall, 1936), the Philippines (Hansen, 1910; W. Tattersall, 1951; present study); Okinawa, Japan (Fukuoka and Murano, 1997; present study). *Siriella inornata* is first recorded from the Gulf of Thailand and off Amami-Oshima Island, Japan. It is a coastal form in the warm-water region of the western Pacific.

8. *Siriella media* Hansen, 1910

Siriella media Hansen, 1910: 38–39, pl. 4, fig. 3a–k; 1912: 194; W. Tattersall, 1943: 65; 1951: 65–66; Gordan, 1957: 380 [catalogue]; Ii, 1964a: 125–131, figs. 33, 34; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 50 [catalogue]; Wang and Liu, 1994: 80–82, fig. 9; Fukuoka and Murano, 1997: 521, fig. 2A, B; Liu and Wang, 2000: 95–97, fig. 16; Keable *et al.*, 2003: 467 [catalogue].

Type locality. Malay Archipelago sea area.

Material examined. [Mainland of Japan] One adult male (12.2 mm) and 1 adult female (13.5 mm) (NSMT-Cr 16326), Nomo, Nagasaki, Japan, hand net during scuba diving, 3 m, above sandy bottom, 5 May 1975, coll. S. Inoue and T. Takita.

[Okinawa, Japan] One adult male (9.4 mm) and 1 adult female (9.9 mm) (NSMT-Cr 15670), Port Aka, Akajima Is., 13 November 1990, hand net under electric light, coll. M. Murano.

[Ogasawara, Japan] One gravid female (9.8 mm) and 1 adult female (damaged) (NSMT-Cr 16465), Futami Harbor, Chichijima Is., 16 June 1995, hand net under electric light, coll. K. Fukuoka. One immature female (5.2 mm) (NSMT-Cr 16466), Miyanohama Beach, Chichijima Is., 27 June 2003, light trap, 2–3 m, sand, coll. K. Fukuoka. One adult male (10.6 mm), 1 gravid female (12.0 mm), 1 adult female (10.5 mm) and 2 immature females (6.0 mm) (NSMT-Cr 16467), Futami Harbor, Chichijima Is., 27 June 2003, hand net under electric light, coll. K. Fukuoka.

[South China Sea] One immature male (7.5 mm) (NSMT-Cr 15668), 04°33.4'N 106°26.4'E to 04°33.9'N 106°26.6'E, 9 July 1972, 22:38–22:55, surface tow with ORI net, coll. M. Murano. One male (ca. 9 mm) (NSMT-Cr 15669), 04°32.8'N 106°26.2'E to 04°33.7'N 106°26.5'E, 9 July 1972, 22:24–22:49, 45–0 m oblique tow with ORI net, coll. M. Murano.

Body length. Adult male, up to 12.2 mm; adult female, up to 13.5 mm.

Distribution. Known from Indonesia (Hansen, 1910); the Gilbert Islands (Hansen, 1912);

the Philippines (Hansen, 1910; W. Tattersall, 1951); Guam (W. Tattersall, 1943); Japan (Ii, 1964a; Fukuoka and Murano, 1997; present study); the South China Sea (Wang and Liu, 1994; Liu and Wang, 2000; present study). The species is first recorded from the Ogasawara Islands, Japan.

9. *Siriella plumicauda* Hansen, 1910

(Fig. 4)

Siriella plumicauda Hansen, 1910: 39; Gordan, 1957: 381 [catalogue]; Ii, 1964a: 123; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 52–53 [catalogue]; Liu and Wang, 2000: 97–98.

Material examined. [Holotype] adult male (ZMUC CRU-7819), 02°00'S 107°06'E, South China Sea, 1869, coll. Captain Andréa.

Type locality. 02°00'S 107°06'E, southern South China Sea.

Body length. Adult male, 12 mm.

Remarks. *Siriella plumicauda* was instituted based on one adult male by Hansen (1910). After that, there is no record on the occurrence of this species. According to Hansen (1910), this species is very closely allied to *S. media*, but easily distinguishable by the aspect of the feathered setae at the end of the telson and on the front side of the first male pleopod. The present reexamination on the type specimen reveals that the feathered setae on the posterior margin of the telson are thicker and longer compared to those of allied species, but the strong lateral branches on these setae can not be observed on the specimen (Fig. 4B), which has been preserved for a long period of more than 140 years. On the front side of the first pleopod, eight setae were confirmed, but any peculiar feature was not observed.

Distribution. Known only from the type locality (Hansen, 1910).

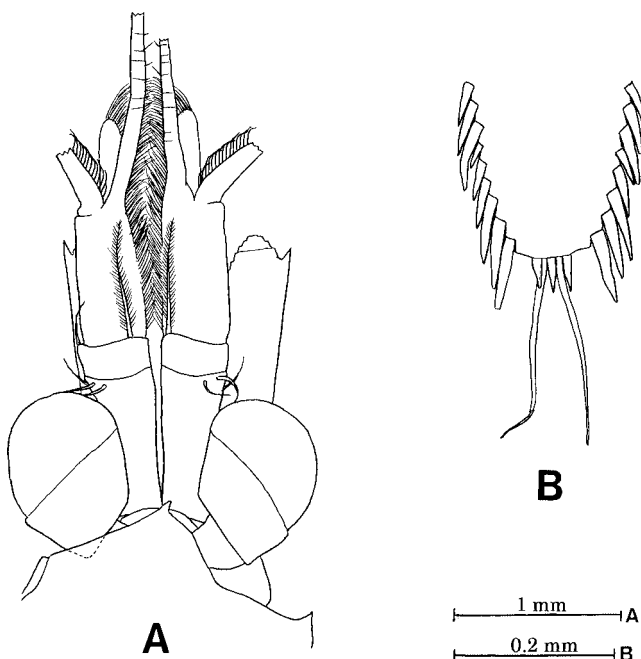


Fig. 4. *Siriella plumicauda* Hansen, 1910, holotype (ZMUC CRU-7819). A, anterior part of body; B, posterior part of telson.

10. *Siriella serrata* Hansen, 1910

(Fig. 5)

Siriella serrata Hansen, 1910: 38; W. Tattersall, 1927a: 188; Coifmann, 1937b: 21; Gordan, 1957: 381 [catalogue]; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 54 [catalogue].

Material examined. Holotype (ZMUC CRU-8077), 1 adult male (divided into two parts), Suez, 21 March 1898, coll. H. Mortensen.

Type locality. Off Suez, Red Sea.

Body length. Adult male, 10.5 mm.

Remarks. *Siriella serrata* was established, without any illustration, by Hansen (1910) based on a single male specimen collected from Suez. Later, W. Tattersall (1927a) reported the occurrence of this species from the Suez Canal, Lake Timsah and Kabret during the Cambridge Expedition to the Suez Canal in 1924, but he also did not give any illustrations. Therefore, the illustrations of this species (Fig. 5) is given for the first time. This species, together with the next species, *S. africana*, are distinguished from all other species of *Siriella* by having small spines on the outer margin of the antennal scale (Fig. 5A). Differences from *S. africana* are discussed in the *Remarks* section for that species.

Distribution. Known only from Suez (Hansen, 1910; W. Tattersall, 1927a).

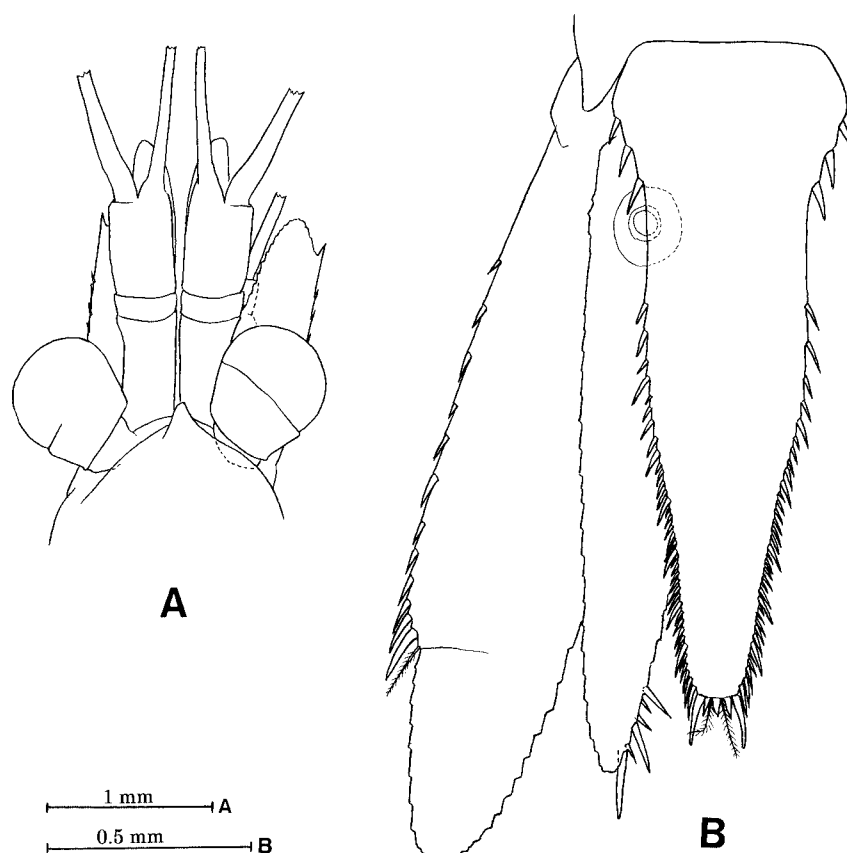


Fig. 5. *Siriella serrata* Hansen, 1910, holotype (ZMUC CRU-8077). A, anterior part of body; B, uropod and telson.

11. *Siriella africana* Panampunnayil, 1981

Siriella africana Panampunnayil, 1981: 87–88, figs. 1, 2; Müller, 1993: 41 [catalogue].

Type locality. 34°51.5'S 20°11.6'E, off Cape Agulhas, South Africa.

No specimen in the present study.

Remarks. *Siriella africana* was instituted based on a single adult female specimen collected from the Agulhas Bank. Modification of the terminal setae of the male pleopods is unknown, but this species is placed on the Inornata-group due to the similarity with *S. serrata* in the antennal scale with small spines on the lateral margin.

This species is distinguished from the most related species, *S. serrata*, by: (1) the rostrum of *S. africana* longer and narrower than in *S. serrata*; (2) the antennal scale with 13 to 15 small spines along the outer margin in *S. africana*, whereas four or five spines in *S. serrata*; (3) the lateral margin of the telson throughout spiny in *S. africana*, while a clear unarmed part inserted between three basal spines and distal series of spines in *S. serrata*.

Distribution. Known only from the type locality (Panampunnayil, 1981).

Australiensis-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Exopod or endopod of third male pleopod and both rami of fourth male pleopod with remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson long, more than 2.5 times as long as broad at base.

12. *Siriella australiensis* Panampunnayil, 1995

(Figs. 6, 7)

Siriella australiensis Panampunnayil, 1995: 1939–1942, figs. 1–23; Keable *et al.*, 2003: 465 [catalogue]; Biju *et al.*, 2006: 292, figs. 1–5.

Type locality. Southwest coast of Australia between 33° and 35°S, and 114° and 119°E.

Material examined. [Gulf of Thailand] Eight males (up to 11 mm) and 9 females (up to 12.4 mm) (NSMT-Cr 16249), Klong Dan Sak, Surat Thani, 10 March 1988, coll. S. Chaiti-amvong.

[Philippines] Two adult males (9.6 mm) (NSMT-Cr 16246), Batbatan, Panay Is., 23–24 March 1979, midnight, coll. SEAFDEC. One adult male (9.1 mm) and 1 gravid female with 16 embryos (9.3 mm) (NSMT-Cr 16247), Batbatan, Panay Is., 21 March 1979, surface tow with larva net, coll. SEAFDEC. Two gravid females (both 8.2 mm with 9 embryos) (NSMT-Cr 16248), Batbatan, Panay Is., 10 May 1979, 05:58, coll. SEAFDEC.

Body length. Adult male, up to 11 mm; adult female, up to 12.4 mm.

Remarks. The present specimens match with main characters of *S. australiensis* described by Panampunnayil (1995), but is slightly different in several aspects: (1) the rostrum extending to less than the middle of the first segment of the antennular peduncle and covering the base of the eyestalks in the type specimens, while that of the present specimens barely extending to the basal

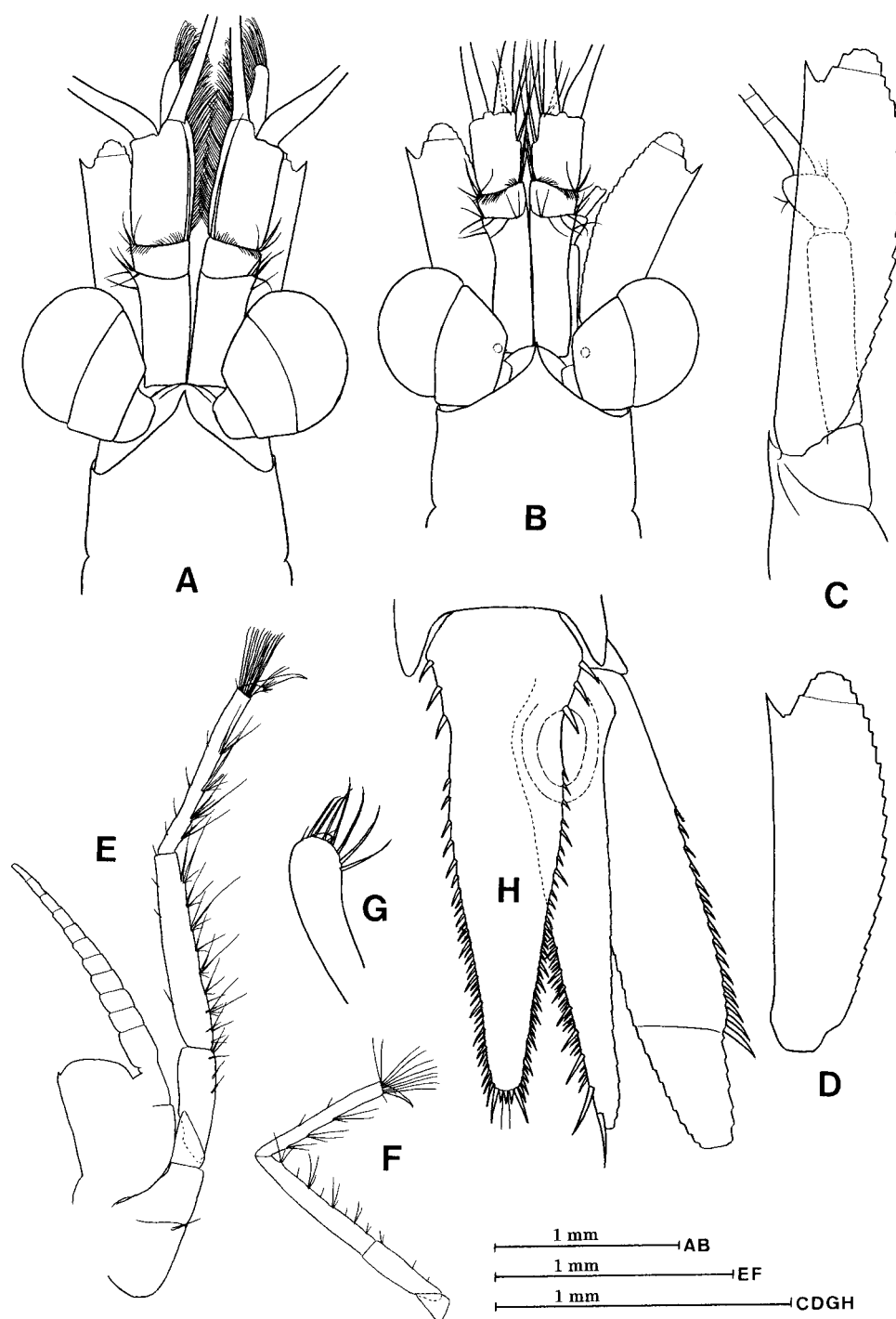


Fig. 6. *Siriella australiensis* Panampunnayil, 1995; from Panay Island, Philippines; A, C, E–H, adult male (9.6 mm) (NSMT-Cr 16246); B, D, gravid female (9.3 mm) (NSMT-Cr 16247). A, B, anterior part of body; C, antenna; D, antennal scale; E, fifth thoracic limb; F, endopod of eighth thoracic limb; G, genital organ; H, uropod and telson.

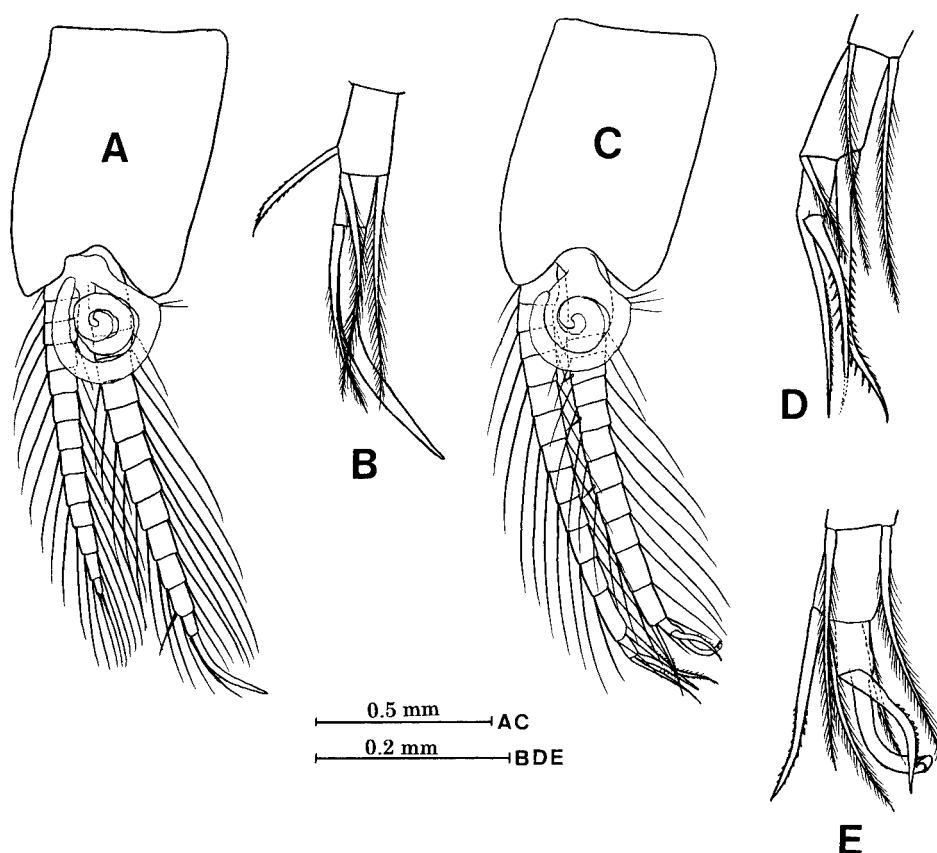


Fig. 7. *Siriella australiensis* Panampunnayil, 1995; from Panay Island, Philippines (NSMT-Cr 16246); adult male (9.6 mm). A, third pleopod; B, extremity of exopod of third pleopod; C, fourth pleopod; D, extremity of endopod of fourth pleopod; E, extremity of exopod of fourth pleopod.

margin of the first segment and exposing the whole organ of the eyes in the male and the most part in the female (Fig. 6A, B); (2) the antennal scale 3 times as long as broad and lacking the terminal suture in the type specimens, while 3.5 times as long in the female and 4 times as long in the male and with a terminal suture in the present specimens (Fig. 6C, D); (3) the exopod of the third male pleopod in the type specimens overreaching the endopod by less than distal two segments and the terminal modified seta only slightly longer than the terminal normal seta, while that of the present specimens extending beyond the endopod for more than distal two segments and the terminal modified seta considerably longer than the terminal normal one (Fig. 7A, B); (4) the terminal modified setae on the exopod of the fourth male pleopod shorter and more strongly twisted in the present specimens (Fig. 7C, E) than in the type ones.

As already discussed by Panampunnayil (1995), *S. australiensis* is distinguished from the other species of the genus by having the modified setae on the exopod of the third pleopod and on the both rami of the fourth male pleopod.

Distribution. *Siriella australiensis* is previously known from the southwest coast of Australia (Panampunnayil, 1995) and the Minicoy lagoon, India (Biju *et al.*, 2006). The present occurrences from the Philippines and the Gulf of Thailand extend eastward the distribution range of this species.

13. *Siriella scissilis* sp. nov.

(Figs. 8–10)

Type series. Holotype (NSMT-Cr 16456), adult male (6.6 mm); allotype (NSMT-Cr 16457), adult female (6.5 mm); paratypes (NSMT-Cr 16458), 13 adult males (6.6–7.1 mm, a specimen of 6.6 mm dissected for drawing), 20 adult females (6.5–7.4 mm, a specimen of 6.5 mm with embryos), 5 immature males (up to 6.0 mm) and 16 immature females (up to 6.7 mm); Sahul Shelf, 12°24.8'S 128°00.1'E to 12°24.8'S 128°00.2'E, 115–115 m, 25 June 1972, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Description. Carapace (Fig. 8A, B) produced into low triangular rostral plate with slightly concave lateral margins and obtusely pointed or narrowly rounded apex extending slightly beyond base of antennular peduncles; anterolateral corner rounded; posterior margin emarginate, leaving last 2 thoracic somites exposed.

Eyes (Fig. 8A, B) big, reaching distal margin of first segment of antennular peduncle; cornea occupying about half of whole organ, wider than eyestalk. Eyestalk (Fig. 8A, B) becoming broader distally.

Antennular peduncle of male (Fig. 8A) more robust than that of female; first segment as long as third, second segment shortest, third segment 1.5 times as long as broad; appendix masculina (Fig. 8A, C) bilobed distally, outer lobe narrow, slightly longer than inner, naked except for short spine-like seta directing medially; inner lobe hirsute. Antennular peduncle of female (Fig. 8B) slender than that of male; first segment longer than succeeding 2 segments combined, second segment with 1 long seta at inner distal corner, third segment with 1 long seta at distal 2/5 of inner margin and 2 long setae at inner distal corner.

Antennal scale (Fig. 8D) almost same in shape between both sexes, not extending to distal margin of antennular peduncle, 3 times as long as broad, outer margin straight, naked, terminating in strong spinous process; terminal lobe broader than long, subterminal suture obscure. Antennal peduncle (Fig. 8D) overreaching spinous process of outer margin of antennal scale, second segment elongated, more than 2.5 times as long as third, armed at inner distal angle with 1 long seta extending beyond distal margin of third segment. Antennal sympod (Fig. 8D) with denticle at outer distal corner.

Labrum with long, acute frontal process. Mandibular palp of male (Fig. 8E) rather slender, third segment with 5 long setae on proximal 1/3 of outer margin. Maxilla as shown in Fig. 8F.

Endopod of first thoracic limb (Fig. 9A) small, with strong claw terminally. Endopod of second thoracic limb (Fig. 9B) robust compared to those of third to eighth thoracic limbs, carpopropodus 1.3 times longer than merus, becoming slightly broader in middle part, dactylus short, with strong terminal claw. Endopod of third to seventh thoracic limbs (Fig. 9C–F) becoming more slender posteriorly, carpopropodus not divided into subsegments, shorter than merus; peculiar setae surrounding dactylus and terminal claw extending beyond tip of terminal claw in third to sixth endopods and to tip in seventh endopod. Endopod of eighth thoracic limb (Fig. 9G) considerably more slender than seventh, carpopropodus slightly shorter than merus, terminal claw extremely elongated, extending far beyond peculiar setae. Flagellum of exopod of thoracic limbs (Fig. 9A–G) 10-segmented in first and eighth limbs, 11-segmented in second to seventh limbs.

Genital organ of male (Fig. 9G) with triangular acute process at posterior distal angle; apical margin rounded and smooth, surrounded with 4 setae, 2 of which are long and plumed.

First to fifth abdominal somites subequal in length, sixth somite 1.5 times longer than fifth.

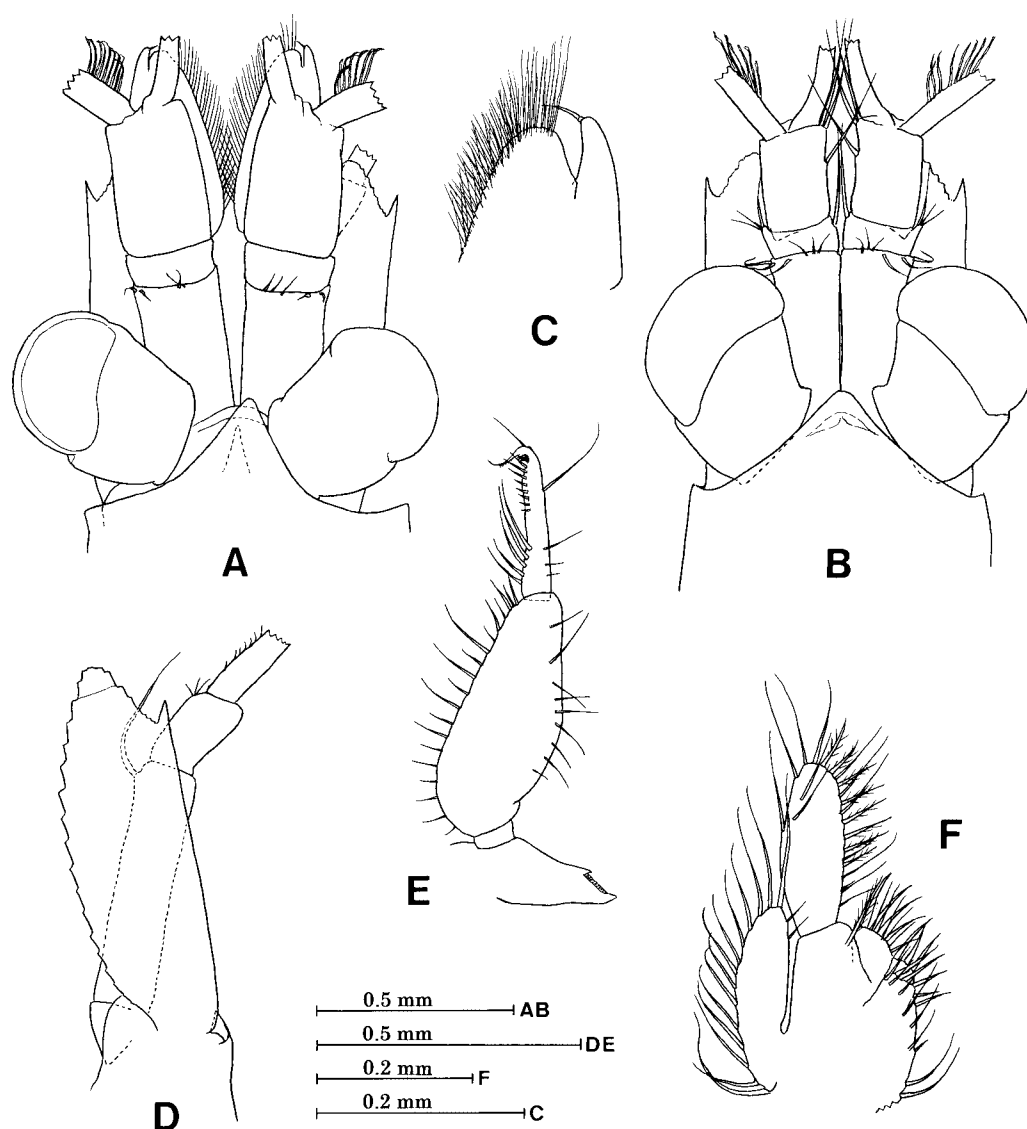


Fig. 8. *Siriella scissilis* sp. nov.; A, C, holotype (NSMT-Cr 16456); B, allotype (NSMT-Cr 16457); D–F, one of paratypes (NSMT-Cr 16458), adult male (6.6 mm). A, B, anterior part of body; C, anterior part of appendix masculina in ventral view; D, antenna; E, mandible and mandibular palp; F, maxilla.

First pleopod of male (Fig. 10A); exopod 9-segmented, endopod wanting. Both rami of second pleopod of male (Fig. 10B) 10-segmented, same in length, without modified setae. Endopod of third pleopod of male (Fig. 10C) 11-segmented, longer than exopod, outer setae of distal 4 segments longer, thicker and armed with shorter hairs than those of inner setae which are ordinary plumose setae; exopod 10-segmented, without modified setae. Fourth pleopod of male (Fig. 10D) with 12-segmented endopod and 11-segmented exopod; endopod longer than exopod, distal 4 segments armed with modified seta at outer corner (Fig. 10F), these modified setae longer, thicker and less plumed than normal plumose setae, except for distal short part naked; exopod (Fig. 10E) with single modified seta terminally, penultimate segment with short naked seta in addition

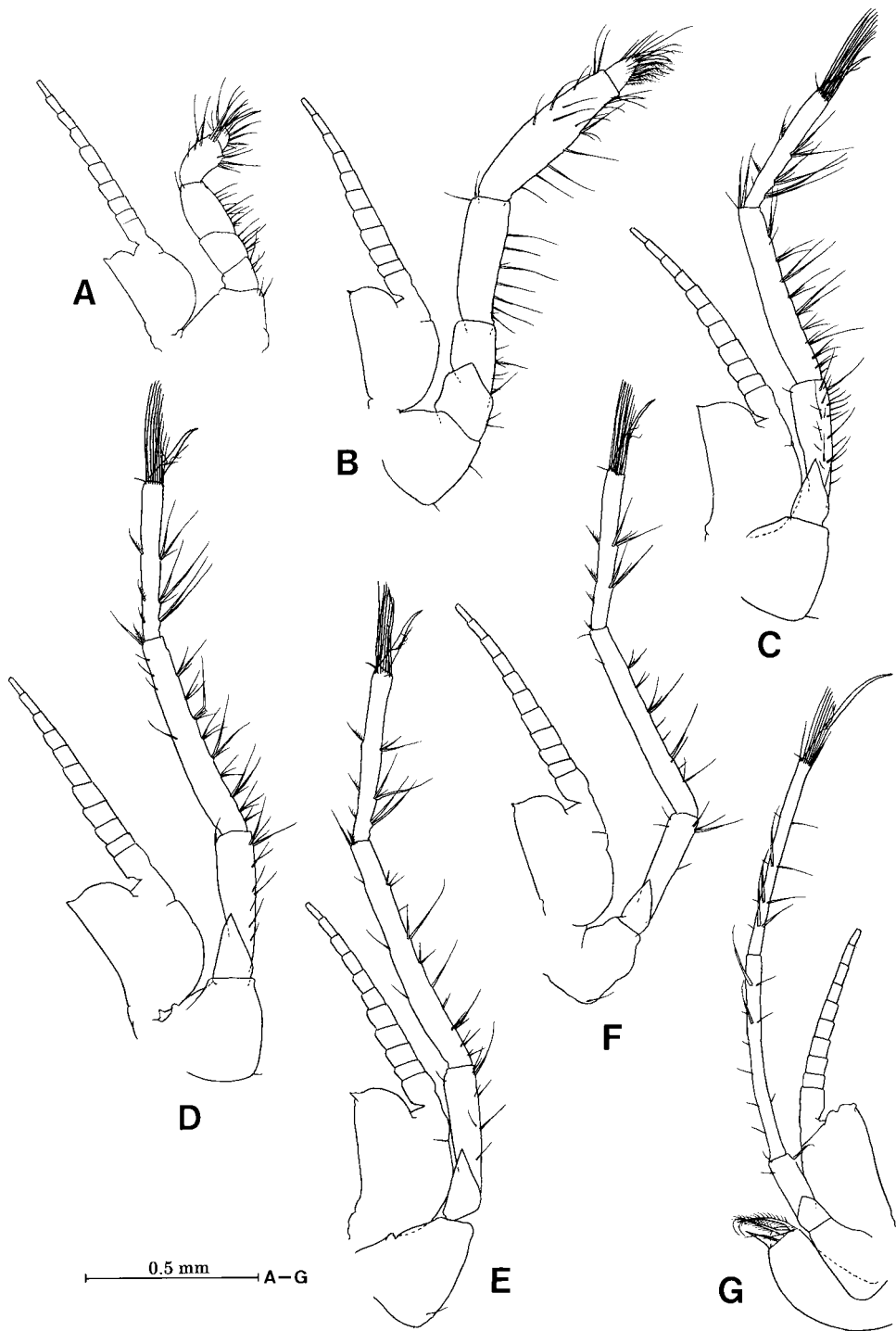


Fig. 9. *Siriella scissilis* sp. nov.; one of paratypes (NSMT-Cr 16458), adult male (6.6 mm). A–F, first to sixth thoracic limbs; G, eighth thoracic limb with genital organ.

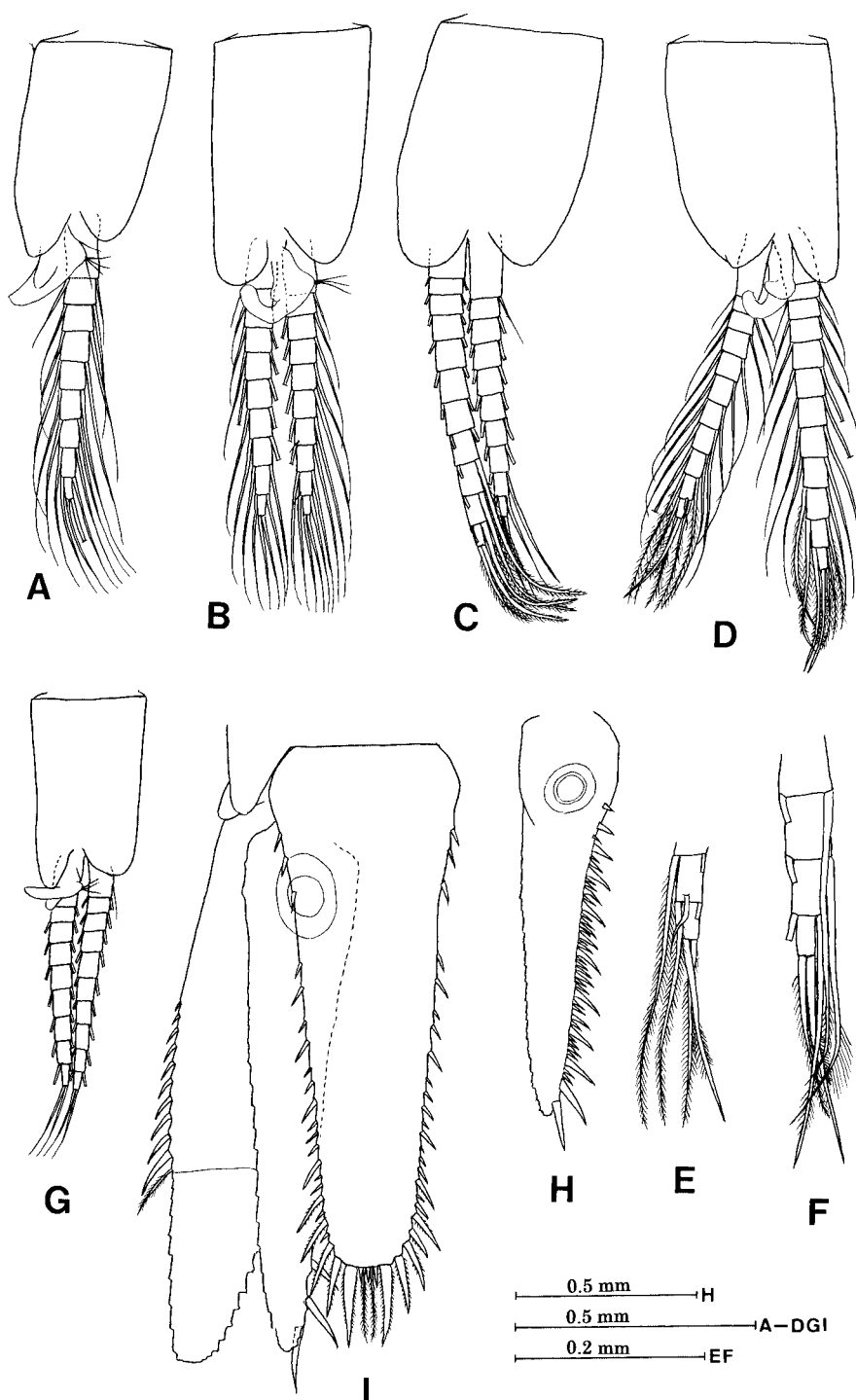


Fig. 10. *Siriella scissilis* sp. nov.; A–H, one of paratypes (NSMT-Cr 16458), adult male (6.6 mm); I, holotype (NSMT-Cr 16456). A, first pleopod; B, second pleopod; C, third pleopod (pseudobranchial rami omitted); D, fourth pleopod; E, extremity of endopod of fourth pleopod; F, extremity of exopod of fourth pleopod; G, fifth pleopod; H, uropodal endopod; I, uropod and telson.

to pair of normal plumose setae. Fifth pleopod of male (Fig. 10G) considerably smaller than preceding ones, exopod 11-segmented, subequal in length to 10-segmented endopod. Pseudo-branchial rami of male (Fig. 10A–G) straight in first and fifth pleopods, coiled probably in second to fourth pleopods.

Uropodal exopod (Fig. 10I) overreaching apex of telson for 1/6 of its length; proximal segment armed on slightly less than distal half of outer margin with 10 graded spines; distal segment half as long as proximal one. Uropodal endopod (Fig. 10H, I) slightly shorter than exopod, extending to tip of long spines on posterior margin of telson, armed along inner margin from statocyst region to apex with row of about 40 stout spines showing alternate arrangement of 1 longer and 1 to 4 shorter ones, except distal 2 long spines between which shorter spines are not inserted.

Telson (Fig. 10I) elongated linguiform, 1.5 times longer than last abdominal somite, extending to halfway of distal segment of uropodal exopod, more than 2.8 times as long as broad at base, narrowing gradually in general to posterior end. Lateral margin of telson with 3 rather slender spines on basal part, followed by short naked part occupying 1/7 of lateral margin, then about 20 spines in alternate arrangement of 1 longer and 1 to 3 shorter ones, except distal 2 longer spines between which smaller spines are not inserted; longer spines increasing in length posteriorly. Posterior margin with pair of long spines, which are 1/6 to 1/7 as long as telson, 3 median short spines, of which median spine tends to be somewhat smaller than others, and pair of plumose setae. Long spines on posterior margin and posterior long lateral spines fringed with spinules.

Etymology. The species is named from the Latin *scindo*, divide, referring to the bilobed appendix masculina.

Remarks. *Siriella scissilis* is readily distinguished from the other known species of *Siriella* by; (1) the bilobed appendix masculina, (2) the antennal peduncle with a long seta on the second segment, (3) the second thoracic limb with long and robust endopod, (4) the endopod of second thoracic limb with the carpopropodus 1.3 times longer than merus, (5) the endopod of third and the both rami of the fourth male pleopods with modified setae, (6) the posterior long spines of the telson fringed with spinules.

Distribution. Known only from the type locality, the Sahul Shelf.

Pacifica-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate. Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled or circularly curved. Both rami of both third and fourth male pleopods with modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones. Telson long, more than 2.5 times as long as broad at base.

14. *Siriella pacifica* Holmes, 1900

(Figs. 11, 12)

Siriella pacifica Holmes, 1900: 227; Hansen, 1913b: 175–176, pl. 9, fig. 1a–f; W. Tattersall, 1932: 302; 1951: 70–72, fig. 17; Gordan, 1957: 380 [catalogue]; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 52, [catalogue]; Price, 2004: 58 [catalogue].

Type locality Coast of California.

Material examined. [California] Three adult males (8.5–8.8 mm), 3 adult females (9.7–10.0 mm) and 1 immature female (8.8 mm) (NSMT-Cr 15672), Catalina Is., 4 April 1975, coll. T. Chess.

Body length. Adult male, 8.5–8.8 mm; adult female, 9.7–10.0 mm.

Remarks. The present specimens agree with the description and figures given by Hansen (1913b) in general, but some differences are recognized as follows: (1) the rostrum of the male (Fig. 11B) distinctly longer than that figured by Hansen, (2) the third segment of the antennular peduncle of the male slightly longer than broad in Hansen's specimens, while 1.3 times longer in the present specimens (Fig. 11B), (3) the shorter spiniform seta on the endopod of the fourth male pleopod somewhat angularly bent at about proximal 1/3 in Hansen's specimens while straight in the present specimens (Fig. 12G).

The pseudobranchial rami on the second to fourth male pleopods are only circularly curved (Fig. 12C, F), and are not coiled spirally, different from many species within *Siriella*.

Following aspect in the genital organ of the male is added to the characteristics of this species; the posterior distal part of the organ is lengthened distally and ending in a pointed apex, and the anterior distal end is rounded and armed with four straight plumose setae and two coiled ones (Fig. 12A). It is similar to that of *S. roosevelti*, but is different in the number of straight

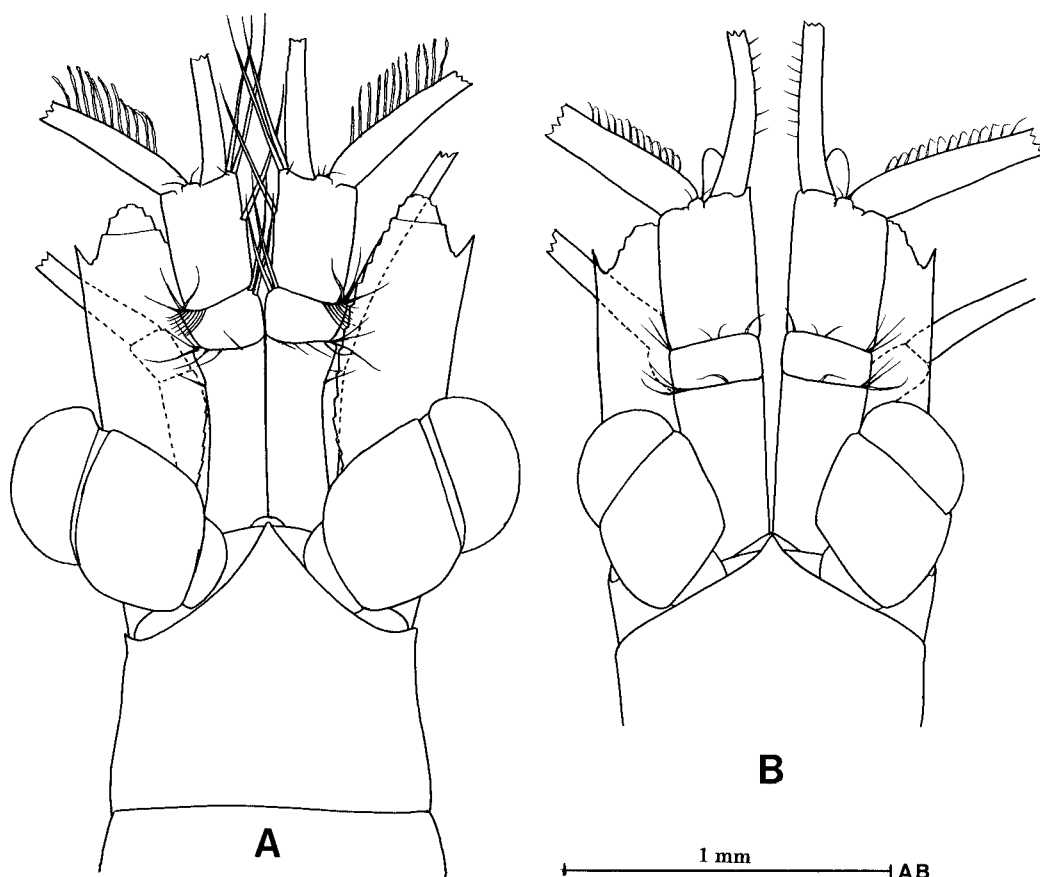


Fig. 11. *Siriella pacifica* Holmes, 1900; from California (NSMT-Cr 15672); A, adult female (10.0 mm); B, adult male (8.8 mm). A, B, anterior part of body.

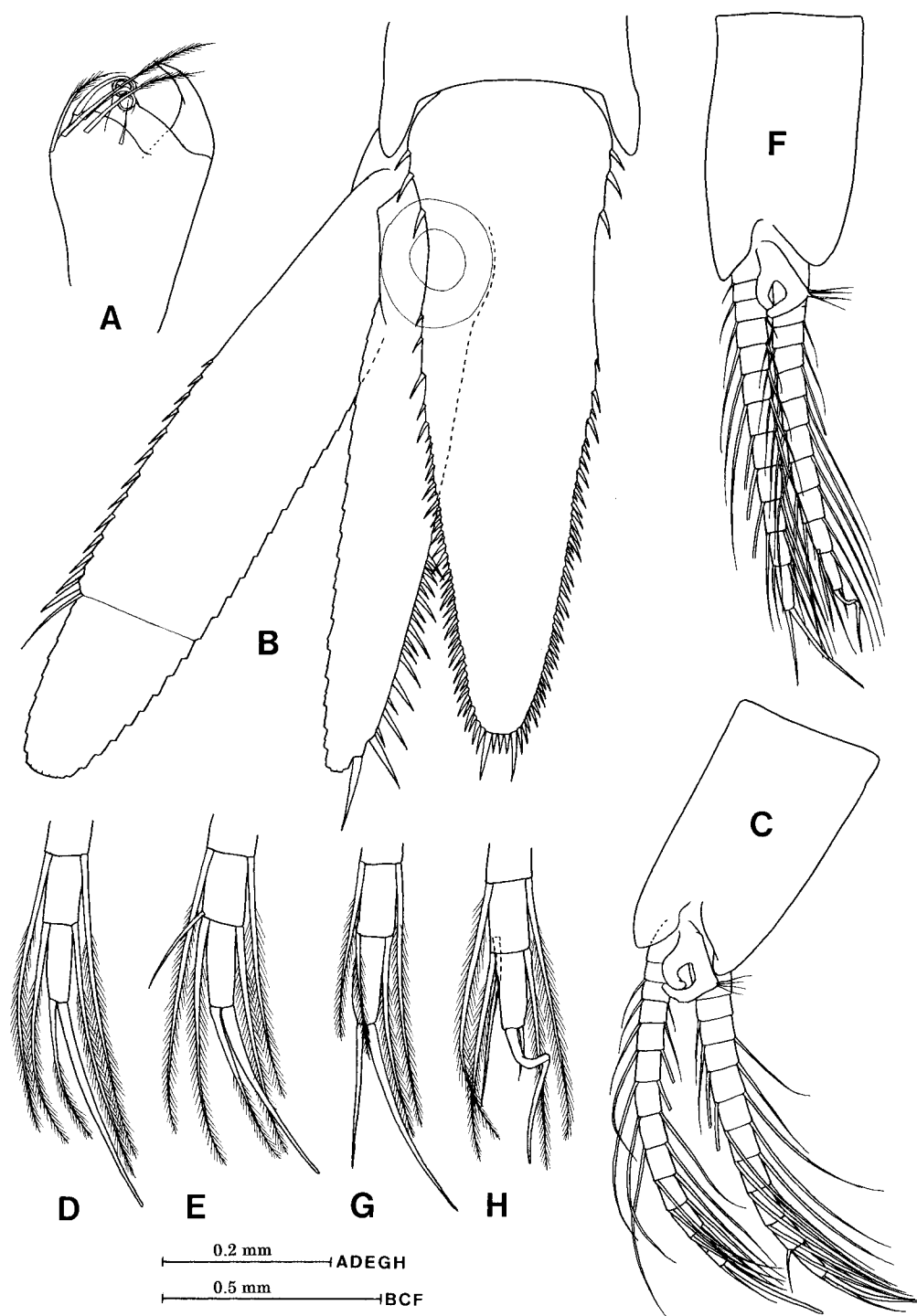


Fig. 12. *Siriella pacifica* Holmes, 1900; from California (NSMT-Cr 15672), adult male (8.8 mm). A, genital organ; B, uropod and telson; C, third pleopod; D, extremity of endopod of third pleopod; E, extremity of exopod of third pleopod; F, fourth pleopod; G, extremity of endopod of fourth pleopod; H, extremity of exopod of fourth pleopod.

plumose setae, i.e. four in *S. pacifica* compared to six in *S. roosevelti*.

Distribution. Known only from the coasts of California (Holmes, 1900; Hansen, 1913b; W. Tattersall, 1932, 1951; present study).

15. *Siriella paulsoni* Czerniavsky, 1882, emend. Nouvel, 1944

Siriella jaltensis: Paulson, 1875b: 124, pl. 20, fig. 2a, b (nec *S. jaltensis* Czerniavsky, 1868).

Siriella (Siriellides) paulsoni, Czerniavsky, 1882: 104.

Siriella paulsoni Czerniavsky: Coifmann, 1937b: 23–25, pl. 9, fig. 13a–e; Nouvel, 1944: 3–5, figs. 1, 2; 1959: 202–208, figs. 20–35.

nec *Siriella paulsoni* Kossmann, 1880: 95–98, figs. 9–14.

?*Siriella paulsoni* Kossmann: W. Tattersall, 1906: 160, pl. 1, figs. 3–7; 1922: 456; Gordan, 1957: 381 [catalogue]; Pillai, 1965: 1693, fig. 18; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 52, [catalogue].

Type locality. Red Sea.

No specimen in the present study.

Remarks. Nouvel (1944, 1959) identified the specimens collected from the Red Sea as *S. paulsoni* Czerniavsky, 1882, which was established for the accommodation of specimens identified as *S. jaltensis* based on those collected from the Red Sea by Paulson (1875a). Meanwhile, Nouvel (1944, 1959) abandoned *S. paulsoni* Kossmann, 1880, as *nomen nudum*. *Siriella paulsoni* Kossmann was also instituted for the reception of specimens identified as *S. jaltensis* by Paulson (1875a), and used for more than half a century by taxonomists, i.e. W. Tattersall (1906, 1922) and Coifmann (1937b). Only female *S. paulsoni* was recorded by W. Tattersall (1906, 1922) from Sri Lanka and no male specimens were available, so that he (1922) reserved the decision of a true taxonomic position until male specimens are available.

Distribution. Known from the Red Sea (Paulson, 1875b; Coifmann, 1937b, Nouvel, 1944, 1959); the Bay of Tadjoura, Djibouti (Nouvel, 1944, 1959); and doubtfully from the waters of Sri Lanka (W. Tattersall, 1906, 1922).

16. *Siriella roosevelti* W. Tattersall, 1941

Siriella roosevelti W. Tattersall, 1941: 2–6, figs. 1, 2; 1951: 72–76, figs. 18, 19; Gordan, 1957: 381 [catalogue]; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 54 [catalogue]; Price, 2004: 58 [catalogue].

Type locality. Off South Seymour Island, Galapagos Islands.

No specimen in the present study.

Distribution. Known only from the waters of the Galapagos (W. Tattersall, 1941, 1951).

17. *Siriella dollfusi* Nouvel, 1944

Siriella dollfusi Nouvel, 1944: 260–265, figs. 3, 4; 1959: 208–213, figs. 36–51; Mauchline and Murano, 1977: 76 [catalogue]; Almeida Prado-Por, 1980: 189; Müller, 1993: 46 [catalogue].

Type locality. Red Sea and Bay of Tadjoura, Djibouti.

No specimen in the present study.

Distribution. Known from the Red Sea (Nouvel, 1944, 1959; Almeida Prado-Por, 1980) and the Bay of Tadjoura, Djibouti (Nouvel, 1944, 1959).

18. *Siriella tadjourensis* Nouvel, 1944

Siriella tadjourensis Nouvel, 1944: 264–265, figs. 5–7; 1959: 213–217, figs. 52–68; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 54–55 [catalogue].

Type locality. Bay of Tadjoura, Djibouti.

No specimen in the present study.

Distribution. Known only from the type locality (Nouvel, 1944, 1959).

19. *Siriella panamensis* W. Tattersall, 1951

Siriella panamensis W. Tattersall, 1951: 76–78, fig. 20; Gordan, 1957: 381 [catalogue]; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 52 [catalogue]; Price, 2004: 58 [catalogue].

Type locality. Coast of Panama on the Pacific side.

No specimen in the present study.

Distribution. Known only from the type locality (W. Tattersall, 1951).

Brevicaudata-group

Definition. Anterior margin of carapace broadly rounded, without distinct rostral projection. Labrum with small process on anterior margin. Endopod of middle pairs of thoracic limbs a little longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Male pleopods without modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines gradually increasing in length distally. Telson relatively short, twice or less than twice as long as broad at base.

20. *Siriella brevicaudata* Paulson, 1875

(Fig. 13)

Siriella brevicaudata Paulson, 1875a: 30, pl. 1, figs. 15, 16; 1875b: 129–130, pl. 20, fig. 1a–m; Czerniavsky, 1887: 32; W. Tattersall, 1922: 450–453, figs. 3a–h, 4a–f; 1927a: 187–188; Coifmann, 1937b: 19–20, pl. 7, fig. 11; Gordan, 1957: 378 [catalogue]; Pillai, 1965: 1691, fig. 12; Băcescu, 1973a: 173; 1973b: 645, fig. 1L; Mauchline and Murano, 1977: 76 [catalogue]; Almeida Prado-Por, 1980: 189; Müller, 1993: 43 [catalogue]; Murano, 1998: 45–46, fig. 2A; Wooldridge and Mees, 2003: 32.

Siriellerythrops gibbosa Ledoyer, 1970: 223–225, figs. 1, 2.

Type locality. Red Sea.

Material examined. All the materials were reported by Murano (1998). On the collection data, see Murano (1998).

Additional description. Antennal scale (Fig. 13A, B) slightly slender in male (2.9 times as long as broad) than in female (2.8 times as long), distal suture distinct in female but not in male. Mandibular palp (Fig. 13C, D) considerably slender compared to that of other species of the genus, furnished on proximal half of outer margin of third segment with 7 long setae in male and 3 or 4 in female. Labrum (Fig. 13E) with small median process on anterior margin.

Body length. Adult male, 5–6 mm; adult female, 4.9–6 mm.

Remarks. *Siriella brevicaudata* is considerably different from the other species within this group in the shape of the telson, i.e. it is quadrangular with a slightly emarginate posterior margin in *S. brevicaudata* (Fig. 13I) while it is linguiform with a rounded posterior margin in the other species.

W. Tattersall (1922) illustrated the pseudobranchial rami on the second to fourth male pleopods to be imperfectly spirally coiled, while in our specimens these rami are coiled perfectly (Fig. 13G), as seen in the other species of this group.

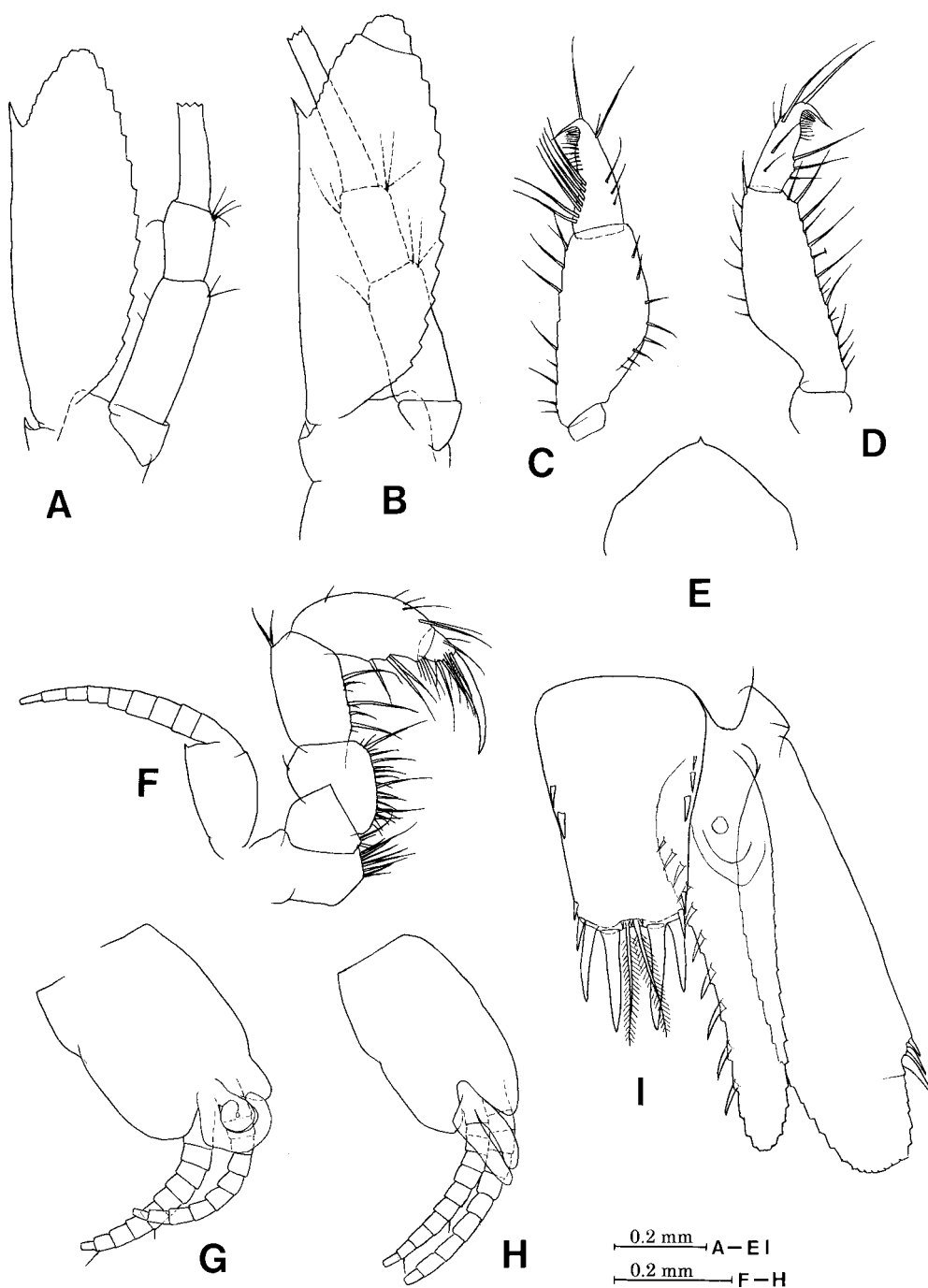


Fig. 13. *Siriella brevicaudata* Paulson, 1875; from Arabian Gulf; A, C, G–I, adult male (damaged); B, D–F, adult female (damaged). A, B, antenna; C, D, mandibular palp; E, anterior half of labrum; F, second thoracic limb; G, fourth pleopod; H, fifth pleopod; I, uropod and telson.

The specimens, which were reported under the name of *Siriellerythrops gibbosa* by Ledoyer (1970) and later synonymized to this species by Băcescu (1973b), are somewhat different from our specimens in: (1) the pointed and downward rostrum, (2) the eyes with small corneal part, (3) the mandibular palp of the female with five long setae on the outer margin of the third segment, (4) the uropodal endopod armed with only three spines.

Distribution. Known from the Red Sea (Paulson, 1875a, b; Coifmann, 1937b; Băcescu, 1973a, b; Almeida Prado-Por, 1980); the Suez Canal (W. Tattersall, 1927a); the Gulf of Manaar (W. Tattersall, 1922); the Arabian Gulf (Persian Gulf) (Murano, 1998); Madagascar (as *Siriellerythrops gibbosa*, Ledoyer, 1970) and Mozambique (Wooldridge and Mees, 2003). W. Tattersall (1922) and Murano (1998) reported that their specimens were collected among seaweeds or seagrasses.

21. *Siriella hansenii* W. Tattersall, 1922

Siriella hansenii W. Tattersall, 1922: 448–450, figs. 1a–c, 2; Gordan, 1957: 379 [catalogue]; O. Tattersall, 1960: 167; Ii, 1964a: 577–578; Pillai, 1965: 1689, 1691; Mauchline and Murano, 1977: 76 [catalogue]; Băcescu, 1986: 19; Müller, 1993: 47–48 [catalogue]; Murano, 1998: 46–48, fig. 2B; Keable *et al.*, 2003: 467 [catalogue].

Type locality. Gulf of Manaar, between India and Sri Lanka.

Material examined. One adult male, Tarut Bay, western Arabian Gulf, 6 May 1985, among seagrasses.

Remarks. In an adult male which was reported by Murano (1998) from the Arabian Gulf, the labrum has a small triangular process on the anterior margin, which is similar to that of *S. brevicaudata* (Fig. 13E). According to the illustration of Ii (1964a), the labrum of *S. lingvura* has an articulation at the base of the anterior process (Ii's fig. 17E). In *S. hansenii* and *S. brevicaudata*, however, such articulation was not observed. Panampunnayil (1995) indicated to have a long anterior spine on the labrum of *S. hansenii* and *S. vincenti* in his Table II, but such matter has not been mentioned in the past literatures (e.g. W. Tattersall, 1922, 1927b).

Species belonging to this group, except *S. brevicaudata*, are closely allied to each other. Differences are depicted in Table 6.

Distribution. Known from the Gulf of Manaar (W. Tattersall, 1922); the Singapore Strait (O. Tattersall, 1960); the Darwin Harbor, Australia (Băcescu, 1986); and the Arabian Gulf (Murano, 1998).

22. *Siriella vincenti* W. Tattersall, 1927

Siriella vincenti W. Tattersall, 1927b: 239–242, fig. 97; Gordan, 1957: 381 [catalogue]; Mauchline and Murano, 1977: 77 [catalogue]; Băcescu and Udrescu, 1984: 93; Müller, 1993: 56 [catalogue]; Keable *et al.*, 2003: 469 [catalogue].

Type locality. Gulf St. Vincent, South Australia.

No specimen in the present study.

Remarks. Differences from the other species of the group are shown in Table 6.

Distribution. Known only from the Gulf St. Vincent (W. Tattersall, 1927b) and the Dangerous Reef (Băcescu and Udrescu, 1984), both located in South Australia.

23. *Siriella lingvura* Ii, 1964

Siriella lingvura Ii, 1964a: 78–82, figs. 17, 18; Mauchline and Murano, 1977: 76 [catalogue]; Valbonesi and Murano, 1980: 212–213, fig. 1; Murano, 1990: 191, fig. 2; Müller, 1993: 49 [catalogue]; Fukuoka and Murano, 1997: 521,

Table 6. Comparison of morphological characters among five species belonging to the Brevicaudata-group.

	<i>S. brevicaudata</i> Paulson, 1875	<i>S. hanseni</i> W. Tattersall, 1922	<i>S. vincenti</i> W. Tattersall, 1927	<i>S. lingvura</i> li, 1964	<i>S. spinula</i> Panampunnayil, 1995
Length/width ratio in antennal scale	3	3.5	3.25	2.6	3
Number of spines on uropodal endopod	11	10 to 17	21	16	♂: 15 to 21, ♀: 19 to 27
Number of spines on proximal segment of uropodal exopod	5	3 or 4	5	4 or 5	♂: 4 or 5 ♀: 3
Telson:					
Shape	Trapezoid	Linguiform	Linguiform	Linguiform	Linguiform
Length/width ratio	1.5	1.5	2	1.8	2
Number of basal spines	2 or 3	3 or 4	3	5 or 6	3
Number of lateral spines (including apical long spines)	5	12	15	9 or 10	12 to 14
Apical long spines	2 pairs; long and stout	3 pairs; subequal in size, not much longer than preceding spines	3 pairs; subequal in size, longer than preceding spines	1 pair; much longer than preceding spines	2 pairs?; ♂: inner pair longer than outer ♀: inner pair shorter than outer

fig. 2C–E.

Type locality. Sagami Bay off Nagatsuro, Izu Peninsula, central Japan.

Material examined. [Mainland of Japan] Two gravid females (NSMT-Cr 14569), Kozu Is., Izu Islands, 20 August 1974, coll. T. Muto. One adult male (5.8 mm), 1 adult female (7.0 mm), 1 immature male (5.4 mm), 1 immature female (5.4 mm) and 1 juvenile (NSMT-Cr 14563), Nomo, Nagasaki, 16 July 1975, 3 m, hand net during scuba diving, coll. S. Inoue and T. Takita. One gravid female (5.6 mm) (NSMT-Cr 16251), Injo, Tanegashima Is., 29 May 2002, on seagrass bed, 5 m, coll. Kato.

[Okinawa, Japan] Four adult males (4.3–4.9 mm), 7 gravid females (4.0–4.6 mm), 6 immature males (up to 3.9 mm), 8 immature females (up to 4.0 mm) and 5 juveniles (NSMT-Cr 14571), Nakano, Iriomote Is., 15 June 1986, 3–4 m, hand net, coll. T. Fujimura. Sixteen adult males (4.8–5.5 mm), 3 adult females (4.5–6.1 mm) and 6 immature males (NSMT-Cr 14567), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. Four adult males, 1 adult female and 1 immature female (NSMT-Cr 14568), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano. One immature male (3.3 mm) (NSMT-Cr 14572), Maenohama, Akajima Is., 18 March 1991, sledge net, coll. M. Murano. One immature male (5.2 mm) (NSMT-Cr 14570), Port Aka, Akajima Is., 5 May 1991, hand net under electric light, coll. M. Murano. One adult male (5.0 mm) (NSMT-Cr 16252), Urasoko Bay, Ishigaki Is., 7 November, 2002, light trap, coll. K. Fukuoka.

Body length. Adult male, 4.3–5.8 mm; adult female, 4.0–7.0 mm. Specimens from Okinawa are generally smaller than those from the mainland of Japan.

Remarks. Differences from the other species of the group are summarized in Table 6.

Distribution. Previously known only from warm-water regions of Japan (mainland of Japan, Ii, 1964a, Valbonesi and Murano, 1980, present study; Ryukyu Islands, Murano, 1990, Fukuoka and Murano, 1997, present study). The present occurrences fall within the known distribution range of this species.

24. *Siriella spinula* Panampunnayil, 1995

Siriella spinula Panampunnayil, 1995: 1942–1950, figs. 24–47; Keable *et al.*, 2003: 468 [catalogue].

Type locality. Southwest coast of Australia between 33° and 35°S, and 114° and 119°E.

No specimen in the present study.

Remarks. Panampunnayil (1995) stated that *S. spinula* is distinguished from *S. vincenti*, which is the most closely allied species, by three following points: (1) smaller body size (6.5 mm in adult male and 6.6 mm in adult female) of *S. spinula* compared to *S. vincenti* (up to 8 mm in adults of both sexes), (2) anterior margin of the labrum with a small spine in *S. spinula* whereas a long spine in *S. vincenti*, (3) the telson of *S. spinula* with apical armature showing a sexual dimorphism. Differences in body size may not be very important characteristics as it is varied with environmental factors such as water temperature. Panampunnayil (1995) indicated in his Table II that the anterior margin of the labrum of *S. vincenti* has a long spine. However, no information about the spine on the labrum has been given in the original description by W. Tattersall (1927b) which is the only report on morphology of *S. vincenti*. Accordingly, the sexual dimorphism in the apical armature of the telson is the only distinguishing point between these two species. However, that the sexual dimorphism on the telson of *S. vincenti* is present or not, is still unknown as W. Tattersall (1927b) did not mention any sexual dimorphism.

Differences from the other species within the group are shown in Table 6.

Distribution. Known only from the type locality (Panampunnayil, 1995).

Thompsonii-group

Definition. Anterior margin of carapace more or less produced into triangular rostral plate (excl. Halei-subgroup). Labrum with long frontal process. Endopod of middle pairs of thoracic limbs a little or exceedingly longer than those of anterior and posterior pairs. Pseudobranchial rami of second to fourth male pleopods spirally coiled. Male pleopods without remarkably modified setae. Proximal segment of uropodal exopod armed with only spines on outer margin. Inner margin of uropodal endopod armed with spines showing alternate arrangement of longer and shorter ones or with spines becoming gradually longer posteriorly. Telson variable in length.

Halei-subgroup

25. *Siriella halei* W. Tattersall, 1927

(Figs. 14, 15)

Siriella halei W. Tattersall, 1927b: 236–239, figs. 95, 96; Gordan, 1957: 379 [catalogue]; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 47 [catalogue]; Keable *et al.*, 2003: 466–467 [catalogue].

Type locality. Gulf St. Vincent, South Australia.

Material examined. [Western Australia] One adult male (ca. 9.2 mm), 3 gravid females (9.8, 13.0 mm), 1 adult female (9.4 mm), 2 immature males (7.4 mm) and 4 immature females (4.2, 6.3 mm) (NSMT-Cr 16250), Thomson Bay, Rottne Is., 11 January 1996, hand net, on sea-grass beds of *Amphibolis antarctica* and *Posidonia sinuosa*, coll. H. Mukai.

Body length. Adult male, ca. 9.2 mm; adult female, 9.4–13.0 mm.

Remarks. At present, *S. halei* is the only species in the Indo-West Pacific region having five or six long setae along the inner margin of the third antennular peduncle segment of the female, although in the Atlantic, there are some species having such setae, e.g. *S. jaltensis* Czerniavsky, 1868, and *S. norvegica* Sars, 1869 (Tattersall and Tattersall, 1951). This species is considerably different from such Atlantic species in the broadly rounded anterior margin of the carapace (Fig. 14A), the recurved spines on the uropodal endopod (Fig. 14E), the thoracic limbs with endopods built robustly (Fig. 15A–D), and the spine arrangement on the telson (Fig. 14F, G).

The present specimens well agree with the original description of W. Tattersall (1927b) in main characters as follows: (1) the anterior margin of the carapace hardly produced into a rostral projection and with a pair of blunt projections over the outer margins of the eyes (Fig. 14A); (2) the eyes relatively long, 1.8 times as long as broad (Fig. 14A, B); (3) the antennular peduncle of the female with the third segment armed with five long setae along the inner margin (Fig. 14A); (4) the thoracic limbs with endopods built robustly (Fig. 15A–D); (5) the inner margin of the uropodal endopod with distal four spines recurved (Fig. 14E). Slight differences are detected in the telson. It is 2.3 to 2.5 times as long as broad at the base in the present specimens (Fig. 14F, G) compared to twice as long in the type specimen, and the lateral margin is furnished with 14 or 15 spines in the present specimens (Fig. 14F, G) compared to 18 in the type.

W. Tattersall (1927b) did not give any description on male specimen. Main characters of the male observed on the present specimen are as follows: Antennular peduncle (Fig. 14B) slightly more robust than that of female, third segment as long as first, without long plumose setae on inner margin, and appendix masculina long, overreaching distal margin of third segment of an-

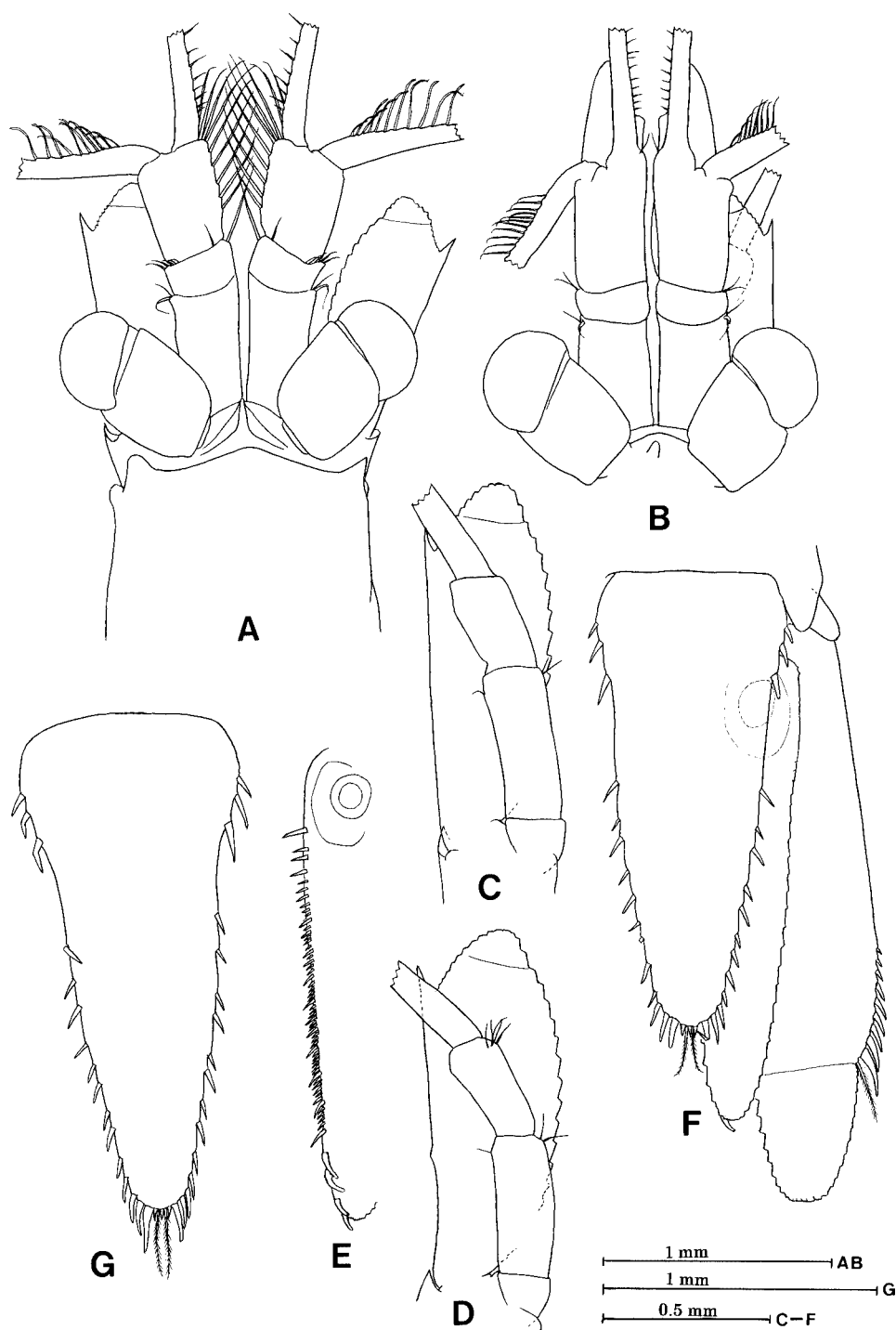


Fig. 14. *Siriella halei* W. Tattersall, 1927; from Rottneest Island, Western Australia (NSMT-Cr 16250); A, gravid female (9.8 mm); B, C, F, adult male (ca. 9.2 mm); D, E, G, gravid female (13.0 mm). A, anterior part of body; B, anterior part of body (rostrum damaged); C, D, antenna, E, inner margin of uropodal endopod in ventral view; F, uropod and telson; G, telson.

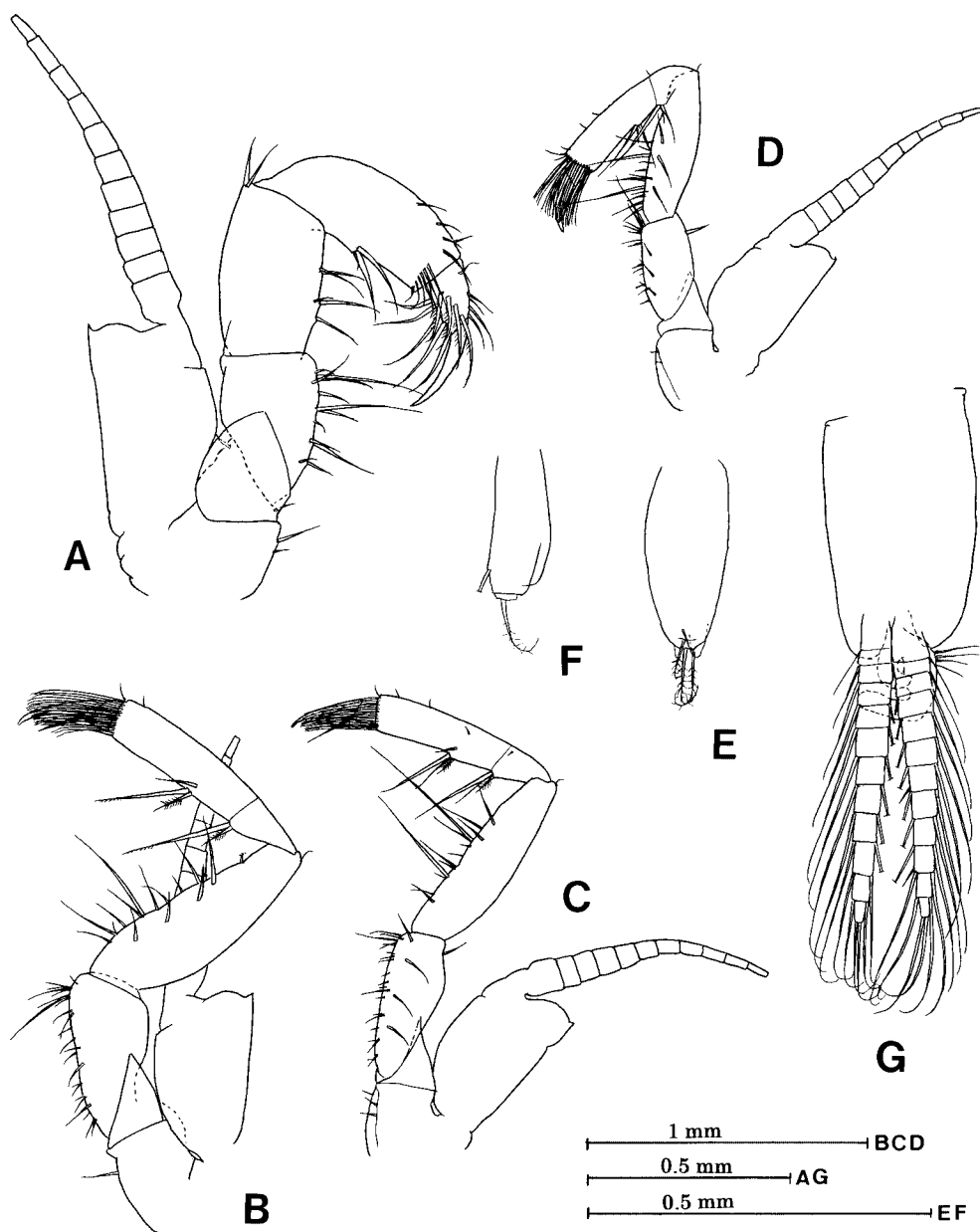


Fig. 15. *Siriella halei* W. Tattersall, 1927; from Rottnest Island, Western Australia (NSMT-Cr 16250); A, B, gravid female (damaged); C–G, adult male (ca. 9.2 mm). A, second thoracic limb; B, third thoracic limb; C, fifth thoracic limb; D, eighth thoracic limb; E, genital organ in anterior view; F, genital organ in lateral view; G, fourth pleopod.

tenacular peduncle for length of own segment. Both rami of fourth pleopod (Fig. 15G) same in length, 12-segmented, without any modified setae. Uropodal exopod (Fig. 14F) relatively broad; proximal segment with 9 spines occupying less than 1/3 of outer margin; distal segment short, about 1/3 of proximal one, only slightly longer than broad. Telson (Fig. 14F) somewhat thicker than that of female (Fig. 14G), not extending to articulation of uropodal exopod; lateral margin

with 3 stout spines on basal broadened part, followed by naked part occupying 1/4 of margin length, then 11 spines in alternate arrangement of longer and shorter ones, except for posterior 3 spines increasing in length posteriorly; posterior margin rounded, with pair of long spines, 3 median short spines and pair of plumose setae.

W. Tattersall (1927b) suggested that well-developed females probably attained to 16 mm, because an immature female with the brood pouch just developing was 12 mm long. The present two adult females with embryos in the brood pouch are 9.8 and 13.0 mm in body length, which are considerably smaller than that estimated by him.

This species was reported as an epifauna inhabiting the surface of seagrasses by Mukai *et al.* (1999), who were collectors and donated these specimens to us for this study.

Distribution. This species has previously been known only from the type locality (W. Tattersall, 1927b). The present occurrence from Thomson Bay, Rottnest Island, Western Australia, extends the distribution range of this species westward.

Thompsonii-subgroup

26. *Siriella thompsonii* (Milne-Edwards, 1837)

Cynthia sp., Thompson, 1829: 55.

Cynthia thompsonii Milne-Edwards, 1837: 462.

Siriella vitrea Dana, 1852: 656, pl. 43, fig. 6a–m.

Siriella brevipes Dana, 1852: 658, pl. 44, fig. 1a–q.

Cynthia inermis Krøyer, 1861: 44, fig. 6a–g.

Promysis galathea Krøyer, 1861: 59, pl. 2, fig. 8a–h.

Siriella Edwardsii Claus, 1868: 271, pl. 18; Paulson, 1875b: 130–131, pl. 20, fig. 3a–k.

Siriella thompsonii, Sars, 1884: 40–41; Thiele, 1905: 447–449, figs. 7, 8; Hansen, 1910: 31; 1912: 192–193; 1913a: 9–10; W. Tattersall, 1913: 870–871; Colosi, 1919: 5–6; 1920: 235; W. Tattersall, 1923: 280; Colosi, 1924: 3; W. Tattersall, 1926: 9; Illig, 1930: 419; Coifmann, 1937a: 2; 1937b: 21–23, pl. 8, fig. 12a–e, pl. 9, fig. 12f, g; W. Tattersall, 1939: 234; 1943: 63–64; 1951: 60–61; O. Tattersall, 1955: 84–86; Holmquist, 1957: 44–45; Gordan, 1957: 381 [catalogue]; O. Tattersall, 1962: 223–225; Birstein and Tchindonova, 1962: 65; Pillai, 1973: 38–41, figs. 10, 11; Mauchline and Murano, 1977: 77 [catalogue]; Stuck *et al.*, 1979a: 234, figs. 2f, 3f, 4f, 5f; 1979b: 244; Price *et al.*, 1986: 47; Escobar-Briones and Soto, 1991: 80–89; Wittmann and Stagl, 1996: 162–163; Wang and Liu, 1994: 84–86, fig. 11; 1997: 203; Liu and Wang, 2000: 87–89, fig. 12; Panampunnayil, 2002: 371–372, fig. 1A–C; Keable *et al.*, 2003: 468 [catalogue]; Price, 2004: 58 [catalogue].

Siriella thompsoni, Sars, 1885: 205–209, pl. 36, figs. 1–24; Ortmann, 1894: 107; 1905: 971–972; W. Tattersall, 1912: 122; Zimmer, 1914: 386–387; 1916: 61; W. Tattersall, 1936: 145; Dion and Nouvel, 1960: 5; O. Tattersall, 1961: 147–148; Ii, 1964a: 62–67, figs. 14, 15; Costa, 1964: 3; Pillai, 1965: 1693, fig. 19; Almeida Prado-Por, 1974: 54; Taniguchi, 1974: 352; Vereshchaka, 1990: 122; Müller, 1993: 55–56 [catalogue]; Jo *et al.*, 1998: 46–47, fig. 13.

Type locality. Atlantic Ocean between Madeira and West Indies.

Material examined. [Neighboring waters of Japan] One adult male (NSMT-Cr 10754), 34°42.8'N 138°32.5'E, mouth of Suruga Bay, 23 May 1964, 240–0 m oblique tow with ORI net in daytime. One adult male (NSMT-Cr 10755), 33°57.5'N 138°27.5'E, mouth of Suruga Bay, 24 April 1965, 1300–0 m oblique tow with ORI net at night. One adult male (NSMT-Cr 10756), 34°32.1'N 138°43.1'E, S. of Suruga Bay, 11 April 1966, surface tow with ORI net at night. Five adult males and 1 adult female (NSMT-Cr 10758), 37°04.2'N 142°37.8'E, E. of Honshu, 29–30 September 1966, surface tow with ORI net at night. Two immature females (NSMT-Cr 16331), 33°53.6'N 141°38.7'E, SE. of Boso Peninsula, 19 April 1967. Eighteen adult males, 11 adult females, 2 immature males and 3 immature females (NSMT-Cr 14594), 32°01.4'N 131°58.7'E, off Miyazaki, Kyushu, 17 May 1968, surface tow with ORI net, coll. M. Murano. Thirty-seven adult

males (up to 8.7 mm), 12 adult females (up to 6.4 mm) and 2 immature females (NSMT-Cr 14613), 32°01.4'N 131°58.7'E, off Miyazaki, Kyushu, 17 May 1968, surface tow with ORI net at night, coll. M. Murano. Eight adult males, 2 immature males, 2 immature females and 2 juveniles (NSMT-Cr 10764), 30°10.9'N 130°13.8'E, S. of Kyushu, 18 May 1968, surface tow with ORI net at night. Two adult males (NSMT-Cr 14597), 30°42.9'N 132°04.4'E, E. of Tanegashima Is., 2 June 1968, surface tow with ORI net, coll. M. Murano. One adult male and 1 immature female (NSMT-Cr 14598), 31°50.7'N 132°07.7'E, off Miyazaki, Kyushu, 5 June 1968, surface tow with ORI net, coll. M. Murano. One adult male (NSMT-Cr 10774), 33°51.6'N 137°14.8'E, E. of Kii Peninsula, 6 June 1968, surface tow with ORI net at night. One immature male (NSMT-Cr 14584), 34°37.2'N 139°50.6'E, S. of Boso Peninsula, 23 April 1975, 720–0 m oblique tow with ORI net, coll. M. Murano. One adult female (NSMT-Cr 14585), 33°59.6'N 140°32.2'E, E. of Miyake Is., 24 April 1975, 1040–0 m oblique tow with ORI net, coll. M. Murano. One adult male (NSMT-Cr 14586), 33°39.9'N 140°32.4'E, SE. of Miyake Is., 24 April 1975, 1000–0 m oblique tow with ORI net, coll. M. Murano.

[Okinawa, Japan] Two adult females (NSMT-Cr 10757), 27°55.5'N 130°19.9'E, 10 June 1966, 908–0 m oblique tow with ORI net at night. Six adult males (6.0–7.5 mm), 10 adult females (6.7–7.4 mm), 27 immature males, 21 immature females and 12 juveniles (NSMT-Cr 15678), W. of Miyako Is., 9 May 1994, method unknown, coll. K. Hashizume.

[Western Pacific Ocean] One immature female (NSMT-Cr 10760), 37°28.7'N 150°03.8'E, 9 December 1967, 100–0 m oblique tow with ORI net at night. Three adult males, 6 adult females, 1 immature female and 1 juvenile (NSMT-Cr 10761), 20°13.4'N 150°21.2'E, 18 December 1967, surface tow with ORI net at night. Eleven adult males, 1 adult female, 2 immature males and 4 immature females (NSMT-Cr 14595), 21°55.5'N 125°14.7'E, 28 May 1968, surface tow with ORI net, coll. M. Murano. Eight adult males, 4 adult females and 1 immature female (NSMT-Cr 14596), 26°03.5'N 131°53.4'E, 31 May 1968, surface tow with ORI net, coll. M. Murano.

[Central Pacific Ocean] Eleven adult males, 4 adult females, 6 immature males and 2 immature females (NSMT-Cr 10762), 18°12.2'N 174°34.9'W, 17 January 1968, surface tow with ORI net at night, coll. M. Murano. Three adult males (NSMT-Cr 10763), 14°01.0'N 174°40.6'W, 18 January 1968, surface tow with ORI net at night, coll. M. Murano. Eighteen adult males, 5 adult females, 3 immature males and 2 immature females (NSMT-Cr 14593), 18°00.0'N 171°49.6'W, 23 January 1968, surface tow with ORI net at night, coll. M. Murano. One male and 1 female (NSMT-Cr 10775), 38°09.6'N 152°37.7'E, 14 August 1969, surface tow with ORI net at night, coll. M. Murano. One adult female (NSMT-Cr 14599), 43°46.2'N 179°40.1'E, 18 August 1969, surface tow with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 16335), 35°00.0'N 154°49.6'W, 6 September 1969, surface tow with ORI net at night, coll. M. Murano. Ten males and 12 females (NSMT-Cr 10776), 34°58.2'N 154°54.3'W, 6 September 1969, 950–0 m oblique tow with ORI net at night, coll. M. Murano. Eighty-nine males and 58 females (NSMT-Cr 10777), 34°57.1'N 154°55.5'W, 6 September 1969, 45–0 m oblique tow with ORI net at night, coll. M. Murano. One male (NSMT-Cr 10778), 35°00.2'N 154°49.2'W, 6 September 1969, 183–260 m horizontal tow with ORI net at night, coll. M. Murano. Fifty-nine males and 56 females (NSMT-Cr 10779), 30°30.7'N 154°53.6'W, 7 September 1969, surface tow with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 10780), 29°58.8'N 155°01.6'W, 8 September 1969, surface tow with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 10781), 24°59.6'N 155°00.0'W, 9 September 1969, surface tow with ORI net at night, coll. M. Murano. Four males and 2 females (NSMT-Cr 10782), 24°59.7'N 154°56.6'W, 10 September 1969, 1250–0 m oblique tow with ORI net at dusk, coll. M. Murano.

Abundant males and females (NSMT-Cr 10783), 24°29.1'N 154°57.3'W, 10 September 1969, surface tow with ORI net at night, coll. M. Murano. Three males and 1 female (NSMT-Cr 10784), 21°04.2'N 155°00.4'W, 12 September 1969, 860–0 m oblique tow with ORI net at dusk, coll. M. Murano. One male (NSMT-Cr 10785), 21°04.4'N 154°57.8'W, 12 September 1969, 110–150 m horizontal tow with ORI net in daytime, coll. M. Murano. Nine males and 8 females (NSMT-Cr 10786), 17°02.9'N 155°07.8'W, 19 September 1969, surface tow with ORI net at dusk, coll. M. Murano. Three males and 1 female (NSMT-Cr 10787), 17°08.8'N 155°05.9'W, 20 September 1969, 70–0 m oblique tow with ORI net at night, coll. M. Murano. Seven adult males, 4 adult females, 27 immature males and 24 immature females (NSMT-Cr 14600), 10°37.9'N 154°58.8'W, 21 September 1969, surface tow with ORI net at night, coll. M. Murano. Forty-six males and 21 females (NSMT-Cr 10789), 10°00.7'N 155°02.3'W, 22 September 1969, surface tow with ORI net at night, coll. M. Murano. One male (NSMT-Cr 10790), 10°00.8'N 155°01.5'W, 22 September 1969, 265–325 m horizontal tow with ORI net at night, coll. M. Murano. Three males and 5 females (NSMT-Cr 10791), 08°33.5'S 154°59.2'W, 4 October 1969, 1250–0 m oblique tow with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 10792), 08°33.5'S 154°59.2'W, 4 October 1969, surface tow with ORI net at night, coll. M. Murano. Fifty-one males and 26 females (NSMT-Cr 10793), 09°55.3'S 154°58.6'W, 6 October 1969, surface tow with ORI net at night, coll. M. Murano. One male (NSMT-Cr 10794), 09°57.7'S 154°58.6'W, 6 October 1969, 60–0 m oblique tow with ORI net at night, coll. M. Murano. Fifty-six males and 23 females (NSMT-Cr 10795), 12°53.3'S 152°51.4'W, 6 October 1969, surface tow with ORI net at night, coll. M. Murano. Eight adult males (up to 10.7 mm), 8 adult females (up to 9.7 mm), 2 immature males and 2 immature females (NSMT-Cr 15679), 27°49.4'N 163°32.1'E, 22 November 1990, method unknown.

[Philippine Sea] One female (NSMT-Cr 10759), 21°12.4'N 142°04.5'E, 13 September 1967, 1200–0 m oblique tow with ORI net at night, coll. M. Murano. Four adult males, 1 immature male, 2 immature females and 2 juveniles (NSMT-Cr 10766), 22°59.8'N 124°15.6'E, 26 May 1968, surface tow with ORI net at night, coll. M. Murano. One immature female (NSMT-Cr 10767), 21°58.9'N 123°31.2'E, 27 May 1968, 500–0 m oblique tow with ORI net at dawn, coll. M. Murano. Two adult females (NSMT-Cr 10768), 21°55.4'N 125°15.6'E, 27–28 May 1968, 1050–0 m oblique tow with ORI net at night, coll. M. Murano. One adult male (NSMT-Cr 10769), 22°09.2'N 129°43.0'E, 28 May 1968, 880–0 m oblique tow with ORI net at night, coll. M. Murano. Eleven adult males, 7 adult females, 2 immature males and 1 juvenile (NSMT-Cr 10770), 22°09.2'N 129°42.1'E, 28 May 1968, surface tow with ORI net at night, coll. M. Murano. Two adult males and 1 adult female (NSMT-Cr 10771), 22°01.0'N 132°09.4'E, 29 May 1968, 80–0 m oblique tow with ORI net in daytime, coll. M. Murano. Three adult females (NSMT-Cr 10772), 22°00.5'N 132°19.5'E, 30 May 1968, 100–0 m oblique tow with ORI net at night, coll. M. Murano. Three adult males, 2 adult females and 1 immature male (NSMT-Cr 10773), 28°04.0'N 131°54.3'E, 1 June 1968, surface tow with ORI net at night, coll. M. Murano. One female (NSMT-Cr 14614), 20°01.6'N 131°58.2'E, 15 May 1972, 900–0 m oblique tow with ORI net, coll. M. Murano. One female (NSMT-Cr 14615), 14°59.2'N 131°55.9'E, 16 May 1972, 800–0 m oblique tow with ORI net, coll. M. Murano. Sixteen males (up to 5.9 mm) and 34 females (up to 5.9 mm) (NSMT-Cr 14616), 14°56.8'N 131°56.8'E, 16 May 1972, surface tow with ORI net at night, coll. M. Murano. Thirty-eight males (up to 7.2 mm) and 47 females (up to 5.6 mm) (NSMT-Cr 14617), 14°58.8'N 131°56.0'E, 16 May 1972, surface tow with ORI net at night, coll. M. Murano. Twenty-five males and 49 females (NSMT-Cr 14618), 15°N 132°E, 16 May 1972, surface tow with ORI net at night, coll. M. Murano. One female (5.1 mm) (NSMT-Cr

14619), 10°02.5'N 132°00.0'E, 17 May 1972, surface tow with ORI net at night, coll. M. Murano. Thirteen males (up to 7.2 mm) and 22 females (NSMT-Cr 14620), 05°04.0'N 130°26.2'E, 19 May 1972, surface tow with ORI net at night, coll. M. Murano. One male (4.9 mm) and 2 females (7.3, 5.2 mm) (NSMT-Cr 14621), 05°22.6'N 127°05.5'E, 22 May 1972, surface tow with ORI net at night, coll. M. Murano. Two males and 3 females (NSMT-Cr 14637), 22°51.6'N 124°08.2'E, E. of Taiwan, 28 July 1972, surface tow with ORI net at dusk, coll. M. Murano. One juvenile (NSMT-Cr 14604), 24°50.6'N 129°10.5'E, 25 February 1973, method unknown.

[East China Sea] Two adult males and 1 immature female (NSMT-Cr 10765), 28°45.3'N 126°44.6'E, 22 May 1968, surface tow with ORI net at night, coll. M. Murano.

[South China Sea] One male (7.2 mm) (NSMT-Cr 14624), 11°58.0'N 114°31.2'E, 28 June 1972, 1286–0 m oblique tow with ORI net at night, coll. M. Murano. One adult female (NSMT-Cr 14625), 11°58.0'N 114°31.6'E, 28 June 1972, surface tow with ORI net, coll. M. Murano. One adult female (NSMT-Cr 14626), 11°05.1'N 112°52.0'E, 15 July 1972, 40–0 m oblique tow with ORI net in daytime, coll. M. Murano. One immature female (NSMT-Cr 14627), 11°00.6'N 113°02.0'E, 15 July 1972, 1200–0 m oblique tow with ORI net in daytime, coll. M. Murano. Seventeen adult males and 19 females (NSMT-Cr 14628), 11°00.2'N 112°59.8'E, 15 July 1972, surface tow with ORI net at night, coll. M. Murano. One adult male and 1 adult female (NSMT-Cr 14629), 11°00.0'N 112°58.6'E, 15 July 1972, 60–0 m oblique tow with ORI net at night, coll. M. Murano. One immature female (NSMT-Cr 14630), 10°57.6'N 112°53.1'E, 15 July 1972, oblique tow with ORI net at night (depth unknown), coll. M. Murano. Twelve males (NSMT-Cr 14631), 10°54.9'N 112°49.5'E, 16 July 1972, surface tow with ORI net at night, coll. M. Murano. Four males (6.1–7.3 mm) and 9 females (5.1–6.2 mm) (NSMT-Cr 14632), 14°31.8'N 115°38.0'E, 18 July 1972, 880–0 m oblique tow with ORI net, coll. M. Murano. One male (4.9 mm) (NSMT-Cr 14633), 14°31.8'N 115°39.2'E, 18 July 1972, surface tow with ORI net at dusk, coll. M. Murano. Ten males (3.8–6.3 mm) and 6 females (3.9–5.6 mm) (NSMT-Cr 14634), 18°54.7'N 119°32.2'E, 20 July 1972, surface tow with ORI net in daytime, coll. M. Murano. One male (5.6 mm) (NSMT-Cr 14635), 20°51.6'N 121°17.2'E, Bashi Strait, 27 July 1972, 1500–0 m oblique tow with ORI net, coll. M. Murano. Eighteen males and 32 females (NSMT-Cr 14636), 20°52.0'N 121°17.2'E, Bashi Strait, 27 July 1972, surface tow with ORI net at night, coll. M. Murano. One adult female (NSMT-Cr 14605), 22°15.5'N 115°28.6'E, 18 March 1973, method unknown. Two adult females (NSMT-Cr 14610), 09°02.3'N 110°27.7'E, 1 March 1977, 750–0 m oblique tow with ORI net. One adult male, 1 immature female and 1 juvenile (NSMT-Cr 14611), 13°01.0'N 113°29.5'E, 3 March 1977, 1000–0 m oblique tow with ORI net. One adult female (NSMT-Cr 14612), 17°01.5'N 118°07.6'E, 7 March 1977, 1100–0 m oblique tow with ORI net. One adult male and 1 immature female (NSMT-Cr 16333), 18°08.5'N 117°05.0'E, 27 September 1981, 939–0 m oblique tow with ORI net. One immature female and 1 juvenile (NSMT-Cr 16334), 14°40.4'N 114°10.0'E, 29–30 September 1981, 1240–0 m oblique tow with ORI net.

[Sulu Sea] Two adult males (7.7, 6.5 mm) and 1 adult female (NSMT-Cr 14623), 11°59.3'N 119°59.6'E, 27 June 1972, surface tow with ORI net at night, coll. M. Murano.

[Celebes Sea] One adult male (6.5 mm) and 1 immature male (5.2 mm) (NSMT-Cr 14622), 04°35.3'N 122°52.8'E, 12 June 1972, surface tow with ORI net at night, coll. M. Murano.

[Eastern Indian Ocean] Three adult males, 5 adult females and 1 immature male (NSMT-Cr 14606), 13°55.5'S 103°10.5'E, 14 January 1977, 980–0 m oblique tow with ORI net. One adult male, 3 adult females and 1 immature female (NSMT-Cr 14607), 17°01.6'S 94°57.2'E, 16 January 1977, 1000–0 m oblique tow with ORI net. Seven adult males, 2 immature males and 1 immature female (NSMT-Cr 14587), 16°59.6'S 117°00.3'E, 20 January 1985, surface tow with

larva net, coll. T. Fukushima. Sixteen adult males, 10 adult females, 2 immature males and 3 immature females (NSMT-Cr 14589), 15°28.9'S 116°01.2'E, 3 February 1985, surface tow with larva net, coll. T. Fukushima. Two adult males, 13 adult females, 1 immature male and 1 immature female (NSMT-Cr 14590), 15°28.7'S 114°00.7'E, 7 February 1985, surface tow with larva net, coll. T. Fukushima. One adult male and 3 adult females (NSMT-Cr 14591), 12°00.9'S 113°00.6'E, 8 February 1985, surface tow with larva net, coll. T. Fukushima. Three adult males, 3 adult females and 2 immature females (NSMT-Cr 14592), 17°59.1'S 112°01.0'E, 10 February 1985, surface tow with larva net, coll. T. Fukushima. Five adult males and 1 adult female (NSMT-Cr 14588), 15°00.8'S 121°01.8'E, 26 April 1985, surface tow with larva net, coll. T. Fukushima.

[Central Indian Ocean] Three adult males, 1 adult female and 1 immature male (NSMT-Cr 14608), 15°07.4'S 86°58.1'E, 19 January 1977, 900–0 m oblique tow with ORI net. One adult male (NSMT-Cr 14609), 00°01.4'S 86°55.0'E, 27 January 1977, 700–0 m oblique tow with ORI net.

[Collection data unknown] Eighteen adult males, 16 adult females, 6 immature males and 6 immature females (NSMT-Cr 14601). One adult male and 1 immature male (NSMT-Cr 14602). One adult male and 1 immature female (NSMT-Cr 14603). Two adult males (NSMT-Cr 16327). Four adult males, 5 adult females, 1 immature male and 2 immature females (NSMT-Cr 16328). Two adult males (NSMT-Cr 16329). Three adult males and 4 adult females (NSMT-Cr 16330). One adult female (NSMT-Cr 16332). Abundant males and females (both up to 7.7 mm) (NSMT-Cr 15680), 26 May 1974.

Body length. Adult male, 6.0–10.7 mm; adult female, 6.1–9.7 mm.

Distribution. *Siriella thompsonii* is known from the warm-water region of the world oceans and seas. It is an epipelagic form in offshore waters.

27. *Siriella gracilis* Dana, 1852

Siriella gracilis Dana, 1852: 658, pl. 44, figs. 1a–g, 2a–c; Sars, 1885: 209–210, pl. 36, figs. 25–28; Ortmann, 1894: 107; 1905: 972; Hansen, 1910: 31–32; 1912: 193–194; W. Tattersall, 1912: 122; Colosi, 1919: 6; 1920: 235–236; 1924: 3; Illig, 1930: 419; Coifmann, 1937a: 3; 1937b: 25–26, pl. 10, fig. 14a–e, pl. 11, fig. 14f, g; W. Tattersall, 1939: 235; 1943: 65; 1951: 62; O. Tattersall, 1955: 86; Gordan, 1957: 379 [catalogue]; Ii, 1964a: 72–78, fig. 16; Pillai, 1964: 6–7; 1965: 1693, fig. 20; 1973: 41–42, fig. 12; Taniguchi, 1974: 352; Mauchline and Murano, 1977: 76 [catalogue]; Cai, 1984: 206–207; Müller, 1993: 47 [catalogue]; Wang and Liu, 1994: 78–80, fig. 8; 1997: 202; Bamber, 2000: 58; Jo *et al.*, 1998: 44–45, fig. 10; Liu and Wang, 2000: 89–91, fig. 13; Panampunnayil, 2002: 372–373, fig. 1D; Fukuo-ka and Murano, 2002: 58; Keable *et al.*, 2003: 466 [catalogue]; Price, 2004: 57–58 [catalogue].

Type locality. Three locations in the Pacific; near St. Augustine's Island, near Pitt's Island, Kingsmills Group, and 15°N 180°.

Material examined. [Neighboring waters of Japan] One adult male (NSMT-Cr 12536), 34°36.9'N 138°34.4'E, Suruga Bay, 23 May 1964, 275–0 m oblique tow with ORI net in daytime, coll. M. Murano. One adult female (NSMT-Cr 12537), 35°01.2'N 138°39.9'E, Suruga Bay, 24–25 May 1964, 50–0 m oblique tow with ORI net at night, coll. M. Murano. One adult female (NSMT-Cr 12538), 34°30.0'N 138°39.8'E, Suruga Bay, 14 July 1965, 45–0 m oblique tow with ORI net in daytime, coll. M. Murano. Eight adult males and 1 adult female (NSMT-Cr 12539), 37°04.2'N 142°37.8'E, NE. of Cape Inubo, 29–30 September 1966, surface tow with ORI net at night, coll. M. Murano. One adult male (NSMT-Cr 12541), 36°06.8'N 142°21.3'E, E. of Cape Inubo, 30 September–1 October 1966, 1050–0 m oblique tow with ORI net at night, coll. M. Murano. Six adult males (NSMT-Cr 12540), 36°05.3'N 142°19.0'E, E. of Cape Inubo, 1 October

1966, surface tow with ORI net at night, coll. M. Murano. Three adult males, 7 adult females and 1 immature male (NSMT-Cr 12550), 33°53.6'N 141°38.7'E, S. of Boso Peninsula, 19 August 1967. Four adult males, 3 adult females and 1 immature female (NSMT-Cr 12544), 32°25.4'N 133°35.6'E, S. of Shikoku, 16 May 1968, surface tow with ORI net at night, coll. M. Murano. Three adult males and 1 immature female (NSMT-Cr 12545), 32°01.4'N 131°58.7'E, off Miyazaki, Kyushu, 17 May 1968, surface tow with ORI net at night, coll. M. Murano. Ten males (2.8–6 mm) and 8 females (4.7–5.5 mm) (NSMT-Cr 12553), 34°55.9'N 138°39.2'E, Suruga Bay, 7 November 1968, 100–0 m oblique tow with ORI net at night, coll. M. Murano. One immature female (NSMT-Cr 12574), 35°04.8'N 138°39.9'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. Two adult males (5.4, 6.2 mm), 2 adult females (5.4 mm), 1 immature male and 2 immature females (NSMT-Cr 12577), 35°03.3'N 138°39.6'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (6.6 mm), 3 adult females (5.0–5.2 mm) and 1 immature male (5.5 mm) (NSMT-Cr 12575), 35°05.1'N 138°45.0'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (5.6 mm), 1 adult female (5.3 mm), 2 immature males and 2 immature females (NSMT-Cr 12576), 34°49.9'N 138°40.0'E, Suruga Bay, 21 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (6.5 mm) (NSMT-Cr 12578), 34°45.0'N 138°39.6'E, Suruga Bay, 24 January 1971, 250–0 m oblique tow with ORI net at night, coll. M. Murano. One adult male (NSMT-Cr 12582), 33°19.3'N 138°57.6'E, S. of Izu Peninsula, 7 July 1979, 920–0 m oblique tow with ORI net. One adult male (NSMT-Cr 12583), 32°48.8'N 138°58.7'E, S. of Izu Peninsula, 9 July 1979, 690–0 m oblique tow with ORI net.

[Okinawa, Japan] One female (4.8 mm) (NSMT-Cr 12580), 24°03.4'N 124°49.5'E, SE. of Ishigaki Is., 13 May 1971, surface tow with ORI net at night, coll. M. Murano. Three adult males (5.4–5.9 mm), 1 adult female (4.8 mm), 1 immature male (4.7 mm) and 2 immature females (4.8 mm) (NSMT-Cr 12601), W. of Miyako Is., 9 May 1994, coll. K. Hashizume.

[Western Pacific Ocean] One adult female (NSMT-Cr 12551), 00°03.3'N 148°38.2'E, 25 December 1967, horizontal tow at 110 m deep with ORI net at night, coll. M. Murano. One adult male and 2 adult females (NSMT-Cr 12542), 00°03.9'N 148°38.8'E, 25 December 1967, surface tow with ORI net at night, coll. M. Murano. One adult male and 1 adult female (NSMT-Cr 12543), 01°28.2'S 158°23.4'E, 4 January 1968, surface tow with ORI net at night, coll. M. Murano.

[Central Pacific Ocean] Five males (3.2–6.6 mm) and 3 females (4.8–5.0 mm) (NSMT-Cr 12554), 30°30.7'N 154°53.6'W, 7 September 1969, surface tow with ORI net at night, coll. M. Murano. Five males (5.1–6.4 mm) and 8 females (4.5–5.5 mm) (NSMT-Cr 12555), 29°58.8'N 155°01.6'W, 8 September 1969, surface tow with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 16324), 24°59.6'N 155°00.0'W, 9 September 1969, surface tow with ORI net, coll. M. Murano. Abundant males and females (NSMT-Cr 16325), 24°29.1'N 154°57.3'W, 10 September 1969, surface tow with ORI net, coll. M. Murano. Two males (4.5 mm) and 1 female (4 mm) (NSMT-Cr 12556), 25°01.1'N 155°04.5'W, 10 September 1969, 70–0 m oblique tow with ORI net in daytime, coll. M. Murano. One male (NSMT-Cr 12579), 25°01.1'N 155°03.2'W, 10 September 1969, horizontal tow at 140–165 m deep with ORI net in daytime, coll. M. Murano. One male (4 mm) and 1 female (4.5 mm) (NSMT-Cr 12557), 24°59.7'N 154°56.6'W, 10 September 1969, 1250–0 m oblique tow with ORI net at dusk, coll. M. Murano. One male (3.1 mm) (NSMT-Cr 12558), 21°04.2'N 155°00.4'W, 12 September 1969, 860–0 m oblique tow with ORI net at dawn, coll. M. Murano. One male (4.6 mm) (NSMT-Cr 12559), 21°04.9'N 154°59.2'W, 12 September 1969, 70–0 m oblique tow with ORI net in day-

time, coll. M. Murano. One female (NSMT-Cr 12560), 21°03.3'N 154°54.3'W, 12 September 1969, horizontal tow at 410–500 m deep with ORI net in daytime, coll. M. Murano. One female (3.5 mm) (NSMT-Cr 12561), 17°03.2'N 155°07.6'W, 19 September 1969, horizontal tow at 580–680 m deep with ORI net at night, coll. M. Murano. One female (4.6 mm) (NSMT-Cr 12562), 17°08.8'N 155°05.9'W, 20 September 1969, 70–0 m oblique tow with ORI net at night, coll. M. Murano. One male (4.3 mm) and 3 females (4–4.9 mm) (NSMT-Cr 12563), 14°06.5'N 154°59.8'W, 20 September 1969, 900–0 m oblique tow with ORI net at night, coll. M. Murano. Twenty-four males (3.7–5.5 mm) and 16 females (3.5–4.8 mm) (NSMT-Cr 12564), 10°37.9'N 154°58.8'W, 21 September 1969, surface tow with ORI net at night, coll. M. Murano. Twenty males (3.5–5.9 mm) and 17 females (4.2–4.8 mm) (NSMT-Cr 12565), 10°00.7'N 155°02.3'W, 22 September 1969, surface tow with ORI net at night, coll. M. Murano. Six males (4.5–6 mm) and 1 female (4 mm) (NSMT-Cr 12566), 06°29.3'N 154°50.2'W, 27 September 1969, surface tow with ORI net at night, coll. M. Murano. One male (5.1 mm) (NSMT-Cr 12567), 04°57.0'N 155°06.4'W, 3 October 1969, surface tow with ORI net at night, coll. M. Murano. Four females (3.0–4.5 mm) (NSMT-Cr 12568), 08°33.5'S 154°59.2'W, 4 October 1969, 1250–0 m oblique tow with ORI net at night, coll. M. Murano. Abundant males (up to 6.5 mm) and females (up to 5.1 mm) (NSMT-Cr 12569), 08°33.5'S 154°59.2'W, 4 October 1969, surface tow with ORI net at night, coll. M. Murano. Fifty males (up to 6.4 mm) and 9 females (4.5–4.9 mm) (NSMT-Cr 12570), 09°55.3'S 154°58.6'W, 6 October 1969, surface tow with ORI net at night, coll. M. Murano. Fourteen males (3.3–4.9 mm) and 15 females (3.7–4.9 mm) (NSMT-Cr 12571), 12°53.3'S 152°51.4'W, 6 October 1969, surface tow with ORI net at night, coll. M. Murano. Abundant males (up to 6 mm) and females (up to 5.1 mm) (NSMT-Cr 12572), 09°02.3'S 176°43.0'W, 27 October 1969, surface tow with ORI net at night, coll. M. Murano. Ten males (3.5–6 mm) and 6 females (4.1–5 mm) (NSMT-Cr 12573), 05°29.3'S 179°32.9'E, 28 October 1969, surface tow with ORI net at night, coll. M. Murano.

[Philippine Sea] One adult male (NSMT-Cr 12547), 21°55.5'N 125°14.7'E, E. of Taiwan, 28 May 1968, surface tow with ORI net at night, coll. M. Murano. Seven males (5.0–5.6 mm) and 6 females (4.2–4.9 mm) (NSMT-Cr 12602), 14°58.2'N 131°56.8'E, 16 May 1972, surface tow with ORI net at night, coll. M. Murano. Fifteen males (4.0–5.5 mm) and 8 females (4.3–4.7 mm) (NSMT-Cr 12603), 14°58.8'N 131°56.0'E, 16 May 1972, surface tow with ORI net at night, coll. M. Murano. Two males (5.2, 5.7 mm) and 3 females (4.3–4.7 mm) (NSMT-Cr 12604), 10°02.5'N 132°00.0'E, 17 May 1972, surface tow with ORI net at night, coll. M. Murano. Two males (3.7, 5.0 mm) (NSMT-Cr 12605), 05°04.4'N 130°26.2'E, 19 May 1972, 1470–0 m oblique tow with ORI net at night, coll. M. Murano. One male (5.1 mm) (NSMT-Cr 12606), 05°04.0'N 130°26.2'E, 19 May 1972, 1330–0 m oblique tow with ORI net at night, coll. M. Murano. Abundant males (up to 5.7 mm) and females (up to 5.4 mm) (NSMT-Cr 12607), 05°04.0'N 130°26.2'E, 19 May 1972, surface tow with ORI net at night, coll. M. Murano. Two males (4.6, 5.2 mm) and 1 female (4.3 mm) (NSMT-Cr 12608), 05°22.6'N 127°04.7'E, 22 May 1972, 700–0 m oblique tow with ORI net at night, coll. M. Murano. Three adult males (4.9–5.3 mm) and 1 adult female (NSMT-Cr 12616), 05°22.6'N 127°05.5'E, 22 May 1972, surface tow with ORI net at night, coll. M. Murano. Two males (4.0, 4.5 mm) (NSMT-Cr 12615), 22°51.6'N 124°08.2'E, 28 July 1972, surface tow with ORI net at night, coll. M. Murano. One adult female (NSMT-Cr 12589), 05°16.4'N 130°05.0'E, 24 October 1981, 1800–0 m oblique tow with ORI net.

[East China Sea] One adult male and 1 immature female (NSMT-Cr 12546), 26°05.2'N 125°01.1'E, 25 May 1968, surface tow with ORI net at night, coll. M. Murano.

[South China Sea] One adult male (5.9 mm) (NSMT-Cr 12618), 04°33.6'N 106°26.5'E, 9

July 1972, surface tow with ORI net at night, coll. M. Murano. Eleven adult males and 3 adult females (NSMT-Cr 12622), 04°33.6'N 106°26.5'E, 9 July 1972, surface tow with ORI net at night, coll. M. Murano. Nine adult males, 11 adult females, 2 immature males and 2 immature females (NSMT-Cr 12611), 06°51.6'N 108°48.0'E, 11 July 1972, 132–137 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano. Twelve males (4.3–5.8 mm) and 16 females (4.1–4.6 mm) (NSMT-Cr 12612), 08°00.9'N 109°33.0'E, 11 July 1972, surface tow with ORI net at night, coll. M. Murano. Abundant males (up to 5.6 mm) and females (up to 5.0 mm) (NSMT-Cr 12620), 11°00.2'N 112°59.8'E, 15 July 1972, surface tow with ORI net at night, coll. M. Murano. Three adult males and 1 adult female (NSMT-Cr 12621), 11°00.6'N 113°02.0'E, 15 July 1972, 1200–0 m oblique tow with ORI net at dusk, coll. M. Murano. One adult male (NSMT-Cr 12623), 10°59.5'N 112°56.2'E, 15 July 1972, horizontal tow at 80–160 m deep with ORI net at night, coll. M. Murano. Abundant males and females (NSMT-Cr 12619), 10°54.9'N 112°49.5'E, 16 July 1972, surface tow with ORI net at night, coll. M. Murano. Seven males (5.0–5.4 mm) (NSMT-Cr 12613), 14°31.8'N 115°38.0'E, 18 July 1972, 880–0 m oblique tow with ORI net in daytime, coll. M. Murano. Nine males (5.1–5.8 mm) and 2 females (NSMT-Cr 12614), 20°52.0'N 121°17.2'E, Bashi Strait, 27 July 1972, surface tow with ORI net at night, coll. M. Murano. One adult male (NSMT-Cr 12594), 21°49.5'N 117°00.8'E, 18 March 1973, method unknown. One adult male and 1 adult female (NSMT-Cr 12597), 09°02.3'N 110°27.7'E, 1 March 1977, 750–0 m oblique tow with ORI net. One adult male and 1 immature female (NSMT-Cr 12598), 17°01.5'N 118°07.6'E, 7 March 1977, 1100–0 m oblique tow with ORI net. Two adult females, 1 immature male and 1 immature female (NSMT-Cr 12584), 18°08.5'N 117°05.0'E, 27 September 1981, 2000 m wire out oblique tow with ORI net. One adult female (NSMT-Cr 12585), 14°40.4'N 114°10.0'E, 29–30 September 1981, 1240–0 m oblique tow with ORI net. One adult female (NSMT-Cr 12586), 14°44.2'N 114°10.0'E, 3 October 1981, 70–0 m oblique tow with ORI net. One adult male, 2 adult females, 3 immature males and 1 immature female (NSMT-Cr 12587), 09°41.6'N 112°38.2'E, 6 October 1981, 1200–0 m oblique tow with ORI net. One adult female (NSMT-Cr 12588), 07°05.3'N 110°07.3'E, 7 October 1981, 1439–0 m oblique tow with ORI net.

[Sulu Sea] Five males (4.2–5.5 mm) (NSMT-Cr 12609), 09°07.6'N 119°03.9'E, 25 May 1972, surface tow with ORI net at night, coll. M. Murano. One male (5.0 mm) (NSMT-Cr 12610), 08°46.7'N 121°45.8'E, 2 June 1972, surface tow with ORI net at night, coll. M. Murano.

[Celebes Sea] Twenty-eight adult males (4.9–5.7 mm), 12 adult females (4.2–4.6 mm), 6 immature males and 3 immature females (NSMT-Cr 12624), 04°35.3'N 122°52.8'E, 12 June 1972, surface tow with ORI net at dusk, coll. M. Murano.

[Philippines] One adult male and 1 immature male (NSMT-Cr 12592), Batbatan, Panay Is., 21 March 1979, coll. SEAFDEC. One adult male (4.9 mm) (NSMT-Cr 12593), Batbatan, Panay Is., 5 May 1979, coll. SEAFDEC.

[Eastern Indian Ocean] One adult female (NSMT-Cr 12617), 11°59.3'S 119°59.6'E, 27 June 1972, surface tow with ORI net at night, coll. M. Murano. Two adult males and 1 immature male (NSMT-Cr 12595), 13°55.5'S 103°10.5'E, 14 January 1977, 980–0 m oblique tow with ORI net. One immature male (NSMT-Cr 12590), 14°28.7'S 119°01.1'E, 23 January 1985, surface tow with larva net, coll. T. Fukushima. Six adult males, 1 adult female and 1 juvenile (NSMT-Cr 12591), 15°00.8'S 121°01.8'E, 26 January 1985, surface tow with larva net, coll. T. Fukushima.

[Central Indian Ocean] One adult male (NSMT-Cr 12599), 15°07.4'S 86°58.1'E, 19 January 1977, 900–0 m oblique tow with ORI net. One adult male (NSMT-Cr 12596), 00°01.4'S 86°55.0'E, 27 January 1977, 700–0 m oblique tow with ORI net.

[Collection data unknown] Seven adult males, 3 adult females, 2 immature males and 1 immature female (NSMT-Cr 12548). Twenty-one adult males, 22 adult females, 7 immature males and 9 immature females (NSMT-Cr 12549). Two males (NSMT-Cr 12552). Twenty adult males (5.9–7.0 mm), 27 adult females (5.3–5.9 mm) and 2 immature males (NSMT-Cr 12581). One adult male (5.6 mm) (NSMT-Cr 12600).

Body length. Adult male, 4.9–7.0 mm; adult female, 4.2–5.9 mm.

Distribution. Known from the western Pacific (Sars, 1885; Ii, 1964a; Cai, 1984; present study); the central Pacific (Ortmann, 1905; W. Tattersall, 1943, 1951; present study); the eastern Pacific (Ortmann, 1894; Hansen, 1912; Colosi, 1924; Coifmann, 1937a; W. Tattersall, 1943, 1951); the Korea Strait (Jo *et al.*, 1998); the East China Sea (Ii, 1964a; Wang and Liu, 1997; present study); the South China Sea (Ii, 1964a; Wang and Liu, 1994; Bamber, 2000; present study); the Philippines (Sars, 1885; W. Tattersall, 1951; present study); the Sulu Sea (present study); the Celebes Sea (present study); the Arafura Sea (Sars, 1885); the Torres Strait (Colosi, 1919, 1920); Indonesia (Hansen, 1910; Colosi, 1920); the Indian Ocean (W. Tattersall, 1912, 1939; Illig, 1930; O. Tattersall, 1955; Pillai, 1964, 1973; Taniguchi, 1974; present study); the Bay of Bengal (Pillai, 1973); the Andaman Sea (Pillai, 1973; Fukuoka and Murano, 2002; Panampunayil, 2002); the Arabian Sea (Coifmann, 1937a; W. Tattersall, 1939; Pillai, 1964, 1973); the Gulf of Aden (Illig, 1930); the Red Sea (Coifmann, 1937b). The present occurrences fall within the known distribution range of this species. *Siriella gracilis*, together with *S. thompsonii*, is the most abundant mysid species at the surface layer in the warm-water region of the Pacific Ocean and the Indian Ocean. There are no occurrence records of this species from the Atlantic Ocean.

28. *Siriella quadrispinosa* Hansen, 1910

Siriella quadrispinosa Hansen, 1910: 32–33, pl. 2, fig. 5a–i; W. Tattersall, 1922: 454; Gordan, 1957: 381 [catalogue]; Ii, 1964a: 91–94, fig. 22; Pillai, 1965: 1691–1692, fig. 14; Mauchline and Murano, 1977: 77 [catalogue]; Băcescu, 1979: 143; Murano, 1990: 193, fig. 4; Müller, 1993: 53 [catalogue]; Wang and Liu, 1994: 82–84, fig. 10; Liu and Wang, 2000: 98–99, fig. 17; Keable *et al.*, 2003: 467–468 [catalogue].

Type locality. 06°33'S 120°26'E, between islands of Bahuluwang and Tambolungan, Indonesia.

Material examined. [Okinawa, Japan] One adult male (7.4 mm) (NSMT-Cr 16368), Port Aka, Akajima Is., 3 June 1989, hand net under electric light, coll. M. Murano. One immature female (5.8 mm) (NSMT-Cr 16374), Port Aka, Akajima Is., 30 December 1989, hand net under electric light, coll. M. Murano. One immature female (5.2 mm) (NSMT-Cr 16373), Maenohama, Akajima Is., 2 February, 1990, under electric light, coll. M. Murano. Two gravid females (5.5, 5.9 mm), 9 immature males (up to 6.1 mm), 13 immature females and 7 juveniles (NSMT-Cr 16369), Port Aka, Akajima Is., 23 June 1990, hand net under electric light, coll. M. Murano. One adult male (NSMT-Cr 16370), Port Aka, Akajima Is., 24 June 1990, light trap at 1 m deep, coll. M. Murano. One adult male (7.8 mm) (NSMT-Cr 16371), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano.

[South China Sea] One adult male (6.2 mm) (NSMT-Cr 16372), 04°33.4'N 106°26.4'E to 04°33.9'N 106°26.6'E, 9 July 1972, surface tow with ORI net at night, coll. M. Murano.

[Philippines] One adult male (6.4 mm) (NSMT-Cr 16365), Batbatan, Panay Is., 21 March 1979, coll. SEAFDEC. One adult male (6.1 mm) and 2 gravid females (5.4, 6.1 mm) (NSMT-Cr 16366), Batbatan, Panay Is., 23–24 March 1979, surface tow with larva net at night, coll. SEAFDEC. One adult female (5.8 mm) (NSMT-Cr 16367), Batbatan, Panay Is., 14 April 1979,

coll. SEAFDEC.

Body length. Adult male, 6.1–7.8 mm; adult female, 5.4–6.1 mm.

Remarks. *Siriella quadrispinosa* is distinguished from allied species by the uropodal exopod armed with six to nine spines occupying less than distal half of the outer margin of the proximal segment and the telson armed on the posterior margin with two pairs of long spines, the outer pair of which is longer than the inner in both sexes.

Distribution. This species is previously known from Indonesia (Hansen, 1910); the Gulf of Manaar, India (W. Tattersall, 1922); the central and southwestern Japan (Ii, 1964a; Murano, 1990); the Great Barrier Reef (Băcescu, 1979); and the South China Sea (Wang and Liu, 1994). The present occurrences fall within the known distribution range of this species.

29. *Siriella vulgaris* Hansen, 1910

(Figs. 16–30)

Siriella suluensis Czernivsky, 1887: 29.

Siriella vulgaris Hansen, 1910: 34–35, pl. 3, fig. 2a–k; W. Tattersall, 1922: 454; Colosi, 1924: 3; W. Tattersall, 1928: 105; 1936: 145; Coifmann, 1937a: 3; W. Tattersall, 1943: 65; 1951, 62–63; Gordan, 1957: 381 [catalogue]; O. Tattersall, 1960: 166–167; Ii, 1964a: 94–95; O. Tattersall, 1965: 76–77; Pillai, 1965: 1692, fig. 15; Mauchline and Murano, 1977: 77 [catalogue]; Băcescu, 1986: 19; Murano, 1990: 193–194, fig. 5a–d; Fukuoka and Murano, 1997: 521–523, fig. 2f, g; Liu and Wang, 2000: 99–101, fig. 18; Fukuoka and Murano, 2002: 59; Keable *et al.*, 2003: 469 [catalogue]; Hanamura and De Grave, 2004: 64, fig. 1c–f; Price, 2004: 58 [catalogue].

Siriella vulgaris var. *rostrata* W. Tattersall, 1951: 63, 64, fig. 14; Ii, 1964a: 95; Murano, 1990: 194–195, fig. 6.

Type locality. Malay Archipelago sea area.

Material examined. [Cotype] Four males (up to 6.2 mm), 6 females (up to ca. 6 mm) and 1 juvenile (ZMUC CRU-8605), St. 99, 06°07.5'N 120°26'E, anchorage off North Ubian, Sulu Archipelago, 28–30 June 1899, 16–23 m, plankton, surface, evening. Thirty-four males (up to 7.0 mm), 40 females (up to 6.4 mm) and 2 juveniles (ZMUC CRU-8606), St. 109, anchorage off Pulu Tongkil, Sulu Archipelago, 5–6 July 1899, plankton net, 13 m.

[Mainland of Japan] One adult male (6.9 mm), 1 adult female (7.0 mm), 2 immature males and 2 immature females (NSMT-Cr 14639), Nomo, Nagasaki, 11 August 1975, coll. S. Inoue and T. Takita.

[Okinawa, Japan] Six males (adult, 6.7–7.2 mm), 7 females (adult, 6.3–6.7 mm) and 3 juveniles (NSMT-Cr 17755), Port Aka, Akajima Is., 3 June 1989, hand net under electric light, coll. M. Murano. Sixteen males (up to 7.8 mm) and 15 females (up to 7.8 mm) (NSMT-Cr 17756), mouth of Nakama River, Iriomote Is., 5 June 1989, coll. M. Murano. Two males and 3 females (NSMT-Cr 17757), Port Ohara, Iriomote Is., 6 June 1989, hand net under electric light, coll. M. Murano. Two males (7.5 mm), 4 females and 1 juvenile (NSMT-Cr 17758), Port Aka, Akajima Is., 30 December 1989, 21:00, hand net under electric light, coll. M. Murano. Two adult females (6.9, 7.2 mm) (NSMT-Cr 17759), Port Aka, Akajima Is., 2 February 1990, hand net under electric light, coll. M. Murano. Thirty-one males (up to 7.1 mm), 36 females (gravid, 5.6–6.3 mm) and 24 juveniles (NSMT-Cr 17760), Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Thirty males (up to 6.8 mm), 40 females (up to 7.0 mm) and 23 juveniles (NSMT-Cr 17761), Port Aka, Akajima Is., 23 June 1990, hand net under electric light, coll. M. Murano. One male (damaged) (NSMT-Cr 17762), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. Fourteen males (up to 6.3 mm) and 27 females (up to 6.5 mm) (NSMT-Cr 17763), Port Aka, Akajima Is., 13 November 1990, hand net under electric light, coll. M. Murano. Eight females (6.1, 7.5 mm) (NSMT-Cr 17764), Port Aka, Akajima Is., 15 March

1991, hand net under electric light, coll. M. Murano. Two immature males and 4 females (up to 7.3 mm) (NSMT-Cr 17765), Port Aka, Akajima Is., 15 May 1991, hand net under electric light, coll. M. Murano. Thirteen males (up to 7.0 mm), 22 females (up to 6.5 mm) and 5 juveniles (NSMT-Cr 17766), Port Aka, Akajima Is., 1 January 1995, hand net under electric light, coll. S. Hosaka.

[Ogasawara, Japan] Abundant males (up to 7.8 mm) and females (up to 7.3 mm) (NSMT-Cr 17741), Futami Port, Chichijima Is., 16 June 1995, hand net under electric light, coll. K. Fukuoka. Seventeen adult males (6.9–7.5 mm, a specimen of 7.5 mm dissected for drawing), 3 gravid females (5.7–6.4 mm), 2 adult females (6.6, 7.1 mm, a specimen of 6.6 mm dissected for drawing), 8 immature males, 8 immature females and 15 juveniles (NSMT-Cr 17740), Futami Port, Chichijima Is., 27 June 2003, 20:45–21:00, hand net under electric light, coll. K. Fukuoka.

[Philippines] Abundant males (up to 7.1 mm) and females (up to 6.6 mm) (NSMT-Cr 17749), Batbatan, Panay Is., 23–24 March 1979, midnight, surface tow with larva net, coll. SEAFDEC. One adult male (6.6 mm) (NSMT-Cr 17750), Batbatan, Panay Is., 3 April 1979, midnight, coll. SEAFDEC. One adult male (6.6 mm) and 2 adult females (6.8 mm) (NSMT-Cr 17751), Batbatan, Panay Is., 5 April 1979, surface tow with larva net, coll. SEAFDEC. Twenty-six males (adult, 6.4–7.1 mm) and 47 females (adult, 6.2–7.4 mm) (NSMT-Cr 17752), Batbatan, Panay Is., 25 April 1979, midnight, coll. SEAFDEC. One adult male (5.9 mm) (NSMT-Cr 17753), Batbatan, Panay Is., 5 May 1979, coll. SEAFDEC. One male (damaged) (NSMT-Cr 17754), Batbatan, Panay Is., 21 September 1979, coll. SEAFDEC.

[Timor Sea] One male and 4 females (damaged) (NSMT-Cr 17748), 12°17.3'S 129°40.9'E to 12°17.2'S 129°41.8'E, Sahul Shelf, 24 June 1972, plankton net installed at mouth of 3-m beam trawl, 49–52 m, coll. M. Murano.

Remarks. Since *S. vulgaris* was instituted by Hansen (1910), its occurrence has been reported by many scientists (e.g. Coifmann, 1937a; W. Tattersall, 1951; Fukuoka and Murano, 1997) It seems, however, that an issue of taxonomy remains still, as stated by Hansen (1910) at the establishment that *S. vulgaris* might comprise two or three species.

In this study, we had an opportunity of examining Hansen's cotype specimens, ZMUC CRU-8605 and ZMUC CRU-8606, which have been preserved in the Zoological Museum, the University of Copenhagen. These specimens do not exactly agree with the description and illustrations of *S. vulgaris* given by Hansen (1910) in some respects, i.e. (1) the rostrum is short triangular with a pointed apex in Hansen's original description (1910, pl. 3, fig. 2a), while that of the cotype specimens is longer in general (Fig. 16B, C, H, I) and in some of them the apical part is bent downward, so that the apex can not be seen in top view observation (Fig. 16A); (2) a small frontal projection on the anterior margin of the cephalon has been depicted between a pair of antennular peduncles in Hansen's figure (1910, pl. 3, fig. 2a), whereas the projection is much more prominent than that drawn by Hansen in many cotype specimens (Fig. 16A, C, I).

In this study, *S. vulgaris* is defined on the basis of both the original description and illustrations by Hansen (1910) and the present observation on the cotype specimens as follows: (1) the rostrum more or less produced anteriorly or bent downward; (2) a projection arising from the anterior margin of the cephalon between antennular peduncles; (3) the terminal lobe of the antennal scale ranged from 0.7 to 1.5 times as long as broad; (4) the endopod of the third to eighth thoracic limbs with the carpopropodus distinctly shorter than the merus; (5) the genital organ of the male armed with two to five rather short recurved setae on the apex and two to six plumose setae on the anterior margin; (6) the uropodal exopod with three to seven graded spines on the outer margin of the proximal segment; (7) the lateral spines of the telson not showing a tendency of

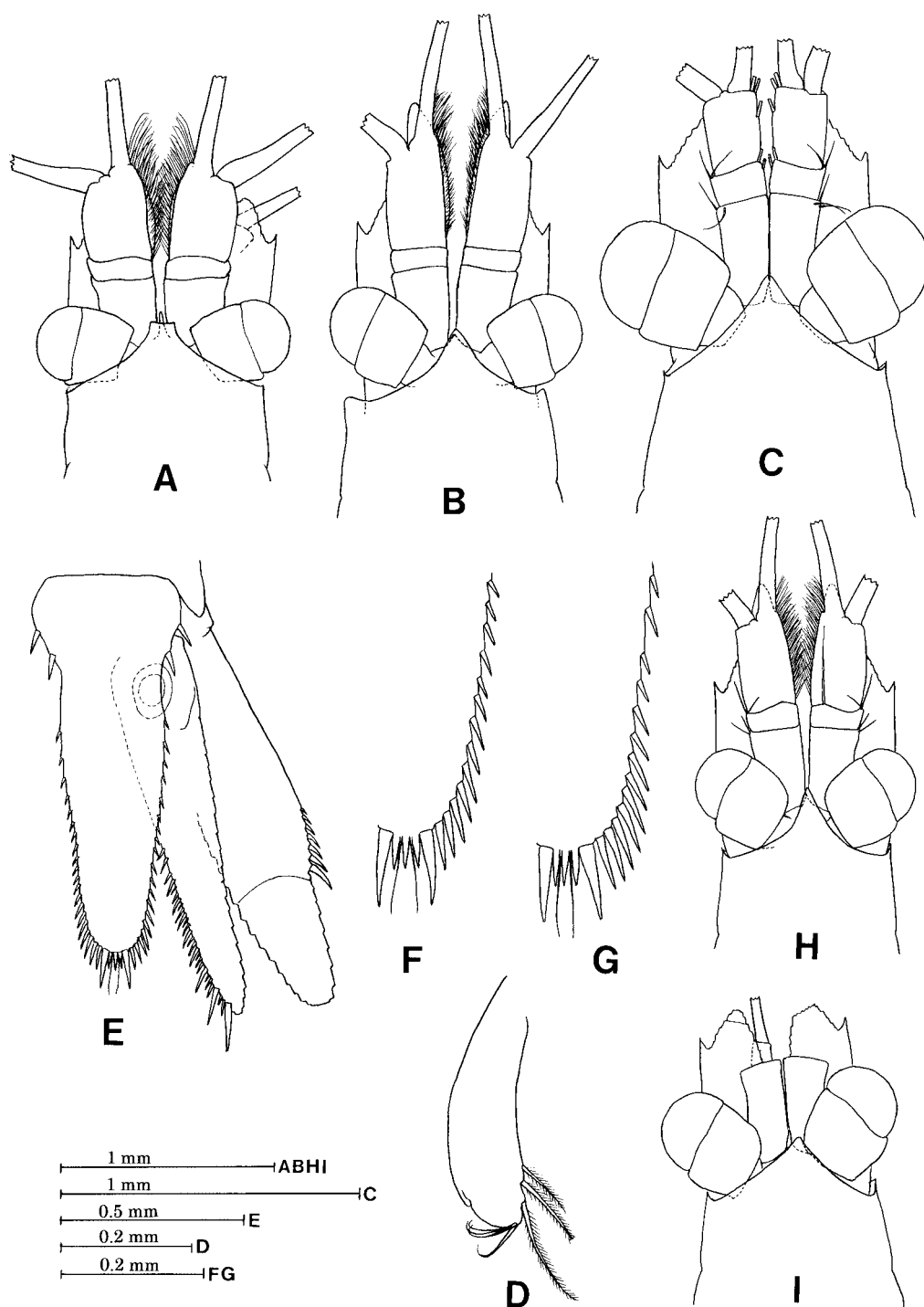


Fig. 16. *Siriella vulgaris* Hansen, 1910; cotype (ZMUC CRU-8605). A, anterior part of body (adult male, 6.6 mm); B, anterior part of body (adult male, 6.8 mm); C, anterior part of body (adult female, damaged); D, genital organ (adult male, ca. 7 mm); E, uropod and telson (adult male, 6.9 mm); F, apex and right margin of telson (adult male, 6.3 mm); G, apex and right margin of telson (gravid female, 6.3 mm); H, anterior part of body (adult male, 6.3 mm); I, anterior part of body (adult female, ca 6.4 mm).

falling into groups; (8) the two basal spines of the telson placed distantly.

In regard to the rostrum, a considerable variation is observed in the present specimens. In those from Panay Island, Philippines, the rostrum is classified roughly into four types:

Type I (Fig. 17A): Short triangular with pointed apex and nearly straight lateral margins. This type is allied to that described and illustrated by Hansen (1910, pl. 3, fig. 2a). In the Panay specimens, it occurs rather rarely.

Type II (Fig. 17B): Long and narrow with rounded apex and concave lateral margins. This type occupies the majority of the Panay specimens.

Type III (Fig. 17C): Bent downward, so that the apex is impossible to be observed from dorsal side. This is hardly observed in females.

Type IV (Fig. 17D): Very long and narrow with sharply pointed apex. This type was reported by W. Tattersall (1951) as a variety, *S. vulgaris* var. *rostrata*, but Hanamura and De Grave (2004) thought that this variety is merely an extreme variation within a morphologically variable species. We are having the same opinion.

The specimens from Okinawa do not show any remarkable variation in the shape of the rostrum. Their rostrum (Fig. 22A, B) is allied to Type I with exception of a small number having Type IV. In Ogasawara specimens, the rostrum (Fig. 25A, B) is similar to Type II, although it is somewhat longer. In specimens collected from Nomo, the mainland of Japan, the rostrum is similar to that of Ogasawara specimens (Fig. 29A, B).

A small projection on the anterior margin of the cephalon between a pair of antennules was depicted by Hansen (1910, Pl. 3, fig. 2a) and also observed in various sizes in the specimens from Panay, Okinawa, Ogasawara and Nomo (Figs. 18A, B, 22A, B, 25A, B, 29A, B). Generally, it is small in those specimens having the rostrum of the Type I or similar kind of rostrum (Figs. 22A, B, 29A, B), and it is long in those having the rostrum of the other three types or similar kind of them (Figs. 18A, B, 25A, B).

The meandering of the inner antennular flagellum of the male is seen clearly in specimens from Okinawa (Fig. 22A) and in less tendency in those from Ogasawara (Fig. 26). This character is never observed in the cotypes and the Panay specimens.

As to the antennal scale, Hansen (1910) described that its terminal lobe is always unusually long, and varies from at least $\frac{2}{3}$ as long as broad to a little longer than broad. In the specimens from Panay Island, the terminal lobe is generally longer than that of the type specimens in both sexes, although a considerable variation is observed (Fig. 17E–H; E, F and H were illustrated on the female, and G on the male). In the specimens used for drawing it is 1.35 times as long as broad in the male and 1.2 times as long in the female (Fig. 18C, D). In those from Okinawa and Ogasawara, there is a considerable difference between sexes, i.e. the terminal lobe of the male is 1.37 times longer than broad in the former specimens (Fig. 22C) and 1.5 times longer in the latter ones (Fig. 25C), while that in the female is almost as long as broad in both specimens (Fig. 22D, 25D). The scale of the Nomo specimens (Fig. 29C, D) is rather allied to those from Panay.

Some differences in the genital organ of the male are noticed on specimens from different localities (Figs. 20D, 24A, 28B, 30E). The specimens collected from Okinawa, Ogasawara and Nomo are having longer recurved setae on the apex than that of Panay specimens. It is a matter of course that the genital organ is an important character in the mysid taxonomy, but the taxonomic valuation is not settled yet in the genus *Siriella*. This matter is left in future as an object of study.

For the male pleopods, Hansen (1910) did not mention any specific character in his original description. In the third and fourth pleopods of Panay specimens, an exceptionally long naked

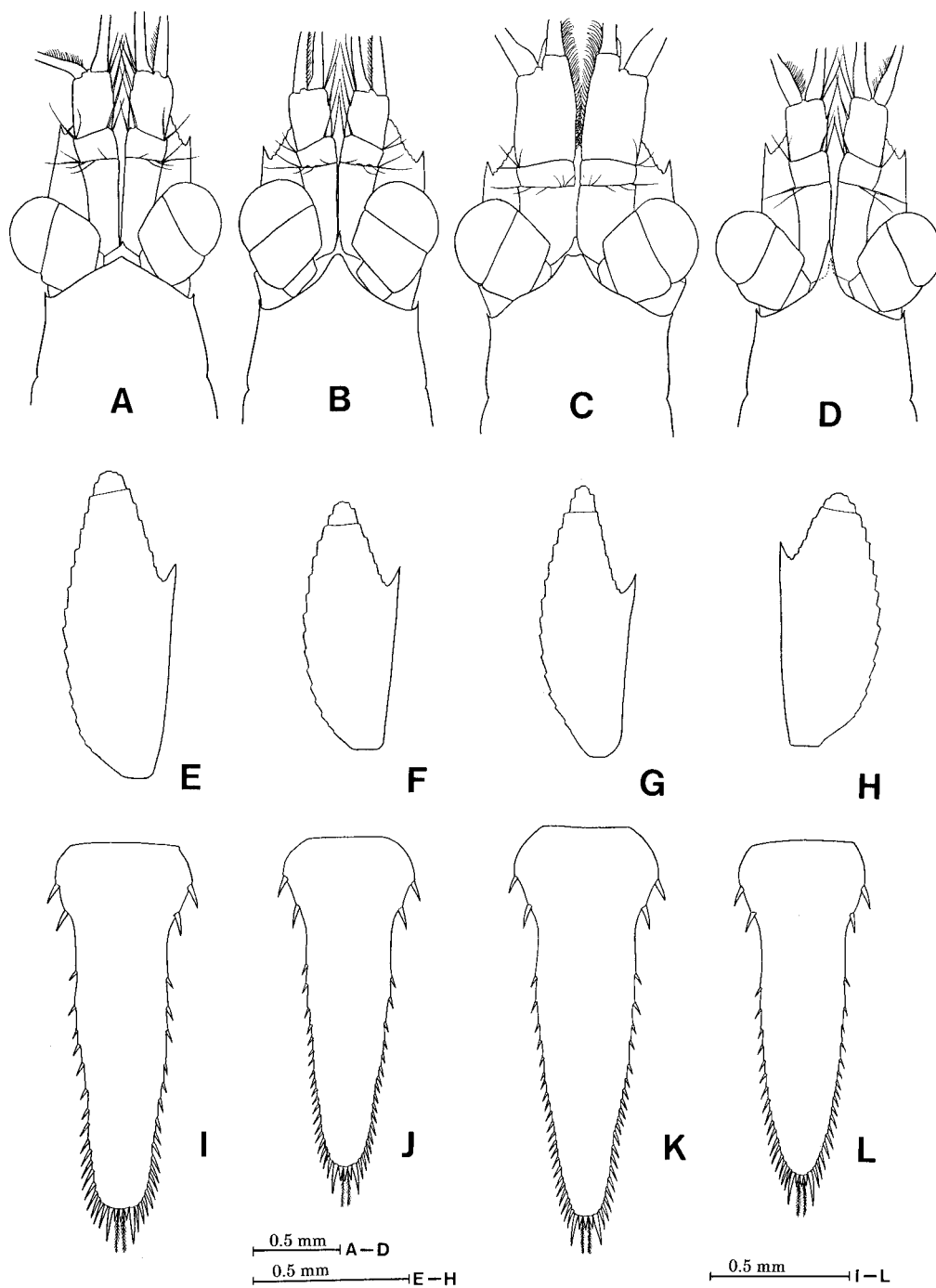


Fig. 17. *Siriella vulgaris* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 17749). A–D, anterior part of body; E–H, antennal scale; I–L, telson.

Table 7. Morphological comparison among Hansen's description, Hansen's cotypes, and local forms from Panay, Okinawa, Ogasawara and Nomo in *Siriella vulgaris*.

	Hansen's description	Hansen's cotype specimens	Specimens from Panay Is., Philippines	Specimens from Akajima Is., Okinawa, Japan	Specimens from Ogasawara Is., Japan	Specimens from Nomo, Kyushu, Japan
Rostrum	Somewhat produced into narrowly triangular plate; tip nearly or completely acute	Variable, short or long triangular, or bent downward; tip nearly or completely acute	Variable, short or long triangular, or bent downward; tip acute or narrowly rounded	Short triangular; tip obtusely pointed	Somewhat produced into long, narrowly triangular plate; tip narrowly rounded	Somewhat produced into long, narrowly triangular plate; tip acute
Projection on anterior end of cephalon	Not described	Short or long	Short or long	Short	Long	Short
Length/width ratio of antennal scale	♂ and ♀: about 3	♂ and ♀: about 3	♂: 3 ♀: 2.76	♂: 3.3 ♀: 2.8	♂: slightly less than 3 ♀: 3	♂: 3 ♀: 2.7
Length/width ratio of terminal lobe of antennal scale	Varied from 2/3 to a little longer than broad	Not examined	♂: 1.35 ♀: 1.2	♂: 1.37 ♀: 1.0	♂: 1.5 ♀: 1.0	♂: 1.3 ♀: 1.17
Length ratio of terminal lobe of antennal scale to antennal scale	Not described	Not examined	♂: more than 0.33 ♀: 0.38	♂: more than 0.33 ♀: 0.32	♂: more than 0.33 ♀: more than 0.25	♂: 0.38 ♀: 0.38
Armature of genital organ of male	Not described	3 plumose setae on anterior margin and 4 recurved setae on apex	2 to 6 (4.0 in ave., n=18) plumose setae on anterior margin and 2 recurved setae on apex	2 to 5 (3.3 in ave., n=19) plumose setae on anterior margin and 2–5 (2.3 in ave., n=19) recurved setae on apex	4 to 6 (4.6 in ave., n=14) plumose setae on anterior margin and 3 (3.0 in ave., n=14) recurved setae on apex	4 (n=1) plumose setae on anterior margin and 2 (n=1) recurved setae on apex
Number of spines on proximal segment of uropodal exopod	3 to 9, but generally 5 to 7	7	♂: 4 to 7 (5.5 in ave., n=38) ♀: 3 to 5 (4.3 in ave., n=33)	♂: 5 to 7 (6.2 in ave., n=37) ♀: 4 to 7 (5.3 in ave., n=58)	♂: 4 to 7 (5.4 in ave., n=30) ♀: 3 to 6 (4.2 in ave., n=24)	♂: 7 (n=1) ♀: 4 (n=1)
Number of lateral spines of telson (excl. basal 2)	♀: 18	♂: 19 or 20	♂: 16 to 25 (20.6 in ave., n=38) ♀: 16 to 19 (17.7 in ave., n=30)	♂: 19 to 27 (22.3 in ave., n=38) ♀: 14 to 20 (17.7 in ave., n=54)	♂: 17 to 25 (20.3 in ave., n=30) ♀: 13 to 18 (17.5 in ave., n=26)	♂: 20, 21 (n=2) ♀: 15, 17 (n=2)

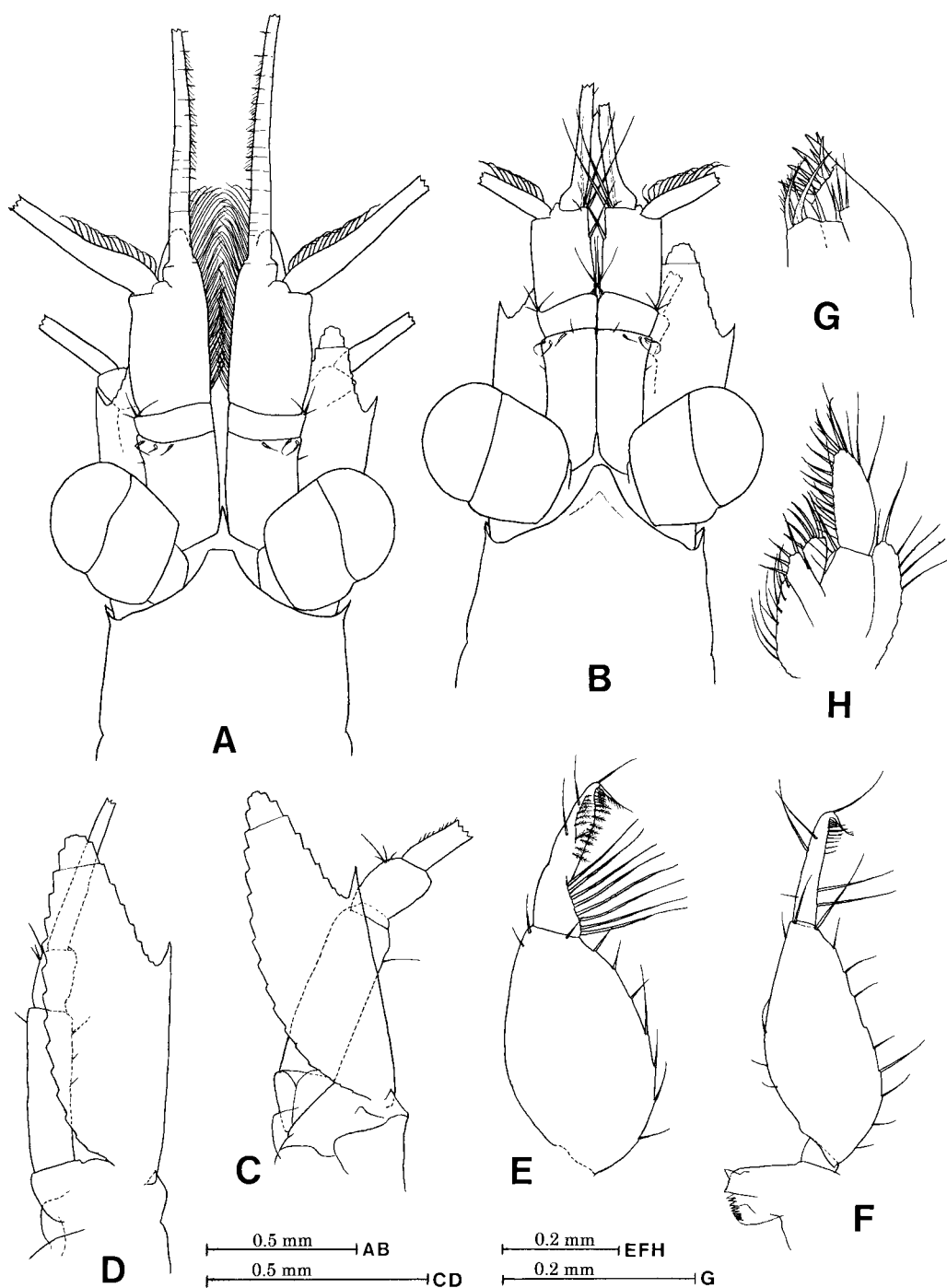


Fig. 18. *Siriella vulgaris* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 17752); A, C, E, G, H, adult male (6.6 mm); B, D, F, adult female (6.6 mm). A, B, anterior part of body; C, D, antenna; E, mandibular palp; F, mandible and mandibular palp; G, maxillule; H, maxilla.

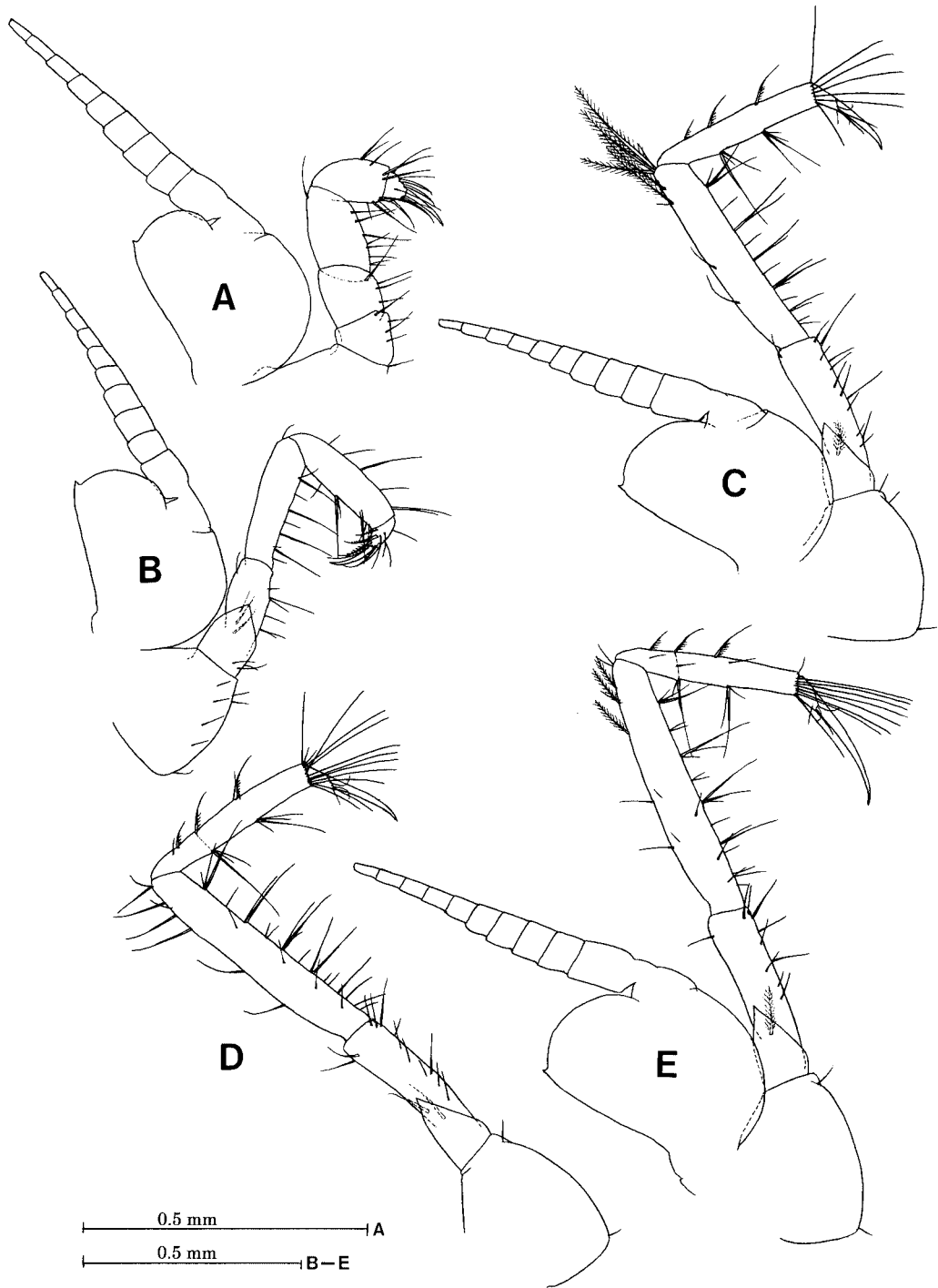


Fig. 19. *Siriella vulgaris* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 17752), adult male (6.6 mm).
A-E, first to fifth thoracic limbs (exopod of fourth limb omitted).

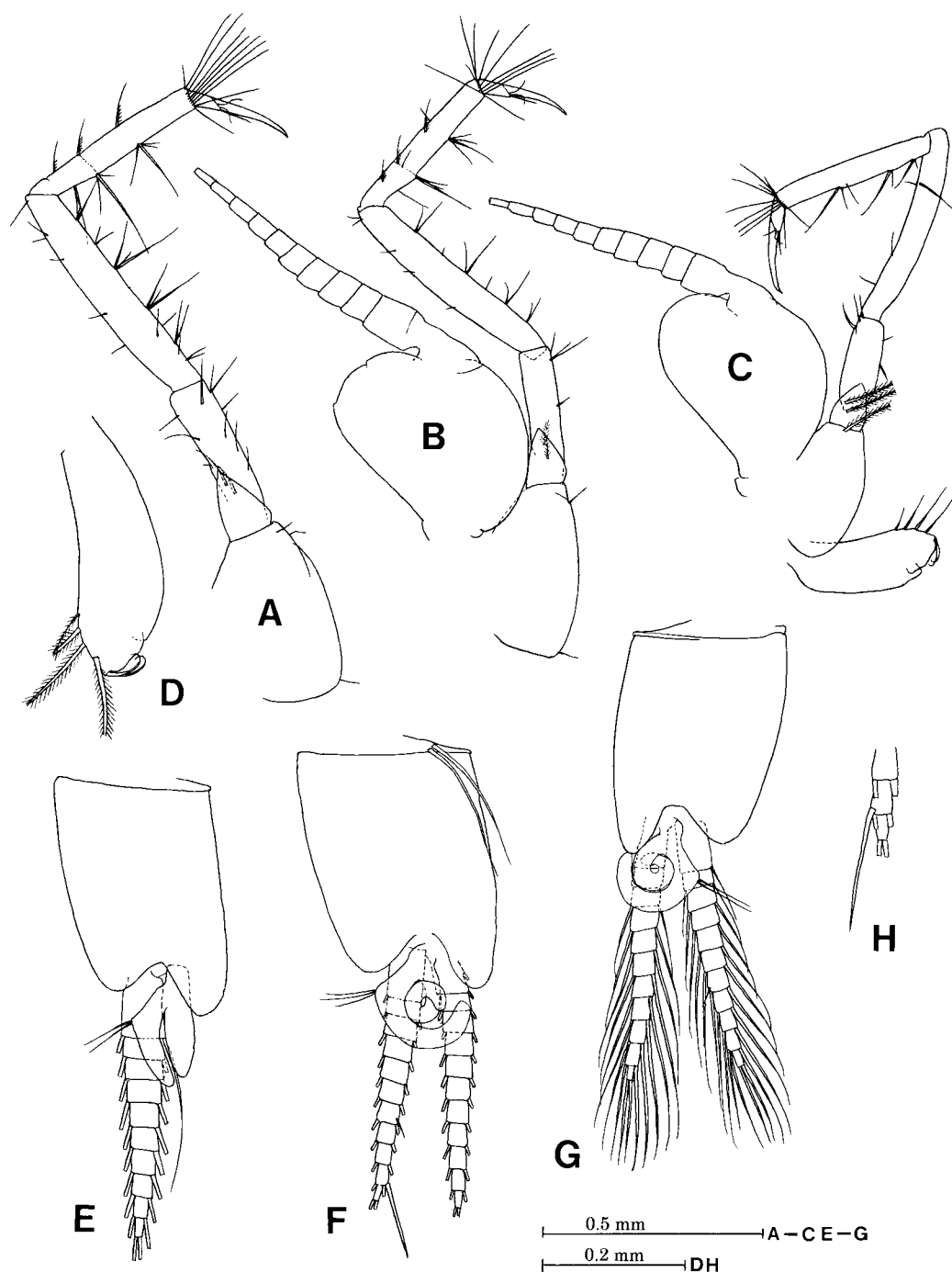


Fig. 20. *Siriella vulgaris* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 17752), adult male (6.6 mm). A–C, sixth to eighth thoracic limbs (exopod of sixth limb omitted); D, genital organ; E, first pleopod; F, third pleopod; G, fourth pleopod; H, extremity of exopod of fourth pleopod.

seta, which was never seen previously in the other species of *Siriella*, was found at the inner distal corner of the penultimate segment of the exopod (Fig. 20F, H). Such a seta was also confirmed in the cotypes, but not in those from Okinawa, Ogasawara and Nomo, in which an ordinary short seta is growing (Figs. 24C, 28D, 30G).

In case of the uropod and telson, there are no remarkable differences within different localities.

As stated above, specimens from Okinawa, Ogasawara and Nomo are somewhat different from the type specimens in some of the followings; (1) the meandering of the inner antennular flagellum of the male, (2) the antennal scale showing a sexual dimorphism, (3) the armature of the genital organ of the male, (4) the length of the naked seta on the penultimate segment of the exopod of the third and fourth male pleopods. These matters indicate a possibility that specimens from Okinawa, Ogasawara and Nomo might be other species than *S. vulgaris*. It seems, however, that these differences are not valid enough to introduce new species required to accommodate these specimens. In this study, therefore, they are included within *S. vulgaris* as local forms. The decision of their true taxonomic position should be made in future studies based on the specimen collected over all seasons and from different sampling sites, and furthermore, should be needed the aid of genetic examination.

Morphological comparison among the type specimens and those from Panay, Okinawa, Ogasawara and Nomo is summarized in Table 7. Illustrations of the cotype specimens are shown in Figs. 16 and those from Panay, Okinawa, Ogasawara and Nomo in Figs. 17 to 21, Figs. 22 to 24, Figs. 25 to 28 and Figs. 29 and 30, respectively.

Distribution. Known from Indonesia (Hansen, 1910); the Philippines (Hansen, 1910; W. Tattersall, 1951; present study); the Andaman Islands (W. Tattersall, 1922); the Andaman Sea (Fukuoka and Murano, 2002); the Arabian Sea (Colosi, 1924); Queensland, Australia (W. Tattersall, 1928); the Great Barrier Reef (W. Tattersall, 1936); Samoa (W. Tattersall, 1943); Guam (W. Tattersall, 1943), Caroline and Marshall (W. Tattersall, 1951), Palau (Hanamura and De Grave, 2004), Micronesia; the vicinity of Taiwan (W. Tattersall, 1951); the Singapore Strait (O. Tattersall, 1960); the Malacca Strait (O. Tattersall, 1965); the northern Australia (Băcescu, 1986; present study); Hong Kong (Coifmann, 1937a); Okinawa (Murano, 1990; Fukuoka and Murano, 1997; present study), Nomo, Nagasaki (present study), Japan. The occurrence from Nomo, Japan, extends northward the distribution range of this species. Coifmann (1937a) recorded the occurrence of this species from Peru, but it is questionable zoogeographically. This species is a coastal form distributed widely in the tropical and subtropical regions of the West Pacific Ocean, the Indian Ocean and their marginal seas.

30. *Siriella affinis* Hansen, 1910

(Fig. 31)

Siriella affinis Hansen, 1910: 35–36, pl. 3, fig 3a–i; W. Tattersall, 1922: 454–455; 1951: 64–65; Gordan, 1957: 378 [catalogue]; Ii, 1964a: 89–91; Pillai, 1965: 1692, fig. 16; Shyamasundari, 1973: 391–392, figs. 1–4; Mauchline and Murano, 1977: 76 [catalogue]; Murano, 1983: 82; Müller, 1993: 41 [catalogue]; Keable *et al.*, 2003: 465 [catalogue].

Type locality. 06°04'N 121°27.5'E, off Pulu Tongkil, Sulu Archipelago, Philippines.

Material examined. [Type] Dissected appendages (ZMUC CRU-9536), anchorage off Pulu Tongkil, Sulu Archipelago, 5–6 July 1899, plankton, 13 m. [Cotype] 4 adult males (6.6–7.3 mm) and 1 gravid female (6.2 mm) (ZMUC CRU-5191), 06°33'S 120°26'E, bank between islands of Bahuluwang and Tambolungan, south of Saleyer, Indonesia, 7–8 May 1899, plankton, 8–10 m.

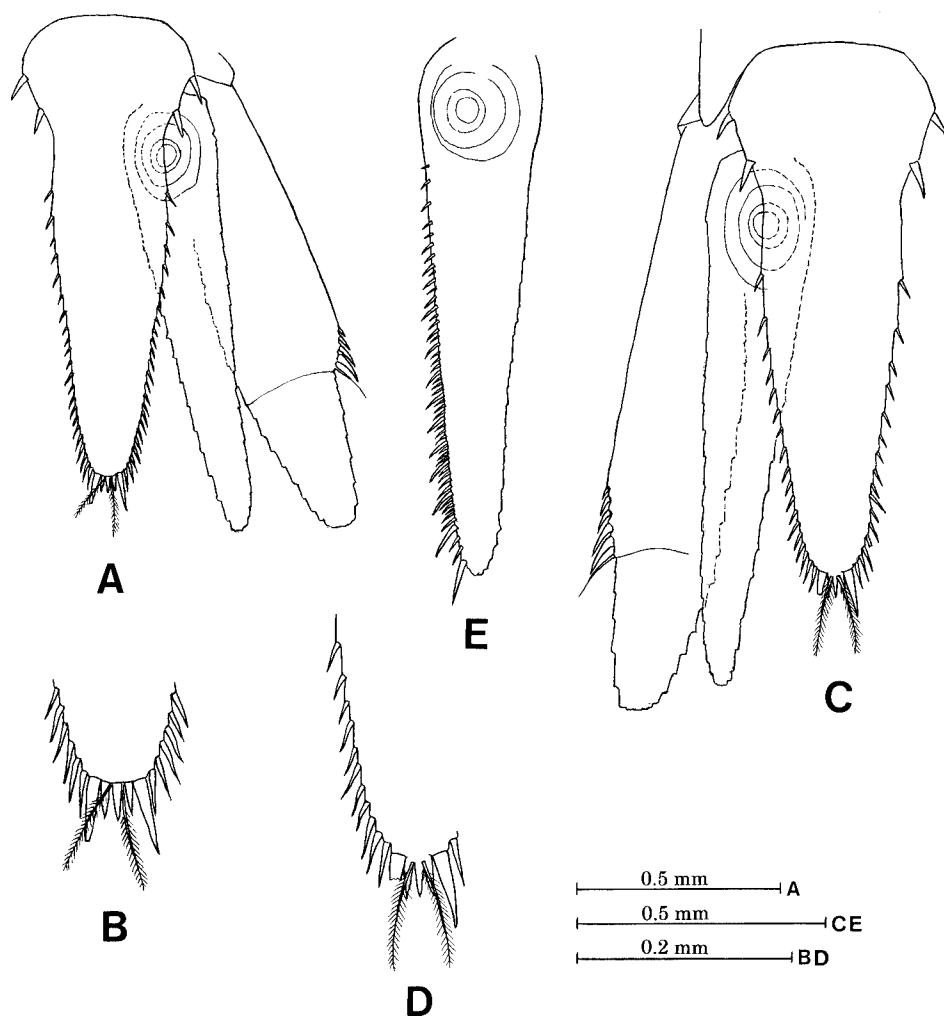


Fig. 21. *Siriella vulgaris* Hansen, 1910; from Panay Island, Philippines (NSMT-Cr 17752); A, B, E, adult male (6.6 mm); C, D, adult female (6.6 mm). A, uropod and telson; B, posterior part of telson; C, uropod and telson; D, apex and posterior half of left lateral margin of telson; E, uropodal endopod.

Body length. Male, 6.6–7.5 mm; female, 6–6.5 mm.

Remarks. We had an opportunity of examining the type specimen, ZMUC CRU-9536 and cotype specimens, ZMUC CRU-5191, which have been stored at the Zoological Museum of the University of Copenhagen.

Hansen (1910) described the rostrum showing a sexual dimorphism. That of the female (Fig. 31A) is considerably longer as compared to that of the male (Fig. 31B), as if it is of another species.

Through the present examination of the type and cotype specimens, important characters in the male were found in the inner antennular flagellum and in the genital organ. The inner antennular flagellum (Fig. 31B, C) is contorted in the proximal 1/3 part, as known in *S. okadai*. Such a feature is observed in all cotype male specimens, except one in which the most part of the inner flagellum is lost due to damage. Hitherto, an adequate observation has not been made on this

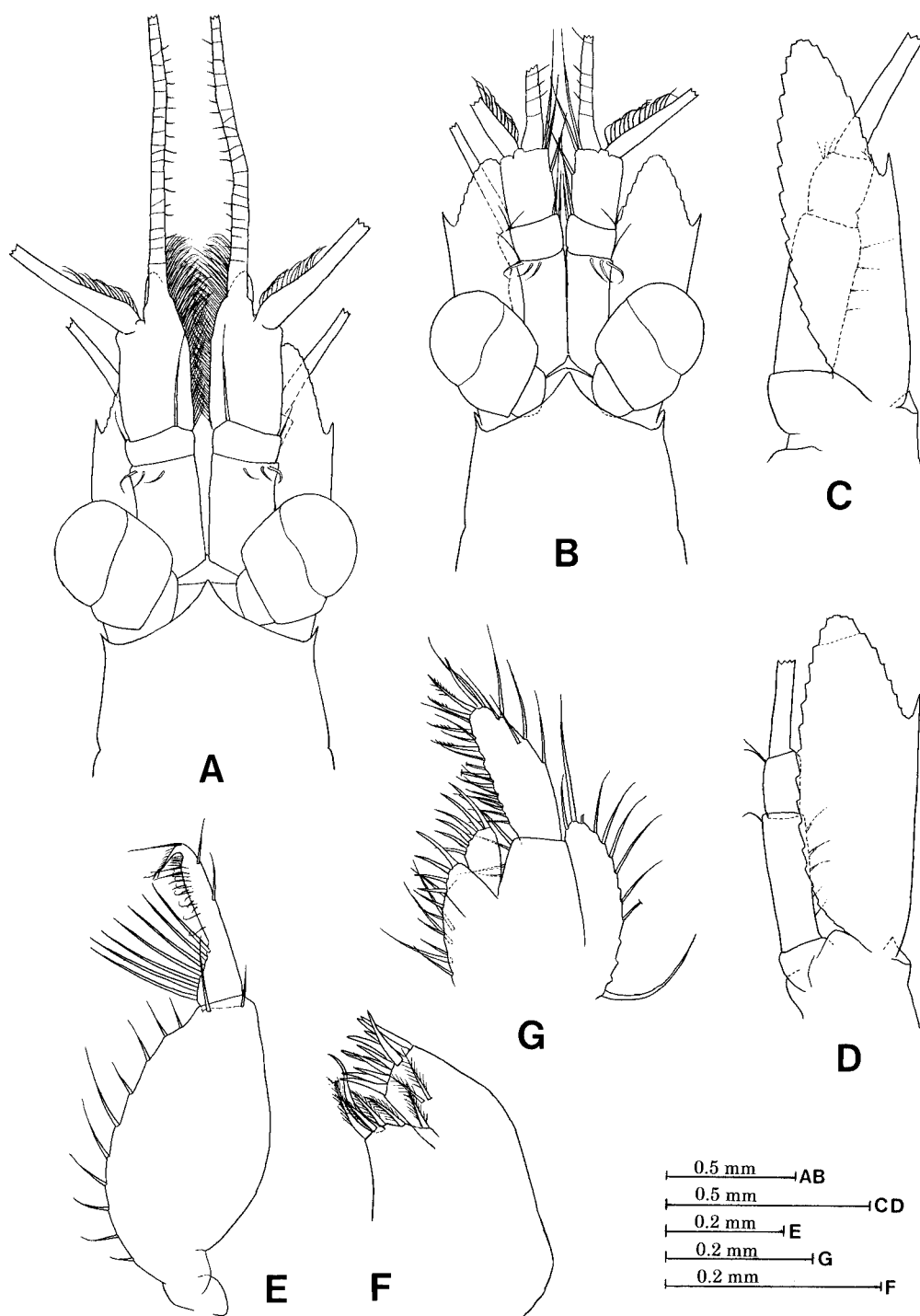


Fig. 22. *Siriella vulgaris* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 17756); A, C, E–G, adult male (7.1 mm); B, D, gravid female (6.7 mm). A, B, anterior part of body; C, D, antenna; E, mandibular palp; F, maxillule; G, maxilla.

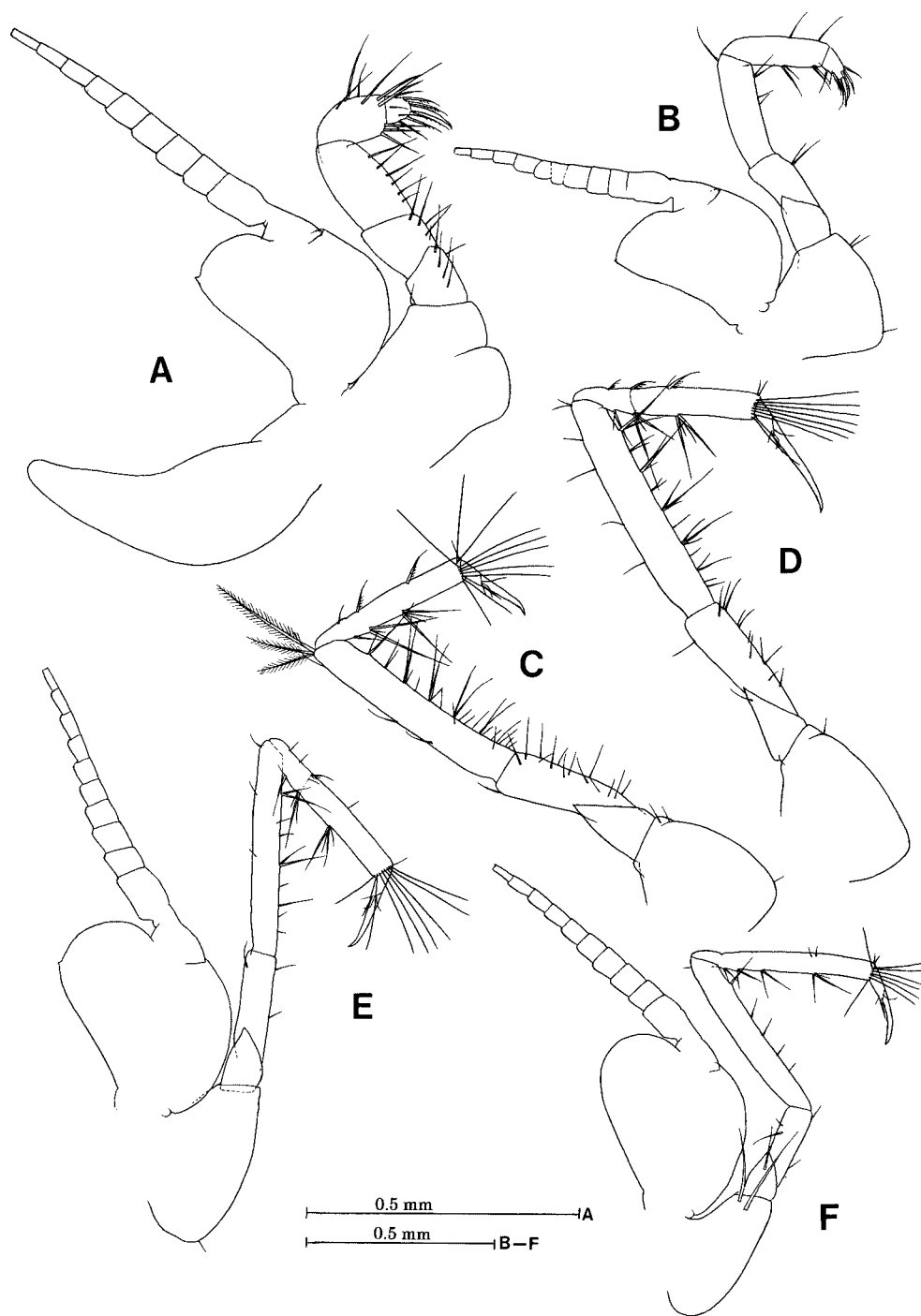


Fig. 23. *Siriella vulgaris* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 17756), adult male (7.1 mm). A, first thoracic limb; B, second thoracic limb; C, endopod of third thoracic limb; D, endopod of fifth thoracic limb; E, seventh thoracic limb; F, eighth thoracic limb.

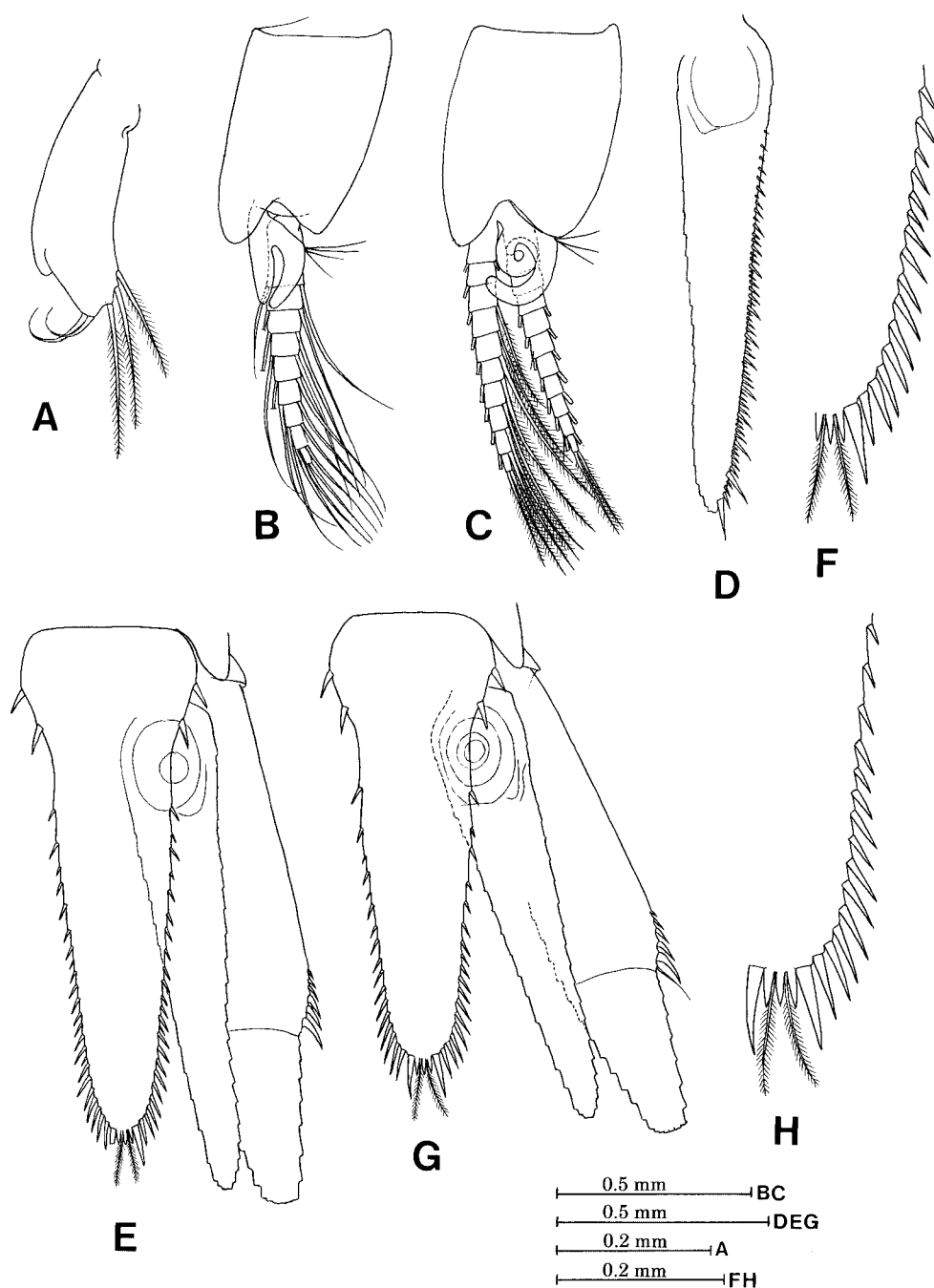


Fig. 24. *Siriella vulgaris* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 17756); A–F, adult male (7.1 mm); G, H, gravid female (6.7 mm). A, genital organ; B, first pleopod; C, fourth pleopod; D, uropodal endopod; E, uropod and telson; F, apex and right margin of telson; G, uropod and telson; H, apex and right margin of telson.

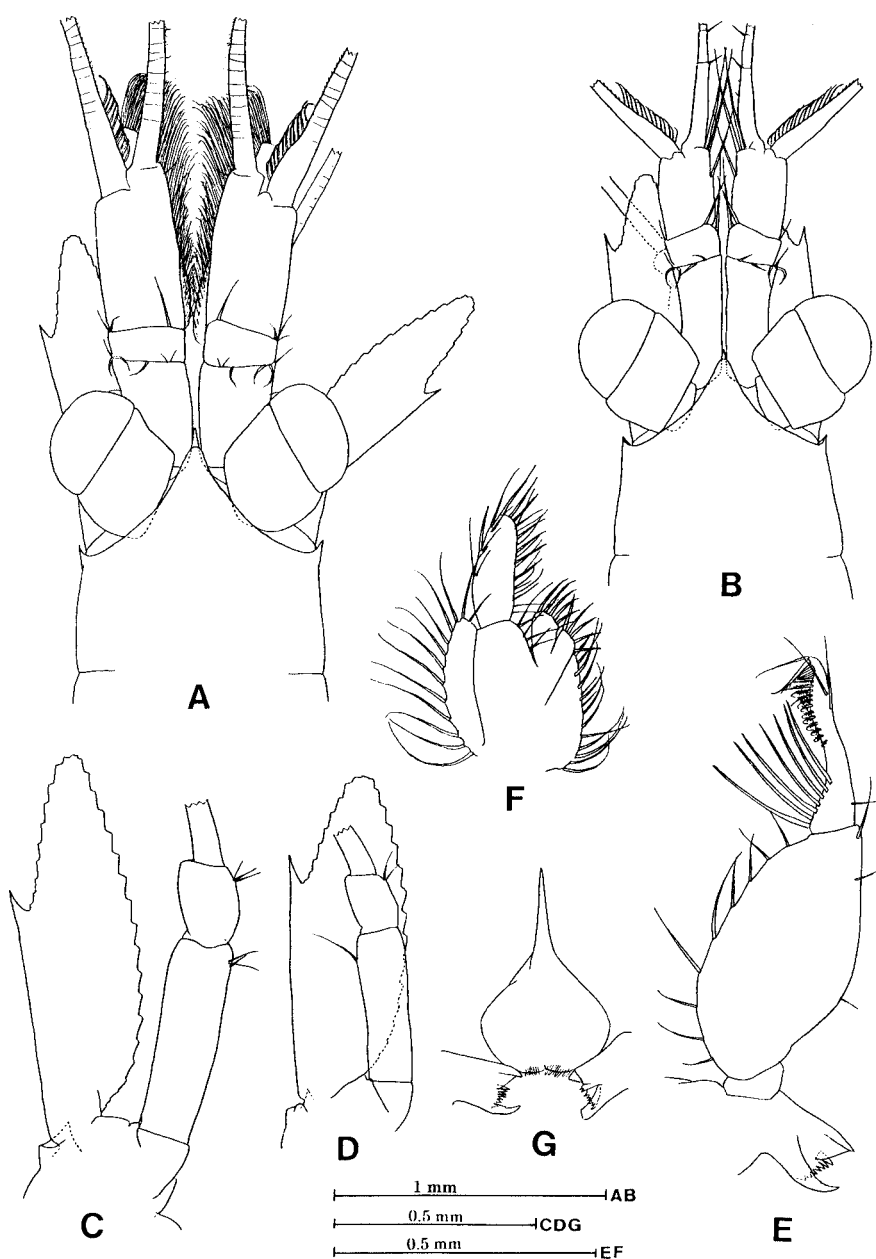


Fig. 25. *Siriella vulgaris* Hansen, 1910; from Ogasawara, Japan (NSMT-Cr 17740); A, C, E–G, adult male (7.5 mm); B, D, adult female (6.6 mm). A, B, anterior part of body; C, D, antenna; E, mandible and mandibular palp; F, maxilla; G, labrum and mandibles.

character, but a heedful observation should be needed in future. The genital organ of the male (Fig. 31D) is more slender than in allied species, nearly five times as long as broad, and armed with two curved setae on the apex and five short, feeble plumose setae on the distal 2/5 part of the anterior margin at almost regular intervals. Such a feature is rather rare in this subgroup, that is why it will be useful as a distinguishing point from allied species.

The number of spines on the proximal segment of the uropodal exopod in the cotype is four

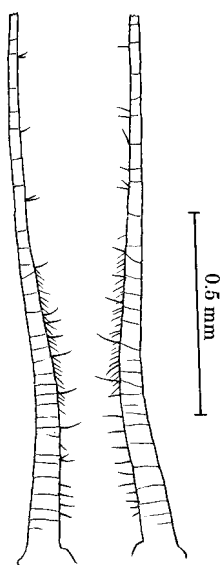


Fig. 26. *Siriella vulgaris* Hansen, 1910; from Ogasawara, Japan (NSMT-Cr 17740), adult male (7.3 mm). A pair of inner flagella of antennule.

in the gravid female and varies from three to seven ($n=4$, 4.5 in an average) in the adult male (Fig. 31E). The lateral spines of the telson (Fig. 31E, F) tend to arrange in series. Each series is composed of two to four graded spines increasing in length posteriorly.

Siriella affinis is distinguished from allied species by the rostrum showing a sexual dimorphism, the antennal scale with a short terminal lobe, the slender genital organ of the male, and the lateral spines of the telson with the tendency of falling into groups.

Distribution. Known from Indonesia (Hansen, 1910); the Philippines (Hansen, 1910; W. Tattersall, 1951); India (W. Tattersall, 1922; Shyamasundari, 1973); Micronesia (W. Tattersall, 1951; Murano, 1983) and the Great Barrier Reef (Carleton and Hamner, 1989). This species is a coastal form in the warm-water region of the Indo-West Pacific.

31. *Siriella watasei* Nakazawa, 1910

Siriella watasei Nakazawa, 1910: 256–257, pl. 8, figs. 8, 36; W. Tattersall, 1921: 407; Gordan, 1957: 381 [catalogue]; Ii, 1964a: 112–113; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 57 [catalogue].

Type locality. Sagami Bay, central Japan.

No specimen in the present study.

Remarks. Location of the Nakazawa's type specimens of this species is unknown.

Nakazawa (1910) established *S. watasei* based on specimens collected from the vicinity of the Misaki Marine Laboratory (now, Misaki Marine Biological Station) of the University of Tokyo in Misaki, Kanagawa, Japan. After that, W. Tattersall (1921) recorded this species from Tateyama, located at the mouth of Tokyo Bay. Ii obtained specimens in close resemblance to *S. watasei* from its type locality, but he (1964a) reported them as a variety of this species, *S. watasei* var. *macropsis*, because his specimens differ from Nakazawa's type in some points. In the present collections, no specimens which agreed exactly with the description of Nakazawa (1910) were also collected.

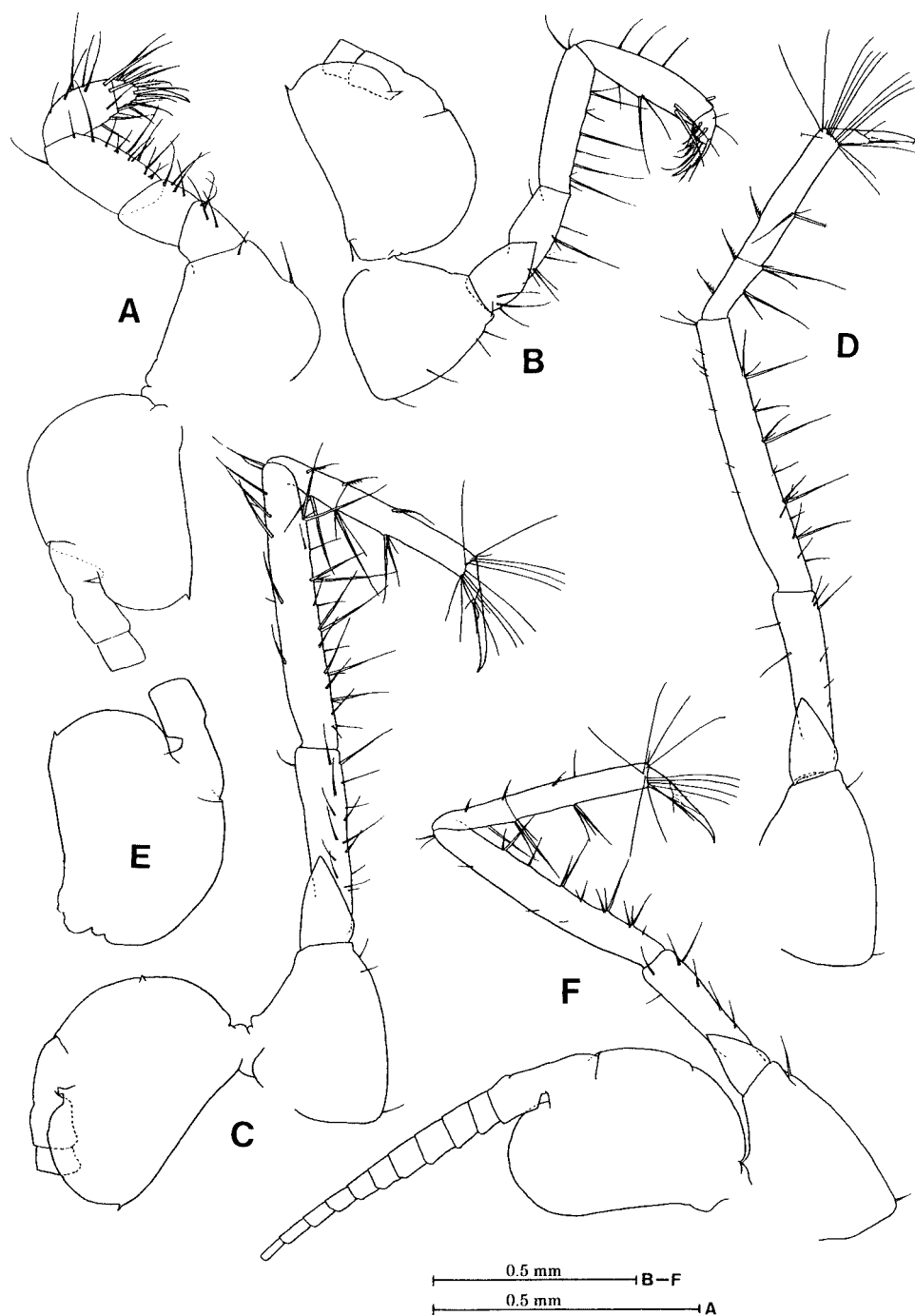


Fig. 27. *Siriella vulgaris* Hansen, 1910; from Ogasawara, Japan (NSMT-Cr 17740), adult male (7.5 mm). A, first thoracic limb; B, second thoracic limb; C, third thoracic limb; D, endopod of fifth thoracic limb; E, basal plate of fifth thoracic limb; F, seventh thoracic limb.

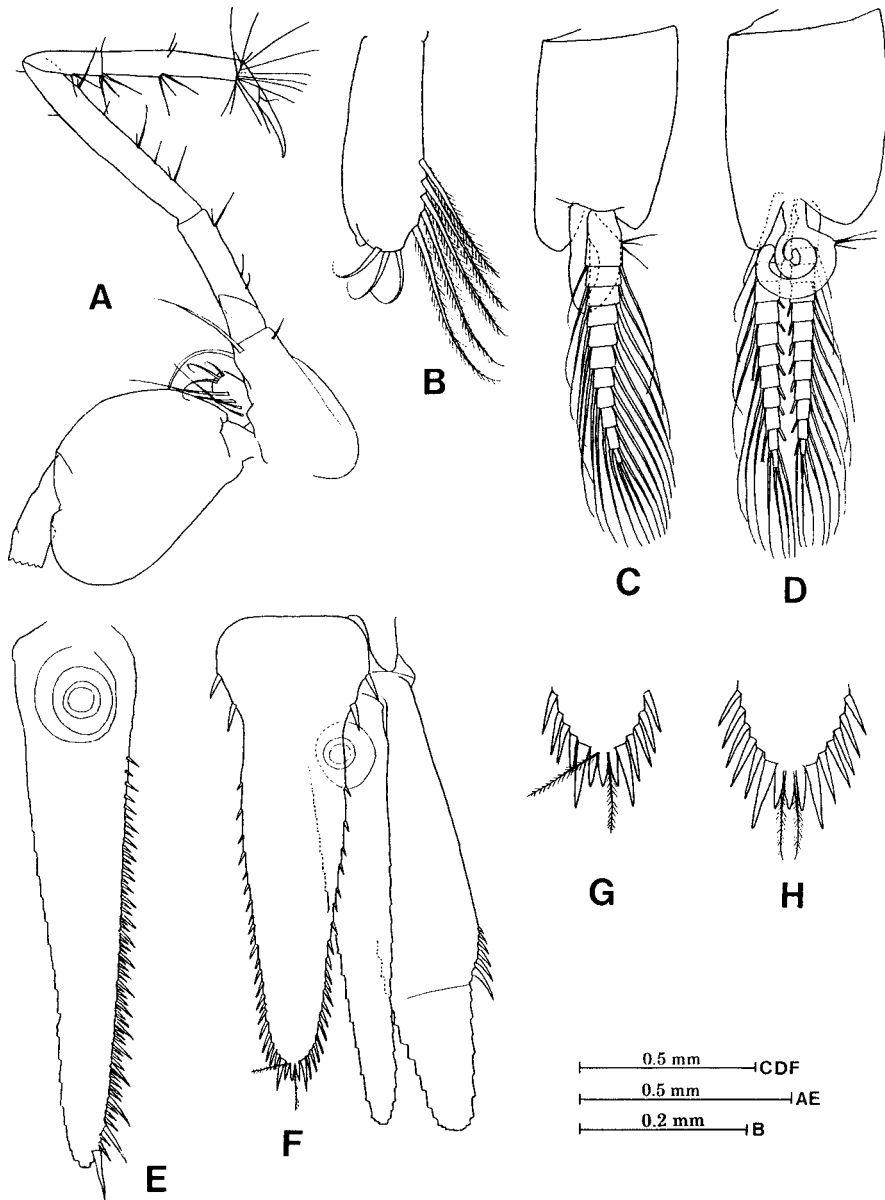


Fig. 28. *Siriella vulgaris* Hansen, 1910; from Ogasawara, Japan (NSMT-Cr 17740); A–G, adult male (7.5 mm); H, adult female (6.6 mm). A, eighth thoracic limb; B, genital organ; C, first pleopod; D, fourth pleopod; E, uropodal endopod; F, uropod and telson; G, H, posterior part of telson.

Siriella watasei has following characters: (1) the carapace with an acute rostrum; (2) the eyes large and globose; (3) the inner flagellum of the male antennule dilated in its basal part; (4) the antennal scale about four times as long as broad; (5) the endopod of the eighth thoracic limb much shorter than preceding five ones; (6) the telson shorter than three times as long as broad at base; (7) the lateral margin of the telson anterior to the constriction with three spines; (8) the outer margin of the proximal segment of the uropodal exopod provided with nine to twelve spines, occupying about distal 2/5 of that margin.

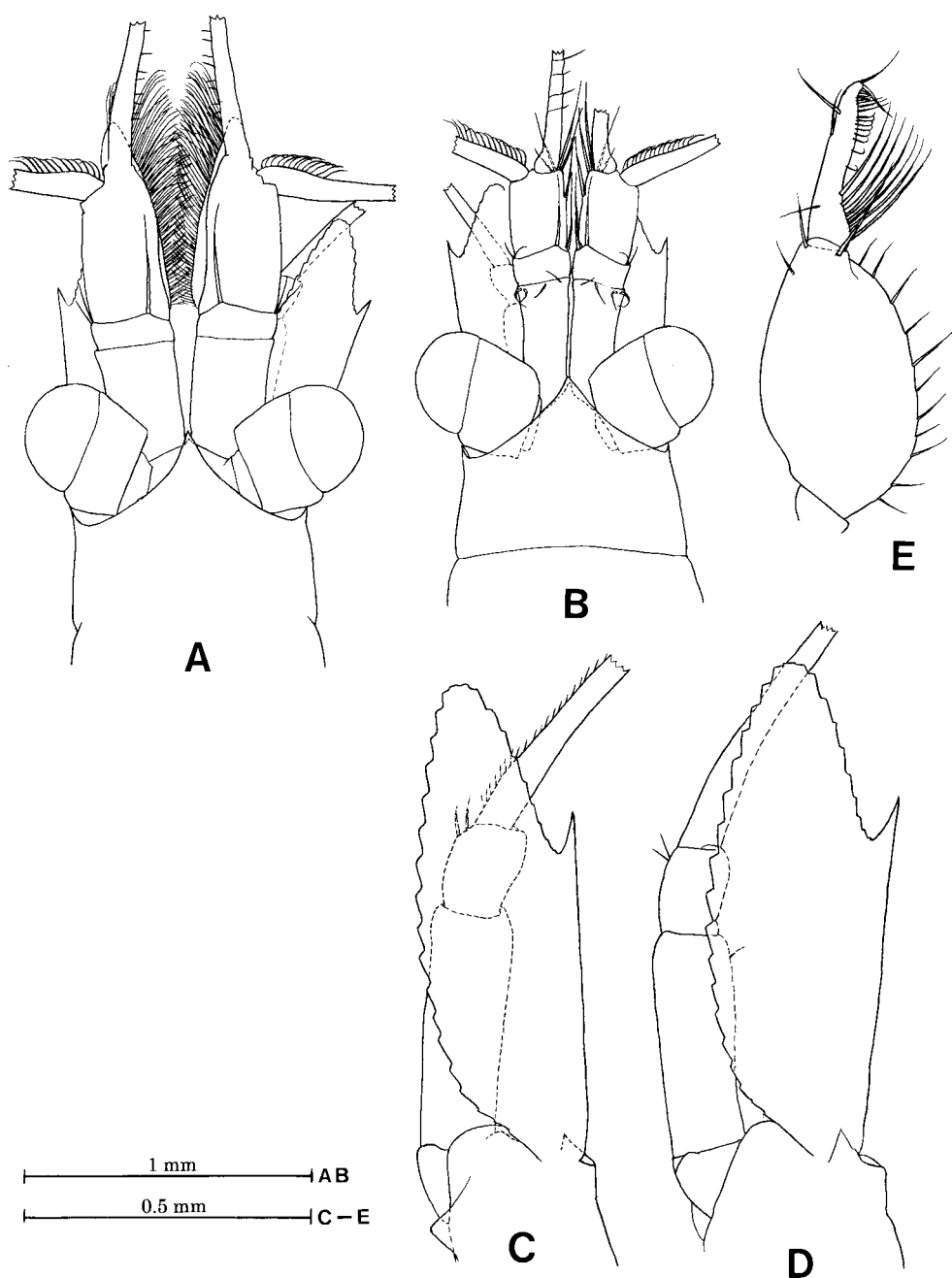


Fig. 29. *Siriella vulgaris* Hansen, 1910; from Nomo, Kyushu, Japan (NSMT-Cr 14639); A, C, E, adult male (6.9 mm); B, D, adult female (7.0 mm). A, B, anterior part of body; C, D, antenna; E, mandibular palp.

Distribution. Known only from the coastal waters of Misaki, Odawara and Tateyama, central Japan (Nakazawa, 1910; W. Tattersall, 1921).

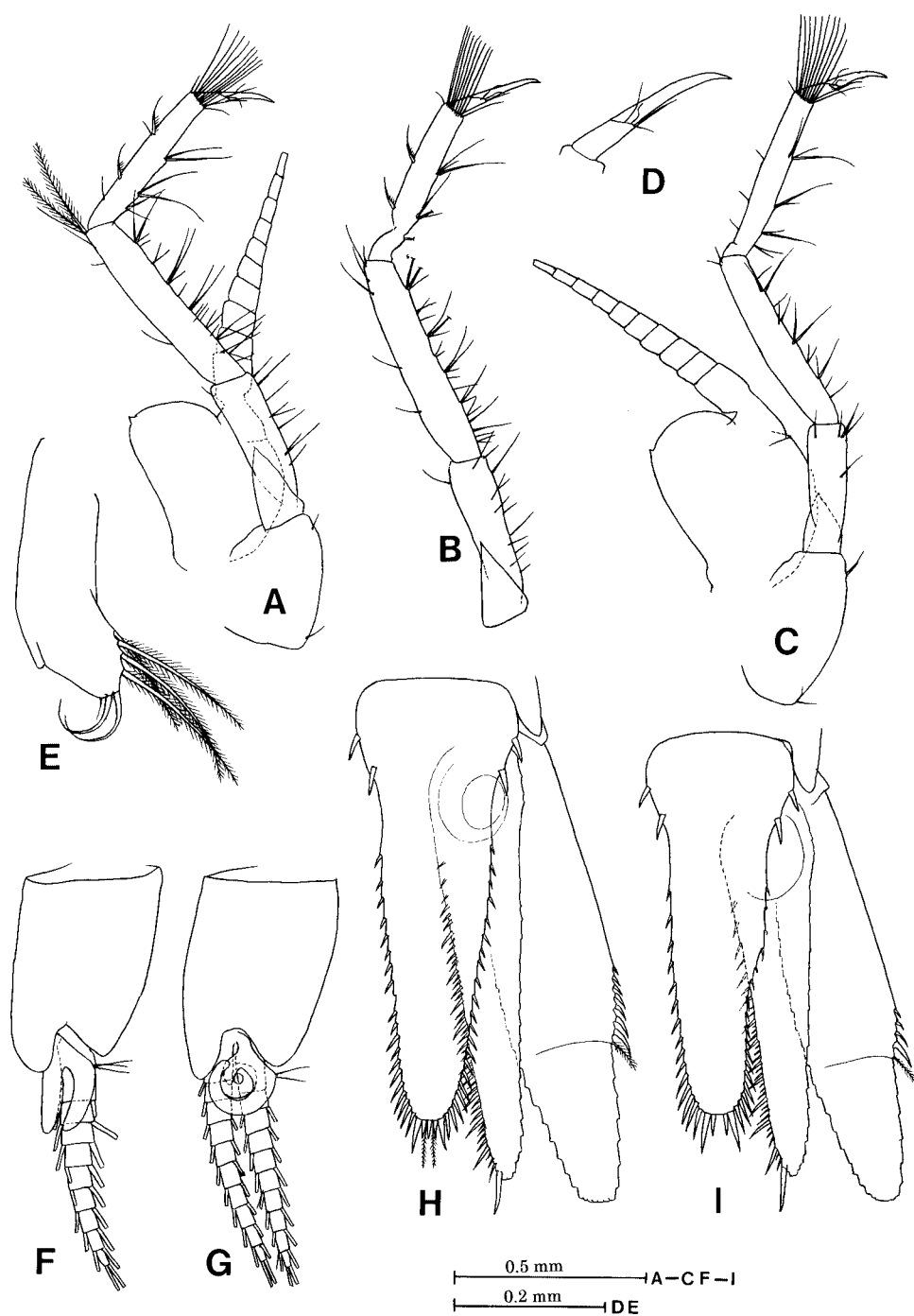


Fig. 30. *Siriella vulgaris* Hansen, 1910; from Nomo, Kyushu, Japan (NSMT-Cr 14639); A-H, adult male (6.9 mm); I, adult female (7.0 mm). A, third thoracic limb; B, endopod of fourth thoracic limb; C, seventh thoracic limb; D, extremity of endopod of seventh thoracic limb; E, genital organ; F, first pleopod; G, fourth pleopod; H, I, uropod and telson.

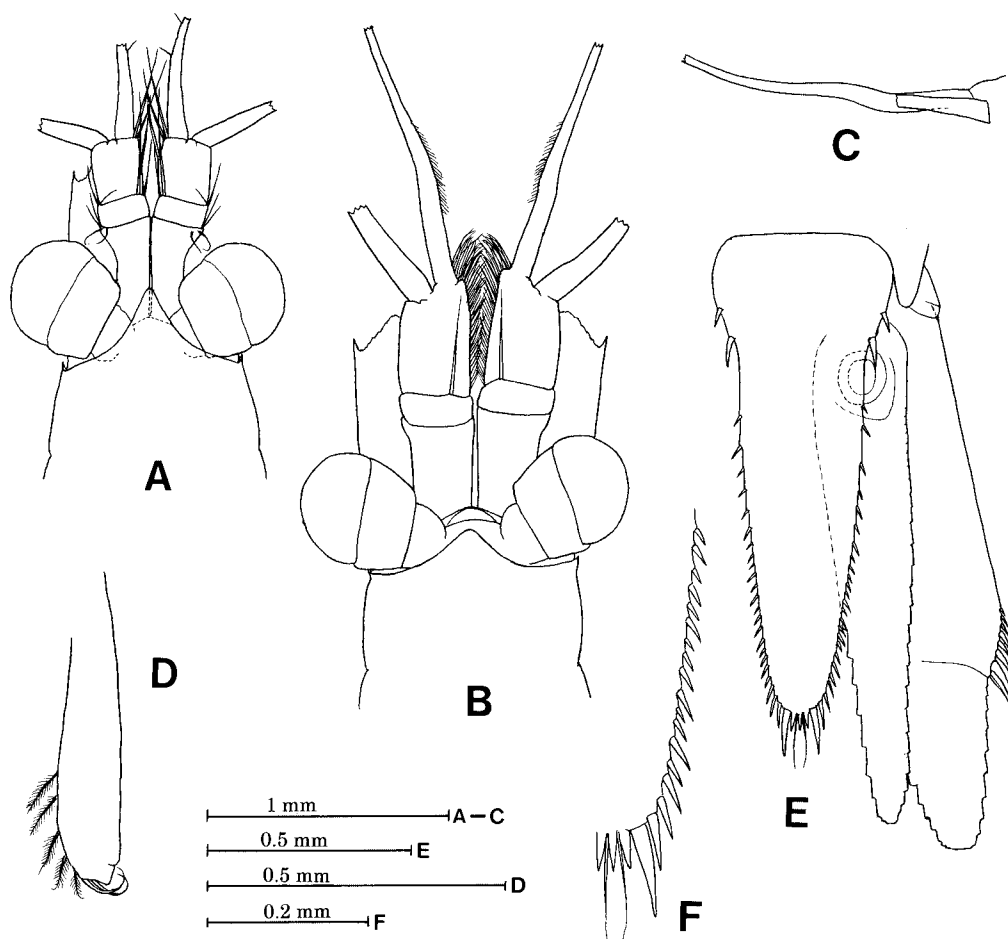


Fig. 31. *Siriella affinis* Hansen, 1910; cotype (ZMUC CRU-5191); A, gravid female (6.2 mm); B, C, adult male (6.6 mm); D–F, adult male (7.3 mm). A, B, anterior part of body; C, inner flagellum of antennule in lateral view; D, genital organ; E, uropod and telson; F, apex and right margin of telson.

32. *Siriella longipes* Nakazawa, 1910

Siriella longipes Nakazawa, 1910: 257–258, pl. 8, fig. 19; Gordan, 1957: 380 [catalogue]; Ii, 1964a: 119–123, fig. 32; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 50 [catalogue].

Type locality. Sagami Bay near Misaki, Miura Peninsula, central Japan.

Material examined. [Mainland of Japan] One adult male, 1 immature female and 1 juvenile (NSMT-Cr 16361), Port Kushimoto, Wakayama, 18 August 1970, hand net under electric light, coll. M. Murano. Abundant males (up to 11.2 mm) and females (up to 12.0 mm) (NSMT-Cr 16355), Nijijima Is., Izu Islands, May 1973, seagrass bed, 2 m, coll. M. Muto. Two immature males (9.0 mm) and 18 immature females (NSMT-Cr 16357), Heda Inlet, Suruga Bay, 23 June 1973, surface tow with plankton net at night, coll. T. Ishimaru. Seven adult males (up to 8.5 mm), 3 adult females (8.7–11.4 mm), 2 immature males, 3 immature females and 20 juveniles (NSMT-Cr 16360), off Mera, Izu Peninsula, 25 July 1973, hand net under electric light, coll. M. Murano. Abundant males (up to 12.6 mm) and females (up to 12.7 mm) (NSMT-Cr 16354), Uchiura Bay, Boso Peninsula, 29 April 1975, coll. M. Murano. Two immature males and 3 immature females

(NSMT-Cr 16358), Nomo, Nagasaki, 7 May 1975, 3 m, above sandy bottom, coll. S. Inoue and T. Takita. Abundant immature males (up to 9.3 mm) and females (up to 8.9 mm) (NSMT-Cr 16356), Tateyama Bay, Boso Peninsula, 19 June 1978. One adult female, 2 immature males, 3 immature females and 2 juveniles (NSMT-Cr 16359), Tateyama Bay, Boso Peninsula, 19 June 1978. Seven adult males (up to 14 mm), 6 gravid females (up to 13.3 mm), 2 adult females, 2 immature males and 2 immature females (NSMT-Cr 16364), mouth of Tsuno River, Miyazaki, Kyushu, 27 March 1987, 3 m, coll. Ito. One adult female (NSMT-Cr 16363), Japan Sea off Shimane, 12 September 1996, trawl, coll. K. Sota. One male and 1 adult female (NSMT-Cr 16353), Japan Sea off Tottori, date unknown.

Body length. Male, up to 14 mm; female, up to 13.3 mm.

Remarks. Location of Nakazawa's type specimen of this species is unknown.

Siriella longipes is characterized by: (1) the endopod of the middle pairs of the third to eighth thoracic limbs considerably longer than those of the anterior and posterior pairs; (2) the eyes somewhat elongated; (3) the inner margin of the uropodal endopod armed with spines showing the alternate arrangement of one longer and several shorter ones; (4) the telson three times as long as broad; (5) the lateral margin of the telson armed with four pairs of spines on the proximal widened part; (6) a distal series of spines on the lateral margin of the telson showing the tendency of falling into groups.

By reason of the character of the thoracic limbs and the telson, this species is related to the *Trispina*-subgroup, but distinguished from it by the spine arrangement on the inner margin of the uropodal endopod.

Distribution. Known only from the coastal waters of the mainland of Japan (Nakazawa, 1910; Ii, 1964a; present study).

33. *Siriella australis* W. Tattersall, 1927

Siriella australis W. Tattersall, 1927b: 242–245, figs. 98, 99; 1940: 327–328; Gordan, 1957: 378 [catalogue]; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 42 [catalogue]; Keable *et al.*, 2003: 466 [catalogue].

Type locality. Gulf St. Vincent, South Australia.

No specimen in the present study.

Remarks. *Siriella australis* is characterized by: (1) the stouter eyes; (2) the endopod of the third to eighth thoracic limbs with a short and stout terminal claw; (3) the carpopropodus of the endopod of the third thoracic limb with the distal subsegment 1.5 times longer than the proximal one; (4) the proximal segment of the uropodal exopod with four to six graded spines at its distal end of the outer margin; (5) the telson 2.5 times as long as broad at the base and armed with three pairs of long, subequal spines on the posterior margin.

O. Tattersall (1952) identified doubtfully an immature male taken from Richard's Bay of Natal, South Africa, with *S. australis*, but her specimen seems to be different from that species by the antennal scale with a short terminal lobe, both rami of the uropod being nearly same in length, and the middle region of the lateral margin of the telson armed with spines of falling into groups.

Distribution. Known from Gulf St. Vincent and Kangaroo Island, South Australia, and Port Hacking, New South Wales, Australia (W. Tattersall, 1927b, 1940).

34. *Siriella longidactyla* W. Tattersall, 1940

Siriella longidactyla W. Tattersall, 1940: 328–330, fig. 1a–d; Gordan, 1957: 380 [catalogue]; Mauchline and Murano,

1977: 76 [catalogue]; Müller, 1993: 50 [catalogue]; Keable *et al.*, 2003: 467 [catalogue].

Type locality. Port Stephens, New South Wales, Australia.

No specimen in the present study.

Remarks. *Siriella longidactyla* is characterized by: (1) the endopod of the third to eighth thoracic limbs very slender and terminating in a long and slender claw; (2) the genital organ of the male with a pointed apex; (3) the outer margin of the proximal segment of the uropodal exopod armed with 12 spines occupying rather more than half the margin; (4) the telson with several pairs of the distal spines distinctly barbed.

Distribution. Known only from the type locality (W. Tattersall, 1940).

35. *Siriella quilonensis* Pillai, 1961

Siriella quilonensis Pillai, 1961: 16–17, pl. 1, figs. A–G; 1965: 1691, fig. 13; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 53 [catalogue].

Type locality. Off Kerala, India.

No specimen in the present study.

Remarks. Pillai (1961) mentioned the specific characters of *S. quilonensis* as follows: (1) the rostrum slightly more produced in the female; (2) the antennal scale with a short terminal lobe; (3) the telson armed with three pairs of long subequal spines on the posterior margin; (4) the distal series of the lateral spines of the telson showing a tendency of falling into series.

Distribution. Known only from the type locality (Pillai, 1961).

36. *Siriella pondoensis* O. Tattersall, 1962

Siriella pondoensis O. Tattersall, 1962: 225–229, figs. 1–9; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 53 [catalogue].

Type locality. 30°0.35'S 31°28'E, South Africa.

No specimen in the present study.

Remarks. *Siriella pondoensis* is distinguished from allied species by: (1) the relatively broader antennal scale; (2) the uropodal exopod with only two spines restricted to the distal end of the outer margin of the proximal segment; (3) the uropodal endopod longer than the exopod; (4) the telson nearly as long as the uropodal exopod and almost parallel-sided in the posterior 4/5 part.

Distribution. Known only from the type locality (O. Tattersall, 1962).

37. *Siriella wadai* Ii, 1964

(Figs. 32, 33)

Siriella wadai Ii, 1964a: 82–85, figs. 19, 20; Mauchline and Murano, 1977: 77 [catalogue]; Liu and Wang, 2000: 107–108, fig. 24; Keable *et al.*, 2003: 469 [catalogue].

Type locality. 11°30'S 135°00'E, Arafura Sea.

Material examined. [Northern Territory, Australia] Four adult males (6.5–8.0 mm), 1 gravid female (6.7 mm), 2 immature males, 1 immature female and 2 juveniles (NSMT-Cr 15685), anchorage at Port Darwin, 23 June 1972, hand net under electric light, coll. M. Murano. One gravid female (6.3 mm) (NTM Cr004185), 11°11.1'S 132°03.4'E, Coral Bay, Port Essington, Cobourg Peninsula, Stn. Cp93, 11 August 1986, 6–8 m, scuba, host hard coral, *Turbinaria* sp., coll. R. S.

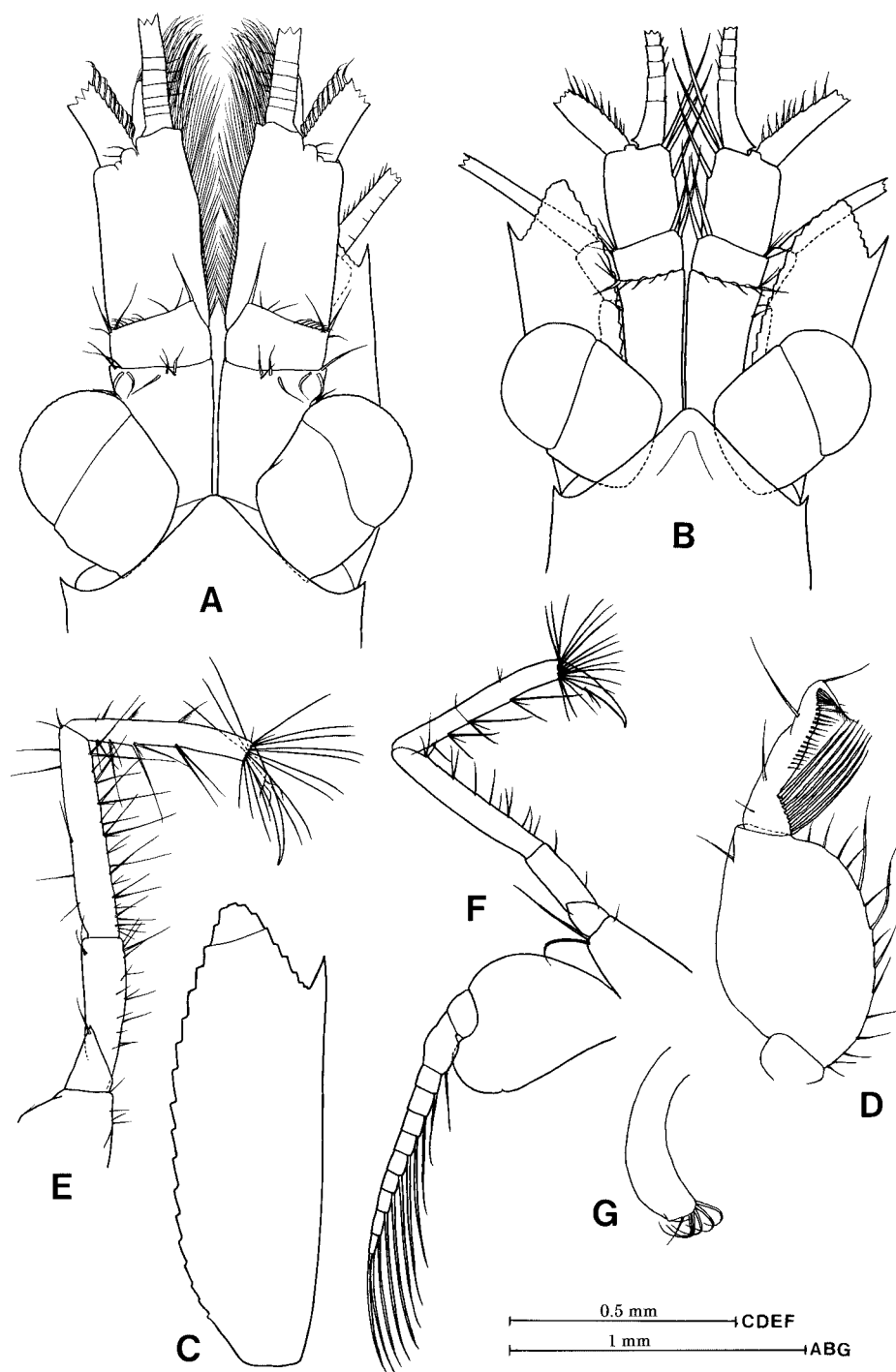


Fig. 32. *Siriella wadai* Li, 1964; from Port Darwin Harbor, Australia (NSMT-Cr 15685); A, C–G, adult male (8.0 mm); B, gravid female (6.7 mm). A, B, anterior part of body; C, antenna scale; D, mandibular palp; E, endopod of fifth thoracic limb; F, eighth thoracic limb; G, genital organ.

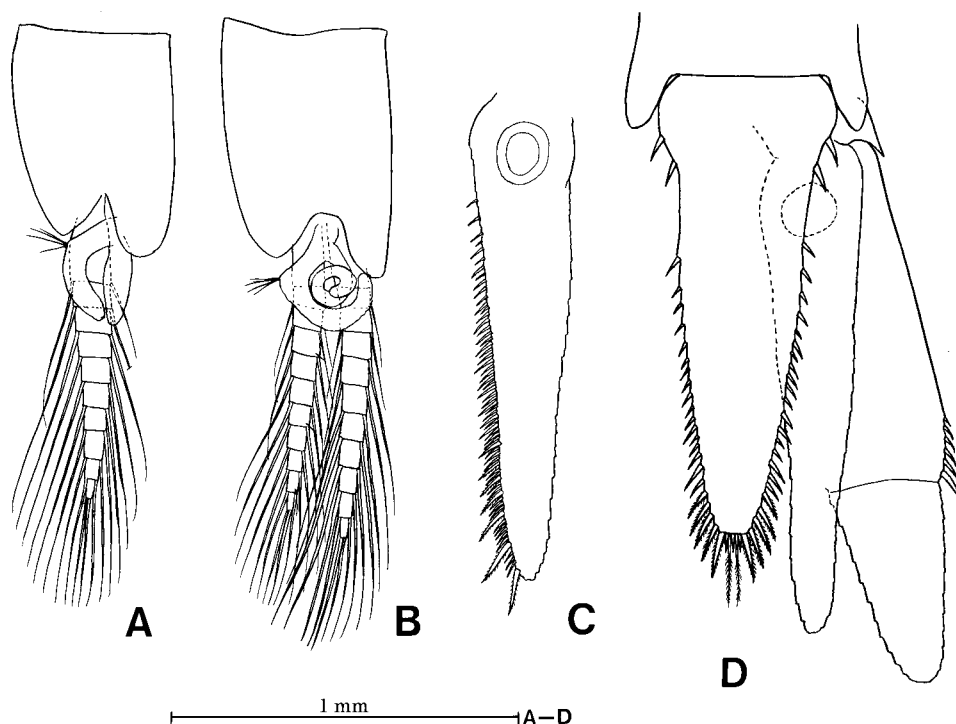


Fig. 33. *Siriella wadai* Ii, 1964; from Port Darwin Harbor, Australia (NSMT-Cr 15685), adult male (8.0 mm). A, first pleopod; B, fourth pleopod; C, uropodal endopod; D, uropod and telson.

Williams.

[Timor Sea] One immature male (NSMT-Cr 15686), 12°17.3'S 129°40.9'E to 12°17.2'S 129°41.8'E, 24 June 1972, 49–52 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano. One immature male (4.3 mm) (NSMT-Cr 15687), 12°24.8'S 128°00.1'E to 12°24.8'S 128°00.2'E, 25 June 1972, 115–115 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano. One immature female (5.2 mm) (NSMT-Cr 15688), 12°37.3'S 124°33.9'E to 12°36.0'S 124°36.4'E, 25–26 June 1972, 74–78 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Body length. Adult male, 6.5–8.0 mm; adult female, 6.3–6.7 mm.

Remarks. Location of Ii's type specimens of this species is unknown.

Ii (1964a) established *S. wadai* based on immature specimens collected from the Arafura Sea. The present specimens are identified as this species by: (1) the eyes somewhat longer than broad (Fig. 32A, B); (2) the antennal scale with a terminal lobe being 3/4 as long as broad (Fig. 32C); (3) the mandibular palp with a second segment exceptionally broadened (Fig. 32D); (4) the endopod of the third to eighth thoracic limbs with a long terminal claw (Fig. 32E, F); (5) posterior spines on the telson armed with secondary spinules (Fig. 33D). However, some differences, which are probably attributable to the state of growth, are recognized in the following points: (1) the antennal scale three times longer than broad (Fig. 32C) whereas 2.5 times longer in the type specimens, (2) the uropodal exopod provided with six spines in the distal part of the outer margin of the proximal segment (Fig. 33D) compared to three to five in the type specimens, (3) the telson 2.7 times as long as broad at the base and armed with 21 or 22 spines on the distal 2/3 of the lateral margin (Fig. 33D), while 2.5 times as long and with 12 or 13 spines in the type specimens.

Adult males are first described as follows. Second segment of mandibular palp (Fig. 32D) exceptionally broadened, with about 15 setae at regular intervals on outer margin; third segment 2/3 as long as second, proximal part broadened, armed with 8 long setae instead of 2 in female. Genital organ (Fig. 32G) slender, curved anteriorly, armed on apex with 5 naked, well-curved setae and one naked, straight seta; anterior and posterior margins naked. First pleopod (Fig. 33A); exopod 10-segmented, endopod wanting. Both rami of fourth pleopod (Fig. 33B) 11-segmented; endopod longer than exopod, outer setae on distal 5 or 6 segments longer and thicker than inner ones; exopod with short naked seta on fourth, seventh and tenth segments. Pseudobranchial rami (Fig. 33A, B) nearly straight in first and fifth limbs and spirally coiled in second to fourth limbs.

Spines on the posterior part of the telson are armed with so minute spinules that they are barely perceptible in careful microscopic observation at a high magnification ($\times 200$). In an adult female from the Port Darwin, the spinules were hardly found, while in the immature specimen (less than 4.9 mm in body length) from the same locality, these were rather easily observed.

Distribution. This species has previously been collected from the Arafura Sea (Ii, 1964a) and the South China Sea (Liu and Wang, 2000). The present specimens were collected during anchorage at Port Darwin and in the Timor Sea, both are the neighboring sea area of the type locality.

38. *Siriella sinensis* Ii, 1964

(Fig. 34)

Siriella sinensis Ii, 1964a: 96–99, fig. 23; Mauchline and Murano, 1977: 77 [catalogue]; Cai, 1980: 40–41, pl. 2, figs. 1–9; Müller, 1993: 54 [catalogue]; Wang and Liu, 1997: 202–203; Liu and Wang, 2000: 105–106, fig. 22.

Type locality. 32°16'N 126°04'E, East China Sea.

Material examined. [East China Sea] One gravid female (8.7 mm) and 3 immature females (in bad condition, less than 4.8 mm) (NSMT-Cr 17771), 31°36.9'N 127°06.5'E to 31°38.5'N 127°08.8'E, 6 August 1974, 11:16–12:23, 110–110 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Remarks. The present gravid female is identified with *S. sinensis* by: (1) the long rostrum with a pointed apex (Fig. 34A); (2) the antennal scale three times as long as broad and its terminal lobe slightly broader than long (Fig. 34B); (3) the endopod of the fourth thoracic limb with the carpopropodus as long as the carpus (Fig. 34D); (4) the telson three times longer than broad and armed on the lateral margin with a distal series of about 30 spines showing a tendency of falling into series (Fig. 34E, F).

Distribution. Known from the west coast of Kyushu, Japan (Ii, 1964a), the East China Sea (Ii, 1964a; Cai, 1980; Wang and Liu, 1997; present study), the South China Sea (Liu and Wang, 2000) and the Yellow Sea (Liu and Wang, 2000).

39. *Siriella okadai* Ii, 1964

(Figs. 35–38)

Siriella okadai Ii, 1964a: 99–102, fig. 24; Mauchline and Murano, 1977: 77 [catalogue]; Jo *et al.*, 1998: 45–46, fig. 12; Müller, 2003: 52 [catalogue]; Liu and Wang, 2000: 104–105, fig. 21.

Type locality. Sagami Bay off Hashima, central Japan.

Material examined. [Mainland of Japan] Syntype (NSMT-Cr 17744) (Ii's Coll. No. 289a), abundant males and females, Sagami Bay off Hashima Is. Shizuoka, 1 October 1938, coll. O. Tanaka. Ten adult males (up to 6.4 mm), 11 adult females (up to 6.0 mm), 12 immature males, 17

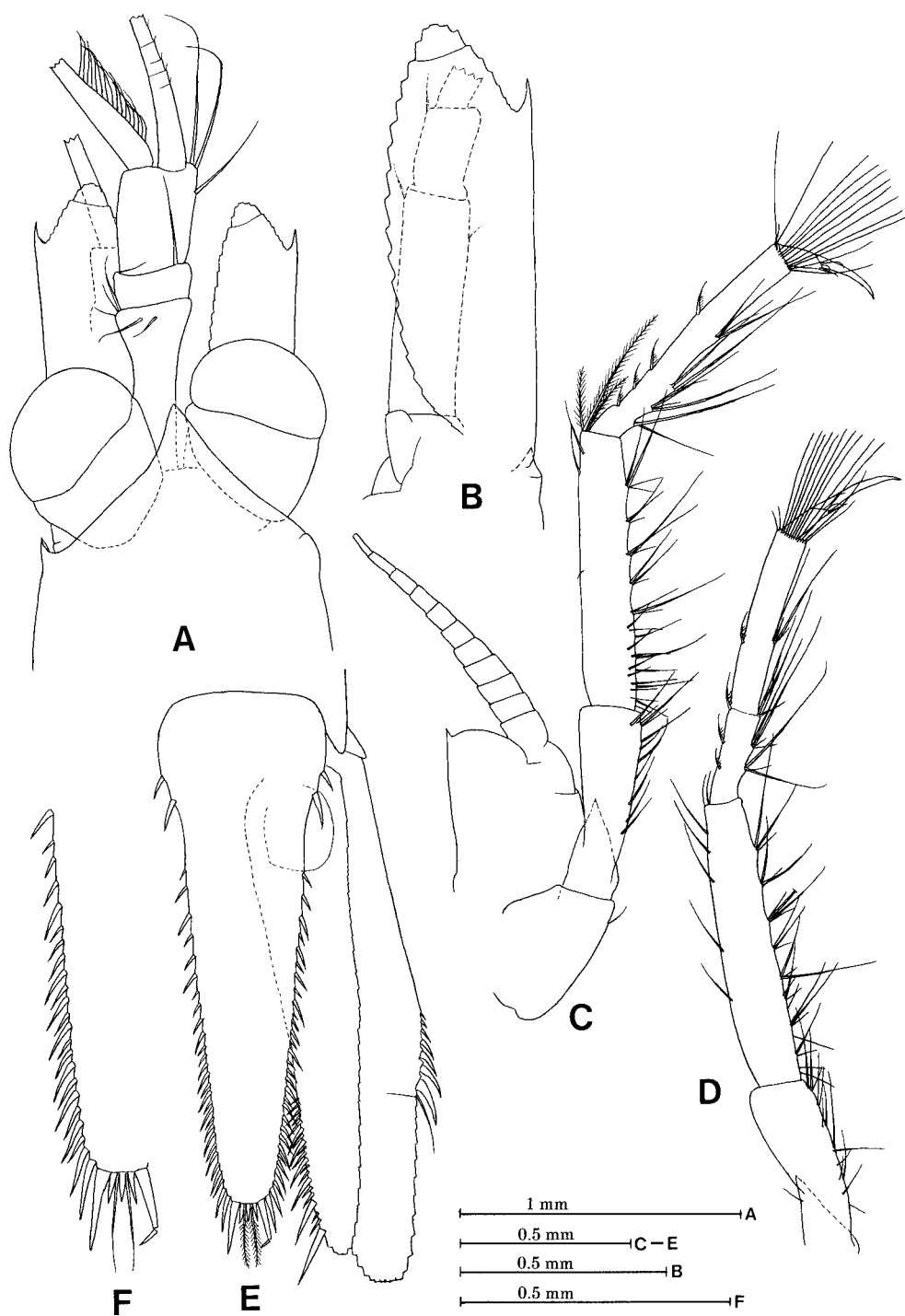


Fig. 34. *Siriella sinensis* Li, 1964; from East China Sea (NSMT-Cr 17771), gravid female (8.7 mm). A, anterior part of body; B, antenna; C, third thoracic limb; D, endopod of fourth thoracic limb; E, uropod and telson; F, apex and left margin of telson.

immature females and 21 juveniles (NSMT-Cr 14641), Suruga Bay off Mera, Izu Peninsula, 25 July 1973, hand net under electric light, coll. M. Murano. One adult male (6.9 mm) and 3 gravid females (5.2, 5.3 mm) (NSMT-Cr 14640), Nomo, Nagasaki, 11 August 1975, coll. S. Inoue and T. Takita.

[Ogasawara, Japan] Six adult males (6.6–7.4 mm), 10 immature males (up to 6.5 mm) and 8 juveniles (NSMT-Cr 17745), Futami Harbor, Chichijima Is., 16 June 1995, hand net under electric light, coll. K. Fukuoka. One adult male (6.5 mm), 1 gravid female (4.6 mm), 1 adult female (5.1 mm) and 4 immature females (up to 4.6 mm) (NSMT-Cr 17746), Miyanohama Beach, Chichijima Is., 26–27 June 2003, light trap at 2–3 m deep, sandy bottom, coll. K. Fukuoka. Ten adult males (6.8–7.7 mm) and 3 immature males (NSMT-Cr 17747), Futami Harbor, Chichijima Is., 27 June 2003, 20:49–21:00, 2–3 m, hand net under electric light, coll. K. Fukuoka.

Body length. Adult male, 6.4–7.7 mm; adult female, 4.6–7.5 mm.

Remarks. We had an opportunity of examining Ii's type specimens of *S. okadai* (Ii's Coll. No. 289a). His syntype specimens are somewhat different from the description and illustrations of Ii (1964a) in some important characters, especially in the posterior armature of the telson of the female and in the inner antennular flagellum of the male. In the observation of about fifty specimens of adult males, the posterior armature of the telson (Fig. 35E, G) agrees with his description and illustration (Ii's fig. 24I), while in thirty gravid females and five immature females with half-grown marsupium, a pair of long spines on the posterior margin of the telson (Fig. 35H–K) varies in length as compared with a pair of ultimate spines on the lateral margin. In many specimens the posterior long spines extend to or near the same level as the ultimate lateral spine (Fig. 35I–K). In some specimens, though it is rare, the spine arrangement is similar to that of the male (Fig. 35H). There are no female specimens having the ultimate lateral spine distinctly longer than the posterior long spines, as shown in Ii's figure (1964a, fig. 24J). The modification observed in the inner flagellum of the male antennule (Fig. 35A) is more indistinct than shown in Ii's fig. 24B, and in some specimens the modification is so slight that it is hardly detected.

A male specimen from Nomo, Kyushu, is provided with the inner antennular flagellum meandering more distinctly, and with the telson furnished with the ultimate lateral spine longer than posterior long spines (Fig. 35L). In the female, the spine arrangement of the posterior part of the telson (Fig. 35M) is similar to that illustrated by Ii.

Specimens collected from Ogasawara are allied to the description and illustrations by Ii (1964a) in general, but slightly different in the inner flagellum of the male antennule. According to Ii (1964a), the inner flagellum is slightly swollen near the base, while in Ogasawara specimens, it is not swollen (Fig. 37A), and the meandering is more distinct in Ogasawara specimens (Fig. 37A) than the type specimens in noticed present observation (Fig. 35A).

In Ogasawara specimens, an intraspecific variation in the spine arrangement on the posterior margin of the female telson is also observed. Three median spines on the posterior margin are generally shorter than longer spines flanking them, as shown in Fig. 38E, but in a few specimens the median three spines are nearly equal in length to the longer spines on the posterior margin, as if there are five median spines (Fig. 38F). In an immature male (6.3 mm in body length), the telson is showing a spine arrangement as seen in females (Fig. 37H).

Main distinguishing points of *S. okadai* from allied species are in the third to eighth thoracic limbs with the endopods terminating in a short and robust claw (Fig. 36C–F), in addition to the meandering in the inner flagellum of the male antennule and the apical armature of the telson showing sexual dimorphism.

Distribution. Known from the mainland of Japan (Ii, 1964a; present study), Ogasawara Is-

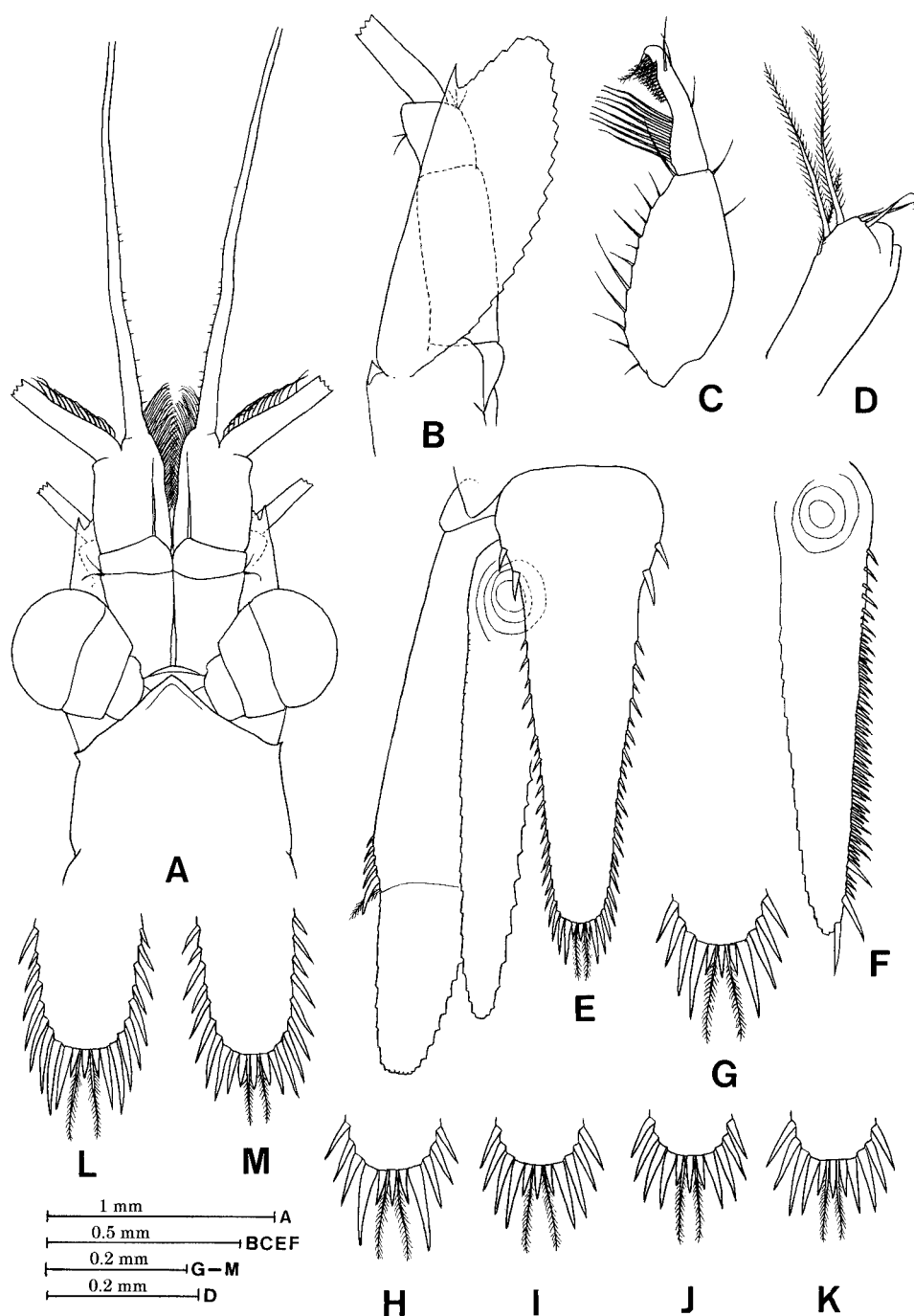


Fig. 35. *Siriella okadai* Ii, 1964; A–K, syntype (NSMT-Cr 17744) (Ii's Coll. No. 289a); A–F, adult male (7.8 mm); G, adult male (7.4 mm); H–K, adult females (6.8, 6.3, 6.0, 6.2 mm, respectively). L, M, from Nomo (NSMT-Cr 14640); L, adult male (6.9 mm); M, adult female (5.2 mm). A, anterior part of body; B, antenna; C, mandibular palp; D, genital organ; E, uropod and telson; F, uropodal endopod; G–M, posterior part of telson.

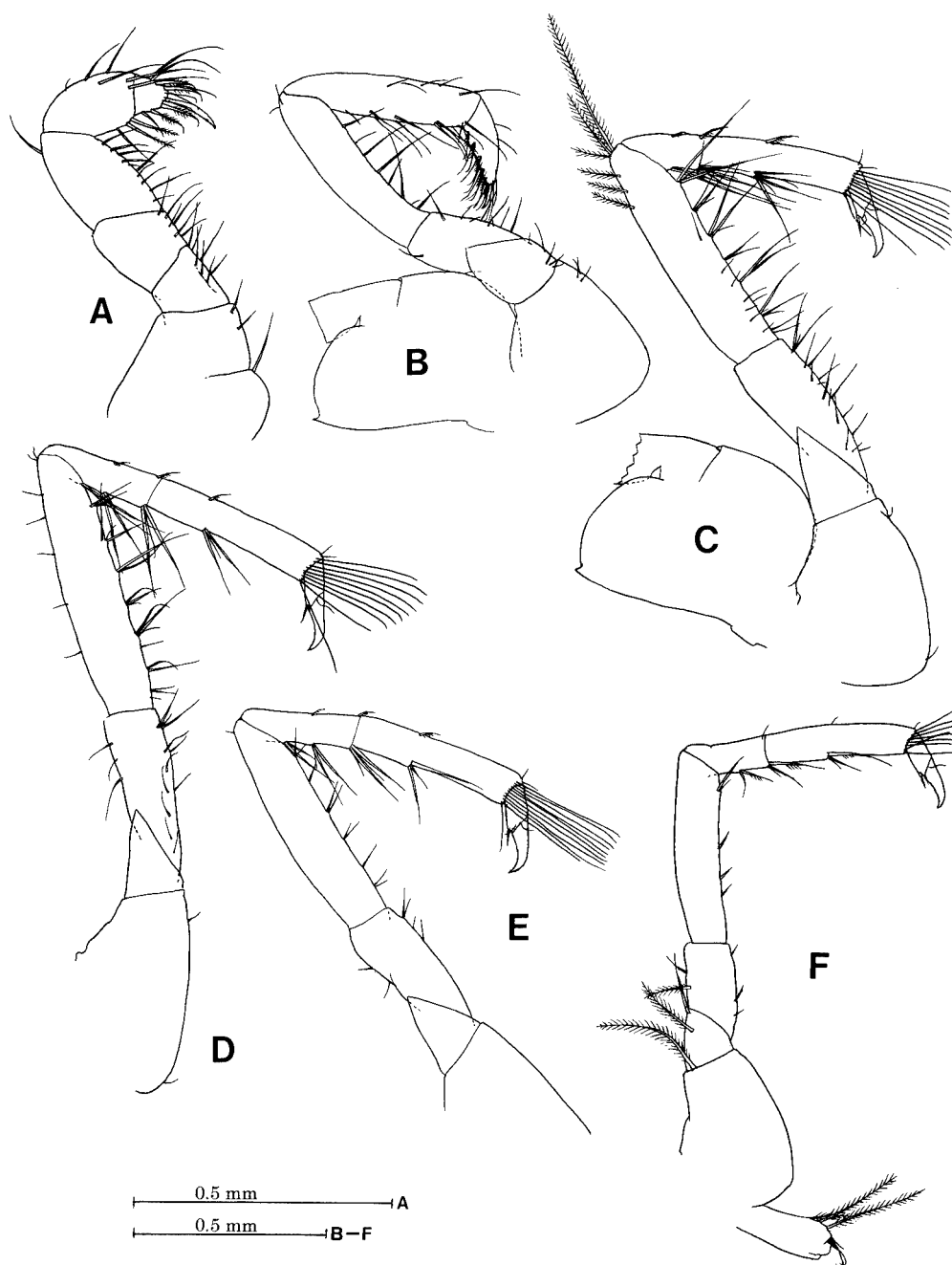


Fig. 36. *Siriella okadai* Li, 1964; syntype (NSMT-Cr 17744) (Li's Coll. No. 289a), male (7.8 mm). A, endopod of first thoracic limb; B, second thoracic limb; C, third thoracic limb; D, endopod of fifth thoracic limb; E, endopod of eighth thoracic limb with genital organ; F, endopod of eighth thoracic limb with genital organ.

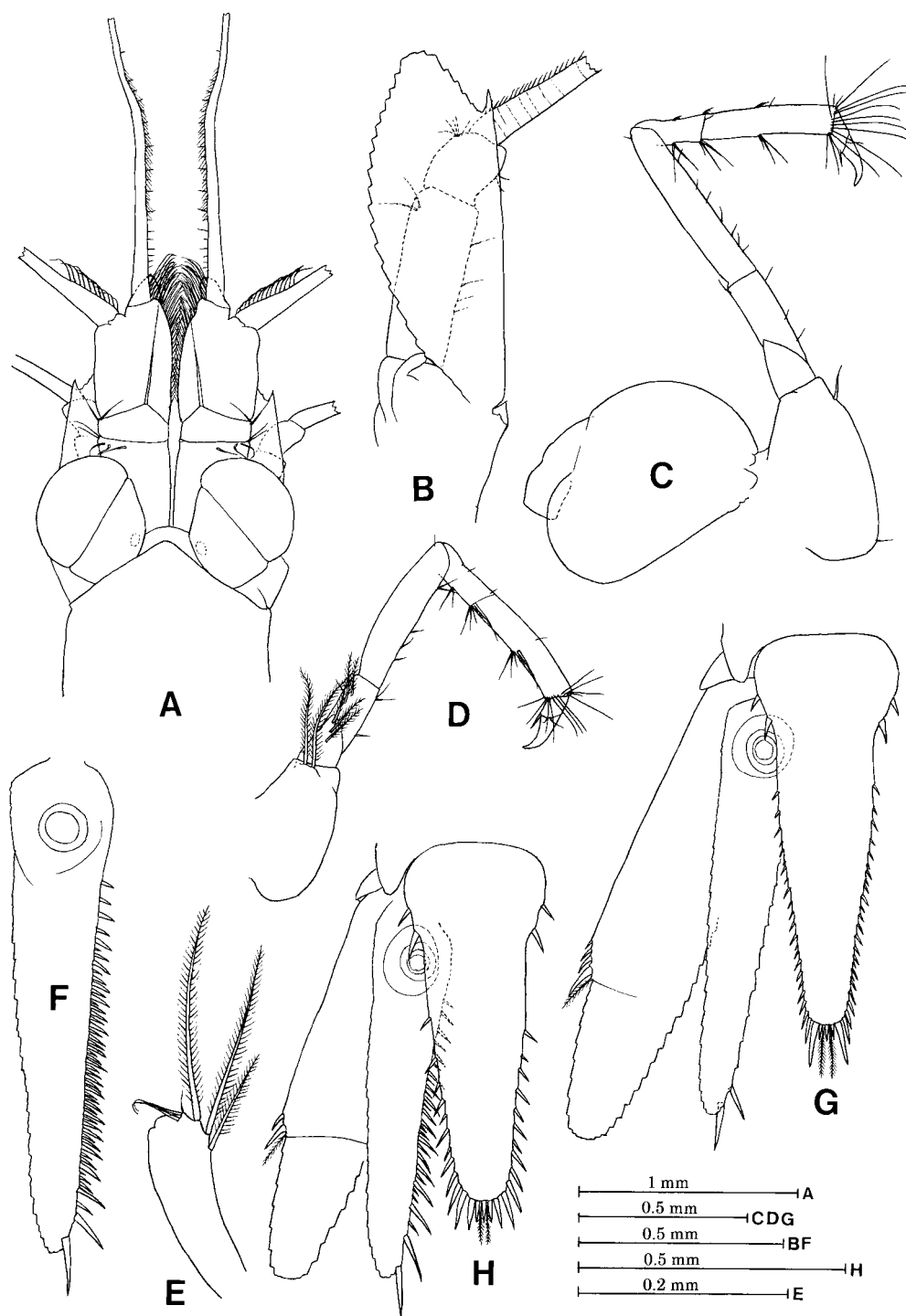


Fig. 37. *Siriella okadai* Ii, 1964; from Ogasawara, Japan (NSMT-Cr 17745); A–G, adult male (7.4 mm); H, immature male (6.3 mm). A, anterior part of body; B antenna; C, seventh thoracic limb; D, endopod of eighth thoracic limb; E, genital organ; F, uropodal endopod; G, H, uropod and telson.

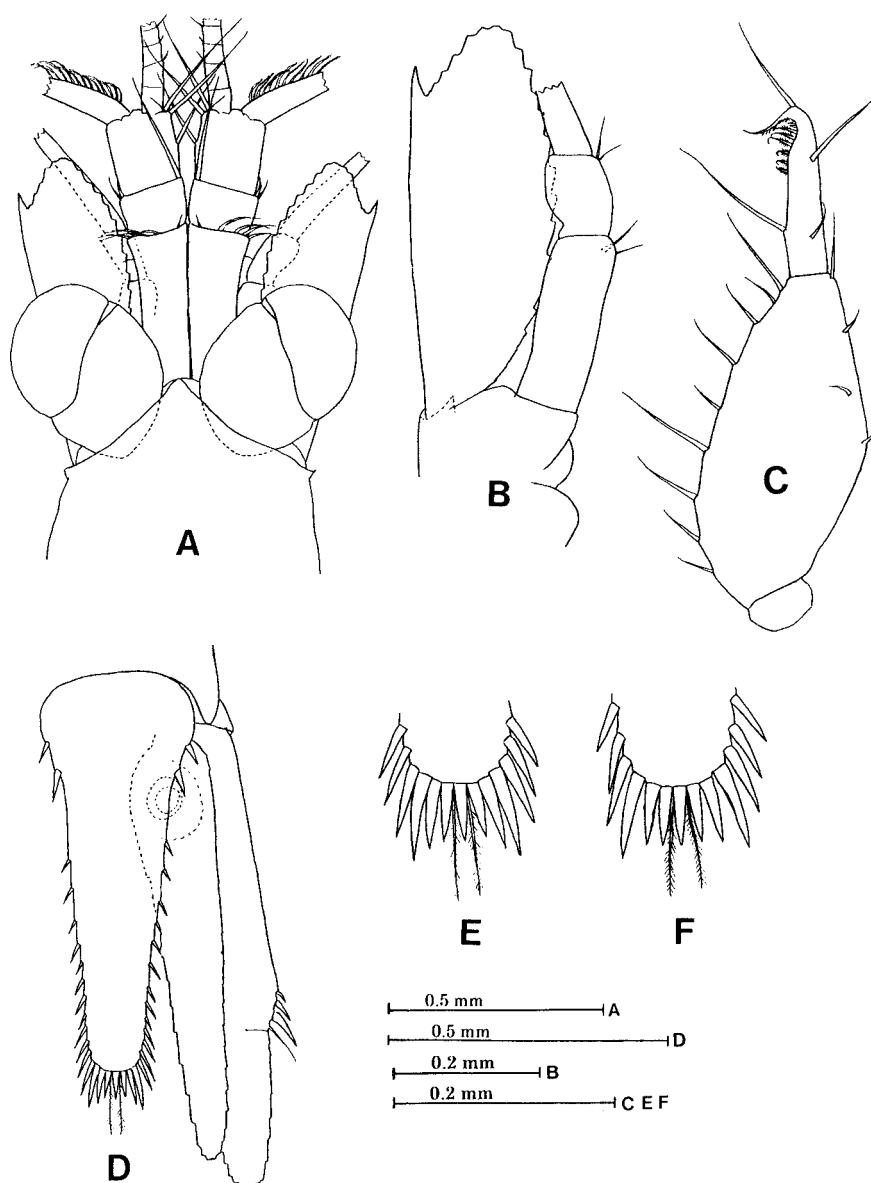


Fig. 38. *Siriella okadai* Ii, 1964; from Ogasawara, Japan (NSMT-Cr 17745); A, D, E, gravid female (4.6 mm); B, C, adult female (5.1 mm); F, gravid female (damaged). A, anterior part of body; B antenna; C, mandibular palp; D, uropod and telson; E, F, posterior part of telson.

lands (present study), the northern South China Sea (Liu and Wang, 2000) and Korea Strait (Jo *et al.*, 1998).

40. *Siriella japonica* Ii, 1964

(Fig. 39)

Siriella japonica Ii, 1964a: 102–105, fig. 25; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 49 [catalogue].
nec *Siriella japonica*, Shen *et al.*, 1989: 192–195, fig. 1.

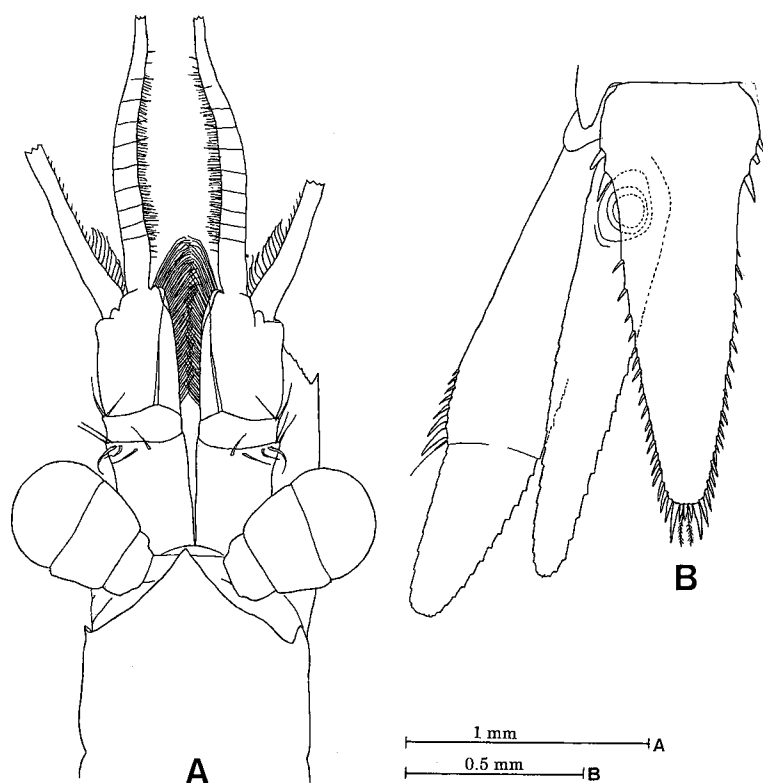


Fig. 39. *Siriella japonica* Ii, 1964; from Ono Bay, Iwate, Japan (NSMT-Cr 16375), adult male (7.8 mm). A, anterior part of body; B, uropod and telson.

nec *Siriella japonica japonica* Liu and Wang, 2000: 101–102, fig. 19.

Type locality. Port Oniwaki, Rishiri Island, Hokkaido, Japan.

Material examined. [Mainland of Japan] Ten adult males (9.5–10.8 mm) (NSMT-Cr 15651), Nomo, Nagasaki, 15 April 1976, 2 m, coll. S. Inoue and T. Takita. One adult male (9.0 mm) (NSMT-Cr 17968), Coast of Towa Town, Yamaguchi Prefecture, Seto Inland Sea, 31 March 1983, sledge net, 1 m deep, sandy mud, coll. Y. Hanamura. Eleven adult males (7.2–8.5 mm), 6 adult females (6.4–7.0 mm), 25 immature males and 38 immature females (NSMT-Cr 16375), Ono Bay, Iwate, 21 August 1990, 11 m, sledge, coll. H. Yamada. One adult male, 3 immature males (up to 5.9 mm), 1 immature female (5.6 mm) and 1 juvenile (NSMT-Cr 16377), Ono Bay, Iwate, 3 September 1990, 10 m, sledge, coll. H. Yamada. Five immature males (up to 6.4 mm), 7 immature females (up to 6.8 mm) and 5 juveniles (NSMT-Cr 16376), Ono Bay, Iwate, 11 September 1990, 10 m, sledge, coll. H. Yamada. One immature female (8.7 mm) (NSMT-Cr 16378), Ono Bay, Iwate, 21 February 1991, 8 m, sledge, coll. H. Yamada. Twelve immature males (up to 10.7 mm), 10 immature females (up to 9.1 mm) and 1 juvenile (NSMT-Cr 16379), Ono Bay, Iwate, 22 February 1991, 8 m, sledge, coll. H. Yamada. Three immature males (up to 6.8 mm) and 2 juveniles (NSMT-Cr 17969), coast of Toyo Town, Ehime Prefecture, Seto Inland Sea, 26 November 1999, 1–3 m, sledge net, coll. Y. Hanamura.

Body length. Adult male, 7.2–10.8 mm; adult female, 6.4–9 mm.

Remarks. Location of the type specimens of this species is unknown.

Siriella japonica is easily distinguished from the other species of *Siriella* by the inner flagellum of the male antennule dilated proximally (Fig. 39A) and the uropodal exopod with six to eight graded spines occupying less than distal 1/4 of the outer margin of the proximal segment (Fig. 39B).

Siriella japonica reported by Shen *et al.* (1989) and *S. japonica japonica* by Liu and Wang (2000), both from the North China coasts, are judged to be identify with *S. izuensis* by having a normal inner flagellum of the antennule.

Distribution. Known from coastal waters of Japan (Ii, 1964a; present study).

41. *Siriella izuensis* sp. nov.

(Figs. 40, 41)

Siriella japonica var. *izuensis* Ii, 1964a: 105–108, fig. 26; Liu and Wang, 2000: 102–104, fig. 20.

Siriella japonica var. *sagamiensis* Ii, 1964a: 108–112, figs. 27, 28.

Siriella japonica, Shen *et al.*, 1989: 192–195, fig. 1.

Siriella japonica japonica Liu and Wang, 2000: 101–102, fig. 19.

Type series. Holotype (NSMT-Cr 17974), adult male (7.3 mm); allotype (NSMT-Cr 17975), gravid female (6.1 mm); paratypes (NSMT-Cr 15653), 18 adult males (up to 9.0 mm), 5 adult females (up to 6.1 mm), 12 immature males and 6 immature females, Suruga Bay off Mera, Izu Peninsula, 25 July 1973, hand net under electric light, coll. M. Murano.

Other material examined. [Mainland of Japan] Syntype of *Siriella japonica* var. *sagamiensis* Ii (NSMT-Cr 17971) (Ii's Coll. No. 290), 13 adult females (6.6–7.3 mm), 7 immature males (5.6–8.1 mm), 11 immature females (up to 7.3 mm) and 6 juveniles, near Misaki Marine Biological Station, University of Tokyo, Aburatsubo Inlet, Kanagawa, 25 December 1938, plankton net with electric light, coll. Y. Matsue. Four adult males, 3 immature males, 2 immature females and 11 juveniles (NSMT-Cr 15660), Port Kushimoto, Wakayama, 18 April 1970, hand net under electric light, coll. M. Murano. Two adult males (9.5 mm), 6 adult females (up to 8.8 mm), 4 immature males, 3 immature females and 3 juveniles (NSMT-Cr 15652), 35°00.0'N 138°44.7'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (10.3 mm) and 1 adult female (8.0 mm) (NSMT-Cr 15654), 35°06.3'N 138°40.0'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (8.3 mm) and 1 adult female (7.9 mm) (NSMT-Cr 14638), 35°05.1'N 138°45.0'E, Suruga Bay, 20 January 1971, surface tow with ORI net, coll. M. Murano. Four adult males (up to 10.1 mm), 6 adult females (up to 8.6 mm) and 1 immature male (NSMT-Cr 15658), 35°03.8'N 138°47.9'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult female (8.5 mm) (NSMT-Cr 15656), 35°03.3'N 138°39.6'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (8.2 mm) (NSMT-Cr 15659), 35°04.8'N 138°39.9'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult female and 1 immature male (NSMT-Cr 15655), 34°45.5'N 138°20.7'E, Suruga Bay, 13 November 1971, bottom-net, 105 m, dusk, coll. M. Murano. One adult female (9.8 mm) (NSMT-Cr 15666), Hamana Bay (Lake Hamana), Shizuoka, near Fisheries Laboratory, Graduate School of Agricultural and Life Sciences, University of Tokyo, 5 March 1973, hand net under electric light, coll. A. Hirai. One adult male (10.1 mm) (NSMT-Cr 15665), Hachijo Is., Izu Islands, 5 March 1974, tidal zone. Ten adult males (up to 7.1 mm) (NSMT-Cr 15661), Nomo, Nagasaki, 9 August 1975, hand net during scuba diving, coll. S. Inoue and T. Takita. Two males (5.4 mm), 2 adult females (5.4 mm) and 1 immature female (NSMT-Cr 15667), Nomo, Nagasaki,

hand net during scuba diving, 11 August 1975, coll. S. Inoue and T. Takita. Four males (up to 7.6 mm) and 1 gravid female (7.7 mm) (NSMT-Cr 15663), Omura Bay, Nagasaki, sledge, 19 June 1977, coll. Y. Kamaga and T. Takita. One adult male (7.3 mm) (NSMT-Cr 15657), Tateyama Bay, Chiba, 19 June 1978. Four males (up to 7.6 mm) and 1 female (6.5 mm) (NSMT-Cr 15662), Tateyama Bay, Chiba, 19 June 1978. One adult male (10.2 mm) (NSMT-Cr 16468), Yaene Harbor, Hachijo Is., 22 June 1995, hand net under electric light, coll. K. Fukuoka. One immature male (5.6 mm) (NSMT-Cr 17770), Japan Sea off Shimane, 14 June 1996, larva net, coll. T. Sota. One adult female (6.8 mm), 3 immature females and 5 immature males (NSMT-Cr 16469), Japan Sea off Shimane, 15 July 1996, trawl, coll. K. Sota. One adult male (7.7 mm) and 2 immature females (NSMT-Cr 16470), Japan Sea off Shimane, 27 August 1996, trawl, coll. K. Sota. Seventy-nine adult and near adult males (up to 7.7 mm), 18 adult females (5.7–6.4 mm) and 5 immature females (up to 5.6 mm) (NSMT-Cr 16472), Japan Sea off Shimane, 12 September 1996, trawl, coll. K. Sota. Two adult males (8.1, 8.6 mm) (NSMT-Cr 16471), Matoshima Is., Shimane, 29 October 1996, trawl, 50 m, coll. K. Sota. Seven adult males (up to 7.5 mm), 15 adult females (up to 7.2 mm), 9 immature males and 13 immature females (NSMT-Cr 17970), coast of Hinoura, Yasuura Town, Hiroshima Prefecture, date unknown, coll. Y. Hanamura.

[Collection data unknown] Twenty-eight males (up to 10.9 mm) and 2 immature females (NSMT-Cr 15664).

Description. Anterior margin of cephalon (Fig. 40A, B) rounded, without any projection. Rostrum (Fig. 40A, B) produced into triangular plate with pointed tip and somewhat concave lateral margins, longer in female than in male. Anterolateral corner of carapace rounded.

Eyes (Fig. 40A, B) moderate in size, slightly longer than broad; cornea occupying slightly less than distal half of whole eye.

Antennular peduncle of male (Fig. 40A) stout; third segment somewhat longer than first; second segment short, with plumose seta on dorsal margin near inner distal corner. Appendix masculina (Fig. 40A) conical and densely hirsute with sensory hairs. Inner flagellum of antennule (Fig. 40A) slender and neither swollen nor peculiarly bent in basal part. Antennular peduncle of female (Fig. 40B) much more slender than in male, with first segment longer than sum of 2 distal ones.

Antennal scale (Fig. 40A–D) extending to distal fourth of third segment of antennular peduncle in male and near distal end in female, almost same in shape, 3 times as long as broad; terminal lobe shorter than broad. Antennal peduncle in male (Fig. 40C) extending to base of spinous process of outer margin and with third segment about 1/3 of second in length; in female peduncle (Fig. 40D) somewhat shorter and more slender than in male.

Endopod of third to eighth thoracic limbs (Fig. 40E, F) with carpopropodus divided into 2 subsegments by obscure articulation; terminal claw rather short, somewhat steeply bent in distal part.

Genital organ of male (Fig. 41A) with 3 long, stout plumose setae on distal part of anterior margin and 2 curved setae on apex.

Pleopods of male (Fig. 41B) without modified setae; pseudobranchial rami spirally coiled in second to fourth pairs and straight in first and fifth pairs.

Uropodal exopod (Fig. 41F); proximal joint armed in fully grown animals with 6 or 7 graded spines occupying about distal 1/4 of outer margin; distal joint about 1/3 of length of exopod, and about 1 2/3 times as long as broad in male, nearly twice as long in female. Uropodal endopod (Fig. 41E, F) of intermediate length between uropodal exopod and telson, armed along ventral inner margin with dense row of spines arranged in series of a longer and shorter ones, between

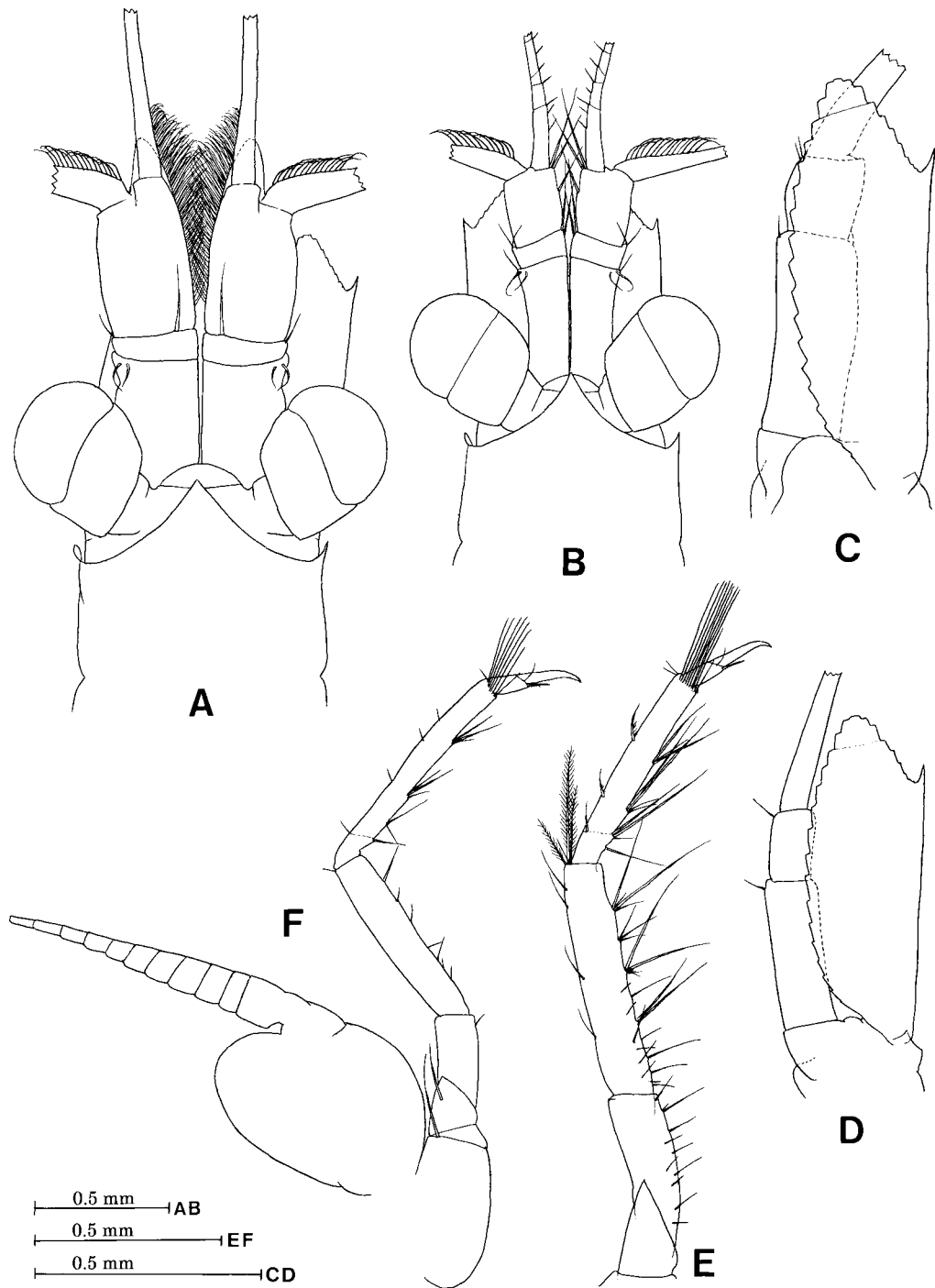


Fig. 40. *Siriella izuensis* sp. nov.; A, C, E, F, holotype (NSMT-Cr 17974); B, D, allotype (NSMT-Cr 17975). A, B, anterior part of body; C, D, antenna; E, endopod of third thoracic limb; F, eighth thoracic limb.

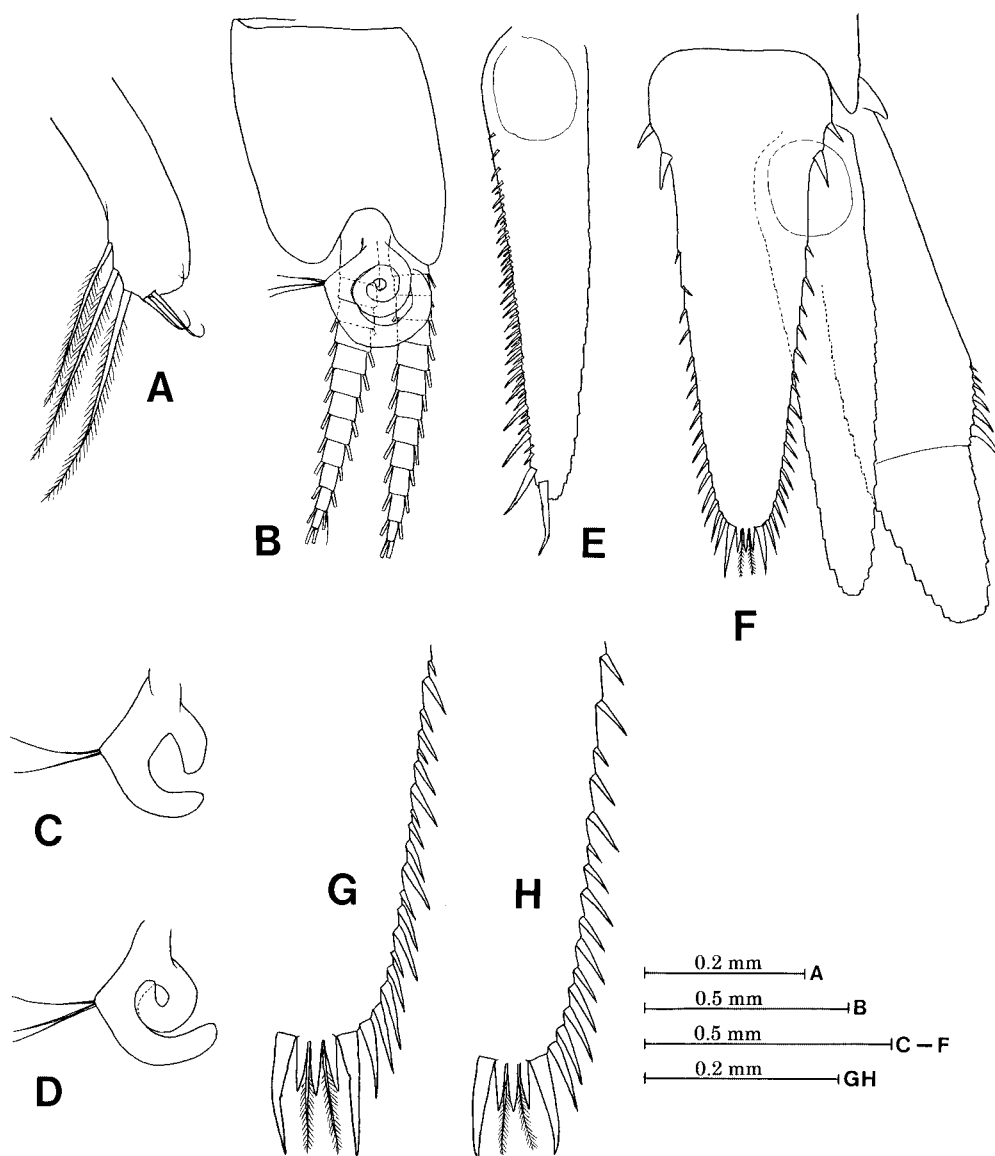


Fig. 41. *Siriella izuensis* sp. nov.; A, B, G, holotype (NSMT-Cr 17974); C, one of paratypes (NSMT-Cr 15653), immature male (8.2 mm); D, one of paratypes (NSMT-Cr 15653), immature male (7.0 mm); E, F, H, allotype (NSMT-Cr 17975). A, genital organ; B, fourth pleopod; C, D, pseudobranchial rami of pleopod; E, uropodal endopod; F, uropod and telson; G, H, apex and right margin of telson.

distal 2 longer spines shorter ones not inserted.

Telson (Fig. 41F, G, H) slightly longer in male than in female, 2.9 times as long as broad in male and 2.7 times as long as broad in female; lateral margin with 2 stout spines on basal widened part, followed by naked part occupying about 1/6 of margin length, then successive series of longer and shorter spines, which are apparently more slender than 2 spines on widened part; apical pair of spines very stout and about 1.3 to 1.5 times as long as distalmost pair of lateral spines.

Body length. Adult male, 6.1–10.3 mm; adult female, 5.4–9.8 mm.

Remarks. Location of Ii's type specimens of this species is unknown.

This species was first described by Ii (1964a) as a variety of *S. japonica*, *S. japonica* var. *izuensis*, as there was no noticeable difference between *S. japonica*, except for the inner antennular flagellum of the male. According to Articles 45.5 and 45.6.3 of the International Code of Zoological Nomenclature (2000), however, scientific name having a lower category than subspecies such as 'variety' is unqualified. Accordingly, the name *S. japonica* var. *izuensis* is abandoned as *nomen nudum* and a new species name, *S. izuensis*, is proposed for it.

Siriella izuensis is distinguished from *S. japonica* in the inner flagellum of the antennule of the male, i.e. the flagellum is considerably swollen and meandering in the proximal part in *S. japonica* (Fig. 39A) while it is normal and slender throughout in *S. izuensis* (Fig. 40A). The difference is great and distinct. Besides the inner antennular flagellum, *S. izuensis* is different from *S. japonica* in two following minor points: the appendix masculina is longer in *S. izuensis* (Fig. 40A) than in *S. japonica* (Fig. 39A), and the tendency of alternate arrangement in the lateral spines of the telson is slightly distinct in *S. izuensis* (Fig. 41F–H) than in *S. japonica* (Fig. 39B).

Ii (1964a) established another variety, *S. japonica* var. *sagamiensis*. This variety was characterized by the inner antennular flagellum of the male being normal and slender, the male antennule with the appendix masculina being not furnished with sensory hairs, and the second to the fourth male pleopods with pseudobranchial rami being not coiled spirally. We had an opportunity of examining the type specimens of *S. japonica* var. *sagamiensis*. There are thirteen adult females (6.6 to 7.3 mm in body length), including those having embryos in their marsupium, and three males having developed pleopods (7.0 to 8.1 mm in body length). Ii (1964a) considered, with some doubts, that these male specimens might be adults on account of the developed pleopods and the body length longer than gravid females. These males, however, are judged to be immature, because the third segment of the antennular peduncle is furnished with one long plumose seta on the inner margin and a few long plumose setae at the inner distal corner. These plumose setae in males are an indicator of immature stages, and disappear with fully mature stage. Two matters mentioned by Ii (1964a) as characters of this variety, the appendix masculina on the male antennule without sensory hairs and the imperfectly coiled pseudobranchial rami on the male pleopods (Fig. 41C, D), are surely due to the immaturity of these specimens. Body length of males longer than females is not a rare case in the genus *Siriella*. With the solution of above-mentioned matters, there are no essential differences in morphology between *S. izuensis* and *S. japonica* var. *sagamiensis*. Moreover, these two forms are common in habitat. Under these circumstances, *S. japonica* var. *sagamiensis* is amalgamated with *S. izuensis*.

Specimens reported as *S. japonica* by Shen *et al.* (1989) and *S. japonica japonica* by Liu and Wang (2000) are certainly identified as *S. izuensis*, judging from the shape of the inner antennular flagellum of the male (Shen *et al.*, 1989, fig. 1 2, 5; Liu and Wang, 2000, fig. XIX 2, 5).

Siriella izuensis is allied to *S. vulgaris*, but distinguished from it by the absence of a projection at the anterior end of the cephalon, the short terminal lobe of the antennal scale, the endopod of the third to eighth thoracic limbs with a terminal claw more steeply curved in the distal part, and more distinct alternate arrangement of the lateral spines of the telson.

This species also resembles *S. sinensis* in many aspects, but is distinguished by the shorter rostrum, the less expanded eyes, and the endopod of the thoracic limbs with the terminal claw more steeply curved in distal part (Fig. 34C, D).

Distribution. Known from Japan (Ii, 1964a; present study); the Yellow Sea, the Bohai Sea and the South China Sea coast of China (Liu and Wang, 2000). In Japan, *S. izuensis* is common in the coasts of warm-water region of the mainland.

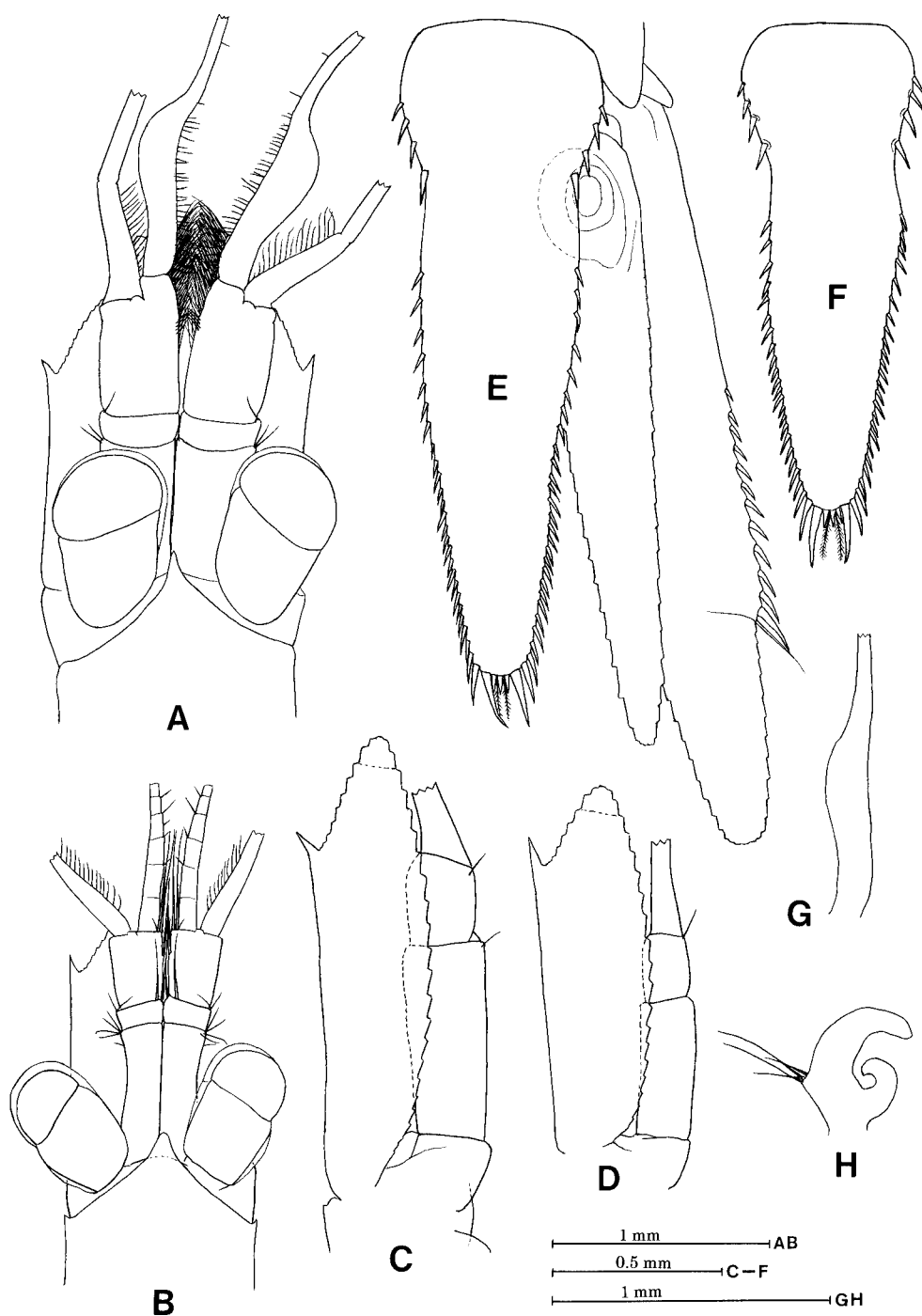


Fig. 42. *Siriella koreana*, sp. nov.; A, C, E, holotype (NSMT-Cr 17923); B, D, F, allotype (NSMT-Cr 17924); G, H, one of paratypes (NSMT-Cr 17925), immature male (8.5 mm). A, B, anterior part of body; C, D, antenna; E, uropod and telson; F, telson; G, proximal part of inner flagellum of left antennule, H, pseudobranchial rami on fourth pleopod.

42. *Siriella koreana* sp. nov.

(Fig. 42)

Siriella watasei var. *koreana* Ii, 1964a: 113–117, 586, figs. 29, 30; 1964b: 2, fig. 1A–F; Müller, 1993: 57 [catalogue].

Type series. Holotype (NSMT-Cr 17923), adult male (10.5 mm); allotype (NSMT-Cr 17924), gravid female (8.9 mm); paratypes (NSMT-Cr 17925), 26 adult males (8.8–11.1 mm) and 28 adult females (8.0–10.6 mm) (all from Ii's Coll. No. 255a); Tatairi, Kyongsangnam Do (Keishonando), Korea, 26 June 1930, coll. M. Fujinaga.

Other material examined. [Korea] Abundant males and females (almost immature specimens) (NSMT-Cr 17926), collection data same as type series.

[Mainland of Japan] Abundant males and females (up to 13 mm) (Ii's Coll. No. 150) (NSMT-Cr 17927), Atsu, Okayama, mouth of Kojima Bay, 17 March 1936, coll. Okayama Prefectural Fisheries Experimental Station. Twenty-four males (up to 12.5 mm) and 33 females (up to 12.4 mm) (Ii's Coll. No. 288) (NSMT-Cr 17928), coast of Ikawazu, Atsumi-cho, Aichi, 7 April 1939, 2 m, among seagrasses, *Zostera*, larva net, coll. S. Arasaki.

Body length. Adult male, up to 12.5 mm; adult female, up to 12.4 mm.

Remarks. This species was first described under the name of *Siriella watasei* var. *koreana* by Ii (1964a). However, that name is abandoned as *nomen nudum* (see *S. izuensis* section) and a new species name *S. koreana* is proposed for it. The description of *S. watasei* var. *koreana* given by Ii (1964a) is applicable to *S. koreana* with slight alteration. As to the inner flagellum of the antennule, Ii (1964a) described that in the female or immature male it shows no peculiar dilation or contortion. But, males in later immature stages with undeveloped pseudobranchial lobe is provided with a dilated inner flagellum (Fig. 42G, H)

Siriella koreana is ranked as a valid species on the basis of the differences from *S. watasei* in the following points: (1) the eyes more slender than in *S. watasei*, and its cornea occupying less than half of the whole eye (Fig. 42A, B); (2) the dilated part of the inner antennular flagellum of the male much thicker than in *S. watasei* (Fig. 42A); (3) the antennal scale of the male extending to or beyond the distal margin of the antennular peduncle in *S. koreana* (Fig. 42A, B), while it does not extend to the distal margin in *S. watasei*.

The specimens from Ikawazu are slightly different from the description and illustrations given by Ii (1964a) in a few points: (1) the inner antennular flagellum of the female slightly thicker than the outer one in the proximal part; and (2) the body size of Ikawazu specimens (up to 12.5 mm in males and up to 12.4 mm in females) larger than the Korea specimens (up to 11.1 mm in males and up to 10.9 mm in females). These variations are probably originated due to their different localities and due to seasons, when specimens were collected.

In addition to the antennule, sexual dimorphism is also observed in the antenna and the mandibular palp. The antennal scale is more slender in the male (Fig. 42C) than in the female (Fig. 42D), and the peduncle is longer and thicker in the male (Fig. 42C) than in the female (Fig. 42D). The mandibular palp is armed with eight long setae on the proximal part of the outer margin of the third segment in the male, whereas four or five setae on the corresponding part in the female.

Distribution. Known from the south coast of Korea; the Inland Sea of Japan near Okayama, western Japan; the coast of Ikawazu, Aichi, central Japan; and Mutsu Bay near Aomori, northern Japan (Ii, 1964a, b).

43. *Siriella macropsis* sp. nov.

(Fig. 43)

Siriella watasei var. *macropsis* Ii, 1964a: 117–119, fig. 31; Müller, 1993: 57 [catalogue].

Type series. Holotype (NSMT-Cr 17929), adult male (ca. 12.4 mm); allotype (NSMT-Cr 17930), adult female (11.8 mm); paratypes (NSMT-Cr 17931), 12 adult males (ca. 10.6–11.1 mm) and 16 adult females (11.1–12.7 mm) (all from Ii's Coll. No. 291); near Misaki Marine Biological Station, University of Tokyo, Aburatsubo Inlet, Kanagawa, 12 April 1933.

Other material examined. [Mainland of Japan] Abundant males (up to 13.2 mm) and females (up to 12.6 mm) (NSMT-Cr 17932), collection data same as type series. Thirty-seven males (up to 11.1 mm) and 87 females (adult, 9.0–11.3 mm) (NSMT-Cr 17933), near Misaki Marine Biological Station, University of Tokyo, Aburatsubo Inlet, Kanagawa, 19 May 1933 (Ii's Coll. No. 187). One immature male (6.5 mm) and 1 immature female (7.0 mm) (NSMT-Cr 16256), Hamana Bay (Lake Hamana), Shizuoka, just front of Fisheries Laboratory, University of Tokyo, 25 July 1973, hand net under electric light, coll. A. Hirai. Two adult males (damaged), 3 immature males (5.5–7.0 mm) and 4 immature females (6.4–8.1 mm) (NSMT-Cr 16257), Japan Sea off Shimane, 12 September 1996, trawl, coll. K. Sota.

Description. Body slender. Rostrum (Fig. 43A, B) produced into triangular plate with acute apex and concave lateral margins, reaching somewhat beyond base of antennular peduncles, somewhat longer in female than in male.

Eyes (Fig. 43A, B) large and elongated with considerably long stalk; whole eye including the stalk $1\frac{2}{3}$ times as long as broad in male and nearly twice as long in female; cornea occupying less than distal $\frac{1}{3}$ of eye and as broad as distal end of stalk; pigment dark brown.

Antennular peduncle of male (Fig. 43A) more robust than in female (Fig. 43B), first segment twice as long as broad, second segment short, with 1 seta at inner distal corner, third segment almost same in length with first, with several short feeble setae at distal $\frac{1}{4}$ of inner margin. Inner flagellum in male (Fig. 43A) peculiarly swollen and contorted in proximal part. Antennular peduncle of female (Fig. 43B) slender, first segment more than 3 times as long as broad at distal end, longer than combined length of succeeding 2 segments, second segment short, with 1 seta at inner distal corner and on dorsal margin near inner corner, third segment with 1 seta at distal $\frac{1}{3}$ of inner margin and 3 long setae at inner distal corner. Inner flagellum in female (Fig. 43B) not modified.

Antennal scale (Fig. 43A, B) not extending to distal margin of antennular peduncle in male and barely extending to in female, about 4 times as long as broad, terminal lobe about as long as broad, suture marking off the distal joint hardly perceptible. Antennal peduncle about $\frac{4}{7}$ in male, and only slightly more than half in female, as long as scale.

Thoracic limbs with proximal subsegment of carpopropodus of endopod varying in length from nearly half, in the anterior pairs, to $\frac{2}{3}$, in the posterior ones, of distal subsegment.

Pseudobranchial rami on the male pleopods nearly straight in first and fifth limbs and spirally coiled in second to fourth limbs (Fig. 43D).

Uropodal exopod (Fig. 43E, F) much longer than inner; proximal segment armed with 9 to 12 graded spines occupying less than distal half of outer margin; distal segment less than half as long as proximal. Uropodal endopod (Fig. 43E, F) somewhat shorter than intermediate length between uropodal exopod and telson, ventral inner margin armed with dense row of spines arranged alternately in successive series of long and short ones.

Telson (Fig. 43E, F) about $\frac{1}{3}$ longer than last abdominal somite, slightly extending beyond

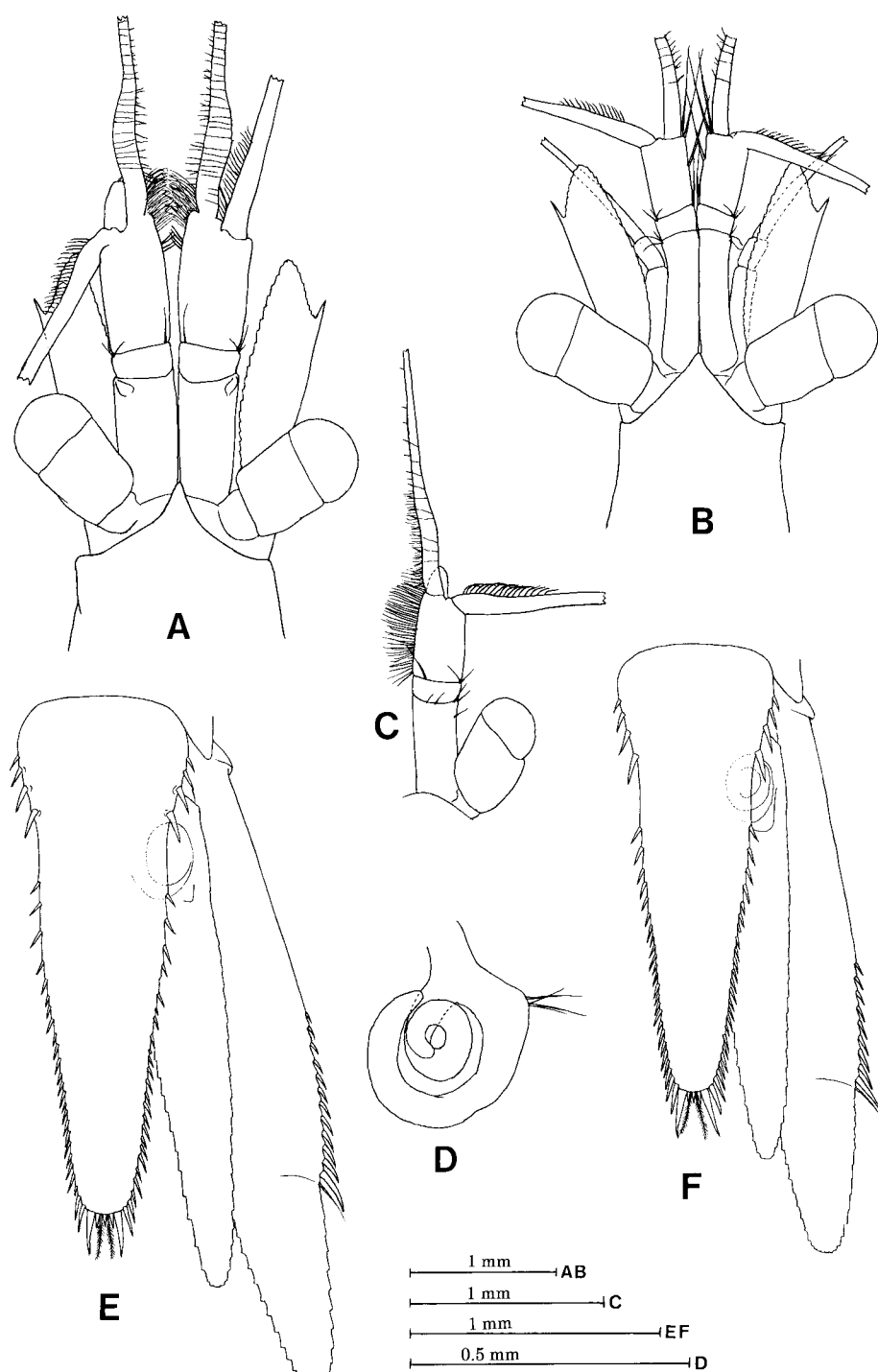


Fig. 43. *Siriella macropsis* sp. nov.; A, D, F, holotype (NSMT-Cr 17929); B, E, allotype (NSMT-Cr 17930); C, damaged male from the Japan Sea. A, B, anterior part of body; C, eye and antennule; D, pseudobranchial rami of fourth pleopod; E, F, uropod and telson.

articulation of uropodal exopod in both sexes, somewhat more than 3 times as long as broad at base in both sexes; lateral margin with 3 or 4 spines in basal broadened part, followed by naked part occupying 1/5 to 1/6 of margin, then distal series of small spines, which are showing alternate arrangement with longer and shorter ones; posterior margin with pair of long spines, 3 small median spines and pair of plumose setae.

Body length. Adult male, up to 13.2 mm; adult female, up to 12.0 mm.

Remarks. This species was first described by Ii (1964a) under the name of *Siriella watasei* var. *macropsis*. This name, however, is abandoned as *nomen nudum* (see *S. izuensis* section) and a new species name, *S. macropsis*, is proposed for it.

In the description of *S. watasei* var. *macropsis*, Ii (1964a) mentioned three points of differences from *S. watasei* and *S. watasei* var. *koreana* (now, *S. koreana*), i.e. the more elongated eyes, the less tendency in the peculiar character of the inner flagellum of the antennule, and the G-shaped pseudobranchial rami of the second to fourth male pleopods. In relation to the G-shaped pseudobranchial rami, however, the present reexamination of Ii's specimens clarified that those on the second to fourth male pleopods are fully coiled spirally, as seen in almost all species in this genus. It seems that Ii (1964a) observed younger specimens just before the maturation. The more elongated eyes (Fig. 43A–C) are considered as a main character to distinguish *S. macropsis* from *S. watasei*, and along with the elongated eyes, less tendency of the proximal dilation of the inner antennular flagellum in the male (Fig. 43A) is considered as differentiating characters from *S. koreana*.

Distribution. Previously, *S. macropsis* has only been known from Aburatsubo Inlet, Central Japan (Ii, 1964a), in which the Misaki Marine Biological Laboratory of the University of Tokyo is located. The present occurrence from Shimane extends the distribution range of this species to the Japan Sea side of Japan.

44. *Siriella bacescui* Udrescu, 1981

Siriella bacescui Udrescu, 1981: 29–32, fig. 1A–K; Müller, 1993: 43 [catalogue]; Keable *et al.*, 2003: 466 [catalogue].

Type locality. Off Benett Island, Chesterfield, Queensland, Australia.

No specimen in the present study.

Remarks. According to Udrescu (1981), *S. bacescui* is distinguished from a closely related species, *S. vulgaris*, by the broader antennal scale, the endopod of the thoracic limbs with the carpopropodus being not jointed, the proximal segment of the uropodal exopod armed with less number of spines, and the larger body length. In addition to above, it is distinguished from *S. vulgaris* by the frontal margin of the cephalon without any projection, the terminal claw of the endopod of the third to eighth thoracic limbs being more slender, and two spines on the basal broadened part of the telson positioned at a shorter distance.

Distribution. Known only from the type locality (Udrescu, 1981).

45. *Siriella akajimaensis* sp. nov.

(Figs. 44–46)

Type series. Holotype (NSMT-Cr 17934), adult male (7.8 mm); allotype (NSMT-Cr 17935), gravid female (6.2 mm); paratypes (NSMT-Cr 17936), 7 adult males (6.7–7.9 mm, a specimen of 7.7 mm dissected for drawing), 3 gravid females (6.1–6.3 mm, a specimen of 6.1 mm dissected for drawing), 1 adult female (6.4 mm), 7 immature males and 13 immature females; Port Aka,

Akajima Is., Okinawa, Japan, 13 November 1990, hand net under electric light, coll. M. Murano.

Other material examined. [Okinawa, Japan] Two immature females and 1 juvenile (NSMT-Cr 17937), Port Aka, Akajima Is., 30 December 1989, hand net under electric light. One adult male (7.1 mm), 1 gravid female (5.9 mm), 2 immature males and 1 juvenile (NSMT-Cr 17938), Port Aka, Akajima Is., 2 February 1990, hand net under electric light, coll. M. Murano. Seven adult females (5.3–6.2 mm), 14 immature males (up to 6.0 mm), 15 immature females and 5 juveniles (NSMT-Cr 17939), Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Two adult males (6.3, 7.1 mm), 1 adult female (6.0 mm), 2 immature males and 2 immature females (NSMT-Cr 17940), Port Aka, Akajima Is., 23 June 1990, hand net under electric light, coll. M. Murano. Seventeen adult males (6.5–7.9 mm), 6 adult females (up to 6.3 mm), 22 immature males, 3 immature females and 3 juveniles (NSMT-Cr 17941), Port Aka, Akajima Is., 24 June 1990, light trap at 1 m deep, coll. M. Murano. Eighteen adult males (6.8–7.9 mm), 18 gravid females (5.4–6.9 mm), 4 adult females, 44 immature males, 7 immature females and 6 juveniles (NSMT-Cr 17942), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano. Six adult males (6.8–7.7 mm), 1 adult female (5.5 mm), 11 immature males and 4 immature females (NSMT-Cr 17943), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. One gravid female (6.0 mm) (NSMT-Cr 17944), Port Aka, Akajima Is., 15 March 1991, hand net under electric light. Fourteen immature males (up to 7.4 mm), 4 immature females and 3 juveniles (NSMT-Cr 17945), Port Aka, Akajima Is., 5 May 1991, hand net under electric light, coll. M. Murano. Three gravid females (up to 6.1 mm), 1 adult female (5.7 mm), 6 immature males (up to 5.8 mm) and 3 immature females (NSMT-Cr 17946), Port Aka, Akajima Is., 1 January 1995, hand net under electric light.

Description. Carapace (Fig. 44A, B) produced anteriorly into triangular rostral plate with concave lateral margins and acutely or obtusely pointed apex extending slightly beyond base of antennular peduncles. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving last 2 thoracic somites exposed dorsally.

Eyes (Fig. 44A, B) moderate in size, as long as broad, not covered with rostrum; cornea globular, occupying more than half of whole organ.

Antennular peduncle of male (Fig. 44A) more robust than in female; first segment about 1.5 times as long as broad, slightly shorter than third segment; second segment short, with 1 long seta on inner dorsal margin; third segment more than 1.5 times as long as broad. Inner flagellum in fully mature male (Fig. 44A, D) peculiarly meandering in proximal 1/3 part, narrower than outer flagellum in proximal part, furnished with fine short setae on inner margin of meandering part. Antennular peduncle of female (Fig. 44B) rather slender; first segment longer than second and third segments combined, 2.5 times as long as broad, outer margin concave, with 1 short seta near distal end; second segment with 2 long setae at inner distal corner; third segment slightly longer than broad, with 1 long seta at distal third of inner margin and 2 long setae at inner distal corner. Inner flagellum of female normal.

Antennal scale (Fig. 44A, B, E, F) not extending to distal end of third segment of antennular peduncle, more slender in male than in female, 3 times as long as broad in male and slightly less than 3 times as long in female; outer margin naked, straight, ending in spine; terminal lobe slightly shorter than broad in male, 2/3 as long as broad in female. Antennal peduncle (Fig. 44F) not extending to terminal spine of outer margin of antennal scale in both sexes. Antennal sympod (Fig. 44F) with anterolateral corner pointed.

Mandibular palp (Fig. 44G); second segment expanded, third segment with 8 long setae on proximal 2/5 part of outer margin in male and 1 seta on corresponding part in female. Maxillule,

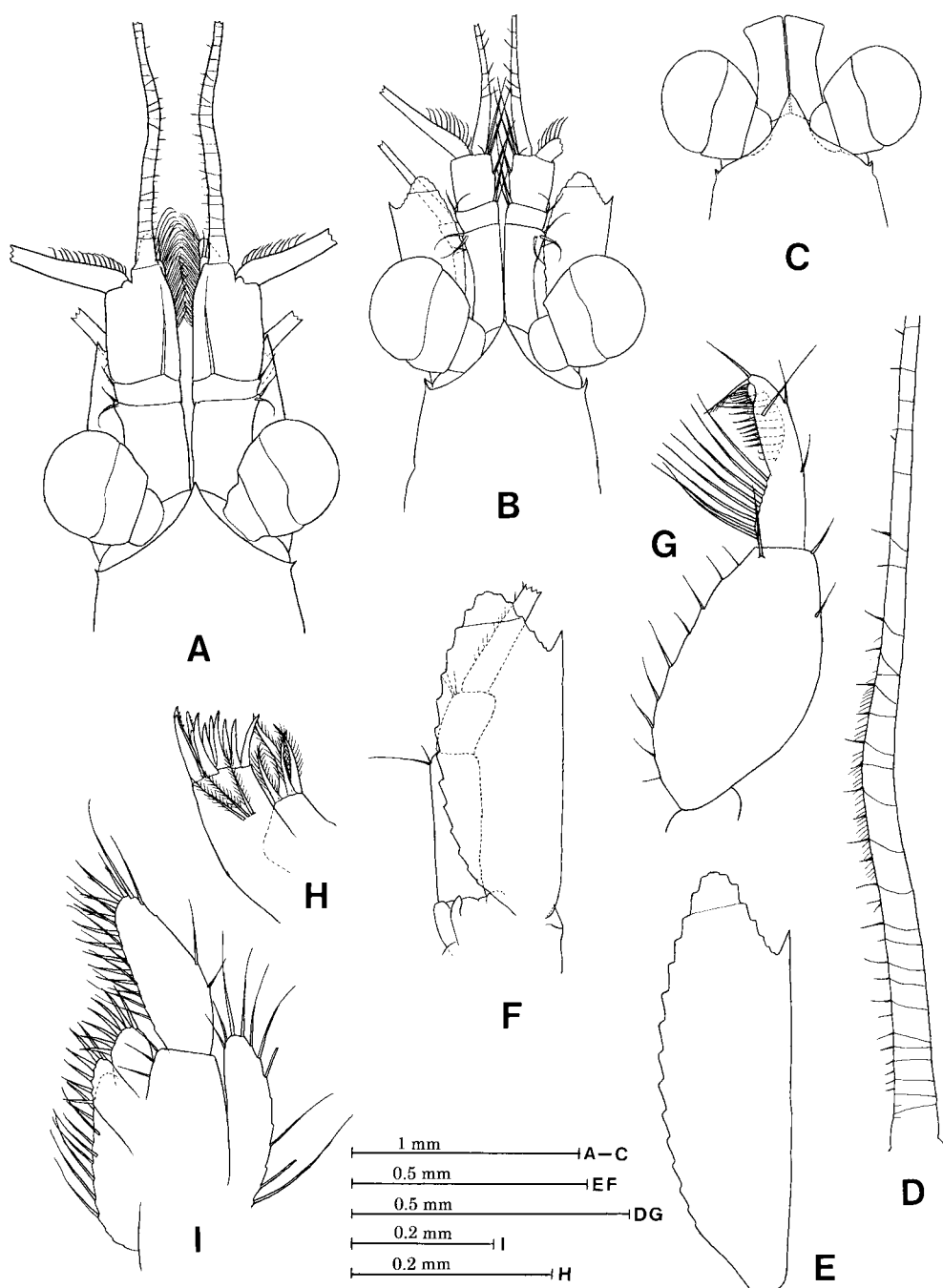


Fig. 44. *Siriella akajimaensis* sp. nov.; A, D, holotype (NSMT-Cr 17934); B, allotype (NSMT-Cr 17935); C, one of paratypes (NSMT-Cr 17936), gravid female (6.2 mm); E, G-I, one of paratypes (NSMT-Cr 17936), adult male (7.7 mm); F, one of paratypes (NSMT-Cr 17936), gravid female (6.2 mm). A, B, anterior part of body; C, rostrum and eyes; D, proximal half of inner flagellum of right antennule; E, antennal scale; F, antenna; G, mandibular palp; H, maxillule; I, maxilla.

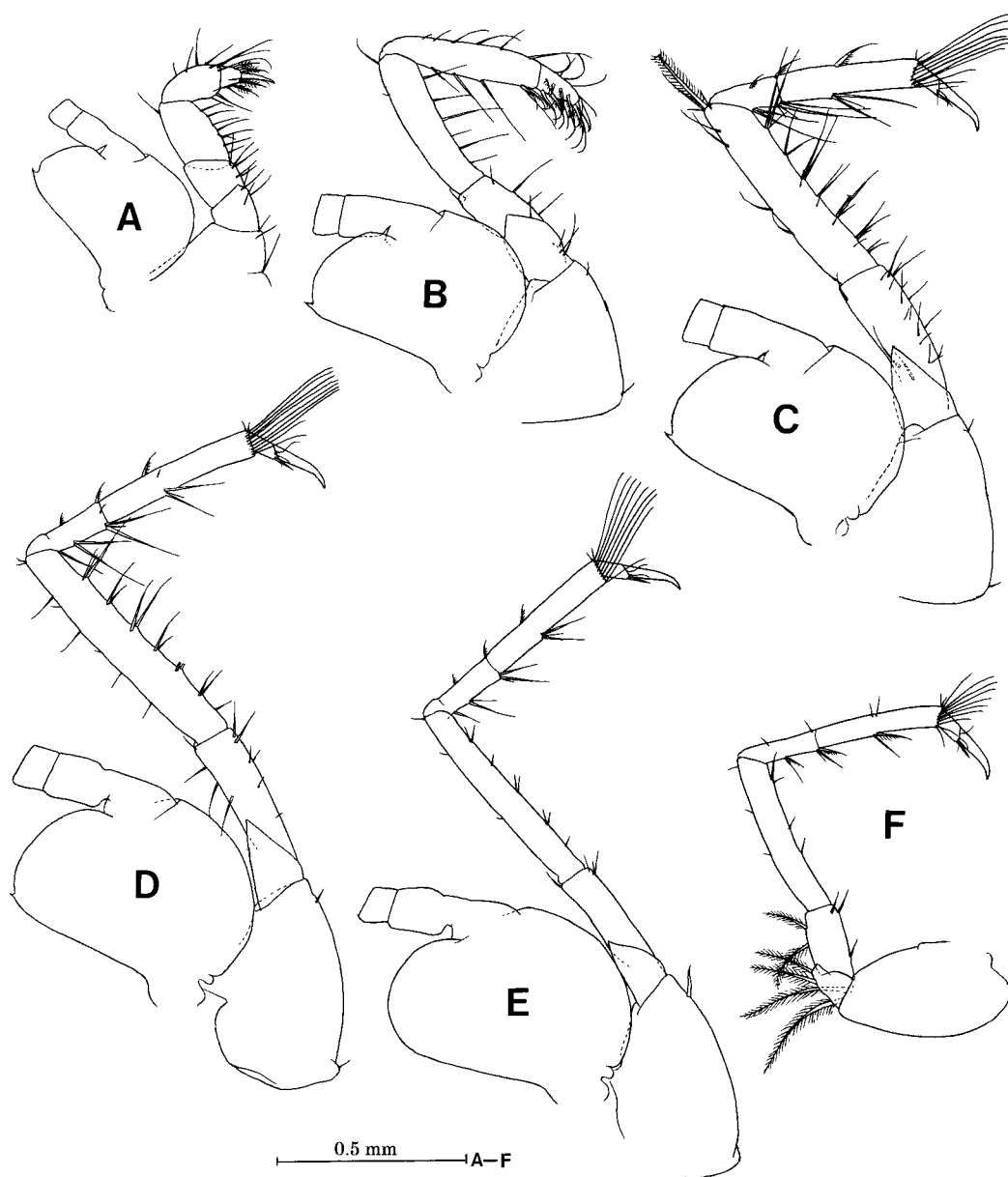


Fig. 45. *Siriella akajimaensis* sp. nov.; one of paratypes (NSMT-Cr 17936), adult male (7.7 mm). A–E, first, second, third, fifth and seventh thoracic limbs (flagellum omitted); F, endopod of eighth thoracic limb.

maxilla, and endopods of first and second thoracic limbs as shown in Fig. 44H, I, and Fig. 45A, B, respectively.

Endopod of third to eighth thoracic limbs (Fig. 45C–F) with 2-subdivided carpopropodus, proximal subsegment much shorter than distal, terminal claw moderately robust. Endopod of third thoracic limb (Fig. 45C) more robust than those of succeeding limbs, merus 1.2 times longer than carpopropodus, armed at distal end of outer margin with 1 long plumose seta, such a seta wanting in succeeding endopods. Endopod of fourth to sixth thoracic limbs (Fig. 45D)

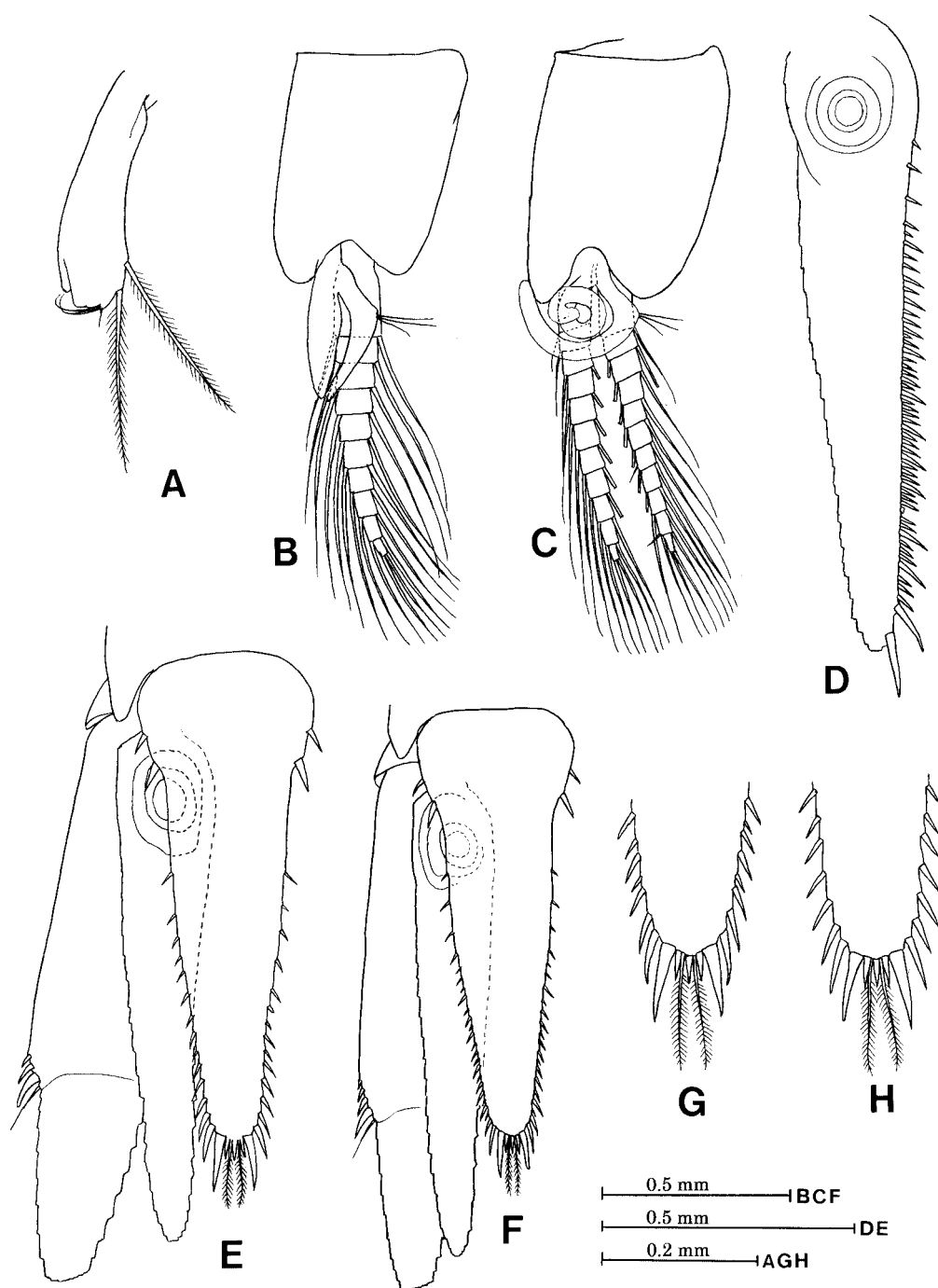


Fig. 46. *Siriella akajimaensis* sp. nov.; A–D, G, one of paratypes (NSMT-Cr 17936), adult male (7.7 mm); E, allotype (NSMT-Cr 17935); F, holotype (NSMT-Cr 17934); H, one of paratypes (NSMT-Cr 17936), gravid female (6.2 mm). A, genital organ; B, first pleopod; C, fourth pleopod; D, uropodal endopod; E, F, uropod and telson; G, H, posterior part of telson.

almost equal in size and shape, merus 1.1 times longer than carpopropodus. Endopod of seventh thoracic limb (Fig. 45E) slightly smaller and more slender than preceding one, merus as long as carpopropodus, basis with 1 spine-like seta on inner margin. Endopod of eighth thoracic limb (Fig. 45F) considerably smaller than preceding one, armed with 2 long plumose setae on each of basis, preischium and ischium; carpopropodus 1.2 times longer than merus. Exopod of thoracic limbs with flagellum 10-segmented in first and eighth limbs and 11-segmented in second to seventh limbs; outer distal angle of basal plate (Fig. 45A–E) with small spine in anterior 5 limbs and rounded in posterior 3 limbs.

Genital organ of male (Fig. 46A) armed with 2 long plumose setae on distal part of anterior margin and 1 tiny straight and 2 short curved setae on distal margin.

Abdominal somites; first somite 1.1 times longer than second, second to fifth somites subequal in length, sixth somite 1.5 times longer than fifth.

First pleopod of male (Fig. 46B); exopod 10-segmented, endopod wanting. Second to fifth pleopods of male (Fig. 46C) biramous, both rami 11-segmented, same in length, without modified setae. Pseudobranchial rami (Fig. 46B, C) nearly straight in first and fifth pleopods and spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 46E, F) extending beyond posterior margin of telson for 1/4 of its length, longer than endopod; proximal segment twice longer than distal, armed with 4 or 5 graded spines occupying distal 1/7 of outer margin in male and 3 or 4 graded spines occupying distal 1/10 of outer margin in female. Uropodal endopod (Fig. 46D–F) overreaching apex of telson for 1/4 of its length in male and 1/5 in female, armed with about 52 spines in male and 40 to 43 spines in female along inner margin from statocyst region to apex, these spines showing alternate arrangement of 1 longer and 1 to 4 shorter ones except for distal 2 longer spines between which shorter spines are not inserted.

Telson (Fig. 46E, F) 1.3 times longer than sixth abdominal somite, 2.7 times as long as broad at base in both sexes, narrowing abruptly towards about basal 1/5, then gradually towards posterior end; lateral margin with 2 stout spines in basal broadened part, followed by naked part occupying about 1/5 length of lateral margin, then distal series of 20 to 25 spines in male and 12 to 17 spines in female, these spines of distal series increasing posteriorly in length with weak tendency of falling in series, last lateral spine 2/3 as long as apical long ones; posterior margin (Fig. 46G, H) narrow, rather rounded, with pair of long spines, 3 median short spines and pair of plumose setae.

Body length. Adult male, 6.3–7.9 mm; adult female, 5.3–6.9 mm.

Etymology. The specific name, *akajimaensis*, refers to the locality in which the type specimens were collected.

Remarks. A female specimen with the long rostrum extending to the proximal 1/4 of the first segment of the antennular peduncles was found (Fig. 44C). It is suggested that there is an intraspecific variation in the length of the rostrum as in *S. vulgaris*.

Siriella akajimaensis is closely allied to *S. vulgaris*, especially to that from the same locality, Okinawa, Japan. It is, however, distinguished from *S. vulgaris* by: (1) the anterior end of the cephalon being not furnished with any projection; (2) the eyes with a more expanded cornea; (3) the antennal scale with a terminal lobe shorter than broad; (4) the endopod of the eighth thoracic limb with carpopropodus longer than merus (the ratio of carpopropodus to the merus in length is 1.2 in *S. akajimaensis* compared to 0.9 in *S. vulgaris* from Okinawa); (5) the genital organ of the male armed with shorter curved setae than in *S. vulgaris*. Differences from *S. vulgaris* collected from Paray Island, Philippines, are summarized in Table 8.

Siriella akajimaensis is also allied to *S. izuensis*, but differs from that species in having the shorter eyes, the male antennule with a meandering inner flagellum, and the proximal segment of the uropodal exopod armed with fewer spines.

In relation to meandering of the inner flagellum of the male antennule, this species resembles *S. affinis* and *S. okadai*. It is, however, distinguished from *S. affinis* by the rostrum showing almost the same feature in both sexes, the antennal peduncle of the male not extending up to the base of the outer spine of the antennal scale, and the genital organ of the male furnished on the anterior margin with two stout plumose setae compared to five feeble setae in *S. affinis*. It is also distinguished from *S. okadai* by the endopod of the third to eighth thoracic limbs being more slender, and the telson not showing any remarkable sexual dimorphism.

Distribution. Known only from the coastal waters of Okinawa, Japan.

46. *Siriella amamiensis* sp. nov.

(Figs. 47–49)

Type series. Holotype (NSMT-Cr 17947), adult male (6.1 mm); allotype (NSMT-Cr 17948), gravid female (6.0 mm); paratypes (NSMT-Cr 17949), 23 adult males (5.6–6.2 mm, a specimen of 5.9 mm dissected for drawing) and 29 gravid females (4.7–6.3 mm, a specimen of 5.2 mm dissected for drawing); Kise Fishing Port, Kasari, Amami-Oshima Is., southwestern Japan, 25 July 2003, hand net under electric light, coll. K. Fukuoka.

Other material examined. [Amami, Japan] Fifty-seven males, 62 females and 78 juveniles (NSMT-Cr 17950), collection data same as type series.

[Okinawa, Japan] Abundant males (adult, 6.4–7.7 mm) and females (adult, 6.0–7.3 mm) (NSMT-Cr 17951), Ibaruma Fishing Port, Ishigaki Is., 5 November 2002, hand net under electric light, coll. K. Fukuoka.

Description. Carapace (Fig. 47A, B) produced anteriorly into low triangular rostral plate with narrowly rounded or obtusely pointed apex extending to or slightly beyond base of antennular peduncles. Lateral margin of rostrum concave, leaving almost of whole eye exposed. Antero-lateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving posterior 2 thoracic somites uncovered dorsally.

Eyes (Fig. 47A, B) rather small, slightly longer than broad; cornea narrower than eyestalk, occupying less than half of whole organ.

Antennular peduncle of male (Fig. 47A) much more robust than that of female, second segment short, with 1 long seta on inner dorsal margin, third segment longer than first, shorter than first and second segments together. Inner antennular flagellum of male normal and slender. Antennular peduncle of female (Fig. 47B) slender, first segment narrow, slightly longer than succeeding 2 segments combined, outer margin concave, with 1 short seta at about distal 1/3, second segment short, with 1 long seta on each of inner distal corner and inner dorsal margin, third segment with 1 long seta at distal 1/3 of inner margin and 3 long setae at inner distal corner.

Antennal scale of male (Fig. 47A, C) more slender than that of female, slightly more than 3 times as long as broad, extending to distal 1/4 of third segment of antennular peduncle; terminal lobe slightly longer than broad; distal suture not perceptible. Antennal scale of female (Fig. 47B, D) barely extending to distal end of third segment of antennular peduncle, 3 times as long as broad; terminal lobe slightly shorter than broad; distal suture obscure. Antennal peduncle (Fig. 47C) more slender in female than in male, extending to base of outer spine of antennal scale in male and not in female, second segment longest, 2.7 times as long as third in male and 3.2 times

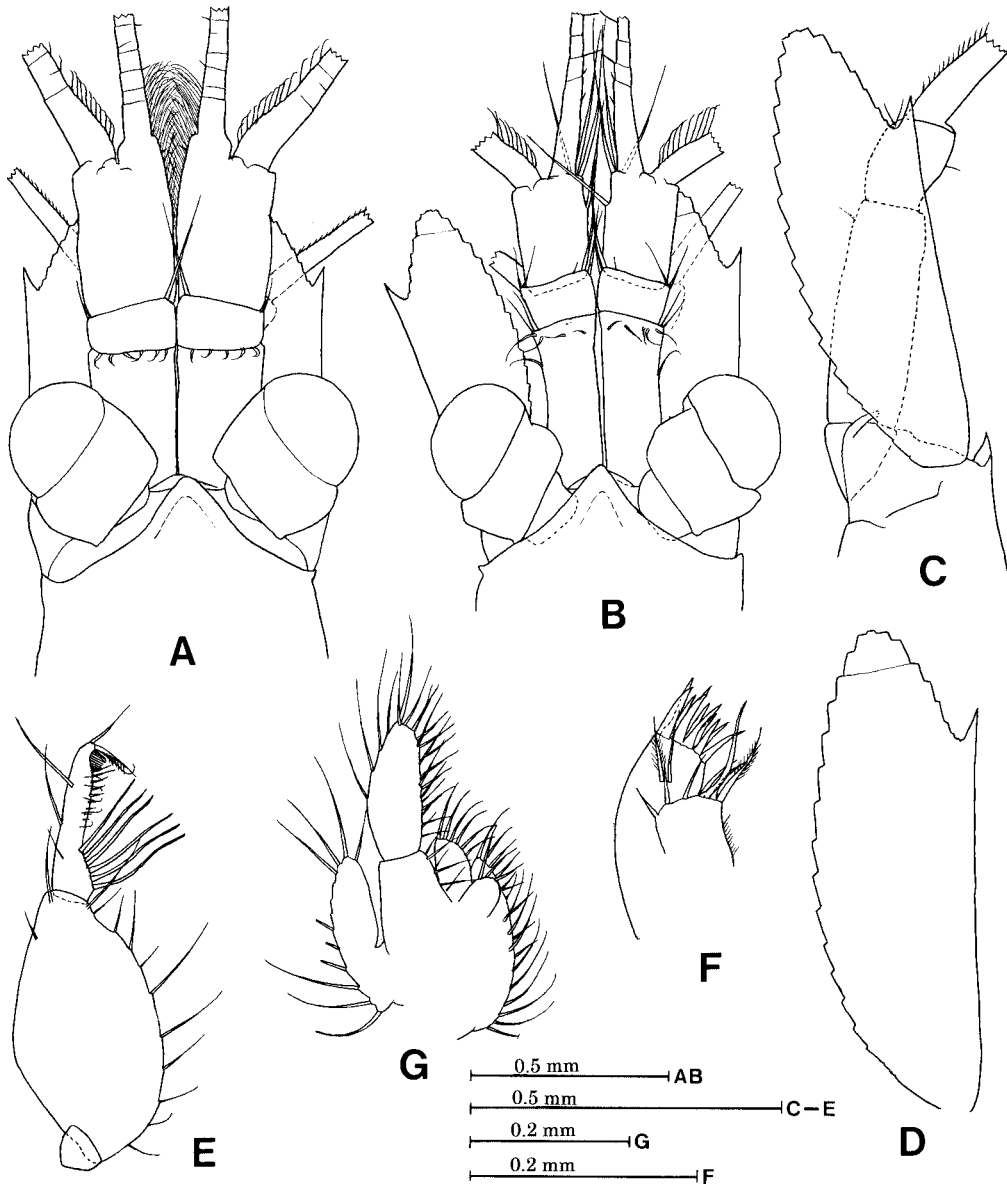


Fig. 47. *Siriella amamiensis* sp. nov.; A, holotype (NSMT-Cr 17947); B, allotype (NSMT-Cr 17948); C, E–G, one of paratypes (NSMT-Cr 17949), adult male (5.9 mm); D, one of paratypes (NSMT-Cr 17949), gravid female (5.2 mm). A, B, anterior part of body; C, antenna; D, antennal scale; E, mandibular palp; F, maxillule; G, maxilla.

as long in female. Antennal sympod (Fig. 47C) with denticle at outer distal corner.

Labrum with long frontal process. Mandibular palp of male (Fig. 47E); second segment expanded, third segment $\frac{2}{3}$ as long as second, becoming narrower towards proximal $\frac{1}{3}$, then parallel-sided, armed on proximal $\frac{1}{3}$ part of outer margin with 6 long setae; that of female slightly slender than in male, third segment almost parallel-sided throughout, with 2 long setae on proximal $\frac{1}{3}$ part of outer margin. Maxillule and maxilla as shown in Fig. 47F and G, respectively.

First and second thoracic limbs as shown in Fig. 49A and B, respectively. Endopod of third to

seventh thoracic limbs (Fig. 48A–C) subequal in size, rather robust, becoming more slender towards posterior pairs, merus longer than carpopropodus (ratio of carpopropodus to merus in length, 0.77 in third limb, 0.76 in sixth limb and 0.79 in seventh limb), carpopropodus not divided or indistinctly divided into 2 subsegments with proximal subsegment much shorter than distal one; terminal claw long and slender. Endopod of eighth thoracic limb (Fig. 48D) slightly smaller and more slender than preceding one, carpopropodus slightly shorter than merus (ratio of carpopropodus to merus in length, 0.89). Exopod of thoracic limbs with flagellipart 10- or 11-segmented (Figs. 48D, 49A), basal plate broad, with small denticle at outer distal corner except for eighth limb rounded (Figs. 48A–D, 49A, B).

Genital organ of male (Fig. 48D) with 1 straight feeble seta and 3 short curved setae on rounded apex and 1 short and 2 long plumose setae on distal part of anterior margin.

Abdomen; first somite 1.3 times longer than second, second to fifth somites subequal in length, sixth somite 1.7 times longer than fifth.

First pleopod of male (Fig. 49C); exopod 9-segmented, endopod wanting. Fourth pleopod of male (Fig. 49D) with both rami 10-segmented; outer setae on distal 3 segments of endopod slightly thicker and longer than others, naked in distal part and sharply pointed at distal end; exopod slightly shorter than endopod, armed with normal setae. Pseudobranchial rami (Fig. 49C, D) straight in first and fifth pleopods, spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 49F) overreaching posterior end of telson by 1/4 of its length; proximal segment armed with 3 to 7 spines (4.9 in average, $n=26$) in adult male and 3 to 5 spines (4.1 in average, $n=17$) in adult female, spines occupying distal 1/6 part of outer margin. Uropodal endopod (Fig. 49E, F) slightly shorter than exopod, armed on inner ventral margin with about 48 spines showing alternate arrangement of 1 longer and 1 to 3 shorter ones.

Telson (Fig. 49F) elongated linguiform, 1.4 times longer than last abdominal somite, 2.75 times as long as broad, slightly extending posteriorly beyond articulation of uropodal exopod, abruptly narrowing towards proximal 1/4, at which slight constriction is present, then gradually narrowing to posterior end. Lateral margin of telson armed on basal widened part with 2 stout spines which are set at relatively long interval, followed by naked part occupying 1/5 of lateral margin, then distal series of 13 to 25 slender spines in male (average 17.4, $n=22$) and 12 to 15 spines in female (average 13.3, $n=23$), these spines increasing in length distally as a whole, posterior 4 or 5 pairs of spines longer in female than in male (Fig. 49G–J). Posterior margin of telson (Fig. 49G–J) slightly arched, with pair of long spines, 3 median small spines and pair of plumose setae; of which long spines twice as long as ultimate lateral spine in male (Fig. 49G) and varying from 0.7 to 1.3 times as long in female (Fig. 49H–J).

Body length. Adult male, 5.6–7.7 mm; adult female, 5.6–7.3 mm.

Etymology. The specific name, *amamiensis*, is derived from the locality, in which the type specimens were collected.

Remarks. An intraspecific variation was found in spine arrangement on the posterior part of the female telson. In 15 out of 20 gravid females examined, the telson (Fig. 49H) is similar to that of males (Fig. 49G), but in one female the ultimate lateral spines are longer than the long spines on the posterior margin (Fig. 49J), as seen in *S. quadrispinosa*, and in the remaining four it is an intermediate form (Fig. 49I).

Specimens from Ishigaki Island are bigger than those from Amami-Oshima Island in body length; i.e. 6.4 to 7.7 mm in adult males and 6.0 to 7.3 mm in adult females in Ishigaki specimens as compared to 5.9 to 6.2 mm in adult males and 4.7 to 6.3 mm in adult females in Amami-Oshima specimens. With the increase of body length, the number of spines arming the outer margin

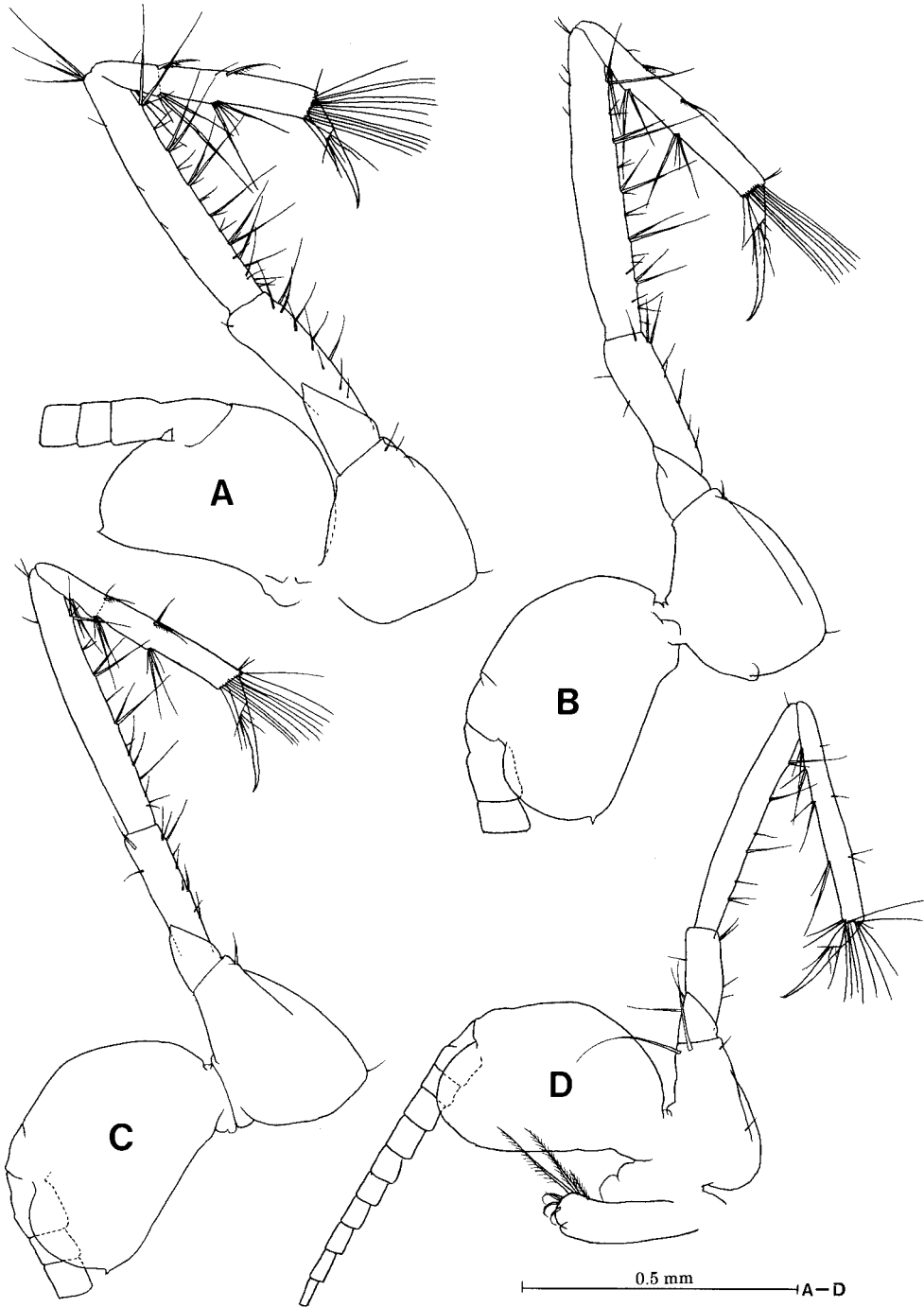


Fig. 48. *Siriella amamiensis* sp. nov.; one of paratypes (NSMT-Cr 17949), adult male (5.9 mm). A, third thoracic limb; B, sixth thoracic limb; C, seventh thoracic limb; D, eighth thoracic limb with genital organ.

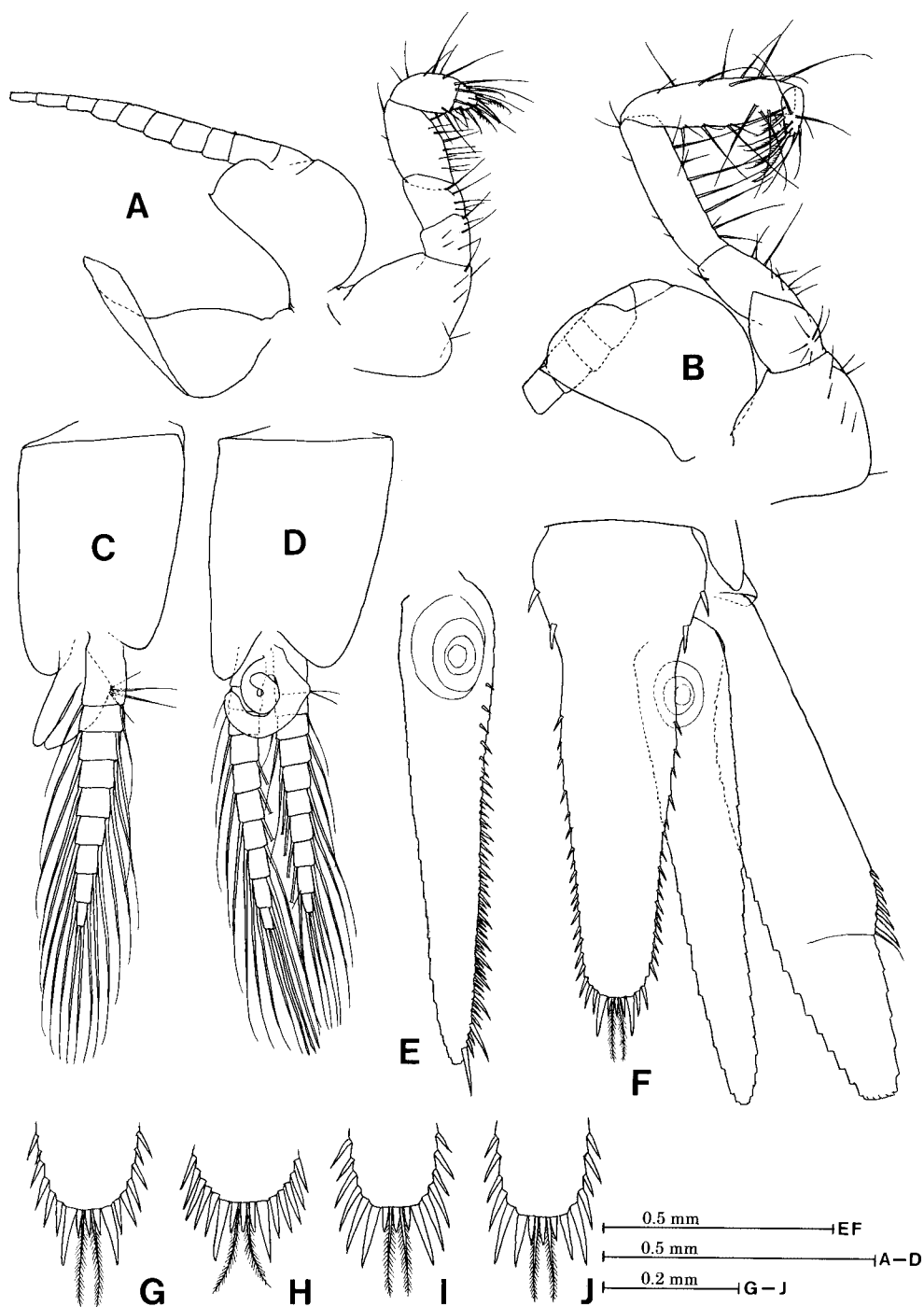


Fig. 49. *Siriella amamiensis* sp. nov.; A–E, G, one of paratypes (NSMT-Cr 17949), adult male (5.9 mm); F, holotype (NSMT-Cr 17947); H, allotype (NSMT-Cr 17948); I, one of paratypes (NSMT-Cr 17949), gravid female (6.2 mm); J, one of paratypes (NSMT-Cr 17949), gravid female (6.1 mm). A, first thoracic limb; B, second thoracic limb; C, first pleopod; D, fourth pleopod; E, uropodal endopod; F, uropod and telson; G–J, posterior part of telson.

of the uropodal exopod and the lateral margin of the telson also increases in the Ishigaki specimens; i.e. the number of spines on the uropodal exopod is six to eight in adult males and five to seven in adult females in the Ishigaki specimens as compared to three to seven in adult males and three to five in adult females in the Amami-Oshima specimens, and that on the lateral margin of the telson is 21 to 26 in adult males and 14 to 19 in adult females in the Ishigaki specimens as compared to 13 to 25 in adult males and 12 to 15 in adult females in the Amami-Oshima specimens. These differences observed between both localities might be due to seasonal variation rather than spatial variation. Sexual differences in the spine arrangement on the posterior part of the telson, which was seen in the type specimens from Amami-Oshima, were hardly observed in the Ishigaki specimens.

Siriella amamiensis resembles *S. vulgaris* and *S. akajimaensis* which have been recorded from a close locality, Okinawa. This species is distinguished from *S. vulgaris* in three differences, i.e. (1) the anterior margin of the cephalon which is not furnished with any projection; (2) the terminal lobe of the antennal scale much shorter than in *S. vulgaris*; (3) the spine arrangement on the posterior part of the telson showing an intraspecific variation. It is also distinguishable from *S. akajimaensis* by: (1) the inner antennular flagellum of the male being neither twisted nor contorted; (2) the antennal scale of almost the same shape in both sexes; (3) the endopod of the third to eighth thoracic limbs with a more slender terminal claw; (4) the female telson showing an intraspecific variation in spine arrangement.

Moreover, this species is allied to *S. izuensis* from the mainland of Japan and *S. bacescui* from the northeastern Australian waters, but distinctly differs from *S. izuensis* in the rostrum with narrowly rounded or obtusely pointed apex, the eyes with smaller cornea, the antennal scale with a longer terminal lobe, the endopod of thoracic limbs with more slender claw, and the telson with two basal spines set distantly, and it differs from *S. bacescui* in the bigger eyes, the terminal lobe of the antennal scale occupying distal 2/7 as against 1/3 in *S. bacescui* and the more slender uropod.

Distribution. Known only from southwestern Japan.

47. *Siriella brucei* sp. nov.

(Figs. 50, 51)

Type series. Holotype (NTM Cr002940), gravid female (6.4 mm, dissected); paratypes (NTM Cr015175), 2 gravid females (6.5, 7.0 mm), 1 adult female (6.5 mm); 11°13.5'S 132°10.5'E, St. CP37, Table Head, Port Essington, Cobourg Peninsula, Northern Territory, Australia, 3 May 1982, 1–3 m, on soft coral *Nephthya* sp., during scuba diving, coll. H. K. Larson.

Description. Carapace (Fig. 50A) produced anteriorly into triangular rostral plate with narrowly rounded apex extending to basal 1/4 of first segment of antennular peduncle; lateral margin of rostrum slightly concave. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving last 2 thoracic somites exposed.

Eyes (Fig. 50A) somewhat elongated, 1.3 times as long as broad; cornea rather small, globular, as broad as eyestalk, occupying distal 1/3 of whole organ.

Antennular peduncle of female (Fig. 50A) rather slender, first segment as long as second and third segments combined; second segment short, with 2 long setae, one at inner distal corner and the other on inner dorsal margin; third segment 1.3 times as long as broad, with 1 long seta at distal 1/4 of inner margin and 2 long setae at inner distal corner.

Antennal scale (Fig. 50B) extending to distal 1/4 of third segment of antennular peduncle,

slightly less than 3 times as long as broad, distal suture distinct; outer margin naked, straight, ending to stout spine; terminal lobe occupying $2/7$ of scale length, as long as broad, nearly 3 times as long as terminal spine of outer margin. Antennal peduncle (Fig. 50B) reaching barely base of terminal lobe of antennal scale, second segment longest, 2.5 times as long as third. Antennal sympod (Fig. 50B) with small denticle at outer distal angle.

Mandibular palp (Fig. 50C); second segment rather slender, slightly more than twice as long as broad, inner margin with 3 short setae, outer margin with 10 setae at about regular intervals; third segment tapered, with 2 long slender setae at about proximal $1/4$ of outer margin. Maxillule and maxilla as shown in Fig. 50D and E, respectively.

Endopod of first thoracic limb (Fig. 50F) short, merus longer than carpopropodus, terminal claw stout. Endopod of second thoracic limb (Fig. 50G) with merus slightly shorter than carpopropodus, terminal claw stout. Endopod of third to eighth thoracic limbs (Fig. 51A–F) slender, becoming gradually longer towards fifth endopod, then becoming gradually shorter and narrower towards eighth endopod; carpopropodus not divided into subsegments, shorter than merus except for eighth endopod in which it is longer than merus; terminal claw slender. Exopod of thoracic limbs (Figs. 50F, G, 51B, F); flagellipart 9-segmented in first and eighth limbs, 10-segmented in second to seventh limbs; outer distal corner of basal plate (Figs. 50F, G, 51B–F) pointed in all exopods.

First to fifth abdominal somites subequal in length, sixth somite 1.5 times longer than preceding one.

Uropodal exopod (Fig. 51G) extending beyond posterior margin of telson for $1/3$ of its length; proximal segment armed with 5 graded spines occupying distal $1/6$ part of outer margin; distal segment less than half as long as proximal. Uropodal endopod (Fig. 51G) tapered, overreaching apex of telson for $1/4$ of its length, inner ventral margin from statocyst region to near apex armed with about 37 spines showing alternate arrangement of 1 longer and 1 or 2 shorter ones.

Telson (Fig. 51H) elongated linguiform, 1.1 times longer than sixth abdominal somite, 2.3 times as long as broad at base, extending to articulation of uropodal exopod, narrowing abruptly from base to proximal $2/7$, at which slight constriction is present, then gradually narrowing towards posterior end. Lateral margin of telson (Fig. 51H) armed on basal broadened part with 2 stout spines which are set distantly, followed by naked part occupying $2/9$ of lateral margin, then distal series of about 20 slender spines on more than distal half of margin, distal series of spines short, rather stout and set sparsely in proximal half, and slender, densely arranged and becoming gradually longer posteriorly in distal half; distal several pairs of lateral spines fringed with secondary spinules. Posterior margin of telson (Fig. 51H) rather broad, with pair of long spines, 3 median spines and pair of plumose setae, of which 3 median spines relatively long, $2/3$ as long as long spines flanking them.

Body length. Adult female, 6.4–7.0 mm.

Etymology. This species is named in honor of Dr. A. J. Bruce who gave us the opportunity of examining this material.

Remarks. *Siriella brucei* is allied to *S. wadai*, which has been recorded from the northern sea area of Australia, in having several posterior pairs of barbed spines on the lateral margin of the telson, but differs from the latter species in the telson having a broad posterior margin and two stout spines set distantly on the basal broadened part.

This species is distinguishable from the other species within the genus by a combination of following characters: (1) the posterior half of the telson relatively broad; (2) the telson with the

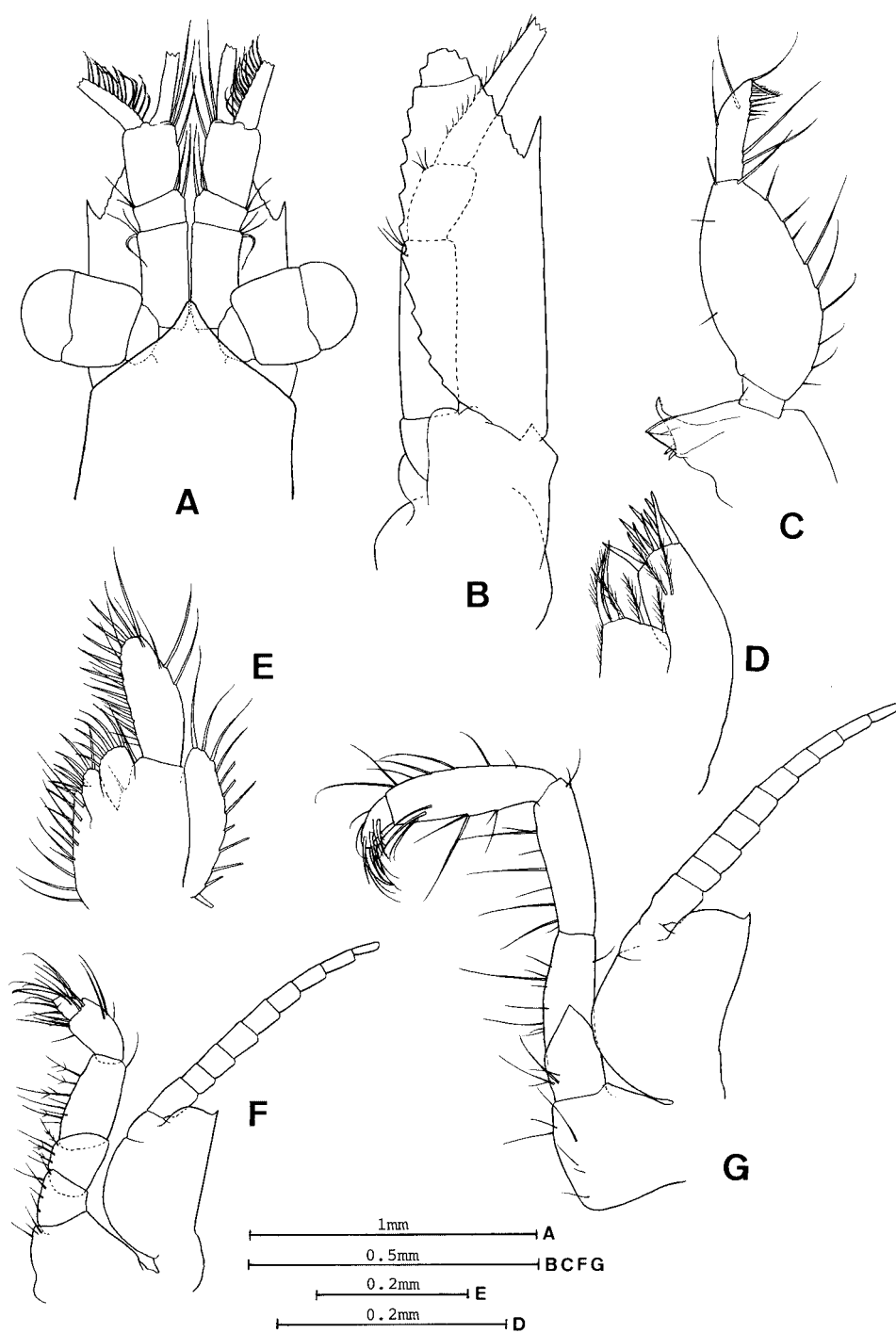


Fig. 50. *Siriella brucei* sp. nov.; holotype (NTM Cr002940). A, anterior part of body; B, antenna; C, mandible and mandibular palp; D, maxillule; E, maxilla; F, first thoracic limb; G, second thoracic limb.

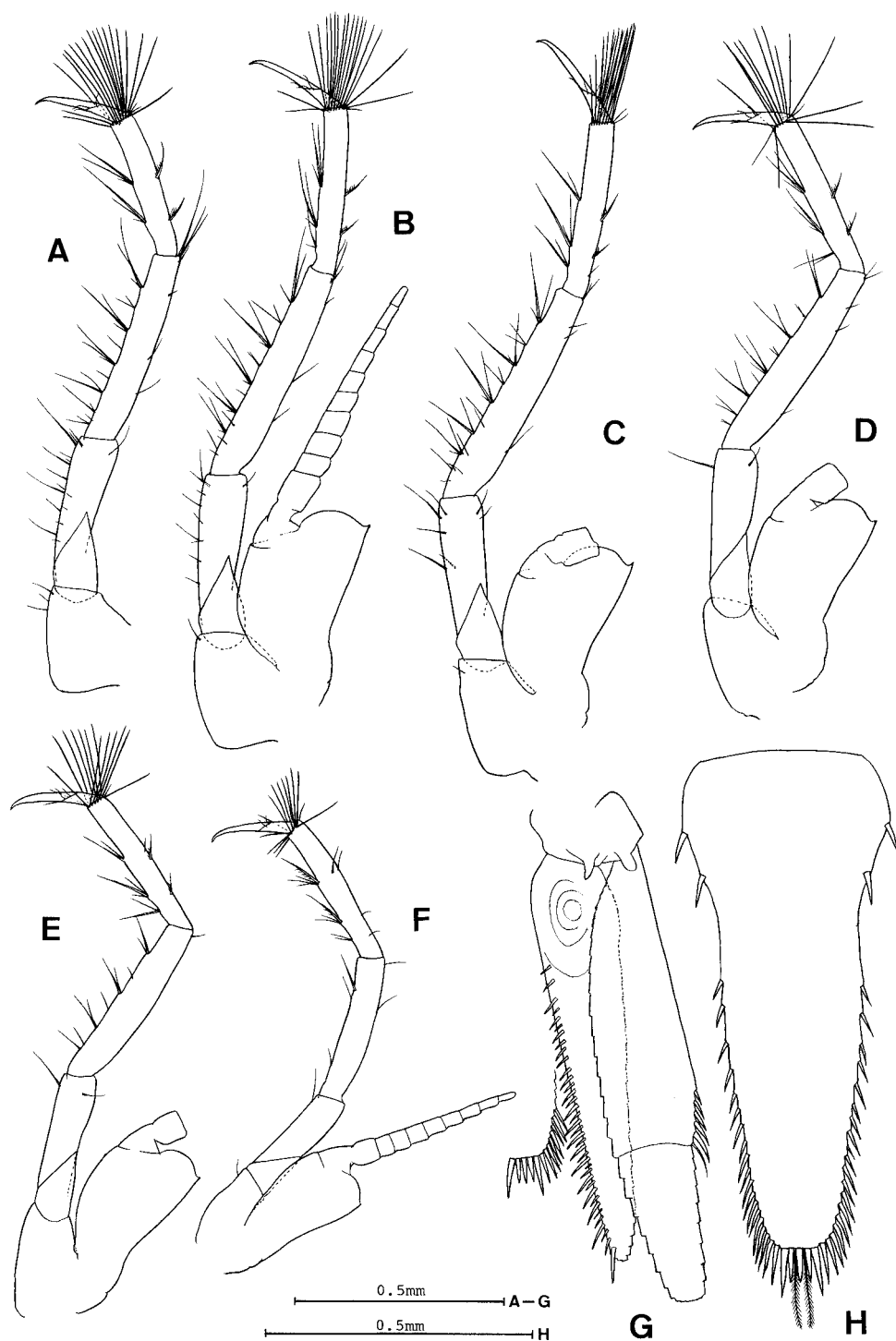


Fig. 51. *Siriella brucei* sp. nov.; holotype (NTM Cr002940). A, endopod of third thoracic limb; B–F, fourth to eighth thoracic limbs; G, uropod; H, telson.

basal broadened part armed with two spines set distantly; (3) the telson with several pairs of posterior lateral spines fringed with secondary spinules; (4) the inner ventral margin of the uropodal endopod armed with relatively small number of spines showing the alternate arrangement of one longer and one or two shorter ones.

The male is unknown.

Distribution. Known only from the type locality.

48. *Siriella essingtonensis* sp. nov.

(Figs. 52, 53)

Type series. Holotype (NTM Cr015176), adult male (7.2 mm); paratype (NTM Cr015177), adult male (7.5 mm, dissected for drawing); 11°14.8'S 132°11.2'E; St. CP45(PE/28), Table Head, Port Essington, Cobourg Peninsula, Northern Territory, Australia, 11 May 1983, low water, basalt reef flat pool, coll. A. J. Bruce.

Description. Carapace (Fig. 52A) produced anteriorly into low triangular rostral plate with pointed apex extending to base of antennular peduncles; lateral margin of rostrum concave, leaving completely whole eyes uncovered. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving posterior 3 thoracic somites exposed dorsally.

Eyes (Fig. 52A) moderate in size, cornea broader than eyestalk, occupying more than half of whole organ.

Antennular peduncle (Fig. 52A); second segment short, with 1 long seta on inner dorsal margin, third segment slightly longer than first, with developed appendix masculina. Inner flagellum of antennule (Fig. 52A) narrower than outer, slightly meandering in proximal 1/3 part.

Antennal scale (Fig. 52A, B) extending to distal 1/4 of third segment of antennular peduncle, 3 times as long as broad; outer margin straight, naked, terminating in strong spine; terminal lobe shorter than broad; distal suture distinct. Antennal peduncle (Fig. 52B) extending to base of outer spine of antennal scale, second segment longest, 2.15 times as long as third; third segment 1.3 times as long as broad. Antennal sympod (Fig. 52B) with denticle at outer distal corner.

Mandibular palp (Fig. 52C); second segment elliptical; third segment 2/3 as long as second, armed with 7 long stout setae on proximal 1/3 part of outer margin.

Endopod of second thoracic limb (Fig. 53A) relatively long; merus becoming slightly broader distally, outer margin naked except for 1 seta at distal corner; carpopropodus as long as merus, slightly expanded in middle part. Endopod of third to seventh thoracic limbs (Fig. 53B, C) relatively robust, becoming more slender towards posterior pairs; merus slightly longer than carpopropodus; carpopropodus divided into 2 subsegments with distal subsegment about twice as long as proximal one; terminal claw slender. Endopod of third thoracic limb (Fig. 53B) with merus armed with 3 long plumose setae at outer distal corner. Endopod of eighth thoracic limb (Fig. 53D) much more slender than preceding ones, carpopropodus 1.2 times longer than merus, divided into 2 subsegments with distal subsegment 1.4 times longer than proximal one. Exopod of thoracic limbs (Fig. 53A–D) with flagellum 10-segmented in first and eighth limbs and 11-segmented in second to seventh limbs; basal plate broad, with outer distal corner armed with small denticle except for eighth limb rounded.

Genital organ of male (Fig. 52D) curved anteriorly; distal 1/3 of anterior margin armed with 7 slender curved setae increasing in length distally; apex rounded, with 2 recurved setae.

Abdomen; first 5 somites subequal in length, sixth somite 1.6 times longer than preceding one.

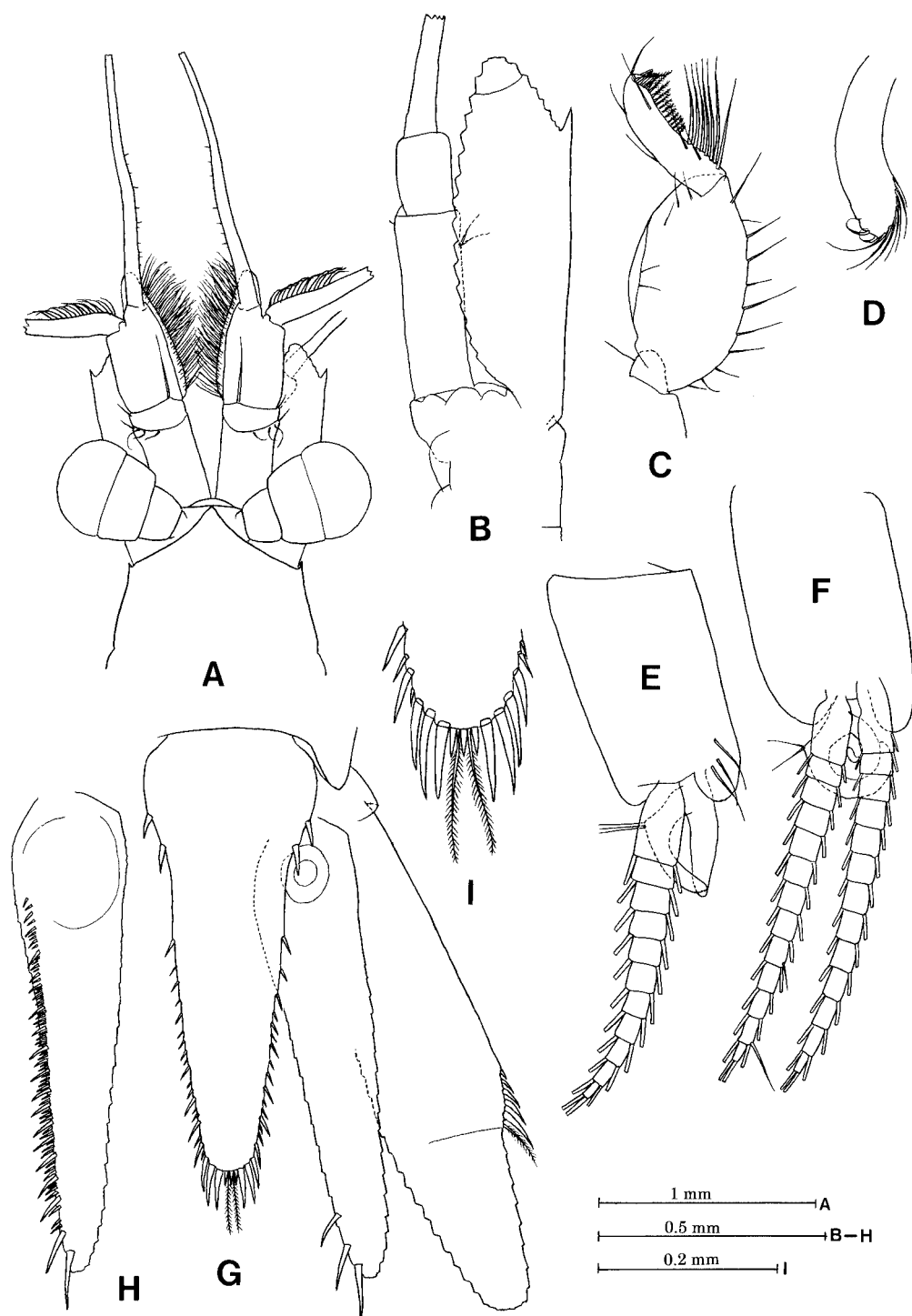


Fig. 52. *Siriella essingtonensis* sp. nov.; A, G, I, holotype (NTM Cr015176); B–F, H, paratype (NTM Cr015177). A, anterior part of body; B, antenna; C, mandibular palp; D, genital organ; E, first pleopod; F, fourth pleopod; G, uropod and telson (most of inner marginal spines on uropodal endopod omitted); H, uropodal endopod, I, posterior part of telson.

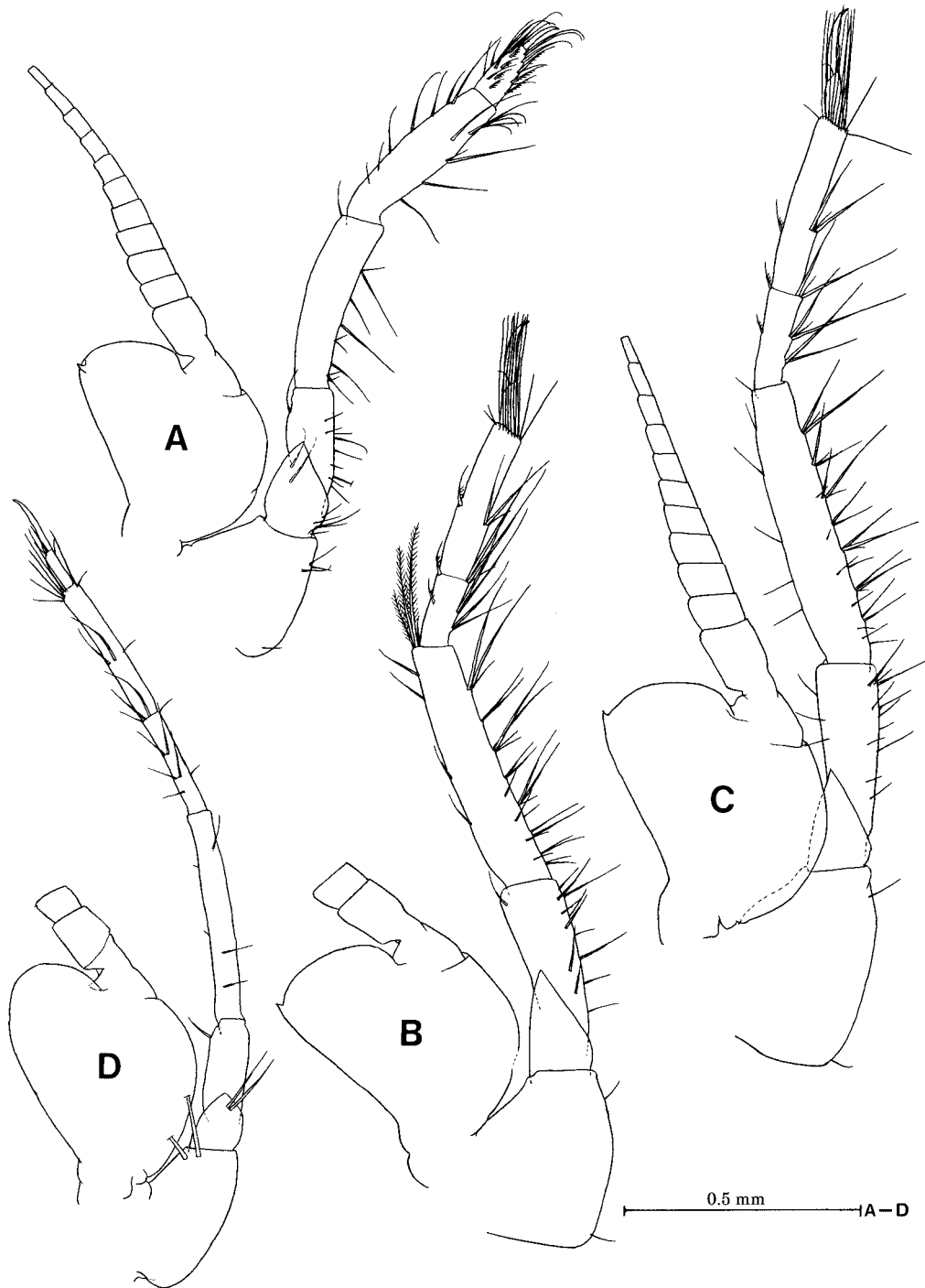


Fig. 53. *Siriella essingtonensis* sp. nov.; paratype (NTM Cr015177). A, second thoracic limb; B, third thoracic limb; C, fifth thoracic limb; D, eighth thoracic limb.

First pleopod (Fig. 52E); exopod 11-segmented, endopod wanting. Second and third pleopods with both rami 12-segmented, exopod with 1 accessory naked seta on each of penultimate and seventh segments. Fourth pleopod (Fig. 52F) somewhat longer than other pleopods, with both rami 13-segmented; exopod equal to endopod in length, with 1 accessory naked seta on penultimate and ninth segments, terminal setae and outer setae on distal several segments slightly thicker than others. Fifth pleopod shorter than second to fourth pleopods, with 13-segmented endopod and 12-segmented exopod, 1 accessory naked seta present on penultimate and seventh segments of exopod. Pseudobranchial rami (Fig. 52E, F) straight in first and fifth pleopods, spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 52G) overreaching posterior end of telson by 1/3 of its length, proximal segment armed with 5 spines on distal 1/6 part of outer margin; distal segment 1.5 times as long as broad, about half as long as proximal segment. Uropodal endopod (Fig. 52G, H) distinctly shorter than exopod, armed on inner ventral margin from statocyst region to near posterior end with about 70 spines showing alternate arrangement of 1 longer and 1 to 4 shorter ones, except for posterior 2 longer spines between which shorter spines are not inserted.

Telson (Fig. 52G) elongated linguiform, 1.3 times longer than last abdominal somite, 2.5 times as long as broad, extending to articulation of uropodal exopod. Lateral margin of telson (Fig. 52G) armed on basal widened part with 2 stout spines, followed by unarmed part occupying less than 1/4 of lateral margin, then distal series of about 17 to 20 spines, these spines showing alternate arrangement of 1 longer and 2 or 3 shorter ones, shorter spines considerably short compared to longer spines. Posterior margin of telson (Fig. 52G, I) arched, with pair of long spines, 3 median short spines and pair of plumose setae, of which longer spines are equal to or shorter than distalmost spine on lateral margin.

Body length. Adult male, 7.2–7.5 mm.

Etymology. The specific name, *essingtonensis*, is derived from the locality, in which the specimens were collected.

Remarks. *Siriella essingtonensis* is distinguished from the other species of the Thompsonii-subgroup by a combination of following characters: (1) the inner flagellum of the antennule slightly meandering in the proximal 1/3 part; (2) the second thoracic limb with endopod relatively elongated, (3) the genital organ of the male armed with seven slender curved setae on the distal 1/3 part of the anterior margin; (4) the second to fifth male pleopods with both rami segmented into 12 or 13; (5) the ultimate spine on the lateral margin of the telson equal to or longer than long spines on the posterior margin.

The female is unknown.

Distribution. Known only from the type locality.

49. *Siriella iii* sp. nov.

(Figs. 54–56)

Type series. Holotype (NSMT-Cr 17767), adult male (8.9 mm); allotype (NSMT-Cr 17768), gravid female with 19 embryos (8.3 mm); paratypes (NSMT-Cr 17769), 42 adult males (7.5–9.7 mm), 45 gravid females (6.3–8.5 mm), 15 adult females (up to 8.9 mm), 27 immature males and 7 immature females (Ii's Coll. No. 187); near Misaki Marine Biological Station, University of Tokyo, Aburatsubo Inlet, Kanagawa Prefecture, central Japan, 19 May 1933, night.

Description. Carapace (Fig. 54A, B) produced anteriorly into right-angled triangular rostral plate in male and acute-angled plate in female, somewhat longer in female than in male, apex

pointed, extending slightly beyond basal margin of antennular peduncles. Lateral margin of rostrum slightly concave, leaving whole organ of eyes exposed in both sexes. Carapace with anterolateral corner rounded; posterior margin emarginate, leaving last 2 thoracic somites uncovered dorsally.

Eyes (Fig. 54A, B) moderate in size, cornea occupying more than half of whole organ, slightly broader than eyestalk.

Antennular peduncle of male (Fig. 54A) robust; first segment less than 1.5 times as long as broad, second segment short, with 1 long seta on inner dorsal margin, third segment as long as first. Antennular peduncle of female (Fig. 54B) much more slender than in male; first segment longer than second and third segments combined, second segment short, with 2 long setae at inner distal corner, third segment about twice as long as second, 1.5 times as long as broad, with 1 long seta at distal 1/3 of inner margin and 2 long setae at inner distal corner. Inner antennular flagellum of male (Fig. 54A, C) peculiarly contorted in proximal 1/3 part, it is more remarkable in lateral view.

Antennal scale in both sexes (Fig. 54A, B, D, E) extending to distal 1/3 of third segment of antennular peduncle, 2.8 times as long as broad; outer margin naked, straight, terminating in stout spine; terminal lobe 1.3 times broader than long; distal suture not perceptible in holotype but distinct in allotype. Antennal peduncle of male (Fig. 54D) extending to base of outer spine of antennal scale, second segment longest, more than twice as long as third. Antennal peduncle of female (Fig. 54E) more slender than in male, not extending to base of outer spine of scale, second segment 2.5 times as long as third. Antennal sympod (Fig. 54D, E) with triangular process at outer distal corner.

Mandibular palp (Fig. 54F, G); second segment relatively slender, about 2.5 times as long as broad, third segment more slender in female, armed with 8 long setae in male and 3 in female on proximal 2/5 part of outer margin. Outer lobe of maxillule and maxilla as shown in Fig. 55H and I, respectively.

Endopod of first thoracic limb (Fig. 55A) small, robust; terminal claw relatively long and stout. Endopod of second thoracic limb (Fig. 55B) shorter than that of third thoracic limb, merus slightly longer than carpopropodus, which is not divided into subsegments, terminal claw small. Endopod of third to eighth thoracic limbs (Fig. 55C–F) comparatively stout in this genus, becoming more slender towards posterior pairs, carpopropodus divided into 2 subsegments with proximal segment occupying 2/5 of its segment; terminal claw short and stout. Exopod of thoracic limbs (Fig. 55A) with flagellum 10-segmented in first limb, 12-segmented in second to eighth limbs; basal plate with outer distal corner pointed in first to sixth limbs, rounded in seventh and eighth limbs.

Genital organ of male (Fig. 55F) small, with 2 curved setae and 1 feeble seta on anterodistal corner and 3 long plumose setae on distal part of anterior margin.

Abdomen; first somite 1.2 times longer than second, second to fifth somites subequal in length, sixth somite 1.7 times longer than fifth.

Male pleopods of typical form in this genus (Fig. 56A–C), without modified setae; pseudo-branchial rami nearly straight in first and fifth limbs and spirally coiled in second to fourth limbs.

Uropodal exopod (Fig. 56E, F) overreaching posterior end of telson for about 1/4 of its length; proximal segment with 5 graded spines on distal 1/5 part in male and 4 on distal 1/6 part in female; distal segment slightly more than half as long as proximal one, setose all round. Uropodal endopod (Fig. 56D–F) extending beyond posterior end of telson for 1/6 of its length, armed on inner margin with many spines (78 spines in holotype and 51 in allotype), which show

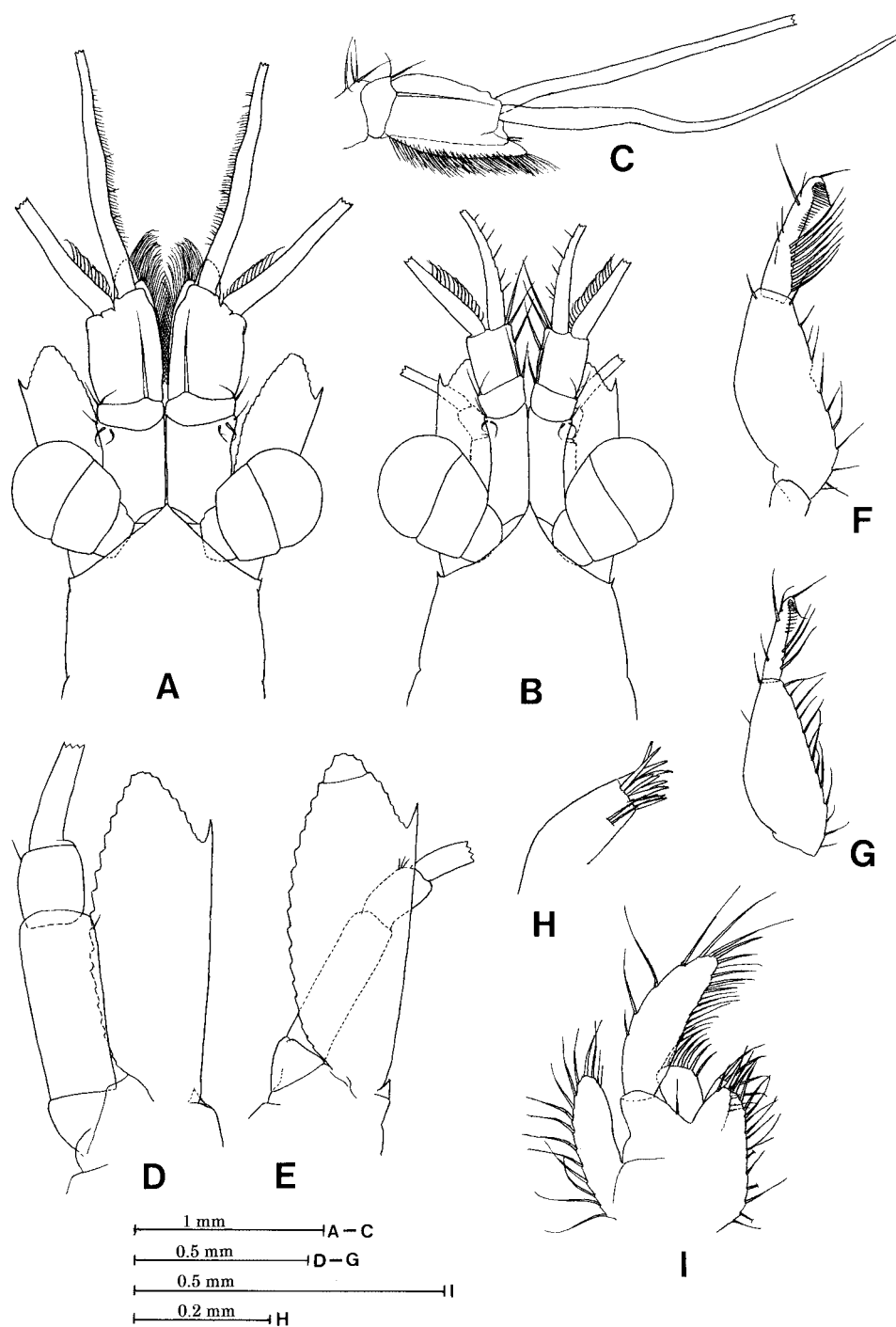


Fig. 54. *Siriella iii* sp. nov.; A, C, D, F, H, I, holotype (NSMT-Cr 17767); B, E, G, allotype (NSMT-Cr 17768). A, B, anterior part of body; C, antennule in lateral view; D, E, antenna; F, G, mandibular palp; H, outer lobe of maxillule; I, maxilla.

alternate arrangement of 1 longer and 1 to 5 smaller ones except for distal 3 and proximal about 9 longer spines between which smaller ones are not inserted.

Telson (Fig. 56E, F) elongated linguiform, 1.3 times longer than last abdominal somite, slightly more than 2.8 times as long as broad, extending posteriorly beyond articulation of uropodal exopod, narrowing abruptly towards proximal 1/5, then gradually towards posterior end. Lateral margin of telson (Fig. 56E, F) armed with 2 stout spines on basal widened part, followed by unarmed part occupying about 1/5 of lateral margin, then distal series of 19 to 21 slender spines in male and 15 or 16 spines in female, these spines increasing in length posteriorly as a whole, although several small spines inserted in places. Posterior margin of telson (Fig. 56E, F) narrow, not showing noticeable sexual dimorphism in armature, with pair of long spines, 3 median short spines, which are 1/3 as long as long spines flanking them, and pair of plumose setae.

Body length. Adult male, 7.5–9.7 mm; adult female, 6.3–8.9 mm.

Etymology. The specific name is derived from Dr. Naoyoshi Ii. The material was found among Ii's Collection of mysids.

Remarks. These present specimens were found in the vial of Ii's Collection No. 187, together with 124 individuals of *Siriella macropsis*.

Siriella iii is closely allied to *S. okadai*, in the following characteristics, such as the contorted inner flagellum of the male antennule, the shape of the antennal scale, the endopod of the third to eighth thoracic limbs armed with a stout terminal claw, and the shape and armature of the telson of the male. As noted in the section of *S. okadai*, the type specimens of *S. okadai* are somewhat different from the original description and illustrations given by Ii (1964a) in relation to the inner antennular flagellum of the male, and the spine arrangement on the posterior margin of the telson of the female. *Siriella iii* is different from both the Ii's description and the present observation on the type specimens of *S. okadai* as follows: (1) the rostrum acuter in *S. iii* than in *S. okadai*; (2) the spine arrangement of the telson of *S. iii* not showing any sexual dimorphism, whereas that of *S. okadai* showing a noticeable dimorphism; (3) the inner antennular flagellum of the male considerably contorted in *S. iii*, while scarcely contorted in the type specimens of *S. okadai* noticed in the present observation, although Ii (1964a) described and illustrated a considerable contortion; (4) the carpopropodus of the endopod of the eighth thoracic limb 1.25 times longer than merus in *S. iii* whereas 1.15 times longer in *S. okadai*; (5) the articulation dividing into subsegments in the carpopropodus of the endopod of the third to eighth thoracic limbs positioned nearer to the proximal end in *S. okadai* than in *S. iii*, e.g. in the eighth thoracic limb, the distal subsegment only 1.4 times longer than the proximal in *S. iii* as compared to 2.2 times longer in *S. okadai*; (6) the uropodal endopod being not inserted with shorter spines within distal three longer spines in *S. iii*, whereas shorter spines being not inserted between distal two longer spines in *S. okadai*.

In the genus *Siriella*, the modification in the inner antennular flagellum of the male is known in some species, such as *S. japonica*, *S. watasei*, *S. koreana*, *S. macropsis*, *S. akajimaensis* etc., in addition to *S. okadai*. *Siriella iii* is distinguished from these species due to a combination of the following characteristics, such as the shape of the rostrum, the antennal scale not showing any sexual dimorphism, the endopod of the third to eighth thoracic limbs with a short and stout terminal claw, the armature on the genital organ of the male, the number of spines on the outer margin of the uropodal exopod, and the spine arrangement on the posterior margin of the telson.

Modification in the inner antennular flagellum of the male is one of the most important character. The smallest specimen having a modified inner flagellum is 6.5 mm in body length, and it is considered as an immature stage due to the developmental state of pleopods.

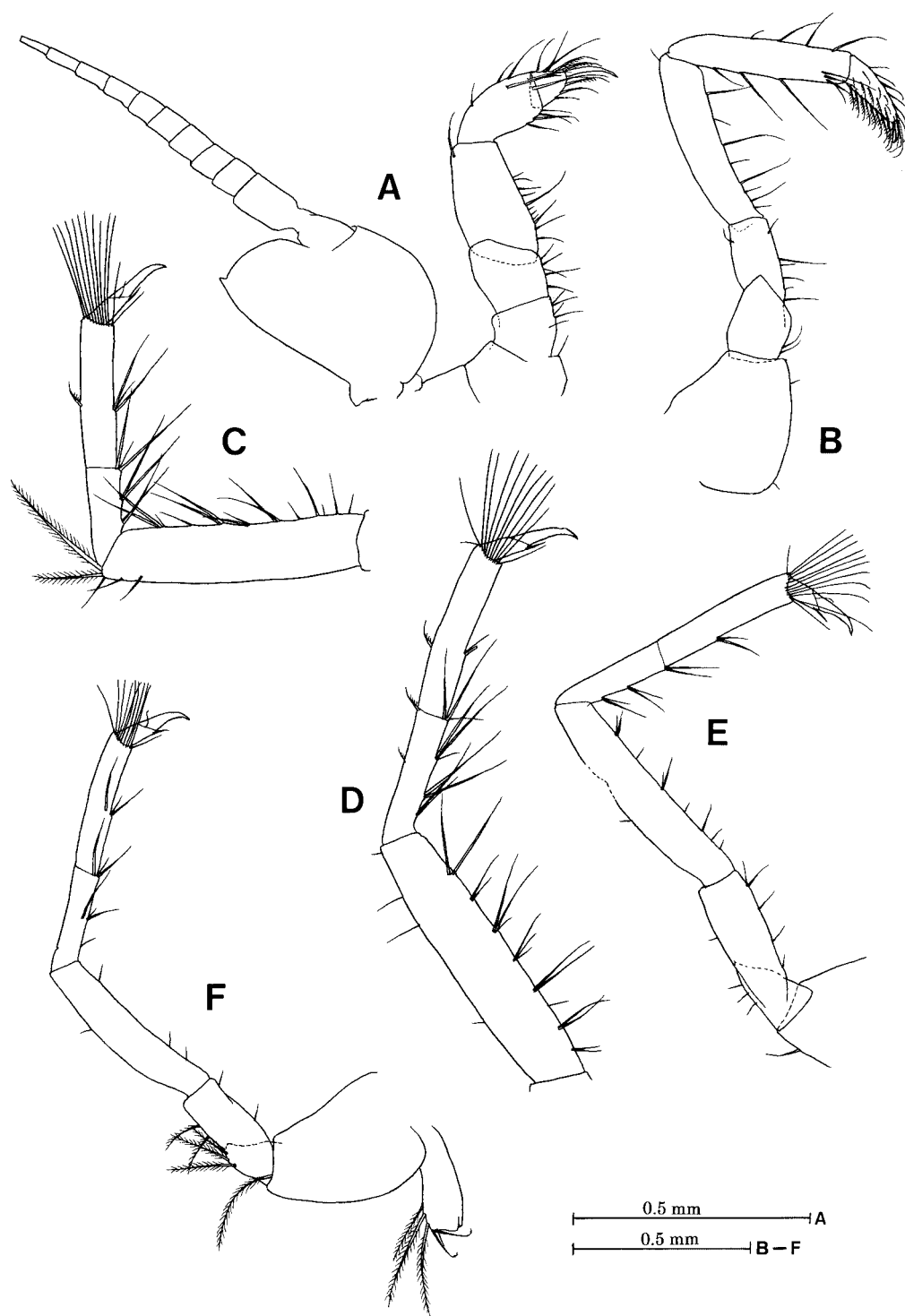


Fig. 55. *Siriella iii* sp. nov.; holotype (NSMT-Cr 17767). A, first thoracic limb; B, endopod of second thoracic limb; C–E, endopod of third, fifth and seventh thoracic limbs; F, endopod of eighth thoracic limb with genital organ.

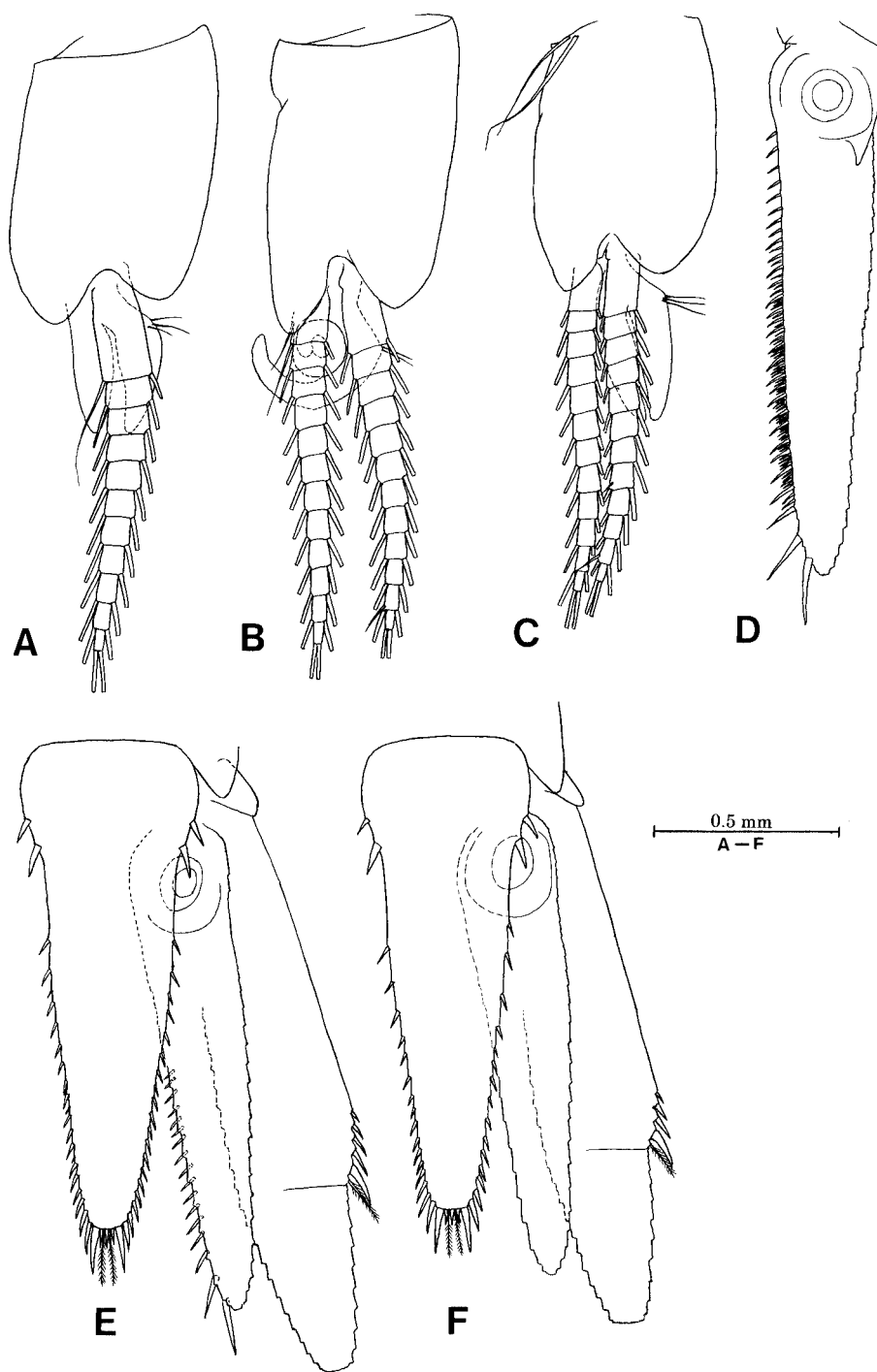


Fig. 56. *Siriella iii* sp. nov.; A–E, holotype (NSMT-Cr 17767); F, allotype (NSMT-Cr 17768). A–C, first, fourth and fifth pleopods; D, uropodal endopod; E, uropod and telson (shorter spines on inner margin of uropodal endopod omitted); F, uropod and telson.

Distribution. Known only from the type locality.

50. *Siriella longiarticulis* sp. nov.

(Figs. 57, 58)

Type series. Holotype (NSMT-Cr 16242), adult female (ca. 7.5 mm, dissected); allotype (NSMT-Cr 16243), adult male (ca. 6.5 mm); paratypes (NSMT-Cr 16244), 2 adult females (one of which ca. 7.0 mm, another damaged) and 1 immature female (damaged); 12°24.8'S 128°00.1'E to 12°24.8'S 128°00.2'E, Sahul Shelf, 25 June 1972, 115–115 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Other material examined. [Sulu Sea] One adult female (ca. 8.5 mm) (NSMT-Cr 16245), 08°09.2'N 117°53.8'E to 08°10.5'N 117°54.5'E, 26 May 1972, 200–215 m, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Description. Rostrum damaged in holotype (Fig. 57A), but in one of female paratypes (ca. 7.0 mm) rostrum produced anteriorly into triangular plate with moderately rounded apex (Fig. 58B). Anterolateral corner of carapace rounded.

Eyes (Fig. 57A) elongated, 1.5 times as long as broad; cornea somewhat injured, probably functionally normal, small, narrower than eyestalk, occupying about 1/3 of whole organ; eyestalk with posterior margin swollen.

Antennular peduncle of female (Fig. 57A) elongated, rather stout; first segment 1.5 times as long as broad, outer margin armed with 1 seta at distal 1/3 and several setae at distal angle; second segment shorter than broad; third segment becoming gradually narrower distally, more than 2.3 to 2.5 times as long as broad, as long as preceding 2 segments combined. Antennular peduncle of male (Fig. 57B) similar to that of female but more robust; first segment 1.2 times as long as broad, with 1 seta at distal 1/4 of outer margin; third segment much longer than preceding 2 segments combined, appendix masculina short, hirsute. Inner flagellum of antennule of both sexes (Fig. 57A, B) narrower than outer, especially in male, directing inwardly at base, then turned forwardly.

Antennal scale of female (Fig. 57A, C) short and broad, 2.6 times as long as broad, extending to proximal 1/4 of third segment of antennular peduncle; apex slightly extending beyond spine terminating naked part of outer margin; apical suture marked off at about distal 1/11. Antennal peduncle of female (Fig. 57A, C) extremely elongated, far extending beyond apex of antennal scale and reaching distal 1/3 of third segment of antennular peduncle; first segment short, wider than long; second segment very long, 7 times as long as broad, extending to base of spine of outer margin of antennal scale; third segment less than 3 times as long as broad, 2/5 as long as second segment. Antenna of male similar to that of female.

Labrum (Fig. 57D) longer than broad, with long frontal process.

Mandibular palp (Fig. 57D) slender; second segment with 5 spine-like setae on distal half of outer margin, inner margin naked; third segment 7 times as long as broad, inner margin with 4 minute setae on proximal half and 1 long seta at about distal 1/5, outer margin armed with 3 or 4 long setae on proximal half in female and 5 in male, and with about 10 barbed setae on distal 1/4.

Endopod of second thoracic limb (Fig. 57E) elongated, more robust than those of succeeding limbs, carpopropodus slightly shorter than merus, not divided into subsegments, dactylus more than 1/3 as long as carpopropodus, narrowing distally, inner margin concave, armed with 2 modified setae at proximal 1/4 and several short barbed setae on distal half, distal part with many long simple setae; terminal claw short but distinct. Endopod of third to eight thoracic limbs (Figs.

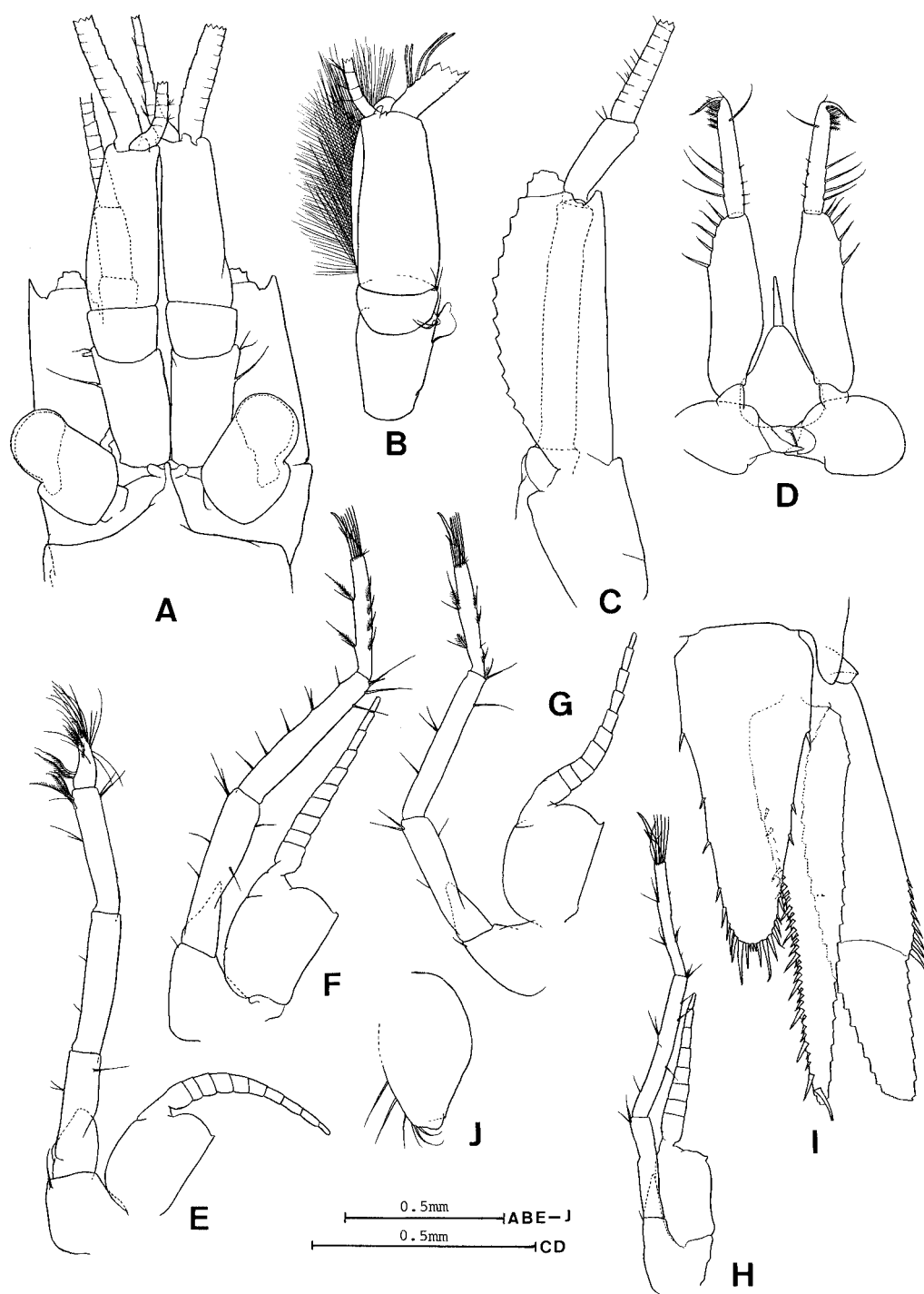


Fig. 57. *Siriella longiarticulis* sp. nov.; A, C–I, holotype (NSMT-Cr 16242); B, J, allotype (NSMT-Cr 16243). A, anterior part of body; B, right antennular peduncle; C, antenna; D, labrum, mandibles and mandibular palps; E–H, second, fourth, fifth and seventh thoracic limbs; I, uropod and telson; J, genital organ.

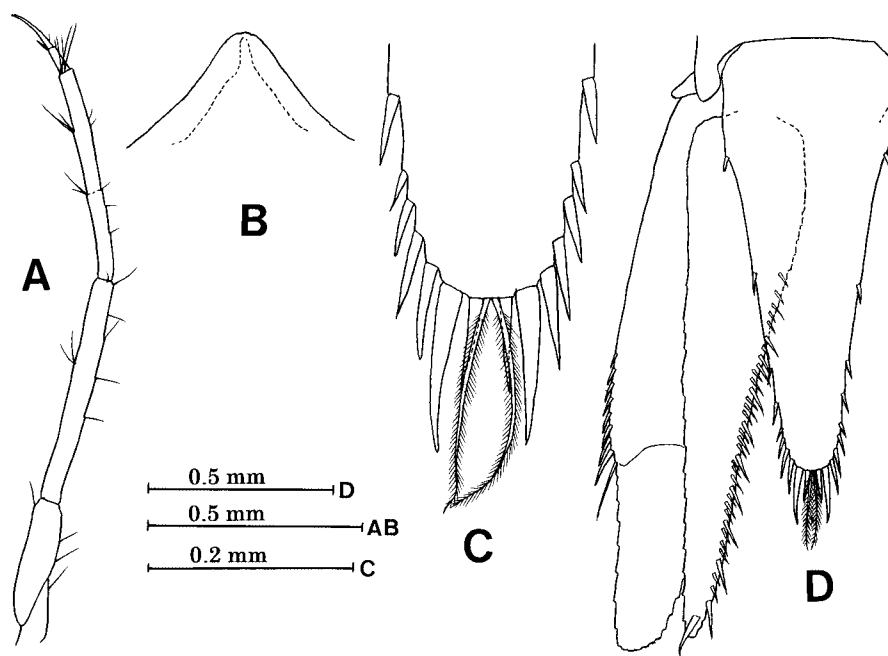


Fig. 58. *Siriella longiarticulis* sp. nov.; A, C, D, adult female from Sulu Sea (NSMT-Cr 16245); B, one of paratypes (NSMT-Cr 16244), adult female (ca. 7.0 mm). A, endopod of eighth thoracic limb; B, rostrum; C, posterior part of telson; D, uropod and telson.

57F–H, 58A) slender, becoming shorter and more slender towards posterior pairs, carpopropodus shorter than merus, not divided into subsegments but obscure suture is sometimes observed; terminal claw slender, relatively small. Exopod of thoracic limbs (Fig. 57E–H); basal plate with small denticle at outer distal corner, flagellipart 8- to 10-segmented.

Genital organ of male (Fig. 57J) oval in shape, anterior margin with 3 simple setae on distal 1/3 and 3 curved setae on distal end, posterior margin naked; apex rounded and naked.

Second pleopod of male with 10-segmented endopod and 11-segmented exopod. Fifth pleopod of male with 9-segmented endopod and 10-segmented exopod. Both pleopods with exopod slightly longer than endopod and without modified setae. Pseudobranchial rami deformed for damage but probably coiled spirally. Other pleopods of male missing.

Uropodal exopod (Figs. 57I, 58D) overreaching posterior margin of telson for 2/5 of its length, proximal segment armed with 8 spines on less than distal 1/3 of outer margin; distal segment occupying more than 1/3 of exopod in length. Uropodal endopod (Figs. 57I, 58D) tapered, almost equal to exopod in length, armed with about 35 spines along inner margin from statocyst region to distal end, these spines showing alternate arrangement of 1 longer and 1 to 3 shorter ones except for distal 2 longer spines between which shorter spines are not inserted, distalmost longer spine slightly directed outwardly.

Telson (Figs. 57I, 58D) as long as last abdominal somite, extending to articulation of uropodal exopod, 2.3 to 2.5 times as long as broad, subparallel for about proximal 1/4 part, then gradually narrowing towards rounded posterior end; lateral margin with 1 spine at distal end of subparallel part, followed by naked part occupying about 1/4 of margin, then 7 or 8 slender spines on distal half of margin, of which posterior 4 or 5 spines are densely arranged and increasing in length posteriorly; posterior margin armed with 2 pairs of long spines, of which outer pair is 1.5

times longer than inner, 3 median small spines and pair of plumose setae.

Body length. Adult female, ca. 7.0–8.5 mm; adult male, ca. 6.5 mm.

Etymology. The species is named from the Latin *longe*, long, and *articulus*, articulate, referring to the antennal peduncle longer than the antennal scale.

Remarks. All the specimens are more or less damaged.

Siriella longiarticulis is unique in morphology and readily distinguished from the other species of the genus *Siriella* by having the following characters: the eyes elongated, with a small cornea, the prolonged antennular peduncle, the extremely elongated antennal peduncle, and the small number of lateral spines of the telson.

The telson of an adult female from the Sulu Sea (Fig. 58C, D) is more slender than that of the holotype and is lacking three median small spines on the posterior margin. Difference in the shape of the telson is probably due to their different origin, and lacking three small spines may be due to the abnormality of the specimen. The specimen is almost identical with the holotype except the telson.

Distribution. Known from the Sahul Shelf in the Timor Sea and the Sulu Sea. This species may be a bottom-living form in depths of 100 to 200 m.

51. *Siriella mulyadii* sp. nov.

(Figs. 59–61)

Type series. Holotype (NSMT-Cr 17963), gravid female (5.7 mm); allotype (NSMT-Cr 17964), adult male (6.7 mm, dissected); paratypes (NSMT-Cr 17965), 16 gravid females (4.8–5.4 mm, a specimen of 5.0 mm with 10 embryos dissected for drawing), 1 adult female (5.6 mm), 85 immature males, 31 immature females and 25 juveniles; Labuan, Java Is., Indonesia, 11 May 1993, surface tow with plankton net at dusk (18:05–18:10), coll. Mulyadi.

Other material examined. [Indonesia] Five gravid females, 3 adult females and 2 immature females (NSMT-Cr 17966), Labuan, Java Is., 18 June 1994, surface tow with plankton net at night, coll. Mulyadi.

Description. Carapace (Fig. 59A, B) produced anteriorly into triangular rostral plate with concave lateral margins and pointed apex extending to basal margin of antennular peduncles. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving last 2 thoracic somites exposed dorsally.

Eyes (Fig. 59A, B) moderate in size, whole eye, including stalk, longer than broad; cornea globular, as broad as stalk, occupying less than half of whole organ.

Antennular peduncle of female (Fig. 59A) slender; first segment longer than second and third segments combined, more than twice as long as broad at anterior end, outer margin slightly concave, naked; second segment short, with 1 seta each at inner distal corner and on inner distal margin; third segment slightly longer than broad, with 1 long seta at distal 1/3 of inner margin and 2 long setae at inner distal corner. Antennular peduncle of male (Fig. 59B) more robust than that of female; first segment 1.3 times as long as broad; second segment short, with 1 long seta on inner distal margin; third segment nearly as long as sum of preceding 2 segments, more than 1.5 times as long as broad. Inner flagellum of male antennule (Fig. 59B) peculiarly meandering in proximal 1/3 part, in which fine short setae grow densely on inner margin; inner flagellum of near-adult male (Fig. 61F) bent outwardly at about proximal 1/4. Outer flagellum (Fig. 59B) slightly broader than inner in proximal part, not modified. Appendix masculina rounded apically in adult male (Fig. 59B), pointed in immature male (Fig. 61F).

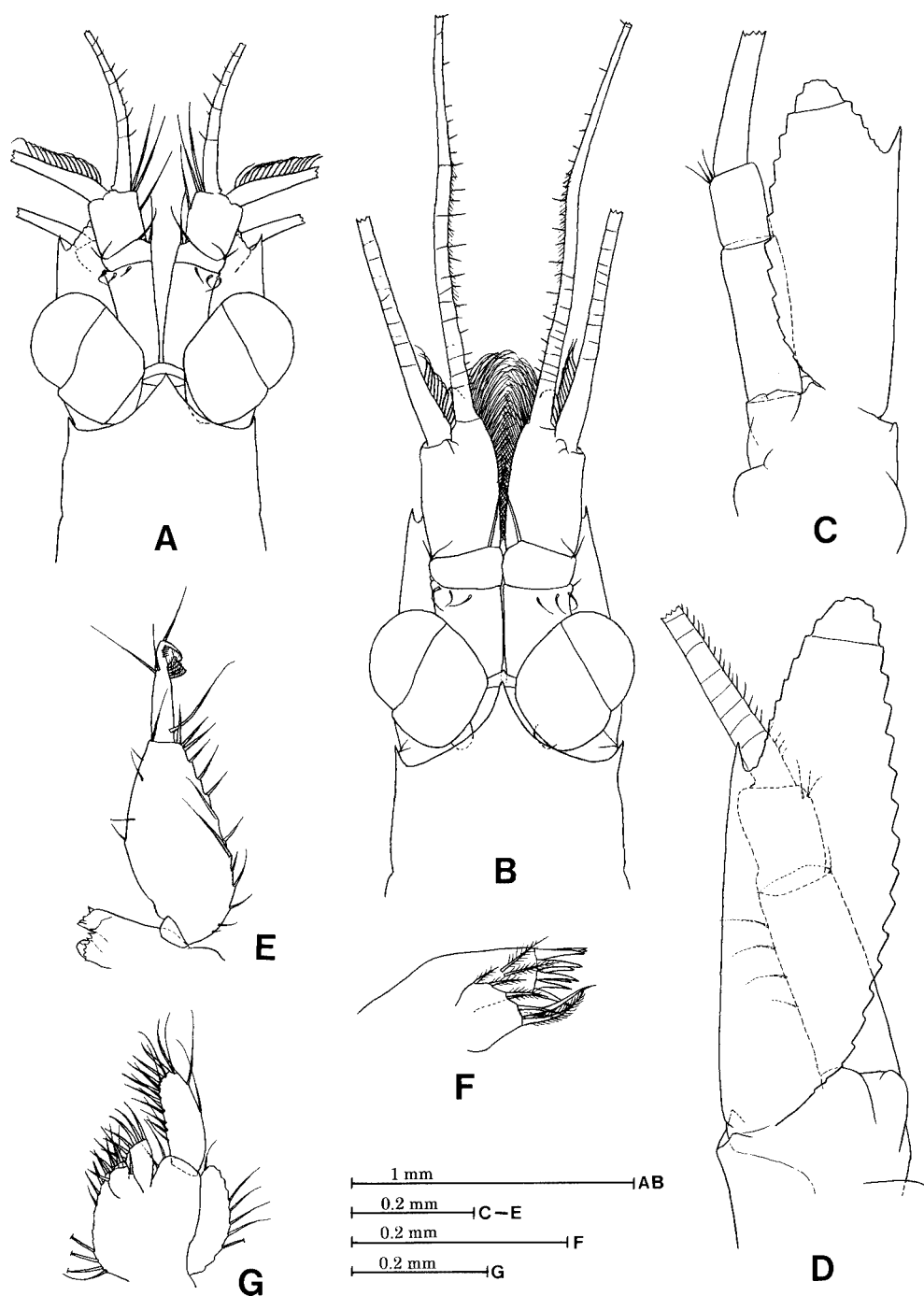


Fig. 59. *Siriella mulyadii* sp. nov.; A, holotype (NSMT-Cr 17963); B, D, allotype (NSMT-Cr 17964); C, E–G, one of paratypes (NSMT-Cr 17965), gravid female (5.0 mm). A, B, anterior part of body; C, D, antenna; E, mandible and mandibular palp; F, maxillule; G, maxilla.

Antennal scale (Fig. 59C, D) not extending to distal margin of third segment of antennular peduncle, 2.7 times as long as broad in female, slightly more than 3 times as long in male; outer margin naked, terminating in spine; terminal lobe showing sexual dimorphism in length, that of female 0.7 times as long as broad and 1/4 of scale in length, while that of male 1.25 times as long and 1/3 of scale length. Antennal peduncle (Fig. 59C, D) not extending to base of spine terminating naked outer margin of antennal scale; second segment longest, twice as long as third.

Mandibular palp (Fig. 59E); second segment expanded, third segment armed on outer margin of proximal part with 1 long seta in female and 7 long setae in male. Maxillule and maxilla as shown in Fig. 59F and G, respectively.

Endopod of first and second thoracic limbs as shown in Fig. 60A and B, respectively. Endopod of third to seventh thoracic limbs (Fig. 60C–F) rather stout, subequal in size; carpopropodus shorter than merus, divided into 2 subsegments with proximal subsegment 2/7 as long as distal one, terminal claw moderately slender. Endopod of eighth thoracic limb (Fig. 60G) smaller than preceding one, carpopropodus as long as merus, divided into 2 subsegments with proximal subsegment 1/3 as long as distal. Exopod of thoracic limbs (Fig. 60A–G) with basal plate furnished with small process at outer distal angle; flagellipart 8-segmented in first and eighth limbs and 9-segmented in third to seventh limbs.

Genital organ of male (Fig. 61C) armed on distal part of anterior margin with 4 plumose setae, proximal one of which is shorter than distal 3, distal margin with 4 recurved setae, which are nearly equal in length to distal 3 plumose setae on anterior margin.

Abdomen; first somite 1.2 times longer than second, second to fifth somites subequal, sixth somite 1.9 times longer than fifth.

First pleopod of male (Fig. 61A); exopod 9-segmented, endopod wanting. Fourth pleopod of male (Fig. 61B) biramous; endopod 10-segmented, outer setae of distal 4 segments slightly longer, stouter and plumose except for distal short part naked; exopod 11-segmented, shorter than endopod, with accessory seta on seventh and tenth segments, without modified setae. Pseudo-branchial rami (Fig. 61A, B) nearly straight in first and fifth pleopods, spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 61D, E) overreaching posterior end of telson for 1/4 of its length in female and 1/5 in male; proximal segment twice longer than distal, armed with 4 to 6 graded spines occupying distal 1/4 of outer margin in female, with 6 or 7 spines occupying distal 2/9 in male. Uropodal endopod (Fig. 61D, E) slightly shorter than exopod, armed along inner margin from statocyst region to apex with about 34 to 36 spines in female and about 50 spines in male, these spines showing alternate arrangement of 1 longer and 1 to 3 shorter ones.

Telson (Fig. 61D, E) elongated linguiform, slightly longer than sixth abdominal somite, overreaching articulation of uropodal exopod, 2.5 times as long as broad at base in female, 2.8 times as long in male; lateral margin with 2 stout spines in basal widened part, followed by naked part occupying 1/5 to 1/6 of lateral margin, then row of 13 to 17 slender spines in female and 23 to 25 slender spines in male, of which posterior 5 or 6 pairs in female, except ultimate one, are as long as long spines on posterior margin, ultimate pair of spines clearly shorter than penultimate; posterior margin rounded, with pair of long spines, 3 median short spines and pair of plumose setae.

Body length. Adult female, 4.8–5.7 mm; adult male, 6.7 mm.

Etymology. The species is named in honor of the collector, Dr. Mulyadi.

Remarks. *Siriella mulyadii* is easily distinguished from the other species of the Thompsonii-subgroup by: (1) the inner antennular flagellum of the male meandering; (2) the antennal scale showing a sexual dimorphism; (3) the endopod of the third to eighth thoracic limbs rather

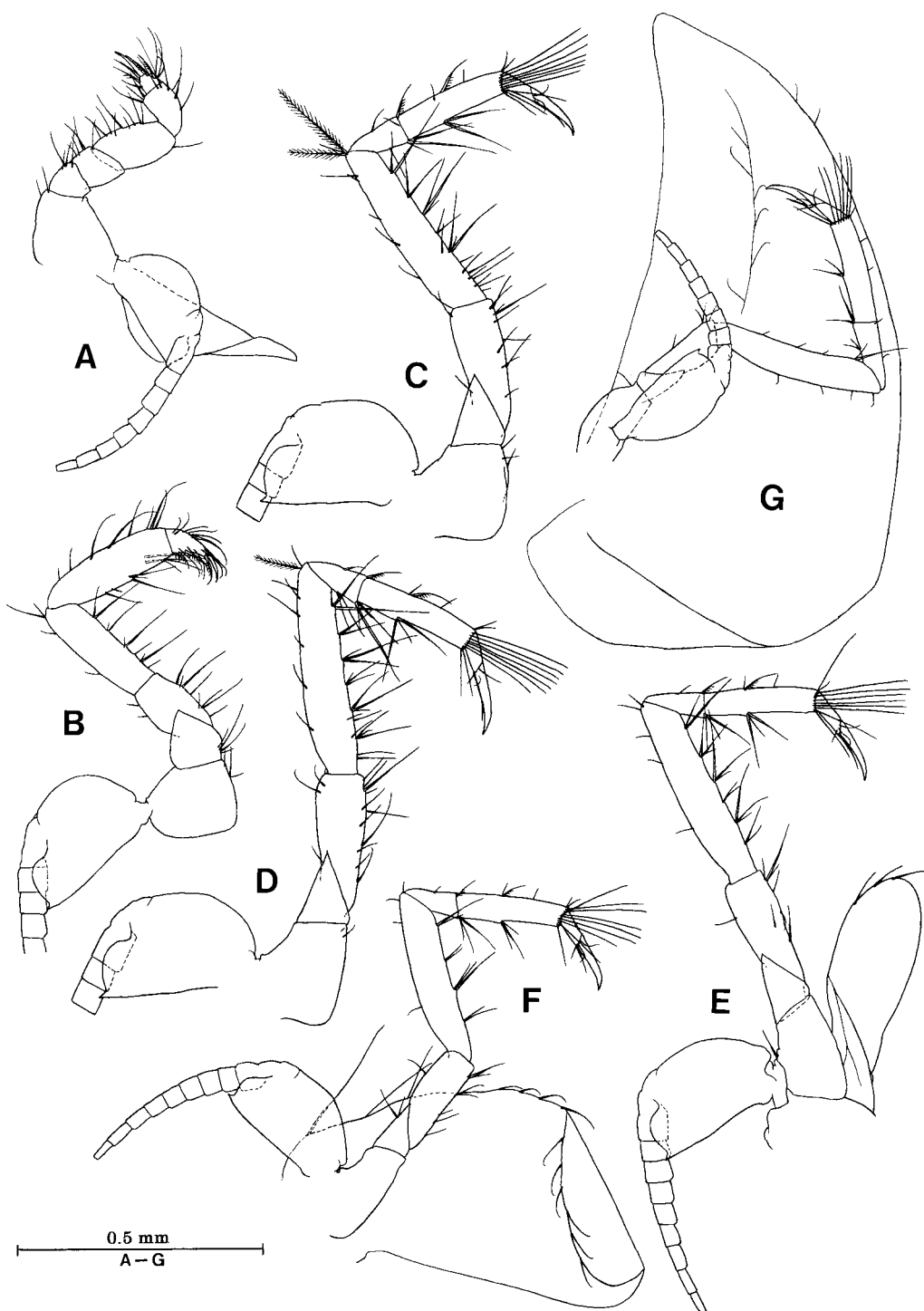


Fig. 60. *Siriella mulyadii* sp. nov.; one of paratypes (NSMT-Cr 17965), gravid female (5.0 mm). A–D, first to fourth thoracic limbs; E–G, sixth to eighth thoracic limbs.

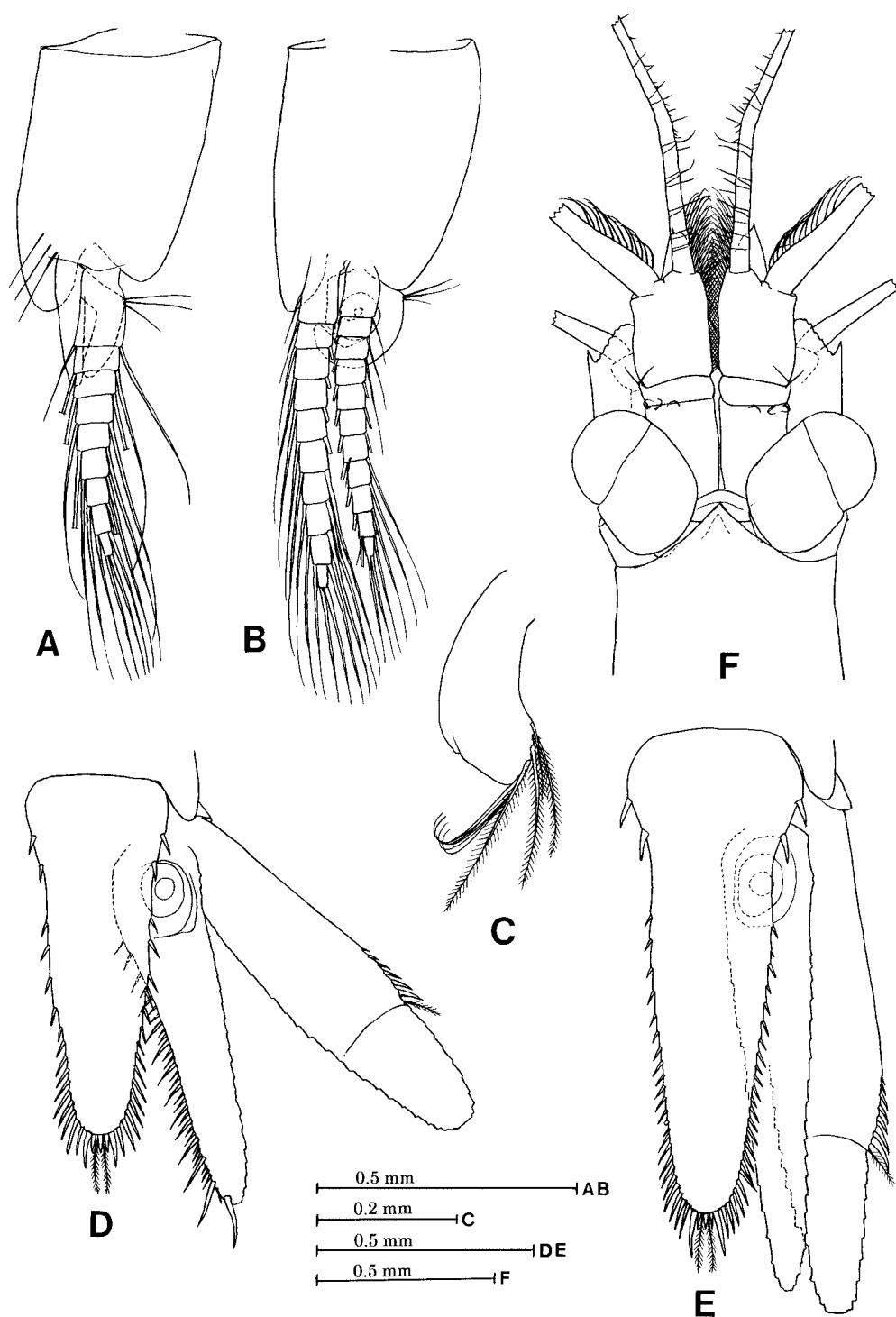


Fig. 61. *Siriella mulyadii* sp. nov.; A–C, E, allotype (NSMT-Cr 17964); D, holotype (NSMT-Cr 17963); F, one of paratypes (NSMT-Cr 17965), immature male (5.1 mm). A, first pleopod; B, fourth pleopod; C, genital organ; D, E, uropod and telson; F, anterior part of body.

stout, (4) the genital organ of the male armed with considerably long recurved setae; (5) the ultimate pair of the lateral spines of the female telson shorter than the penultimate spines.

Immature males of this species possess appendix masculina with a pointed apex (Fig. 61F). As far as we can determine, such an appendix is a unique character within the genus *Siriella*.

Distribution. Known only from the type locality.

52. *Siriella rimata* sp. nov.

(Figs. 62, 63)

Type specimen. Holotype (NSMT-Cr 16455), adult male (ca. 8.7 mm); Sahul Shelf, 12°17.3'S 129°40.9'E to 12°17.2'S 129°41.8'E, 49–52 m, 24 June 1972, plankton net installed at mouth of 3-m beam trawl, coll. M. Murano.

Description. Carapace short posteriorly, exposed last 2 thoracic somites dorsally. Anterolateral corner of carapace rounded. Exact feature of rostrum unknown for damage. Digitate process (Fig. 62A) present on dorsal side near anterior end of cephalon.

Eyes (Fig. 62A) moderate in size; cornea occupying about half of whole organ, functionally normal; eyestalk as broad as cornea.

Antennular peduncle of male (Fig. 62A) with third segment as long as first and second segments combined; appendix masculina (Fig. 62A, B) developed, bilobed distally, outer lobe narrow, curved inwardly, armed at apex with single spine-like seta directing forward and with row of fine setae on inner margin, outer lobe slightly shorter than inner, with sensory hairs on inner margin.

Antennal scale of male (Fig. 62A, C) slightly shorter than antennular peduncle, 3.5 times as long as broad; outer margin naked, terminating in triangular denticle; terminal lobe slightly longer than broad, less than 3 times as long as terminal spine of outer margin. Antennal peduncle (Fig. 62C) not extending to base of outer terminal denticle of antennal scale; second segment occupying more than half as long as peduncle. Antennal sympod (Fig. 62C) without denticle at outer distal corner.

Labrum with long frontal process. Third segment of mandibular palp (Fig. 62D) slender, 0.7 as long as second, armed with 7 long setae on less than proximal half of outer margin.

Endopod of second thoracic limb (Fig. 62E) relatively long, thicker than those of third to eighth limbs, carpopropodus longest, slightly broader in middle part, dactylus short, with strong but short terminal claw. Endopod of third to eighth thoracic limbs (Figs. 62F, G, 63A) becoming longer and more slender towards posterior pairs, carpopropodus not divided into subsegments; terminal claw slender, peculiar setae surrounding dactylus and claw long, extending far beyond tip of terminal claw. Endopod of third thoracic limb (Fig. 62F) slender, carpopropodus shorter than merus, with 5 long setae on proximal part of inner margin. Endopod of sixth thoracic limb (Fig. 62G) slender, carpopropodus 1.3 times longer than merus, with 7 long setae proximally. Endopod of eighth thoracic limb (Fig. 63A) slender, carpopropodus 1.4 times longer than merus, with 6 long setae proximally. Flagella of exopod of thoracic limbs (Figs. 62F, G, 63A) 11-segmented in second to seventh limbs and 10-segmented in eighth limb. Outer distal corner of basal plate of exopod (Figs. 62F, G, 63A) pointed in second to seventh limbs, rounded in eighth limb.

Genital organ of male (Fig. 63A) rounded apically, with 5 plumose setae on distal 1/3 of anterior margin and 5 recurved setae on anterodistal angle.

First 5 abdominal somites subequal in length. Sixth abdominal somite approximately twice as long as preceding one.

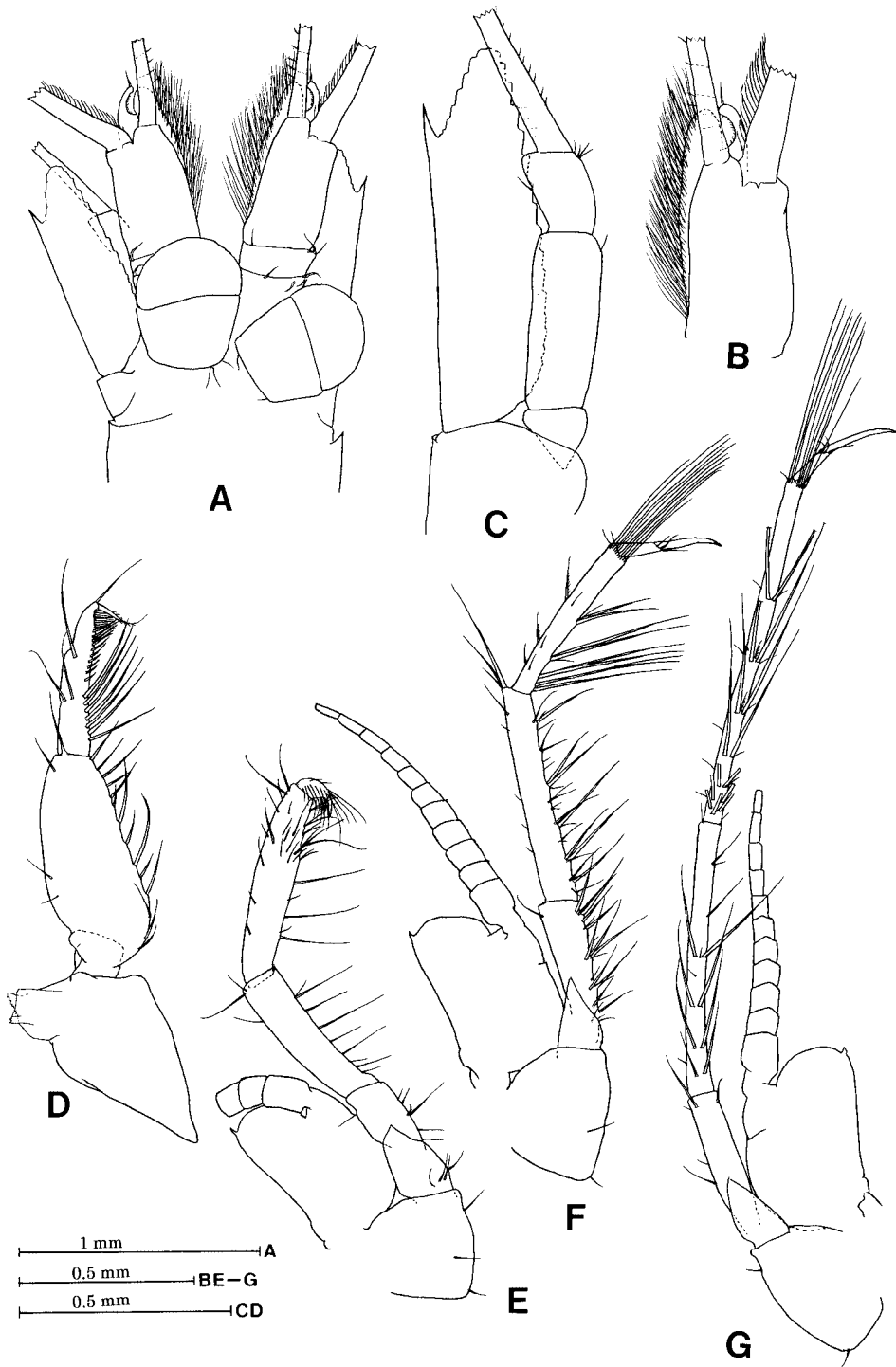


Fig. 62. *Siriella rimata* sp. nov.; holotype (NSMT-Cr 16455). A, anterior part of body; B, third segment of right antennular peduncle; C, antenna; D, mandible and mandibular palp; E–G, second, third and sixth thoracic limbs.

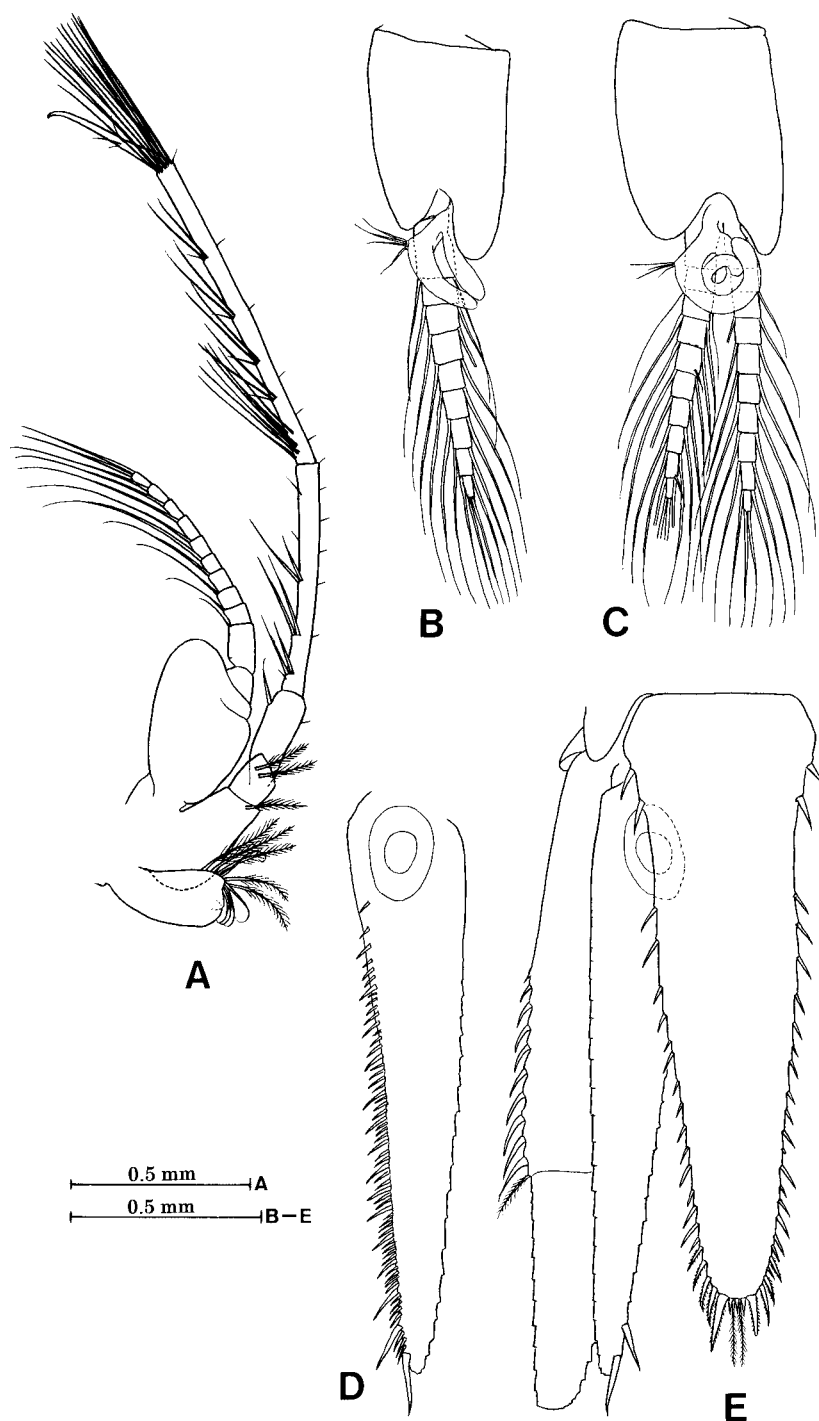


Fig. 63. *Siriella rimata* sp. nov.; holotype (NSMT-Cr 16455). A, eighth thoracic limb with genital organ; B, first pleopod; C, fourth pleopod; D, uropodal endopod; E, uropod and telson (most of inner marginal spines on uropodal endopod omitted).

First male pleopod (Fig. 63B); exopod 9-segmented, endopod wanting. Both rami of second to fifth male pleopods (Fig. 63C) 10-segmented, without any modified setae. Pseudobranchial rami (Fig. 63B, C) spirally coiled in second to fourth pleopods, nearly straight in first and fifth pleopods.

Uropodal exopod (Fig. 63E) overreaching apex of telson for about 1/7 of its length, slightly longer than endopod; proximal segment furnished with 10 graded spines on distal half of outer margin. Uropodal endopod (Fig. 63D, E) slender, tapering, armed along inner margin from statocyst region to near apex with about 63 slender spines showing alternate arrangement of 1 longer and 2 to 4 smaller subequal-sized ones.

Telson (Fig. 63E) elongated, 1.5 times longer than last abdominal somite, 3.2 times as long as broad at base, reaching halfway of distal segment of uropodal exopod, narrowing gradually towards rounded apex in general. Lateral margin of telson (Fig. 63E) with 2 robust spines in proximal part, followed by short naked part, which occupies 1/6 of lateral margin, then about 20 spines. Posterior margin (Fig. 63E) with pair of long spines, 3 median small spines and pair of plumose setae. Apical long spines and some longer spines on posterior part of lateral margins (Fig. 63E) fringed with secondary spinules.

Etymology. The specific name is derived from the Latin *rimo*, fissure, in reference to the bilobed appendix masculina on the male antennular peduncle.

Remarks. Only a single male specimen was collected. *Siriella rimata* is distinguished from all the species of the said genus, except *S. scissilis* which is described as a new species in this paper, by having the bilobed appendix masculina on the male antennular peduncle. This species is distinguished from *S. scissilis* due to the following characteristics: (1) the outer lobe of the appendix masculina on the antennule curved inwardly and armed with fine setae on the inner margin in *S. rimata*, while nearly straight and without fine setae on the inner margin in *S. scissilis*; (2) the carpopropodus of the endopod of the third to eighth thoracic limbs with five to seven long setae in the proximal part in *S. rimata*, while lacking such long setae in *S. scissilis*; (3) the third and fourth male pleopods without modified setae in *S. rimata*, whereas the endopod of the third pleopod and on both rami of the fourth pleopod with modified setae in *S. scissilis*; (4) the telson 3.2 times as long as broad at the base and with two pairs of spines in basal part in *S. rimata*, whereas 2.8 times as long and with three pairs of spines in corresponding part in *S. scissilis*.

In addition to the character of the appendix masculina, this species is distinguished from the other species of the genus by having the following characters: the endopod of the third to eighth thoracic limbs slender and armed with long setae, the uropodal exopod armed with ten spines occupying the distal half of the outer margin of the proximal segment, and the posterior longer spines of the telson fringed with secondary spinules.

The female is unknown.

Distribution. Known only from the type locality.

53. *Siriella seafdeci* sp. nov.

(Figs. 64–66)

Type series. Holotype (NSMT-Cr 17952), adult male (6.0 mm, dissected); allotype (NSMT-Cr 17953), gravid female (6.7 mm, dissected); paratypes (NSMT-Cr 17954), 18 adult males (5.1–5.9 mm, a specimen of 5.8 mm dissected), 50 gravid females (5.6–7.2 mm), 17 adult females (5.7–6.3 mm), 19 immature males and 28 immature females; Batbatan, Panay Island, Philippines, 21 September 1979, coll. SEAFDEC.

Other material examined. [Philippines] One adult male (damaged), 4 gravid females (6.1–6.4 mm), 5 adult females (6.0–6.6 mm), 1 immature male and 3 immature females (NSMT-Cr 17955), Batbatan, Panay Is., 20 September 1979, coll. SEAFDEC. One adult male (5.9 mm), 3 gravid females (6.0, 6.1 mm), 2 adult females (5.6, 6.2 mm), 2 immature females and 1 juvenile (NSMT-Cr 17956), Batbatan, Panay Is., 20 September 1979, coll. SEAFDEC. Seven adult males (5.7–6.4 mm), 30 gravid females (6.0–6.3 mm), 2 adult females, 5 immature males and 25 immature females (NSMT-Cr 17957), Batan, Panay Is., 21 September 1979, coll. SEAFDEC. One male and 2 gravid females (6.0, 6.4 mm) (NSMT-Cr 17958), Batan, Panay Is., 21 September 1979, coll. SEAFDEC. Ten adult males (5.3–5.9 mm), 12 gravid females (5.5–6.3 mm), 8 adult females (6.1–6.2 mm), 17 immature males and 16 immature females (NSMT-Cr 17959), Batbatan, Panay Is., 21 September 1979, coll. SEAFDEC. Eight adult males (5.5–6.0 mm), 24 gravid females (5.5–6.3 mm), 8 adult females (5.5–6.0 mm), 16 immature males, 27 immature females and 5 juveniles (NSMT-Cr 17960), Batbatan, Panay Is., 21 September 1979, coll. SEAFDEC. Abundant males (up to 6.3 mm) and females (up to 6.8 mm) (NSMT-Cr 17961), Batbatan, Panay Is., date unknown, coll. SEAFDEC.

Description. Carapace (Fig. 64A, B) produced anteriorly into low triangular rostral plate with narrowly rounded or obtusely pointed apex, not extending to base of antennular peduncles, apical part sometimes bent downwardly. Lateral margin of carapace concave, leaving whole organ of eyes exposed. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving posterior 2 thoracic somites uncovered dorsally. Anterior margin of cephalon (Fig. 64A, B) rounded, without any projection.

Eyes (Fig. 64A, B) moderate in size, 1.2 times longer than broad; cornea as broad as eye-stalk, occupying less than half of whole organ.

Antennular peduncle of male (Fig. 64A) more robust than that of female; first segment 1.5 times as long as broad; second segment short, with 1 rather short seta on inner distal margin; third segment slightly longer than first, with appendix masculina large and hirsute. Inner antennular flagellum of male (Fig. 64A) not modified. Antennular peduncle of female (Fig. 64B) slender; first segment narrow, much longer than succeeding 2 segments combined, 2.5 times as long as broad at anterior end, outer margin concave, with 1 minute seta at about distal 1/5; second segment short, with 1 long seta each at inner distal corner and on inner distal margin; third segment 1.5 times as long as broad, with 1 long seta at distal 1/3 of inner margin and 2 long setae at inner distal angle.

Antennal scale of male (Fig. 64A, C) more slender than that of female, extending near distal end of antennular peduncle, 3.2 times as long as broad; outer margin straight, naked, ending in spine; terminal lobe as long as broad, 1/4 as long as scale; distal suture present. Antennal scale of female (Fig. 64B, D) extending to distal end of third segment of antennular peduncle, 2.8 times as long as broad; terminal lobe slightly shorter than broad, slightly more than 1/4 as long as scale; distal suture present. Antennal peduncle of male (Fig. 64C) broader than in female, barely extending to base of outer spine of antennal scale; second segment longest, 2.2 times as long as third. Antennal peduncle of female (Fig. 64D) not extending to base of outer spine of antennal scale; second segment twice as long as third, armed with 6 short setae at regular intervals on outer margin. Antennal sympod (Fig. 64C, D) with denticle at outer distal corner.

Labrum with long spine-like frontal process.

Mandibular palp of male (Fig. 64E); second segment expanded, 1.7 times as long as broad; third segment 2/3 as long as second, becoming narrower towards proximal 1/3, then parallel-sided, armed on proximal 1/3 part of outer margin with 6 long setae. Mandibular palp of female

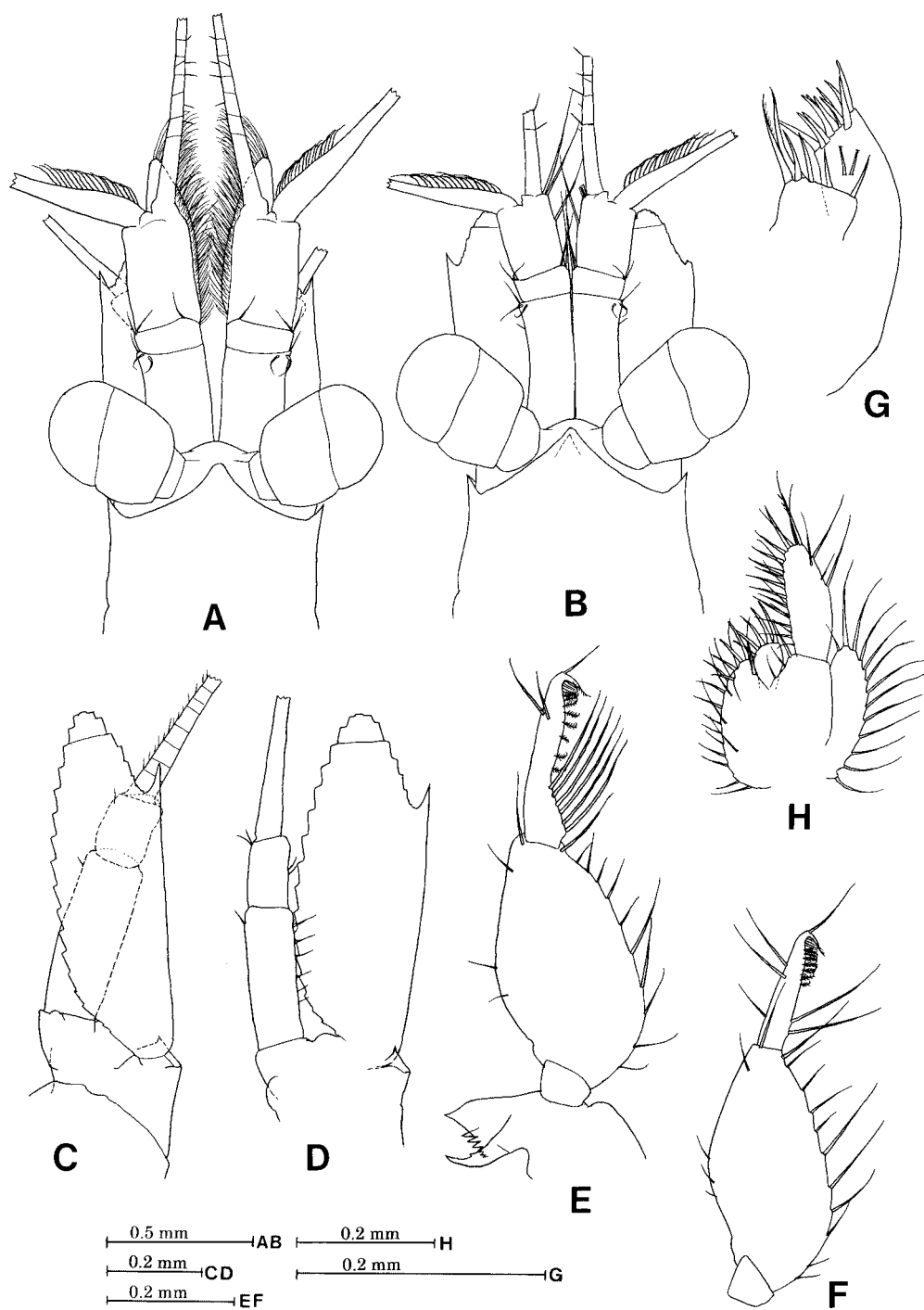


Fig. 64. *Siriella seafdeci* sp. nov.; A, C, E, G, H, holotype (NSMT-Cr 17952); B, D, F, allotype (NSMT-Cr 17953). A, B, anterior part of body; C, D, antenna; E, mandible and mandibular palp; F, mandibular palp; G, maxillule; H, maxilla.

(Fig. 64F) smaller and more slender than in male; third segment half as long as second, becoming gradually narrower towards distal end, with 2 long setae at proximal 1/3 of outer margin. Maxillule and maxilla as shown in Fig. 64G and H, respectively.

Endopod of first thoracic limb (Fig. 65A) small, robust, terminating in strong claw. Endopod of second thoracic limb (Fig. 65B) robust, twice longer than that of first, terminating in strong claw. Endopod of third thoracic limb (Fig. 65C) 1.4 times as long as second, merus longer than carpopropodus, armed with 3 long plumose setae at distal angle of outer margin, terminal claw slender, more than half as long as carpopropodus. Endopod of fourth to seventh thoracic limbs (Fig. 65D–G) subequal, slightly longer than third, becoming more slender towards posterior limbs, carpopropodus shorter than merus (in fifth endopod 0.77:1), not divided or divided into 2 subsegments by obscure articulation, terminal claw long and slender. Endopod of eighth thoracic limb (Fig. 65H) considerably shorter and narrower than preceding one, carpopropodus slightly shorter than merus, divided into 2 subsegments by obscure articulation. Exopod of thoracic limbs (Fig. 65C, E, G, H); basal plate with small denticle at outer distal corner, except for eighth limb rounded; flagellipart 9-segmented in first limb, 10-segmented in second to seventh limbs, and 9- or 10-segmented in eighth limb.

Genital organ of male (Fig. 66C) bilobed apically, with 2 to 4 (2.9 in average, $n=21$) plumose setae on distal part of anterior margin and 3 or 4 (3.1 in average, $n=21$) long recurved setae at distal angle of anterior margin.

Abdomen; first to third and fifth somites subequal, fourth somite shortest, 0.9 of preceding one in length, sixth somite 1.7 times longer than fifth.

First male pleopod (Fig. 66A); exopod 10-segmented, endopod wanting. Second and third male pleopods with both rami 10-segmented, exopod with short naked seta on sixth and ninth segments in second pleopod and on fifth and ninth segments in third pleopod. Fourth male pleopod (Fig. 66B); endopod 10-segmented, slightly longer than exopod, setae arising from outer corner of distal 4 segments somewhat longer and thicker than others and with short naked part apically; exopod 10-segmented, armed with short naked seta at inner distal angle of seventh and ninth segments. Fifth male pleopod with both rami 9-segmented, exopod with short naked seta on fifth and eighth segments. Pseudobranchial rami (Fig. 66A, B) nearly straight in first and fifth pleopods, spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 66E, G) overreaching posterior end of telson by 1/6 of its length in male and 2/9 in female; proximal segment armed with 5 to 10 spines in adult male (6.8 in average, $n=48$) and 5 to 7 spines in adult female (5.8 in average, $n=74$), occupying distal 1/4 to 2/7 part of outer margin. Uropodal endopod (Fig. 66D, E, G) shorter than exopod, armed on inner ventral margin from statocyst region to near apex with about 53 spines showing alternate arrangement of 1 longer and 1 to 5 shorter ones except for proximal several spines.

Telson (Fig. 66E–H) elongated linguiform, 1.4 times longer than last abdominal somite, 2.6 to 2.8 times as long as broad at base, extending slightly beyond articulation of uropodal exopod, becoming narrower towards proximal 2/7, at which slight constriction is present, again slightly broadened towards proximal 2/3, at which first spine of distal series arises, then gradually narrowing towards apex. Lateral margin of telson (Fig. 66E–H) armed on basal widened part with 2 spines set distantly, followed by naked part occupying about 1/5 of margin, then distal series of 14 to 21 slender spines in adult male (17.0 in average, $n=45$) and 12 to 19 slender spines in adult female (14.5 in average, $n=72$), these spines, especially in female, showing tendency of falling into groups, except for posterior 4 or 5 pairs of spines long and slender. Posterior margin of telson (Fig. 66E–H) arched, with pair of long spines, 3 median small spines and pair of plumose

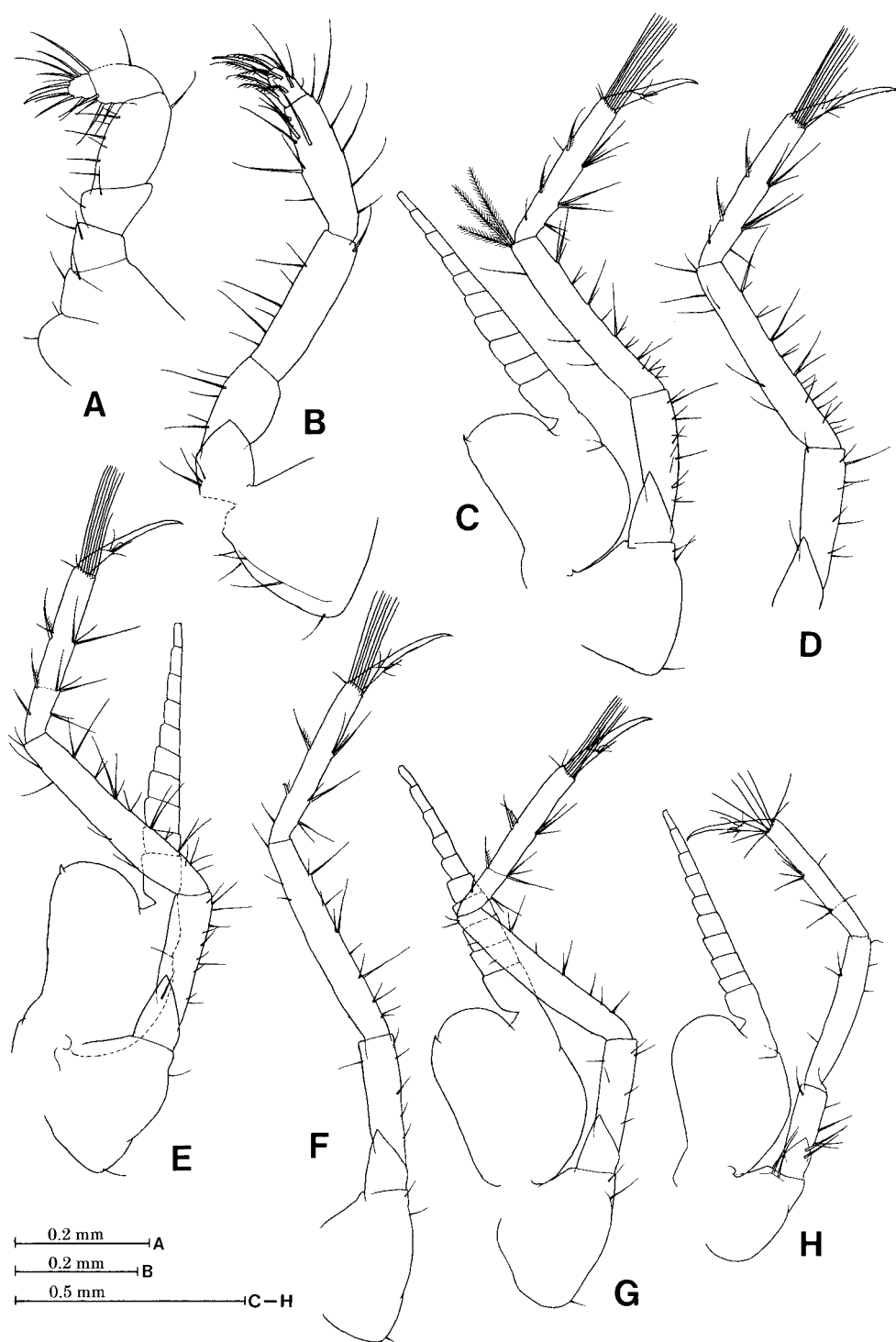


Fig. 65. *Siriella seafdeci* sp. nov.; A–G, holotype (NSMT-Cr 17952); H, one of paratypes (NSMT-Cr 17954), adult male (5.8 mm). A–H, first to eighth thoracic limbs.

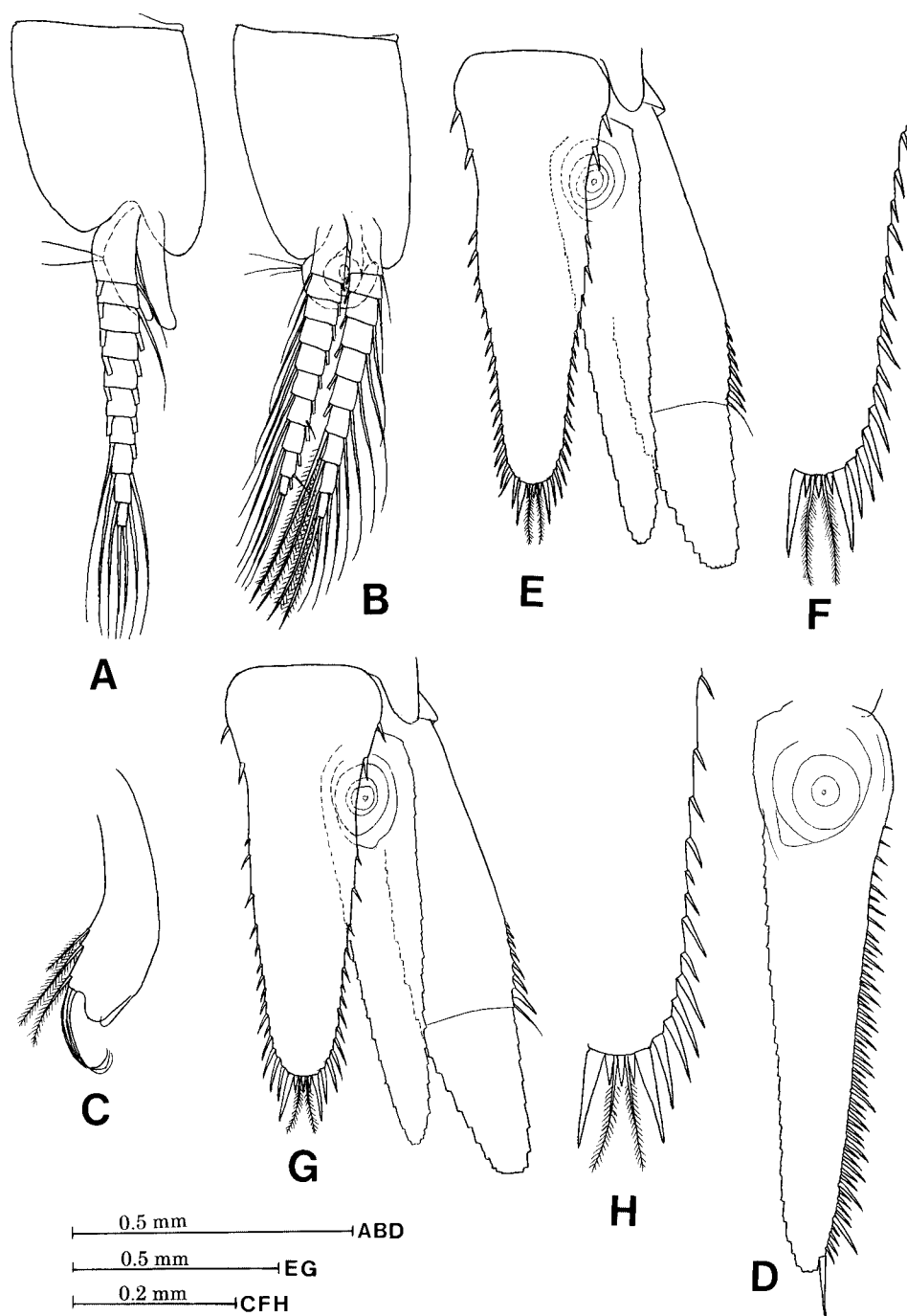


Fig. 66. *Siriella seafdeci* sp. nov.; A–F, holotype (NSMT-Cr 17952), G, H, allotype (NSMT-Cr 17953). A, first pleopod; B fourth pleopod; C, genital organ; D, uropodal endopod; E, uropod and telson; F, apex and right lateral margin of telson; G, uropod and telson; H, apex and right lateral margin of telson.

Table 8. Morphological comparison among *Siriella vulgaris* from Panay Island, Philippines, *S. akajimaensis* sp. nov. and *S. seafdeci* sp. nov.

	<i>S. vulgaris</i> from Panay Is., Philippines	<i>S. akajimaensis</i> sp. nov.	<i>S. seafdeci</i> sp. nov.
Rostrum of male	Frequently bent downward, so that apex cannot be observed from above	Not bent downward	Sometimes bent downward
Anterior median projection of cephalon	Present	Absent	Absent
Eyes	1.1 times as long as broad	As long as broad	1.2 times as long as broad
Inner antennular flagellum of male	Not meandering	Meandering in proximal 1/3 part	Not meandering
Endopod of 5th thoracic limb	Merus 1.5 times longer than carpopropodus	Merus 1.1 times longer than carpopropodus	Merus 1.3 times longer than carpopropodus
Endopod of 8th thoracic limb	Merus 1.2 times longer than carpopropodus	Carpopropodus 1.2 times longer than merus	Merus slightly longer than carpopropodus
Recurved setae on genital organ of male	Short	Short	Long
Exopod of 3rd and 4th male pleopods	Penultimate segment with long naked seta	Penultimate segment with short naked seta	Penultimate segment with short naked seta
Number of spines on proximal segment of uropodal exopod	♂: 4 to 7 (5.5 in ave., n=38) ♀: 4 or 5 (4.3 in ave., n=33)	♂: 4 or 5 ♀: 3 or 4	♂: 5 to 10 (6.8 in ave., n=48) ♀: 5 to 7 (5.8 in ave., n=74)
Number of spines on lateral margin of telson (excl. basal 2)	♂: 16 to 25 (20.6 in ave., n=38) ♀: 16 to 19 (17.7 in ave., n=30)	♂: 20 to 25 ♀: 12 to 17	♂: 14 to 21 (17.0 in ave., n=45) ♀: 12 to 19 (14.5 in ave., n=72)

setae; of which long spines are 1.3 times as long as distalmost lateral spines, and 3 median spines are relatively short and leave spaces enough to be inserted a pair of plumose setae between them.

Body length. Adult male, 5.1–6.4 mm; adult female, 5.5–7.2 mm.

Etymology. The specific name is derived from a research institution, SEAFDEC (Southeastern Asian Fisheries Development Center) in Iloilo, Panay Island, Philippines.

Remarks. *Siriella seafdeci* is very closely allied to *S. amamiensis*, but distinguished from that species by having different morphological characteristics in the genital organ of the male and the marginal spines on the posterior part of the telson. The genital organ of the male of *S. seafdeci* is furnished at the distal end of the anterior margin with considerably long curved setae as compared to those of *S. amamiensis*. The telson of *S. seafdeci* is almost the same in relation to the spine arrangement in both sexes, whereas that of *S. amamiensis* shows a sexual dimorphism and an intraspecific variation in the spine arrangement of the posterior part of the female.

This species also resembles *S. vulgaris* of the same locality and *S. akajimaensis* from Okinawa. These differences are summarized in Table 8.

Distribution. Known only from the type locality.

54. *Siriella tenuiungula* sp. nov.

(Figs. 67, 68)

Type specimen. Holotype (NTM-Cr015178), gravid female (5.4 mm); 11°10.5'S 132°03.5'E, St. CP67, Coral Bay, Port Essington, Cobourgh Peninsula, Northern Territory, Australia, 18 May

1983, surface tow with plankton net, coll. A. J. Bruce.

Description. Rostrum (Fig. 67A) low triangular, apex narrowly rounded, extending slightly beyond basal margin of antennular peduncles, lateral margin slightly concave. Anterolateral corner of carapace rounded. Posterior margin of carapace emarginate, leaving last 2 thoracic somites exposed.

Eyes (Fig. 67A) big, 1.5 times as long as broad; cornea globular, as broad as eyestalk, occupying distal 1/3 of whole organ.

Antennular peduncle (Fig. 67A) rather robust; first segment longer than second and third segments combined; second segment short, with 2 setae at inner distal corner; third segment 1.3 times as long as broad, with 1 long seta at distal 1/3 of inner margin and 2 long setae at inner distal angle.

Antennal scale (Fig. 67A, B) extending to distal 1/4 of third segment of antennular peduncle, rather slender, slightly more than 3 times as long as broad; outer margin naked, straight, terminating in denticle; terminal lobe as long as broad, 2.5 times as long as terminal denticle of outer margin, 1/5 of telson length; distal suture distinct. Antennal peduncle (Fig. 67B) slender, barely reaching base of outer denticle of antennal scale; second segment longest, 2.5 times as long as third, 4 times as long as broad; third segment 1.7 times as long as broad. Antennal sympod (Fig. 67B) with small denticle at outer distal angle.

Mandibular palp and maxilla as shown in Fig. 67C and D, respectively.

Endopod of first thoracic limb (Fig. 68A) short, merus as long as carpopropodus and dactylus combined, terminal claw stout. Endopod of third to seventh thoracic limbs (Fig. 68B–D) slightly increasing in length towards fifth limb, then becoming gradually shorter and narrower towards seventh limb; carpopropodus distinctly shorter than merus, not divided or divided obscurely into subsegments; terminal claw slender, becoming longer and more slender towards posterior limbs. Endopod of eighth thoracic limb (Fig. 68E) considerably slender, merus slightly curved inwardly, carpopropodus slightly longer than merus; dactylus and terminal claw combined 2/3 as long as carpopropodus. Exopod of first to seventh thoracic limbs (Fig. 68A, C); flagellipart 9-segmented in first limb, 10-segmented in second to seventh limbs; basal plate rather narrow, with outer distal corner pointed. Exopod of eighth thoracic limb (Fig. 68E) very small compared to anterior ones, basal plate with outer distal corner pointed, flagellipart 10-segmented.

First 4 abdominal somites subequal in length, fifth somite 1.25 times longer than fourth, sixth somite 1.7 times longer than fifth.

Uropodal exopod (Fig. 68F) overreaching apex of telson for 2/7 of its length, proximal segment armed with 9 graded spines occupying distal 2/5 part of lateral margin, distal segment half as long as proximal one. Uropodal endopod (Fig. 68F) tapered, shorter than exopod, overreaching apex of telson for 1/4 of its length, inner ventral margin armed with 2 tiny spines in anterior part of statocyst and with more than 50 spines from posterior part of statocyst region to near apex, these spines showing alternate arrangement of 1 longer and 1 to 6 shorter ones.

Telson (Fig. 68F) elongated linguiform, gradually narrowing from base to relatively broad posterior end, 1.3 times longer than sixth abdominal somite, 2.5 times as long as broad at base, slightly extending posteriorly beyond articulation of uropodal exopod. Lateral margin nearly straight, armed proximally with 2 spines which are set at relatively wide interval, followed by unarmed part occupying 1/5 of lateral margin, then distal series of 17 to 19 spines on more than distal half of margin, proximal 2/3 of distal series of spines showing alternate arrangement of 1 longer and 1 or 2 shorter ones, posterior 3 pairs of lateral spines long, stout, gradually lengthened posteriorly, barbed with secondary spinules. Posterior margin relatively broad, armed with pair of long spines, which are 1.2 times as long as ultimate lateral spine and fringed with secondary

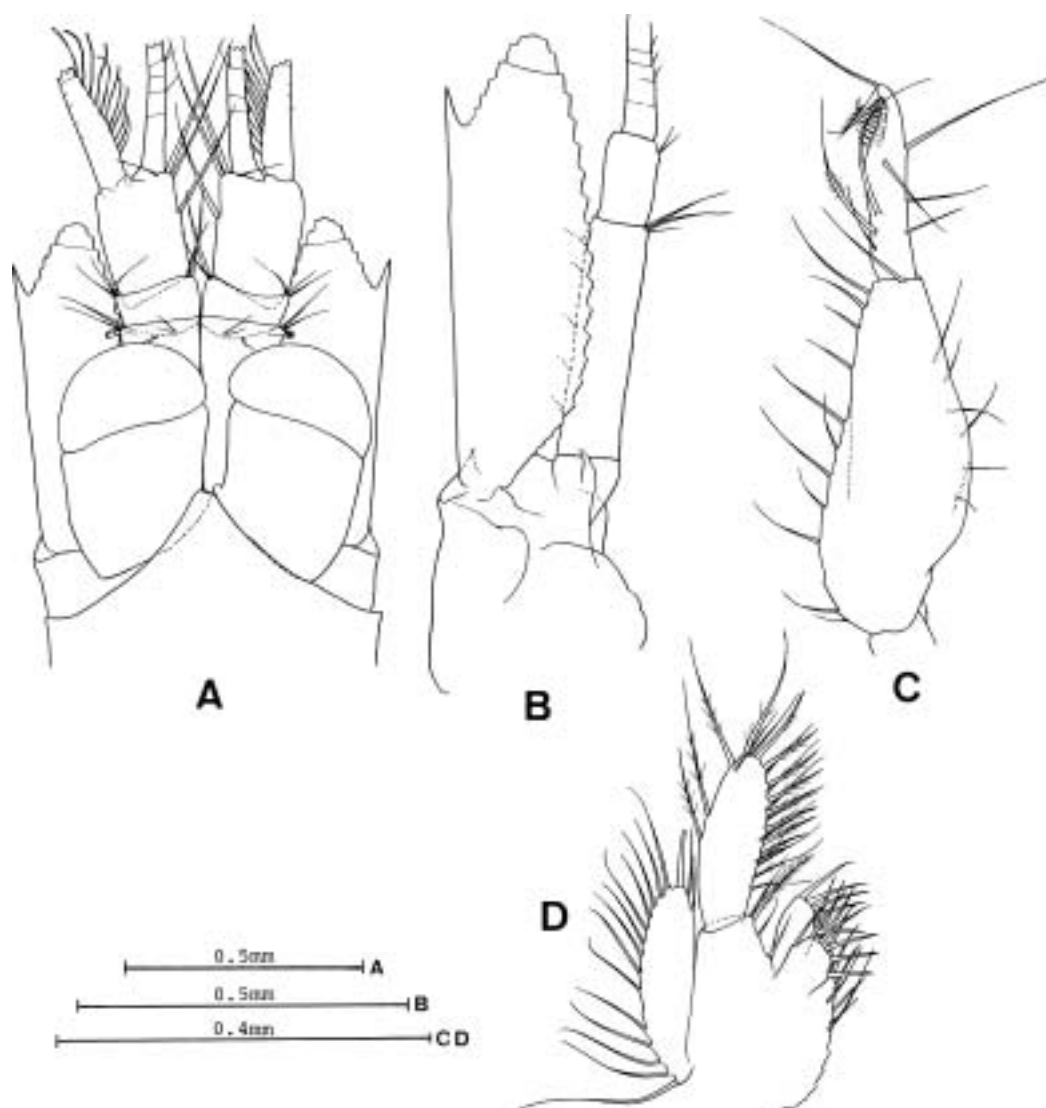


Fig. 67. *Siriella tenuiungula* sp. nov.; holotype (NTM-Cr015178). A, anterior part of body; B, antenna; C, mandibular palp; D, maxilla.

spinules, 3 median small spines, which are 1/5 as long as long spines flanking them, and pair of plumose setae.

Body length. Adult female, 5.4 mm.

Etymology. The specific name is derived from Latin *tenuis*, slender, and *ungula*, claw, referring to the long and slender claw of the endopod of thoracic limbs.

Remarks. *Siriella tenuiungula* is easily distinguished from the other species of the genus by the endopod of thoracic limbs provided with an extremely elongated terminal claw, which is longer than any of the known species, the uropodal exopod armed with nine spines occupying the distal 2/5 part of the lateral margin, and several pairs of posterior long spines on the telson fringed with secondary spinules.

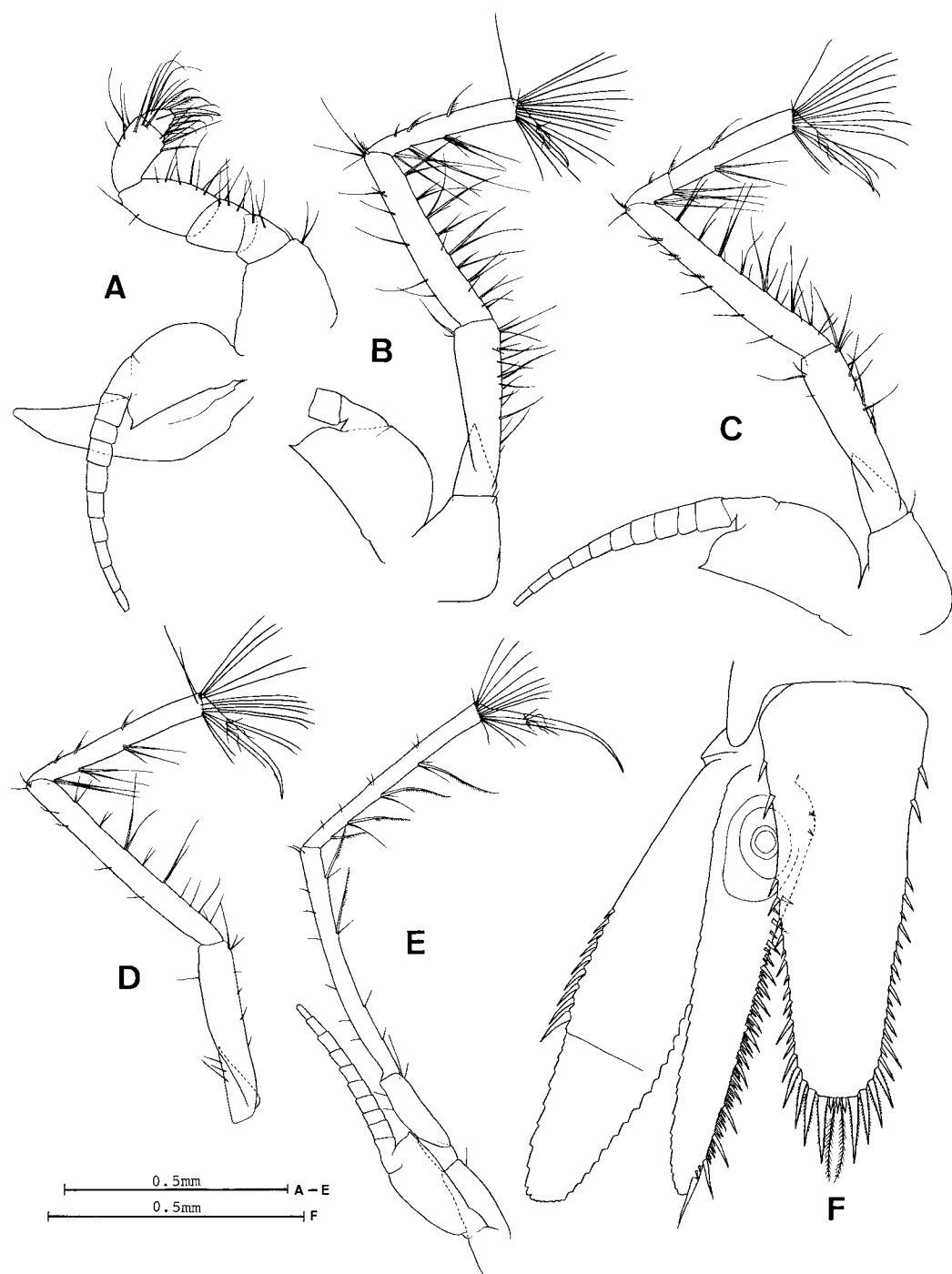


Fig. 68. *Siriella tenuiungula* sp. nov.; holotype (NTM-Cr015178). A–C, first, third and fourth thoracic limbs; D, endopod of seventh thoracic limb; E, eighth thoracic limb; F, uropod and telson.

The male is unknown.

Distribution. Known only from the type locality.

Trispina-subgroup

55. *Siriella trispina* Ii, 1964

(Figs. 69, 70)

Siriella trispina Ii, 1964a: 86–89, fig. 21; Mauchline and Murano, 1977: 77 [catalogue]; Cai, 1980: 40, pl. 1, figs. 1–9; Müller, 1993: 56 [catalogue]; Wang and Liu, 1997: 203–204; Liu and Wang, 2000: 106–107, fig. 23.

Material examined. Lectotype (NSMT-Cr 17972), adult male (dissected parts) (Ii's Coll. No. 129); paralectotypes (NSMT-Cr 17973), 10 males and 8 females (Ii's Coll. No. 129); 33°55'N 125°05'E, East China Sea, 28 June 1933, collected during Hatsutaka Maru Cruise.

[Mainland of Japan] One immature female (6.2 mm) (NSMT-Cr 16425), 34°53.9'N 138°25.8'E, Suruga Bay, 13 May 1969, bottom-net, 32–44 m, coll. M. Murano. One immature male (5.0 mm) and 2 immature females (4.9, 5.2 mm) (NSMT-Cr 16419), Port Kushimoto, Kii Peninsula, 18 April 1970, hand net under electric light, coll. M. Murano. One immature female (7.1 mm) (NSMT-Cr 16422), 35°05.1'N 138°45.0'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (7.7 mm), 2 adult females (7.1 mm) and 1 immature male (NSMT-Cr 16423), 35°03.8'N 138°47.9'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult female (6.3 mm) (NSMT-Cr 16424), 35°04.8'N 138°39.9'E, Suruga Bay, 20 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult female (7.1 mm) (NSMT-Cr 16426), 34°55.2'N 138°39.9'E, Suruga Bay, 21 January 1971, surface tow with ORI net at night, coll. M. Murano. One adult male (6.5 mm), 1 adult female (6.3 mm) and 1 immature female (5.7 mm) (NSMT-Cr 16420), Ariake Bay, Kyushu, 6 August 1975, coll. S. Inoue and T. Takita. One adult female (5.8 mm) (NSMT-Cr 15681), Omura Bay, Kyushu, 30 September 1977, coll. Y. Kamaga and T. Takita. One adult male (6.1 mm), 1 adult female (6.3 mm) and 1 immature male (5.8 mm) (NSMT-Cr 16431), Japan Sea off Shimane, 27 August 1996, trawl, coll. K. Sota. One adult male (7.5 mm), 4 gravid females (6.2–7.4 mm) and 3 immature males (up to 6.6 mm) (NSMT-Cr 16432), Matoshima Is., Shimane, 29 October 1996, trawl, 50 m, coll. K. Sota. Seven adult males (6.9–7.6 mm), 2 gravid females (6.1, 6.7 mm) and 4 adult females (5.7, 6.7 mm) (NSMT-Cr 16421), Omura Bay, Kyushu, date unknown, coll. Y. Kamaga and T. Takita.

[East China Sea] One adult male, 1 gravid female (8.8 mm, with 24 embryos) and 2 adult females (9.6 mm) (NSMT-Cr 16427), 30°07.6'N 125°43.6'E, 21 May 1968, bottom-net, 76 m, coll. M. Murano. Two adult males (9.8, 10.7 mm), 1 immature male and 2 immature females (NSMT-Cr 16428), 29°48.8'N 126°04.6'E, 21 May 1968, surface tow with ORI net at night, coll. M. Murano. One immature male (NSMT-Cr 16429), 28°40.6'N 126°48.6'E, 22 May 1968, bottom-net, 185 m, coll. M. Murano. Two gravid females (9.7 mm with 20 embryos, 10.0 mm with 23 embryos), 2 adult females (9.6 mm) and 1 immature female (NSMT-Cr 16430), 29°11.0'N 124°30.4'E, 23 May 1968, bottom-net, 78 m, coll. M. Murano. Three males and 5 females (up to 7.0 mm) (NSMT-Cr 15682), 32°01.3'N 125°02.2'E, 7 August 1974, surface tow with ORI net at dawn, coll. M. Murano.

Body length. Adult male, 6.1–10.7 mm; adult female, 5.7–10.0 mm.

Remarks. Among Ii's Collection, a dissected adult male specimen, which was certainly used for drawing by Ii (1964a), has been kept in a separate vial apart from that containing ten

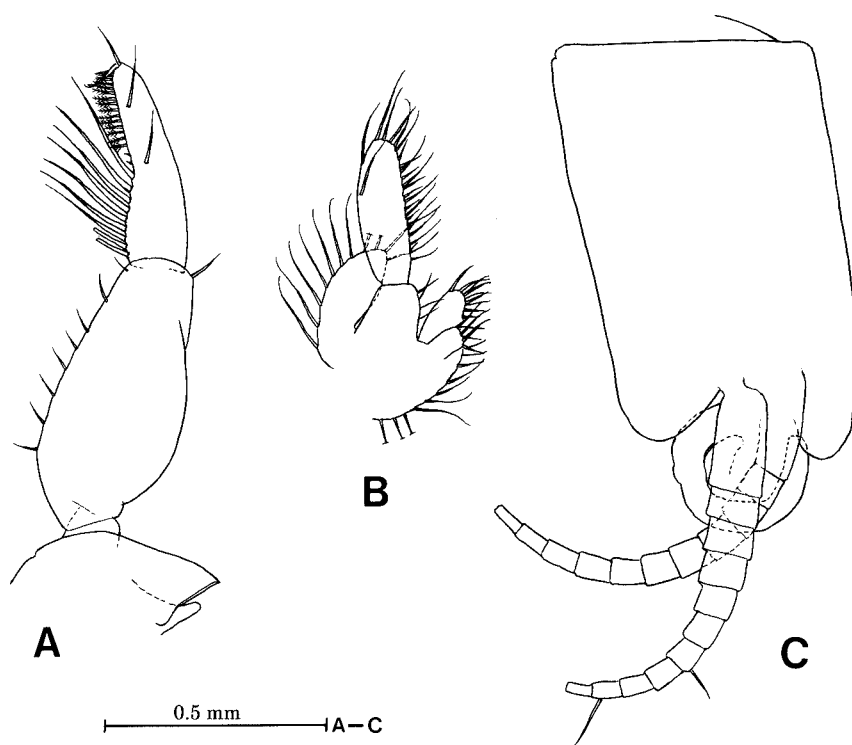


Fig. 69. *Siriella trispina* Ii, 1964, lectotype (NSMT-Cr 17972). A, mandible and mandibular palp; B, maxilla; C, one of second to fourth pleopods.

males and eight females collected from the same site. It is judged to be appropriate that this dissected specimen is designated as lectotype and the others as paralectotype.

Three appendages shown in Fig. 69 were depicted based on those found in the vial of the lectotype and not used for his publication (1964). The second segment of the mandibular palp (Fig. 69A) is rather slender, and its inner margin is naked except for a single seta at the distal end. The third segment of the palp is $3/4$ as long as the second and armed with nine long setae on the proximal half of the outer margin (Fig. 69A). Maxilla is of a typical form of the genus (Fig. 69B). One of the second to fifth male pleopods has 11-segmented endopod and 11-segmented exopod, and the exopod is furnished with a short naked seta on the seventh and tenth segments (Fig. 69C).

Ii (1964a) illustrated the three median spines on the posterior margin of the telson indicating a distinct tendency of divergence posteriorly. Such feature is not so notable in these specimens from the mainland of Japan (Fig. 70E, F).

A sexual dimorphism is observed in the antennal peduncle and the mandibular palp. The antennal peduncle of the female (Fig. 70B) is shorter and more slender than that of the male (Fig. 70A), and the mandibular palp of the female (Fig. 70D) is more slender and armed with less number of setae than in the male (Fig. 70C). In the antennal scale (Fig. 70A, B) and the telson (Fig. 70E, F), sexual dimorphism is hardly found.

The genital organ of the male (Fig. 70G) is furnished with three recurved setae at the anterodistal angle and three long plumose setae restricted in the distal part of the anterior margin.

The size of specimens is generally smaller in those from the mainland of Japan (6.1 to 7.7 mm in the male, 5.8 to 7.4 mm in the female) than those from the East China Sea (9.8 to 10.7 mm

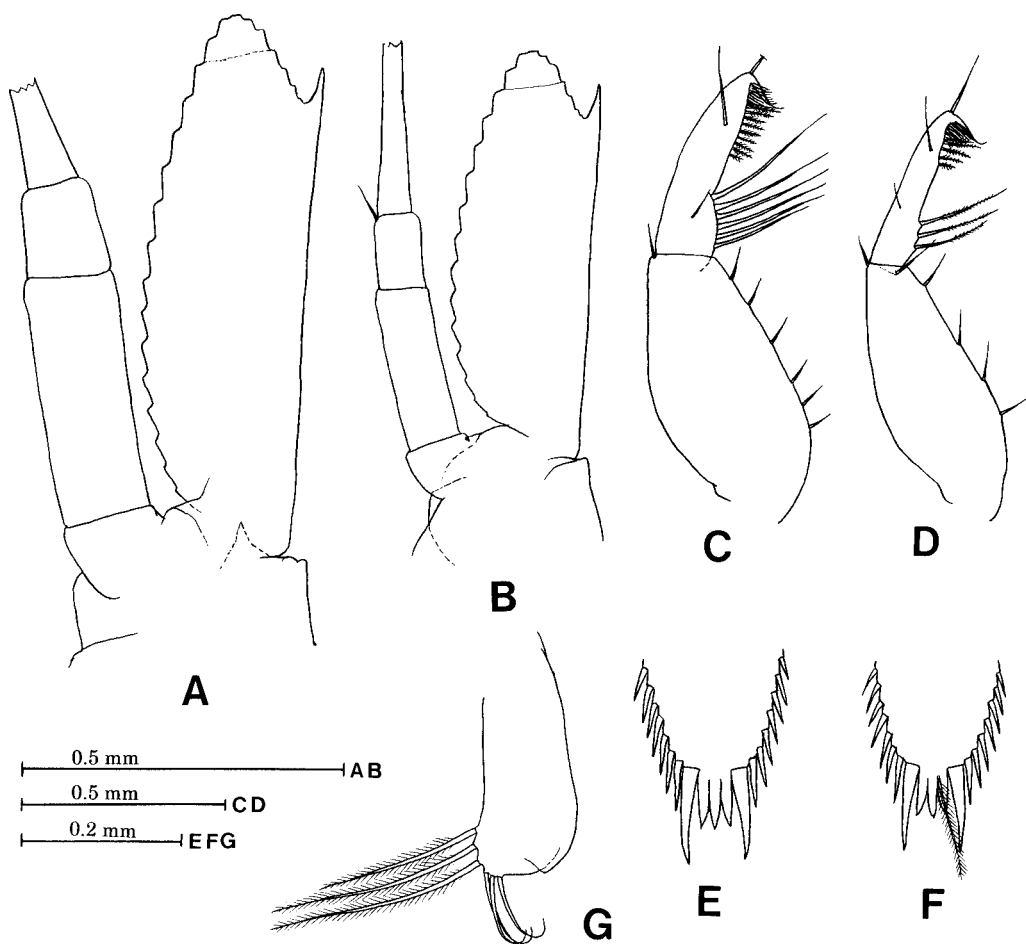


Fig. 70. *Siriella trispina* Ii, 1964; from Omura Bay (NSMT-Cr 16421); A, C, E, adult male (7.0 mm); B, D, F, adult female (6.1 mm). G, from Taiwan Strait (Ii's Coll. No. 414), adult male (ca. 8.5 mm). A, B, antenna; C, D, mandibular palp; E, F, posterior part of telson; G, genital organ.

in the male, 8.8 to 10.0 mm in the female).

Distribution. Known from the coastal water of the central and western Japan (present study), the East China Sea (Ii, 1964a; Wang and Liu, 1997; Cai, 1980; Liu and Wang, 2000; present study), the Yellow Sea (Cai, 1980; Liu and Wang, 2000) and the South China Sea (Liu and Wang, 2000).

56. *Siriella denticulata* (Thomson, 1880)

Mysis denticulata Thomson, 1880: 1; 1881: 205, pl. 7, figs. 1, 2.

Siriella denticulata: Thomson, 1900: 482–483, pl. 33, figs. 1–5; W. Tattersall, 1913: 871–872; 1923, 280–282; Gordan, 1957: 379 [catalogue]; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 45–46 [catalogue].

Type locality. Dunedin Harbor, South Island, New Zealand.

No specimen in the present study.

Remarks. *Siriella denticulata* was first described by Thomson (1880) based on specimens from New Zealand, and later redescribed supplementally by W. Tattersall (1923) based on the

new specimens from the north of New Zealand during the British Antarctic (Terra Nova) Expedition. This species, however, is still not so clarified due to the lack of appropriate illustrations for doing specific validity.

According to W. Tattersall (1923), *S. denticulata* has the uropodal endopod furnished with thirteen to seventeen spines on the inner margin, and the telson armed with three to five strong spines on each side of a proximal widened portion. These characters appear to indicate a close relation to *S. trispina*. On the other hand, the state of the endopod of the thoracic limbs, which is an important character of the Trispina-subgroup, is unknown yet. Therefore, *S. denticulata* is tentatively placed in this subgroup.

Siriella denticulata is distinguished from the other species of this subgroup, *S. trispina*, by the uropod, i.e. the proximal segment of the exopod is armed with nine to eleven spines occupying slightly less than the distal half of the outer margin in *S. denticulata* whereas six to ten spines occupying less than the distal 1/3 part of the outer margin in *S. trispina*. And the endopod is armed with 13 to 17 spines on the inner margin in *S. denticulata* as compared to 24 to 28 spines in *S. trispina*.

Distribution. Known only from the neighboring waters of New Zealand (Thomson, 1880, 1881, 1900; W. Tattersall, 1923).

Nodosa-subgroup

57. *Siriella nodosa* Hansen, 1910

(Figs. 71–73)

Siriella nodosa Hansen, 1910: 33–34, pl. 3, fig. 1a–l (only female); Colosi, 1919: 6; 1920: 236; W. Tattersall, 1936: 145; 1943: 65; Gordan, 1957: 380 [catalogue]; Ii, 1964a: 85–86; Mauchline and Murano, 1977: 77 [catalogue]; Băcescu, 1979: 143; Murano, 1990: 192, fig. 3; Müller, 1993: 51 [catalogue]; Keable *et al.*, 2003: 467 [catalogue].

Type locality. 04°40'N 125°24'E, off Kawio and Kamboling Islands, Indonesia.

Material examined. [Mainland of Japan] One adult male, 1 immature male and 1 immature female (NSMT-Cr 14578), Nomo, Nagasaki, 28 November 1975, hand net during scuba diving, 5 m, coll. S. Inoue and T. Takita.

[Okinawa, Japan] Two immature males and 4 juveniles (NSMT-Cr 16253), Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Five adult females and 3 immature females (NSMT-Cr 14574), Port Aka, Akajima Is., 23 June 1990, hand net under electric light, coll. M. Murano. Eight adult males (5.9–7.0 mm), 17 adult females (4.9–5.5 mm), 7 immature males and 1 immature female (NSMT-Cr 14575), Port Aka, Akajima Is., 24 June 1990, light trap at 1 m deep, coll. M. Murano. Nine adult males (6.3–7.3 mm), 9 adult females (5.1–5.5 mm), 8 immature males and 4 immature females (NSMT-Cr 14576), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano. Eleven adult males (5.7–7.2 mm), 7 adult females (4.8–6.5 mm), 7 immature males and 6 immature females (NSMT-Cr 14577), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. Four adult males (6.6–7.1 mm), 23 gravid females (4.7–5.1 mm), 4 adult females (5.3–5.4 mm), 32 immature males (up to 6.3 mm) and 42 immature females (up to 4.9 mm) (NSMT-Cr 14583), Port Aka, Akajima Is., 13 November 1990, hand net under electric light. One gravid female (5.0 mm), 2 immature males, 14 immature females (up to 5.0 mm) and 6 juveniles (NSMT-Cr 14579), Port Aka, Akajima Is., 5 May 1991, hand net under electric light, coll. M. Murano. One adult male (7.0 mm) (NSMT-Cr 14580), between Fukachi Is. and Geruma Is., Kerama Islands, 7 January 1992, hand net. One gravid female (4.7 mm), 1 adult female and 3 immature females (NSMT-Cr 14581), Port Aka,

Akajima Is., 1 January 1995, hand net under electric light.

[Philippines] One adult male (6.7 mm) (NSMT-Cr 14582), Batbatan, Panay Is., 23–24 March 1979, larva net at surface, coll. SEAFDEC.

Body length. Adult male, 5.2–7.3 mm; adult female, 4.7–6.5 mm.

Remarks. The present female specimens agree with the description and figures given by Hansen (1910). In males, however, considerable differences are recognized in the carapace, the uropodal endopod and the telson. Namely, (1) male of Hansen's specimens is not provided with any protuberance along the mid line of the carapace, while in the present male specimens the carapace is provided with a protuberance in the front of the cervical sulcus, although it is not much prominent (Fig. 71C); (2) spines on the inner ventral margin of the uropodal endopod in the present male become gradually longer towards the distal end, as seen in the female (Fig. 73A), while these spines in Hansen's male specimen show the alternate arrangement of one longer and one or two shorter ones (Hansen, 1910, pl. 3, fig. 1k); (3) the telson in the present male is 2.25 times as long as broad (Fig. 73B) and more or less similar in shape to the female (Fig. 73C), whereas in Hansen's specimen (Hansen, 1910, pl. 3, fig. 1k) that is more slender (3 times as long as broad) than in female; (4) the telson in the present male does not extend up to the articulation of the uropodal exopod like female specimens, while in Hansen's specimen it extends posteriorly beyond the articulation (Hansen, 1910, pl. 3, fig. 1k).

Under these circumstances, the male specimen described and illustrated by Hansen (1910) is judged to belong to a different species from the female. He did not designate the holotype of *S. nodosa*, but the priority of the species name should be given to the female, because the specific name *nodosa* is referring to the protuberances on the carapace. The name of species that the male should belong is unknown at the present state.

The most conspicuous feature of the male is the appendix masculina on the antennule (Fig. 71D, E); i.e. it is long and narrow spatulate in shape with rounded apex, the inner margin is concave and with sensory hairs becoming sparser apically except fine sensory hairs near the apex, the outer margin is naked and provided with a small protuberance at the distal third. Such a feature is so unique that it is never seen in all the other species belonging to the genus *Siriella*.

Main characters of the male, besides the protuberance of the carapace and the appendix masculina of the antennule, are as follows. Carapace (Fig. 71A) short anteriorly, leaving whole eyes and triangular small process exposed. Antennal scale (Fig. 71F) 3 times as long as broad, with terminal lobe broader than long. Genital organ (Fig. 71I) 4 times as long as broad in lateral view, armed with 2 long plumose setae in distal part of anterior margin and 2 recurved setae at anterodistal corner; posterior margin naked. Pleopods developed, natatory; exopod of first pleopod (Fig. 72E) 11- or 12-segmented and broader than that of the second to fifth pleopods; endopod wanting. Second to fifth pleopods (Fig. 72F) with both rami 12-segmented, and without modified setae. Pseudobranchial rami (Fig. 72E, F) nearly straight in first and fifth pleopods, and spirally coiled in second to fourth pleopods. Uropodal exopod (Fig. 73B) with 4 spines restricted to distal end of outer margin of proximal segment. Uropodal endopod (Fig. 73A) armed along ventral inner margin with 20 spines becoming longer distally. Telson (Fig. 73B) 2.25 times as long as broad at base, gradually becoming narrower from proximal end to apex as a whole; lateral margin with a single spine in proximal broadened part, followed by unarmed part occupying 1/4 of margin, then distal series of 15 to 17 same-sized small spines; posterior margin with pair of long spines, 3 median small spines and pair of plumose setae, of which long spines are 2.5 times longer than last lateral spines.

Sexual dimorphism in the specimens from Okinawa, Japan, is summarized in Table 9.

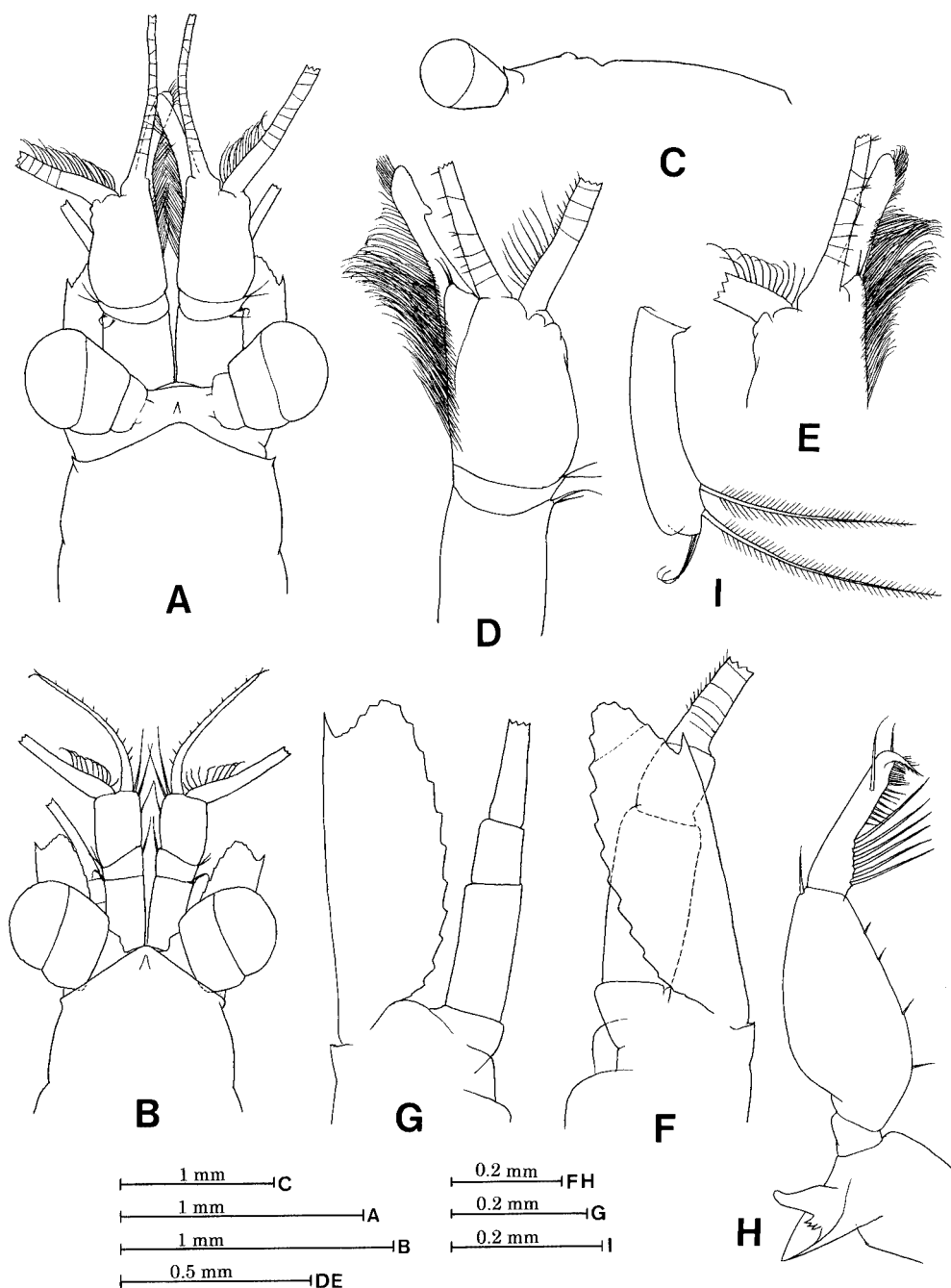


Fig. 71. *Siriella nodosa* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 14583); A, C–F, H, I, adult male (7.0 mm); B, G, adult female (5.4 mm). A, B, anterior part of body; C, eye and dorsal surface of carapace in lateral view; D, right antennular peduncle; E, third segment of left antennular peduncle; F, G, antenna; H, mandible and mandibular palp; I, genital organ.

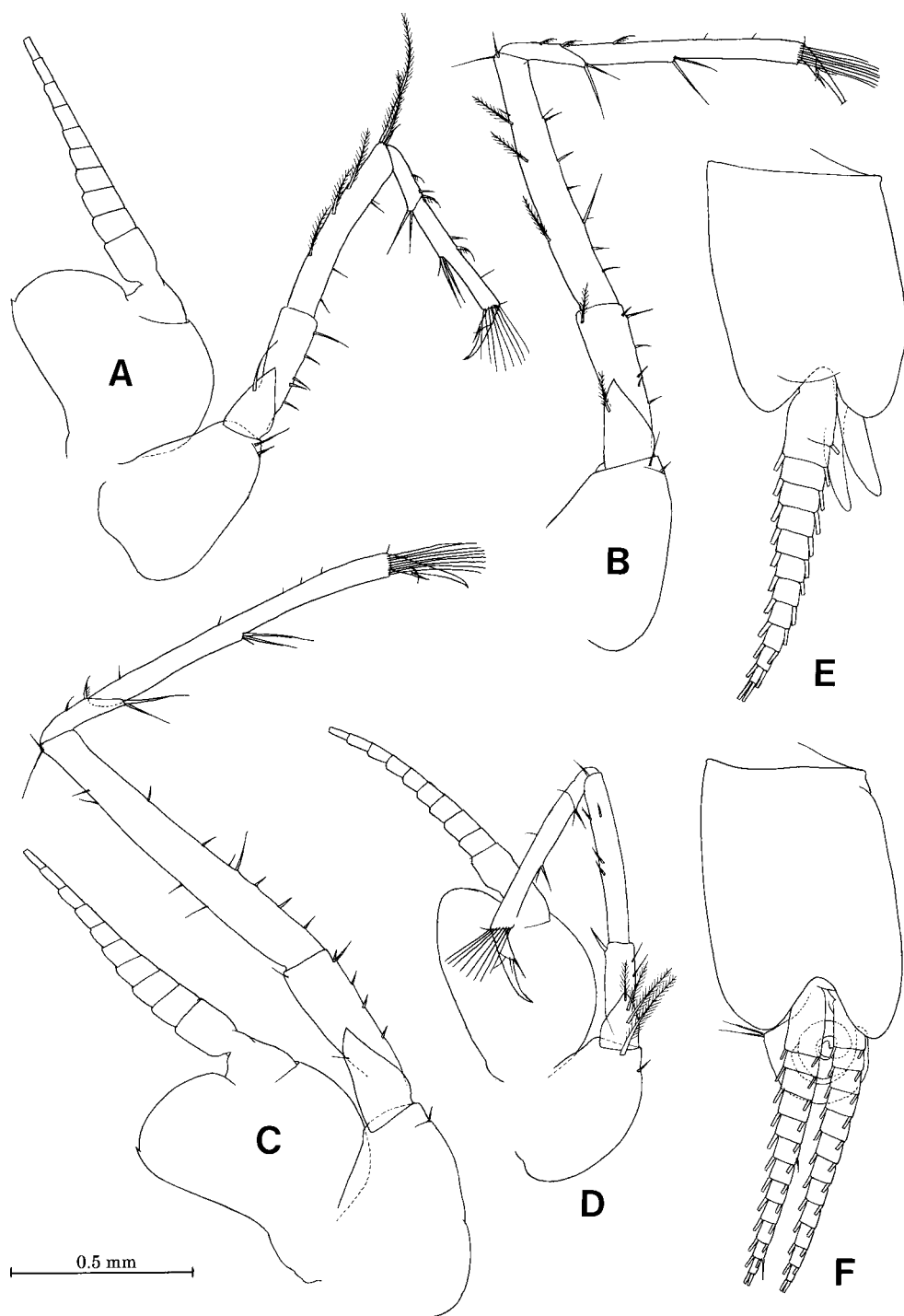


Fig. 72. *Siriella nodosa* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 14583), adult male (7.0 mm). A, third thoracic limb; B, endopod of fourth thoracic limb; C, fifth thoracic limb; D, eighth thoracic limb; E, first pleopod; F, fourth pleopod.

Table 9. Sexual differences in morphology of *Siriella nodosa* from Okinawa, Japan

	Female	Male
Carapace	With 2 notable protuberances along median line	With one small protuberance along median line
Rostrum	Produced into broad triangular plate extending to base of antennular peduncles, covering eyestalks partly and small digitate process completely	Slightly produced, exposing completely eyes and small digitate process
Antennule	Slender; inner flagellum as long as its own peduncle	Robust; inner flagellum 3 times as long as its own peduncle
Antenna	Scale slightly less than 3 times as long as broad; terminal lobe slightly extending beyond tip of outer spine; peduncle narrow, extending to distal 1/3 of scale	Scale 3 times as long as broad; terminal lobe 4 times as long as outer spine; peduncle broad, extending to distal 1/9 of scale
Mandibular palp	Third segment with 3 long setae on proximal half of outer margin	Third segment with 6 long setae on proximal half of outer margin
Telson	Posterior margin broadly rounded; posterior series of lateral spines longer, 11 or 12 in number	Posterior margin narrowly rounded; posterior series of lateral spines shorter, 15 to 17 in number

Siriella nodosa is easily distinguished from the other species of the genus by the carapace with two protuberances in the female and one in the male along the mid line, the spatulate appendix masculina, and the telson armed with a pair of spines in the basal broadened part.

Distribution. Previously known from the Indonesian waters (Hansen, 1910), the Torres Strait (Colosi, 1919, 1920), the Great Barrier Reef (W. Tattersall, 1936; Băcescu, 1979), Guam (W. Tattersall, 1943), and Okinawa, Japan (Murano, 1990; present study). The occurrence from the Philippines is first recorded. The occurrence from Nomo, Japan, extends northward the geographical distribution range of this species. It is widely distributed in the coastal waters of the tropical and subtropical regions of the western Pacific Ocean and its marginal seas.

Brevirostris-subgroup

58. *Siriella brevirostris* Nouvel, 1944

Siriella brevirostris Nouvel, 1944: 256; 1959: 196–199, figs. 1–9; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 43 [catalogue].

Siriella gibba Nouvel, 1944, syn. nov.: 256, 257; 1959: 199–202, figs. 10–19; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 47 [catalogue].

Type locality. Bay of Tadjoura, Djibouti.

No specimen in the present study.

Remarks. *Siriella brevirostris* was established based on two males collected from Tadjoura Bay, Djibouti, by Nouvel (1944). In the same article, Nouvel (1944) also described *S. gibba* for the reception of a single immature female collected from the same locality. He assumed that *S. gibba* might be a female of *S. brevirostris*, but he ultimately concluded it as a different species from *S. brevirostris* due to the difference in the frontal plate and in the eyes. *Siriella gibba* has common characters with *S. brevirostris* in following two aspects, i.e. the uropodal endopod armed with spines becoming gradually longer distally along the inner margin, and the lateral margin of the telson armed with two proximal spines situated at a short distance. The frontal plate of *S. gibba* (female) is longer than in *S. brevirostris* (male). This is one of differences between both species mentioned by Nouvel (1959). This difference is probably accounted due to

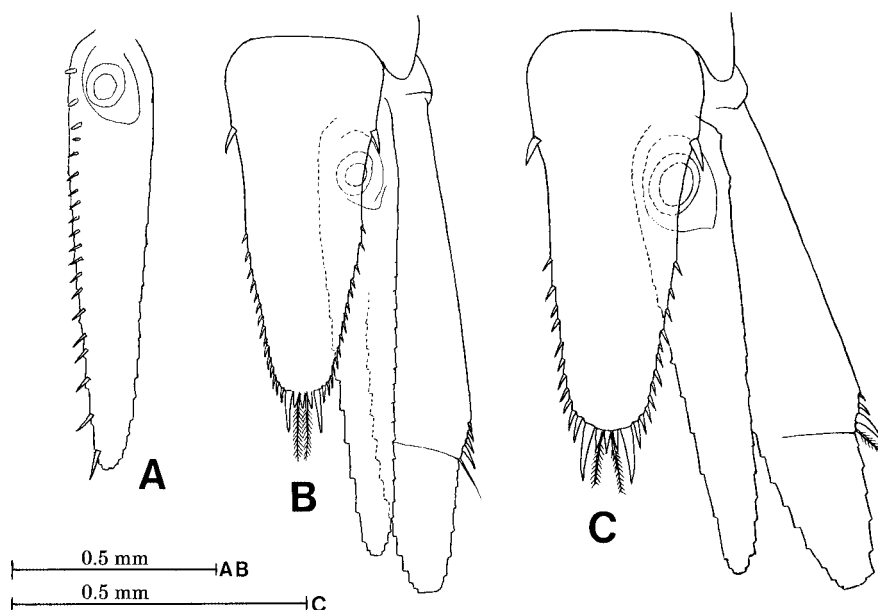


Fig. 73. *Siriella nodosa* Hansen, 1910; from Okinawa, Japan (NSMT-Cr 14583); A, B, adult male (7.0 mm); C, adult female (5.4 mm). A, uropodal endopod; B, C, uropod and telson.

sexual dimorphism and such difference has been observed in some species in the genus *Siriella*, e.g. *S. affinis* (Fig. 31A, B), *S. macropsis* (Fig. 43A, B), and *S. nodosa* (Fig. 71A, B). The other difference, such as size of the eyes, might be due to the sex difference and/or the state of growth. So, these two species are considered as a single species. Consequently, both are included in a single species, *S. brevirostris*.

Siriella brevirostris closely resembles *S. tuberculum*. Differences are discussed in the *Remarks* section of the said species.

Distribution. Known only from Tadjoura Bay, Djibouti (Nouvel, 1944, 1959).

59. *Siriella jonesi* Pillai, 1964

Siriella jonesi Pillai, 1964: 11–13, figs. 5, 6; 1965: 1689, fig. 10; 1973: 47–50, figs. 17, 18; Mauchline and Murano, 1977: 76 [catalogue]; Müller, 1993: 49 [catalogue].

Type locality. 20°20'N 72°00'E, Arabian Sea.

No specimen in the present study.

Remarks. *Siriella jonesi* is distinguished from the other species of this subgroup by the small eyes, and the lateral spines of the telson having a tendency of falling into groups.

The female is unknown.

Distribution. Known only from the type locality (Pillai, 1964, 1965, 1973).

60. *Siriella tuberculum* Fukuoka and Murano, 1996

(Figs. 74, 75)

Siriella tuberculum Fukuoka and Murano, 1996: 512–516, figs. 1, 2.

Material examined. [Okinawa, Japan] One immature male (6.9 mm) (NSMT-Cr 16820),

Port Aka, Akajima Is., 23 June 1990, surface tow with plankton net at night, coll. M. Murano. Eight adult males (7.0–7.6 mm), 5 gravid females (6.0–6.8 mm), 2 adult females (6.6 mm), 7 immature males (5.1–6.2 mm) and 10 immature females (4.7–5.9 mm) (NSMT-Cr 15683), Port Aka, Akajima Is., 24 June 1990, light trap at 1 and 4 m deep, coll. M. Murano. One adult male (7.7 mm) and 1 immature male (5.5 mm) (NSMT-Cr 16821), Port Aka, Akajima Is., 24 June 1990, light trap at 4 m deep, coll. M. Murano. Five adult males (up to 7.6 mm) and 2 immature females (NSMT-Cr 15684), Port Aka, Akajima Is., 24 June 1990, light trap at 8 m deep, coll. M. Murano. One immature male and 2 immature females (NSMT-Cr 17772), Urasoko Bay, Ishigaki Is., 6–7 November 2002, light trap above sandy bottom, coll. K. Fukuoka.

[Ogasawara, Japan] Two adult males (6.8 mm), 1 gravid female (5.2 mm), 9 immature males, 5 immature females and 2 juveniles (NSMT-Cr 16254), Port Futami, Chichijima Is., 16 June 1995, hand net under electric light, coll. K. Fukuoka. One immature female with small marsupium (NSMT-Cr 16255), Miyanohama Beach, Chichijima Is., 26–27 June 2003, light trap, coll. K. Fukuoka.

Type locality. Port Aka, Akajima Island, Ryukyu Islands, Japan.

Body length. Adult male, 6.8–7.6 mm; adult female, 5.2–6.8 mm.

Remarks. The description in our previous paper (1996) on the endopod of the thoracic limbs was inadequate because the fifth endopod was lost due to damage. The endopod of thoracic limbs (Fig. 74A–F) increases in length from the third pair to the fifth and decreases from the sixth pair to the eighth. Length ratios in the merus of these six endopods are 0.59 : 0.81 : 1 : 0.71 : 0.59 : 0.56 from the third pair to the eighth, respectively. The carpopropodus of these endopods are obscurely divided by an oblique articulation into two subsegments with the proximal subsegment much shorter than the distal. In the present fully developed male of 7.6 mm long, the genital organ (Fig. 75A) is nearly 4 times as long as broad in lateral view, and armed with two curved naked setae on the rounded distal margin, two long plumose setae on the distal part of the anterior margin and 6 short plumose setae on the posterior margin. The telson is slightly more slender in the male (2.6 times as long as broad) (Fig. 75B) than in the female (2.5 times as long) (Fig. 75D). Sexual dimorphism in the armature of the telson is hardly observed.

Differences from *S. nodosa* were already discussed in our previous paper (Fukuoka and Murano, 1996). *Siriella tuberculum* is distinguished from an allied species, *S. brevirostris*, which was described based on specimens collected from Tadjoura Bay, Djibouti, by the following points: (1) the endopod of the fifth thoracic limb longer in *S. tuberculum* than in *S. brevirostris*, i.e. the merus of the fifth endopod 1.8 times longer than that of the eighth in *S. tuberculum* as compared to 1.2 times longer in *S. brevirostris*; (2) a pair of long spines on the posterior margin of the telson more than twice as long as the distalmost spine on the lateral margin in *S. tuberculum*, while less than twice as long in *S. brevirostris*; (3) the lateral spines on the telson arranged more sparsely in *S. tuberculum* than in *S. brevirostris*; (4) the median three spines on the posterior margin of the telson slightly longer than the distalmost spine on the lateral margin in *S. tuberculum* while considerably shorter in *S. brevirostris*; (5) the genital organ of the male armed with two long plumose setae on the distal part of the anterior margin in *S. tuberculum* as compared to three in *S. brevirostris*.

Siriella tuberculum is also distinguished from the other species of this subgroup, *S. jonesi*, by the large eyes and an indistinct tendency of falling into groups of the lateral spines of the telson.

Distribution. Hitherto, *S. tuberculum* has only been known from the type locality, Okinawa, Japan (Fukuoka and Murano, 1996). The occurrence from Ogasawara Islands extends easterly the distribution range of this species.

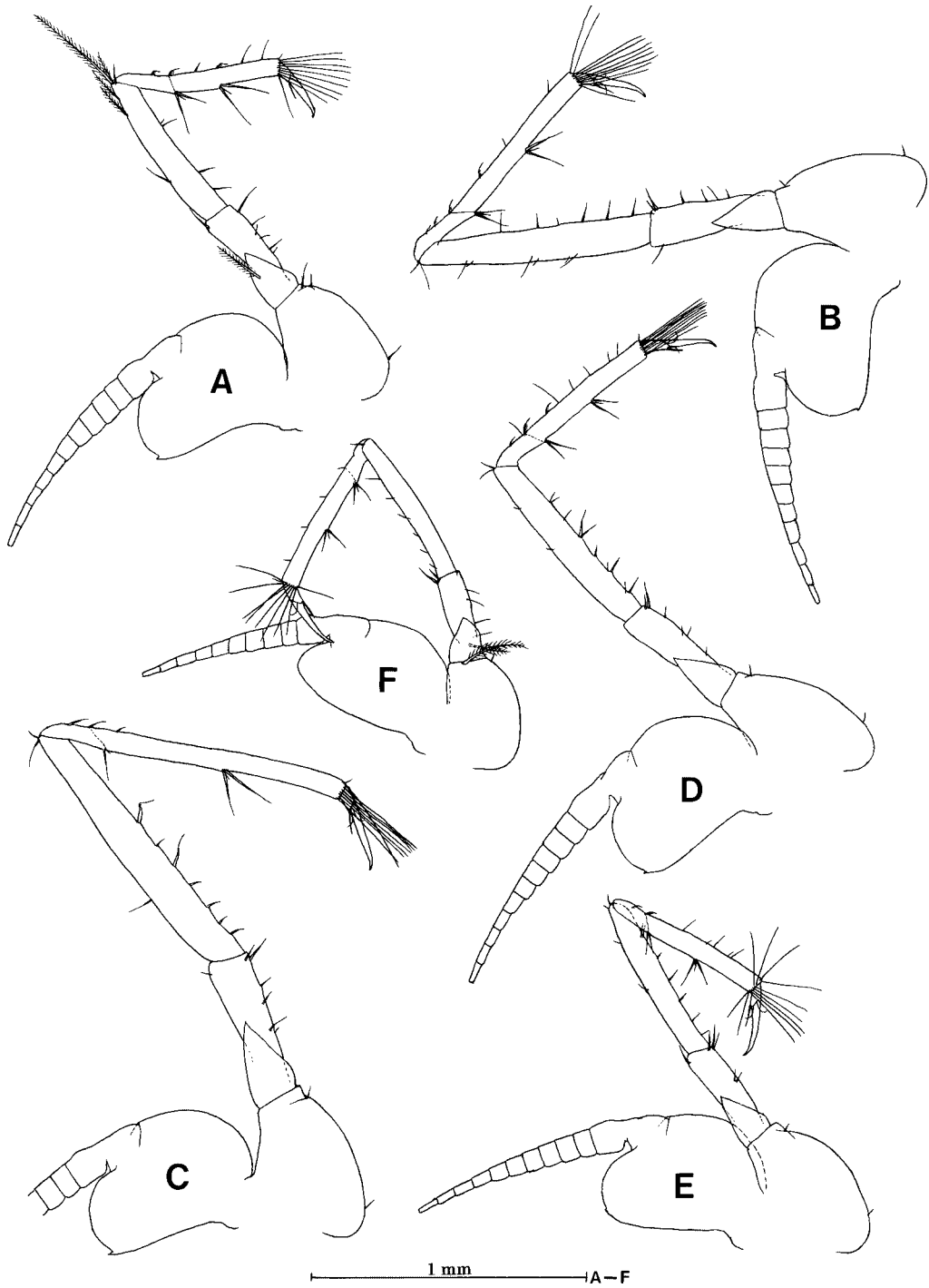


Fig. 74. *Siriella tuberculum* Fukuoka and Murano, 1996; from Okinawa, Japan (NSMT-Cr 15683), adult male (7.6 mm). A–F, third to eighth thoracic limbs.

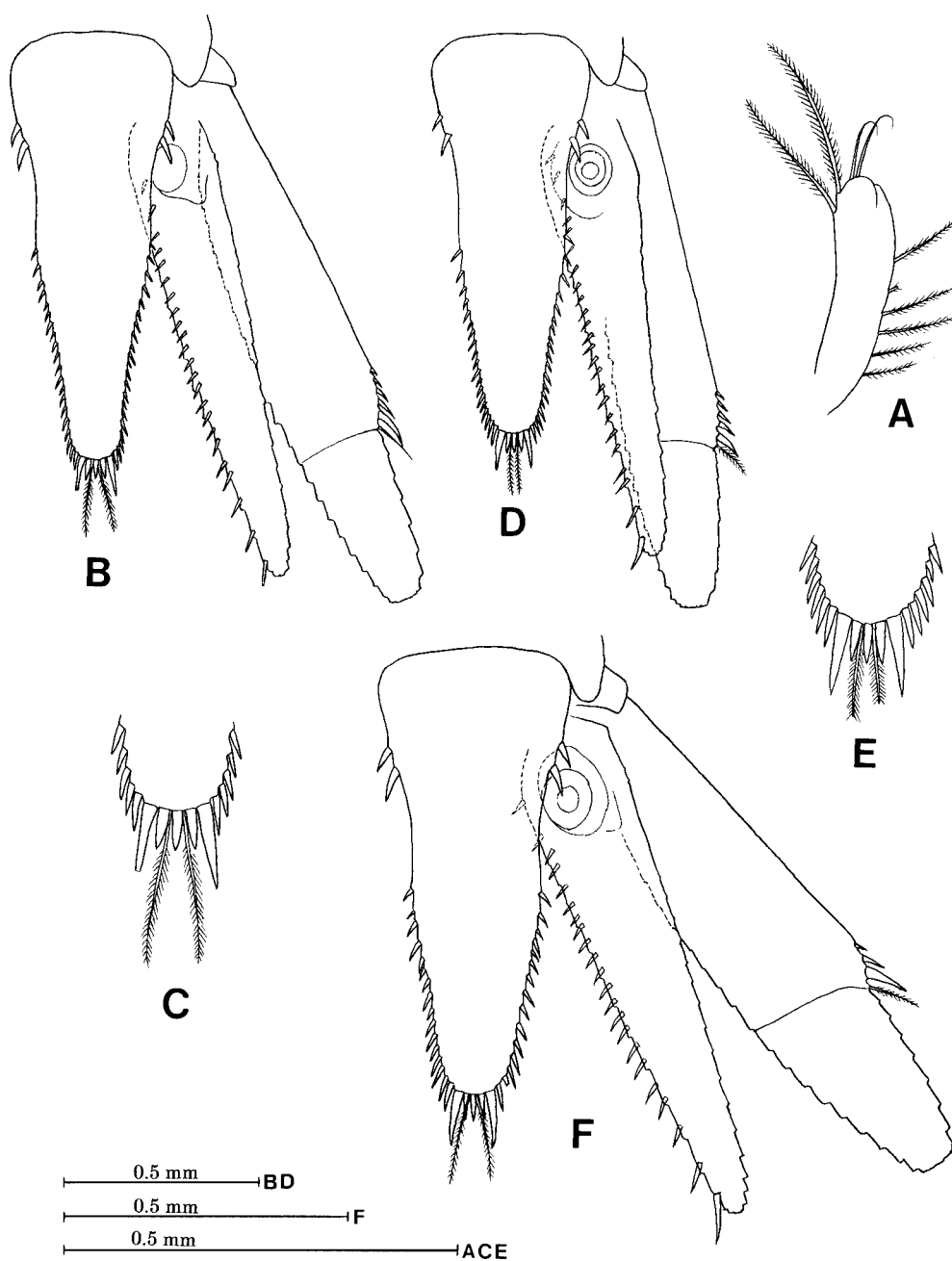


Fig. 75. *Siriella tuberculum* Fukuoka and Murano, 1996; from Okinawa, Japan (NSMT-Cr 15683); A–C, adult male (7.6 mm); D, E, gravid female (6.8 mm); F, immature female with small marsupium (5.7 mm). A, genital organ; B, D, F, uropod and telson; C, E, posterior part of telson.

61. *Siriella chaitiamvongae* sp. nov.

(Figs. 76–78)

Type series. Holotype (NSMT-Cr 16459), adult male (5.4 mm); allotype (NSMT-Cr 16460), adult female (ca. 6 mm); paratypes (NSMT-Cr 16461), 11 adult males (4.9–5.9 mm, 2 of which, 5.6 and 5.9 mm long, were dissected for drawing), 2 adult females (5.3 mm), 3 immature males and 2 immature females; Pha Ngan Is., Gulf of Thailand, 15 August 1992, on seagrass bed, coll. S. Chaitiamvong.

Other material examined. [Gulf of Thailand] One adult female and 1 immature male (NSMT-Cr 16462), Pha Ngan Is., 16 August 1992, on seagrass bed, coll. S. Chaitiamvong.

[Philippines] One gravid female (5.8 mm) (NSMT-Cr 16464), Batbatan, Panay Is., 23–24 March 1979, midnight, coll. SEAFDEC.

[Indonesia] One immature male (5.7 mm) (NSMT-Cr 16463), Labuan, Java Is., 18 June 1994, surface tow with plankton net at night, coll. Mulyadi.

Description. Carapace (Fig. 76A, B) short anteriorly in both sexes; in female small protuberance present between apex and cervical sulcus along dorsal median line (Figs. 76C, 78A); in male such protuberance wanting; anterolateral corner rounded; posterior margin (Fig. 76C) emarginate, leaving last 3 thoracic somites exposed. Rostrum produced anteriorly into low triangular plate with rounded apex and straight or slightly convex lateral margins, leaving eyes and antennular peduncles uncovered. Frontal median digitate process (Fig. 76A, B) distinct and exposed.

Eyes (Fig. 76A, B) big, extending to distal margin of first segment of antennular peduncle in female and beyond it in male; cornea globular, occupying more than half of whole organ, slightly broader than eyestalk.

Antennular peduncle of male (Fig. 76A) robust, third segment as long as preceding 2 segments combined. That of female (Fig. 76B) much more slender than in male; first segment narrow, as long as succeeding 2 segments together, outer margin concave; second segment short, connected obliquely with third segment, armed with 1 long seta at inner distal corner, outer distal corner strongly protruding anteriorly and tipped with several short setae; third segment with 1 long seta at distal 1/3 of inner margin and 2 long setae at inner distal corner.

Antennal scale of male (Fig. 76A, D) extending to distal 1/3 of third segment of antennular peduncle, more than 3.5 times as long as broad, with distal suture at about distal 1/11; outer margin naked, straight, ending into denticle; terminal lobe broader than long, twice as long as terminal spine of outer margin. Antennal scale of female (Fig. 76B, E) almost same as that of male. Antennal peduncle (Fig. 76D, E) broader and longer in male than in female, reaching distal 1/4 of antennal scale in male and distal 1/3 in female, second segment longest, occupying more than half of peduncle in length. Antennal sympod (Fig. 76D, E) without denticle at outer distal angle.

Mandibular palp (Fig. 76F) rather slender; inner margin of second segment naked except 1 spine-like seta at distal end, outer margin with 4 short setae; third segment narrow, with 5 slender setae in male and 3 in female on proximal part of outer margin. Maxillule (Fig. 76G); inner lobe with 3 stout setae on apical margin and 3 setae on outer margin; outer lobe with single seta on ventral surface.

Endopod of first thoracic limb (Fig. 76H) short and robust, merus as long as carpopropodus and dactylus combined, terminal claw stout. Endopod of second thoracic limb (Fig. 76I) short, robust, with merus slightly shorter than carpopropodus, terminal claw long and stout. Endopod of third to eighth thoracic limbs (Fig. 77A–D) slender, increasing in length towards fifth limb, then decreasing towards eighth limb; carpopropodus not divided into subsegments; terminal claw

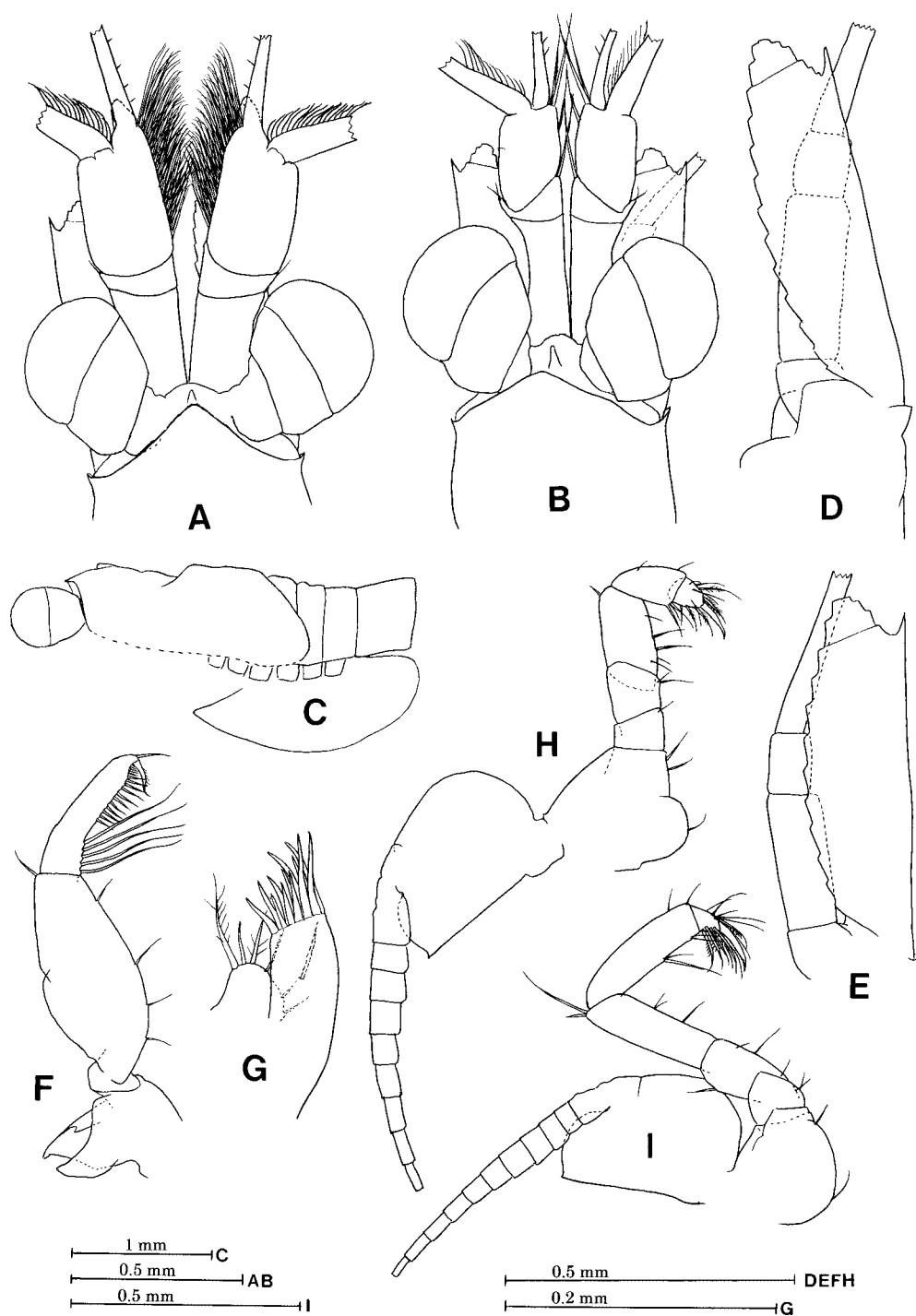


Fig. 76. *Siriella chaitiamvongae* sp. nov.; A, holotype (NSMT-Cr 16459); B, C, E, allotype (NSMT-Cr 16460); D, F–I, one of paratypes (NSMT-Cr 16461), adult male (5.6 mm). A, B, anterior part of body; C, anterior half of body in lateral view; D, E, antenna; F, mandible and mandibular palp; G, maxillule; H, first thoracic limb; I, second thoracic limb.

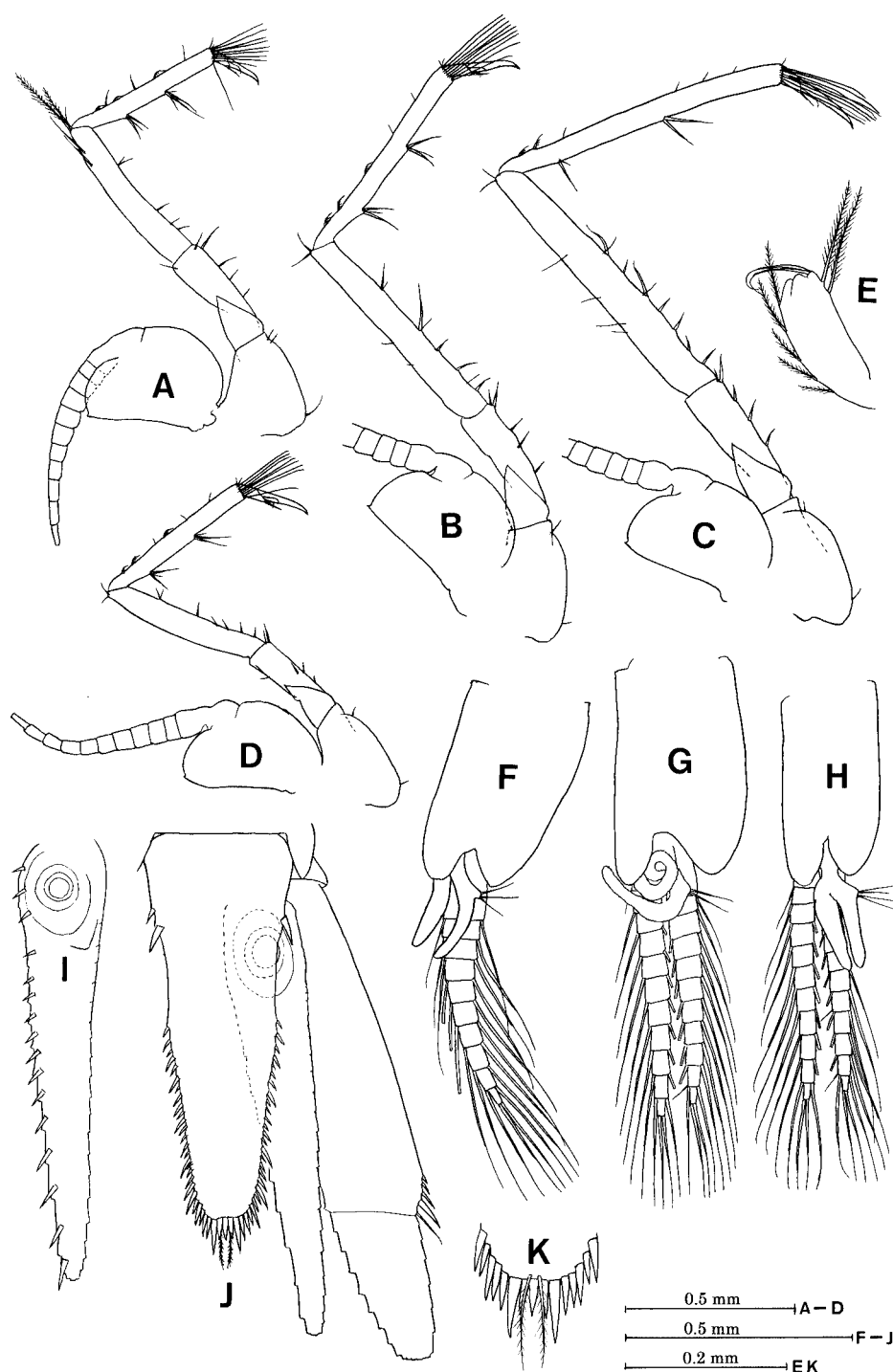


Fig. 77. *Siriella chaitiamvongae* sp. nov.; paratypes (NSMT-Cr 16461); A–E, adult male (5.9 mm); F–H, adult male (5.6 mm); I–K, holotype (NSMT-Cr 16459). A–D, third to fifth and seventh thoracic limbs; E, genital organ; F, first pleopod; G, fourth pleopod; H, fifth pleopod; I, uropodal endopod; J, uropod and telson; K, posterior part of telson in ventral view.

moderately slender. Endopod of third thoracic limb (Fig. 77A) much longer than that of second, merus slightly longer than carpopropodus, with 2 long plumose setae at outer distal corner. Endopod of fourth thoracic limb (Fig. 77B) elongated, ischium and proximal half of merus armed with spine-like setae on inner margin. Endopod of fifth thoracic limb (Fig. 77C) extremely elongated, more than 1.5 times longer than third endopod, with merus as long as carpopropodus, merus and ischium with spine-like setae on inner margin. Endopod of seventh thoracic limb (Fig. 77D) shorter than third. Endopod of eighth thoracic limb short and slender. Exopod of first to eighth thoracic limbs with basal plate furnished with small denticle at outer distal corner. Flagellipart of exopods (Figs. 76H, I, 77A, D) 9-segmented in first limb, 11-segmented in second to seventh limbs and 10-segmented in eighth limb.

Genital organ of male (Fig. 77E) 3 times as long as broad in lateral view, with 2 long plumose setae in distal part of anterior margin, 5 plumose setae along posterior margin and 2 relatively long recurved setae at anterodistal corner.

First to fifth abdominal somites subequal in length, sixth somite 1.6 times longer than preceding one.

Pleopods of male developed, natatory; exopod of first pleopod (Fig. 77F) 10-segmented, broader than rami of second to fifth pleopods, endopod wanting; second to fifth pleopods (Fig. 77G, H) with both rami 10-segmented, without modified setae. Pseudobranchial rami (Fig. 77F–H) straight in first and fifth pleopods, spirally coiled in second to fourth pleopods.

Uropodal exopod (Fig. 77J) extending beyond posterior margin of telson for 1/3 of its length, proximal segment armed on distal part of outer margin with 4 or 5 spines in male and 3 in female. Uropodal endopod (Fig. 77I, J) tapered, overreaching apex of telson for 1/4 of its length, armed with 16 spines along inner ventral margin from statocyst region to near apex, these spines becoming gradually longer distally and not arranged in series.

Telson (Fig. 77J, K) narrowly linguiform, 1.1 times longer than sixth abdominal somite, more than 2.5 times as long as broad at base, extending to articulation of uropodal exopod; lateral margin armed at proximal 1/5 with 2, rarely 1, spines, in case of 2 spines, both located at short distance, followed by unarmed portion occupying 1/4 of margin, then distal series of about 26 spines which are arranged tightly in distal part and somewhat sparsely in proximal part, and falling into groups, each group comprising 2 to 5 graded spines. Posterior margin of telson armed with pair of long spines, 3 median small spines and pair of plumose setae; median 3 spines relatively long, subequal in length to ultimate spines on lateral margin, more than half as long as long spines flanking them and lined tightly, so that plumose setae arising from ventral side of telson.

Etymology. This species is named in honor of Mrs. Somnuk Chaitiamvong who gave us the material for our study.

Remarks. Among the *Brevirostris*-subgroup, *S. chaitiamvongae* closely resembles *S. brevirostris* collected from Tadjoura Bay, Djibouti, but it is distinguished from *S. brevirostris* in following points: (1) a median digitate process exposed just in the front of the apex of the rostrum in *S. chaitiamvongae*, while such a process wanting in *S. brevirostris*; (2) the antennular peduncle longer and more slender in *S. chaitiamvongae* than in *S. brevirostris*; (3) the carpopropodus of the endopod of the third to eighth thoracic limbs being not divided into subsegments in *S. chaitiamvongae*, while divided into two subsegments by a somewhat oblique articulation in *S. brevirostris*; (4) the characteristic setae surrounding the dactylus and the terminal claw of the endopod of the third to eighth thoracic limbs longer in *S. chaitiamvongae* than in *S. brevirostris*, especially in the eighth limb; (5) three median spines on the posterior margin of the telson more than half as long as the long spines flanking them in *S. chaitiamvongae*, while less than half as long as the

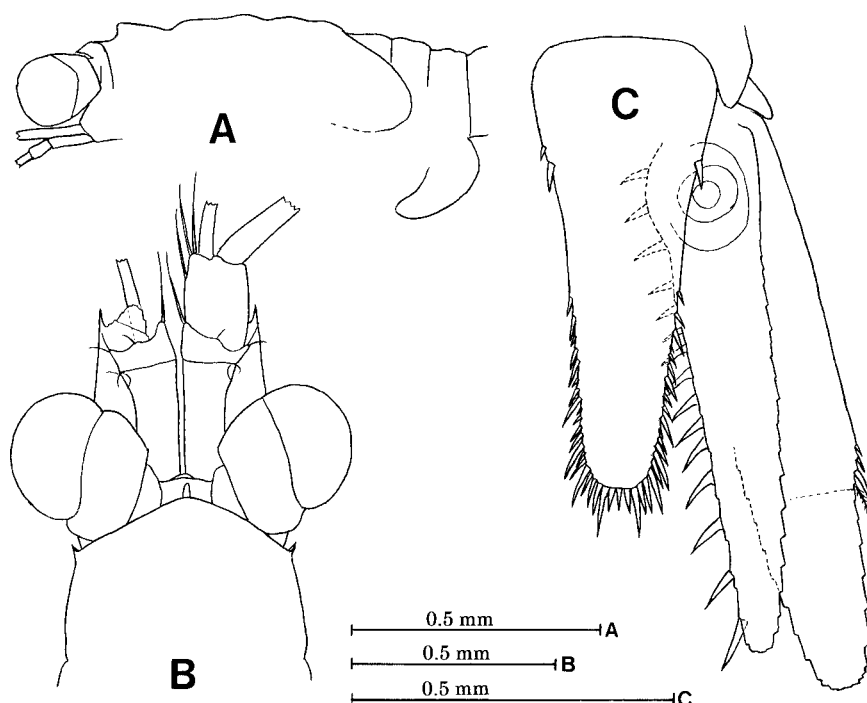


Fig. 78. *Siriella chaitiamvongae* sp. nov.; paratypes (NSMT-Cr 16461); A, C, immature female (5.0 mm); B, immature female (4.8 mm). A, anterior half of body in lateral view; B, anterior part of body; C, uropod and telson.

long spines in *S. brevirostris*.

Siriella chaitiamvongae is also allied to *S. tuberculum* and *S. jonesi*. From *S. tuberculum*, however, *S. chaitiamvongae* is distinguished in the number of spines along the inner ventral margin of the uropodal endopod (16 in *S. chaitiamvongae* and 23 to 26 in *S. tuberculum*), and in the lateral spines of the telson arranged in groups. From *S. jonesi*, it is rather easily distinguishable due to the size of eyes.

Distribution. *Siriella chaitiamvongae* was captured from the Gulf of Thailand; the Panay Is., Philippines; and Labuan, Java, Indonesia. This species appears to be a coastal form distributed widely in Southeast Asian seas.

Unnamed species

62. *Siriella* sp. 1

(Fig. 79)

Material examined. [Philippines] 1 adult male (5.6 mm) (NSMT-Cr 17743), Batbatan, Panay Is., 23–24 March 1979, midnight, surface tow with larva net, coll. SEAFDEC.

Remarks. This was sorted from a vial containing a number of *S. vulgaris* specimens. It is characterized by (1) the inner antennular flagellum with a meandering part proximally (Fig. 79A), (2) the antennular peduncle with a bilobed appendix masculina (Fig. 79B), (3) the endopod of the third to eighth thoracic limbs slender (Fig. 79D, E), (4) the genital organ slender, and with three curved, one long and one short setae on apex (Fig. 79F), (5) the uropodal exopod with eight spines on the posterior 2/5 part of the outer margin of the proximal segment (Fig. 79H), (6) the

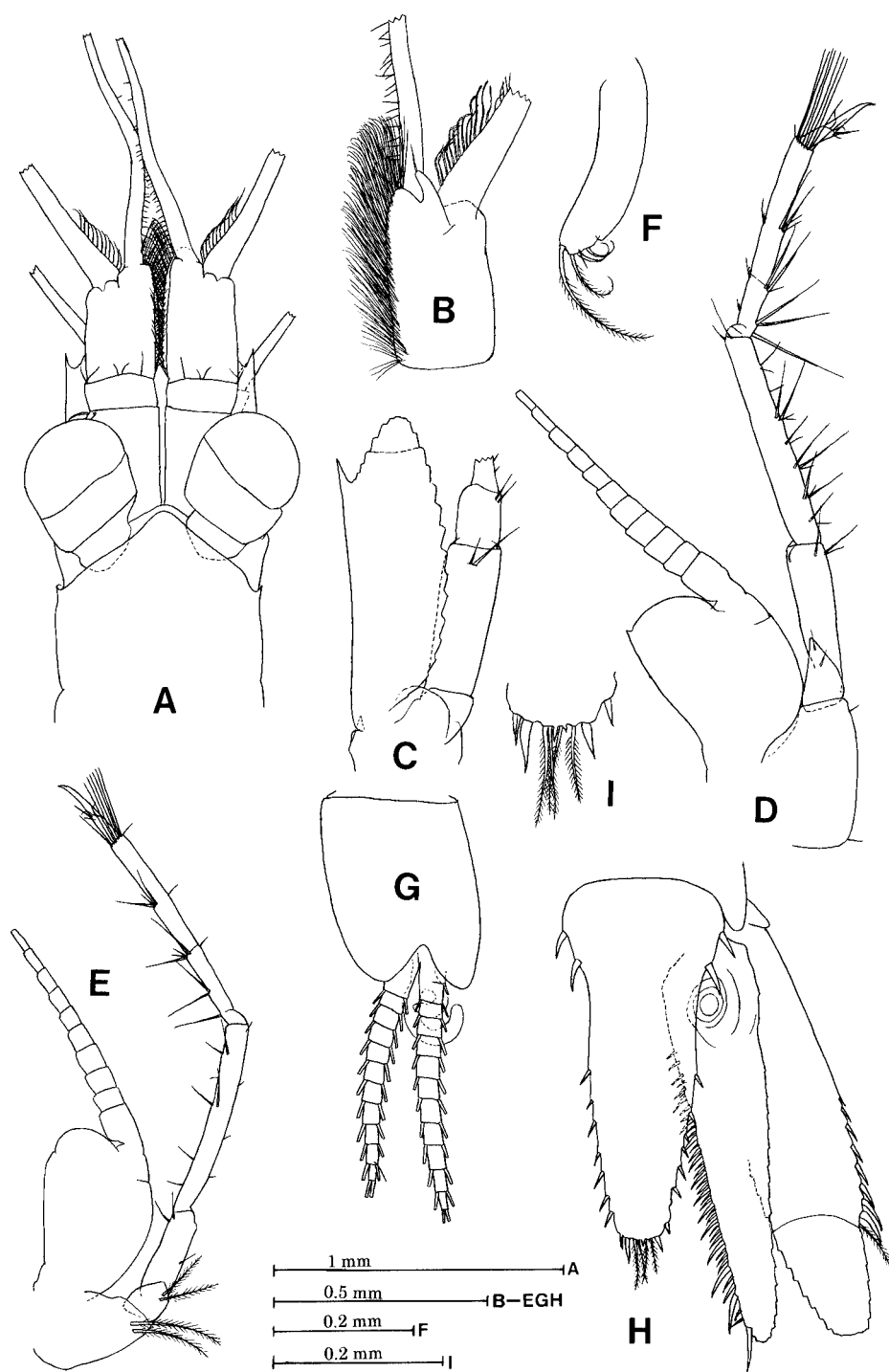


Fig. 79. *Siriella* sp. 1; from Panay Island, Philippines (NSMT-Cr 17743), adult male (5.6 mm). A, anterior part of body; B, third segment of left antennule in ventral view; C, antenna; D, fifth thoracic limb; E, eighth thoracic limb; F, genital organ; G, fourth pleopod; H, uropod and telson; I, posterior part of telson.

uropodal exopod only slightly longer than the endopod and with a considerably short distal segment (Fig. 79H).

This specimen is related with *S. scissilis* and *S. rimata* by having the bilobed appendix masculina on the antennular peduncle. It is, however, distinguished from them by the inner antennular flagellum with a proximal meandering part. Moreover, it is different from *S. rimata* in the endopod of the third to the eighth thoracic limbs armed with less number of long setae, and from *S. scissilis* in the third and fourth male pleopods without modified setae.

The telson of this specimen is certainly abnormal (Fig. 79H, I). The specimen remains as anonymous until further specimens in good condition become available.

63. *Siriella* sp. 2

(Fig. 80)

Material examined. [Western Australia] Four immature females with half-grown marsupium (ca. 6.1–ca. 6.6 mm, specimen of 6.3 mm dissected for drawing) (NSMT-Cr 17742), Thomson Bay, Rottnest Is., 15–18 January 1996, on seagrass bed of *Amphibolis antarctica* and *Heterozostera tasmanica*, hand net, coll. H. Mukai.

Remarks. All the specimens are depressed laterally, because they had been preserved within a small polyethylene bag together with a little amount of formalin seawater. Accordingly, the body trunk including the rostrum has been deformed considerably, while appendages have been kept in relatively good condition.

This species is allied to *S. iii* and *S. essingtonensis* in having the rather robust endopod of the thoracic limbs (Fig. 80D, E), and the outer margin of the uropodal exopod and the lateral margin of the telson furnished with relatively small number of spines (Fig. 80F). However, it is different from *S. iii* and *S. essingtonensis* in the shape of the endopod of the eighth thoracic limb and the uropodal endopod furnished with relatively small number of spines on the inner margin.

This species seems to be new to science but is remained as anonymous because all the present specimens are immature females and in bad condition.

64. *Siriella* sp. 3

(Fig. 81)

Material examined. [Philippines] Two adult males (6.3 mm) and 1 adult female (5.9 mm) (NSMT-Cr 15645), Batbatan, Panay Is., 22–23 March 1979, surface tow with larva net at night, coll. SEAFDEC. One adult male (6.6 mm) (NSMT-Cr 15646), Batbatan, Panay Is., 23–24 March 1979, surface tow with larva net at night, coll. SEAFDEC.

Remarks. The material was sorted from a vial containing a number of *S. vulgaris* specimens.

This species is allied to *S. affinis* in having the antennal scale with a short terminal lobe (Fig. 81C, D), the lateral spines of the telson with the tendency of falling into groups (Fig. 81E), and the proximal segment of the uropodal exopod armed with four graded spines (Fig. 81E). However, this species is distinguished from *S. affinis* by the ultimate pairs of the lateral spines of the telson longer than the pair of long spines on the posterior margin (Fig. 81E), and the genital organ of the male armed with three long plumose setae on the distal part of the anterior margin (Fig. 81F). This species also resembles *S. quilonensis*, but is distinguished by the shape and armature of the telson (Fig. 81E), i.e. the telson extending up to the articulation of the uropodal exopod in *S. quilonensis*, while extending posteriorly beyond the articulation in the present species, the telson 2.5 times longer than broad in *S. quilonensis* as compared to 2.8 times longer in this species,

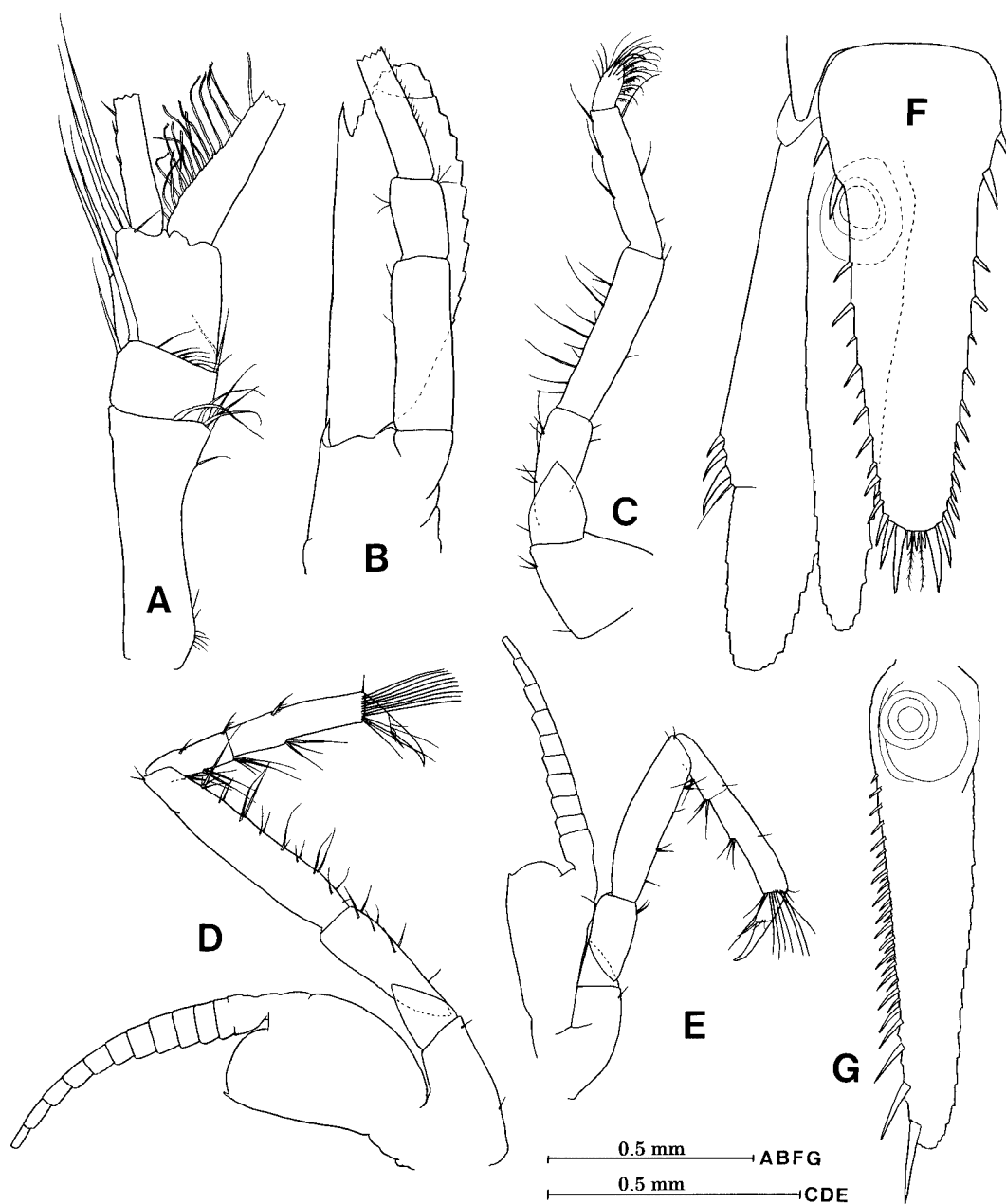


Fig. 80. *Siriella* sp. 2; from Rottnest Island, Western Australia (NSMT-Cr 17742), immature female (ca. 6.3 mm). A, right antennule; B, antenna; C, endopod of second thoracic limb; D, one of middle pairs of thoracic limbs; E, eighth thoracic limb; F, uropod and telson; G, uropodal endopod.

and the posterior margin of the telson armed with three pairs of long subequal spines in *S. quilonensis* as compared to one pair in this species.

There is no species which had a telson as shown in Fig. 81E. However, the present species is remained as anonymous, because these specimens are not in good condition.

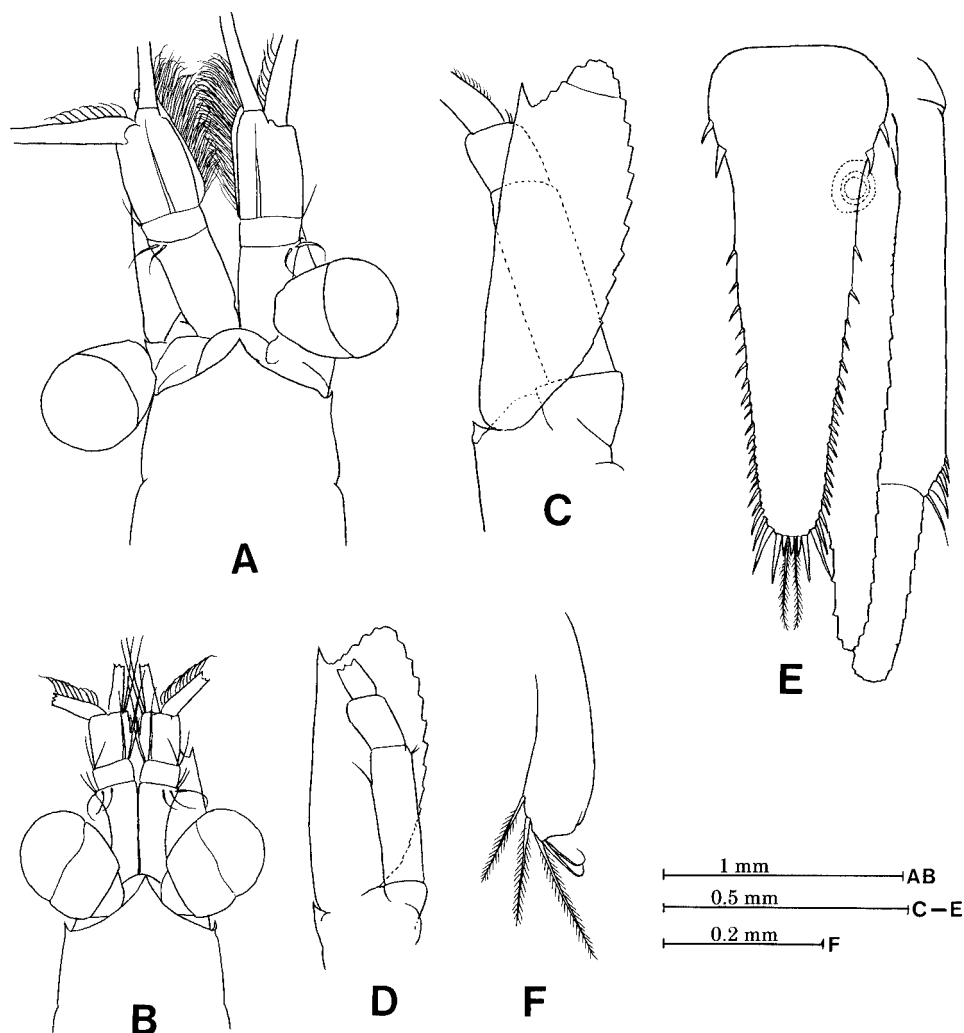


Fig. 81. *Siriella* sp. 3; from Panay Island, Philippines; A, C, E, F, adult male (6.6 mm) (NSMT-Cr 15646); B, D, adult female (5.9 mm) (NSMT-Cr 15645). A, B, anterior part of body; C, D, antenna; E, uropod and telson; F, genital organ.

65. *Siriella* sp. 4

(Figs. 82–84)

Material examined. [Indonesia] Two gravid females (5.3, 5.6 mm, a specimen of 5.6 mm dissected for drawing), 5 immature males (up to 5.5 mm, a specimen of 5.4 mm dissected for drawing) and 9 immature females (up to 5.2 mm) (NSMT-Cr 17962); Labuan, West Java, 18 June 1994, plankton net tow at night, coll. Mulyadi.

Remarks. There are no adult male specimens in the present collections. Female specimen of this species closely resembles that of *S. akajimaensis* collected from Okinawa, southwestern Japan, and only slight differences are observed. One of the specific characters in *S. akajimaensis* is the meandering inner flagellum on the male antennule. Among the present materials, no mature male was included, and the meandering is absent in immature males collected. Key charac-

teristics for identifying the genus *Siriella* are frequently seen only in males, and that is why identification of female specimens is rather tough. It is supposed that the species name of the present specimens should be decided after the adult male is fully clarified. In this paper, therefore, this species is remained anonymous.

Main characters of the female of this species are given in the following: (1) the rostrum (Fig.

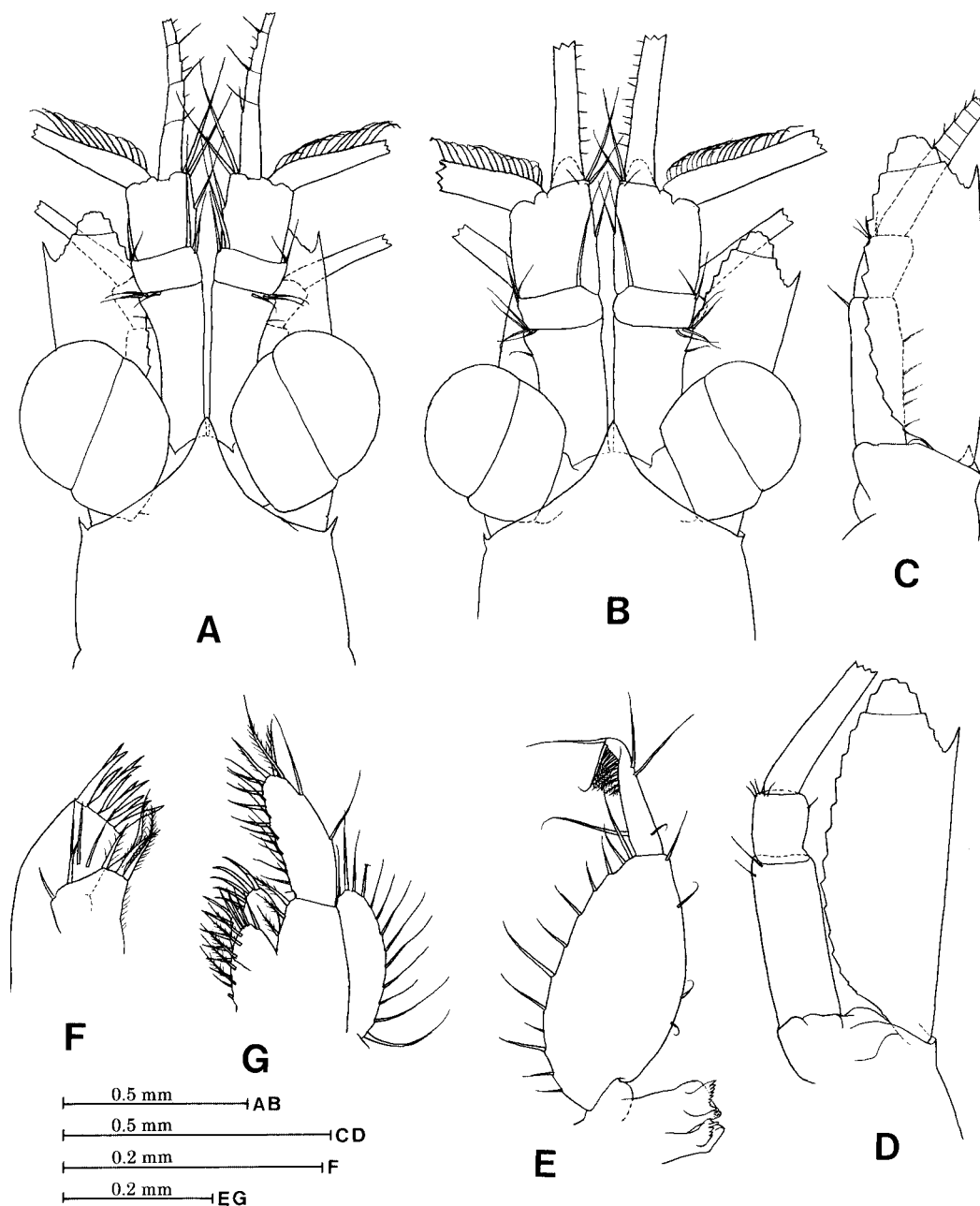


Fig. 82. *Siriella* sp. 4; from Labuan, Indonesia (NSMT-Cr 17962); A, C, E-G, gravid female (5.6 mm); B, D, immature male (5.4 mm). A, B, anterior part of body; C, D, antenna; E, mandible and mandibular palp; F, maxillule; G, maxilla.

82A) produced anteriorly into a narrowly triangular plate with concave lateral margins and an acute apex extending beyond the basal margin of the antennular peduncles; (2) the eyes (Fig. 82A) relatively big in size, slightly longer than broad, the cornea globular and occupying half of the whole organ; (3) the antennular peduncle (Fig. 82A) much more slender in the female than in immature males; (4) the antennal scale (Fig. 82C) not extending up to the distal margin of the third segment of the antennular peduncle, it is nearly 3 times as long as broad; (5) the terminal

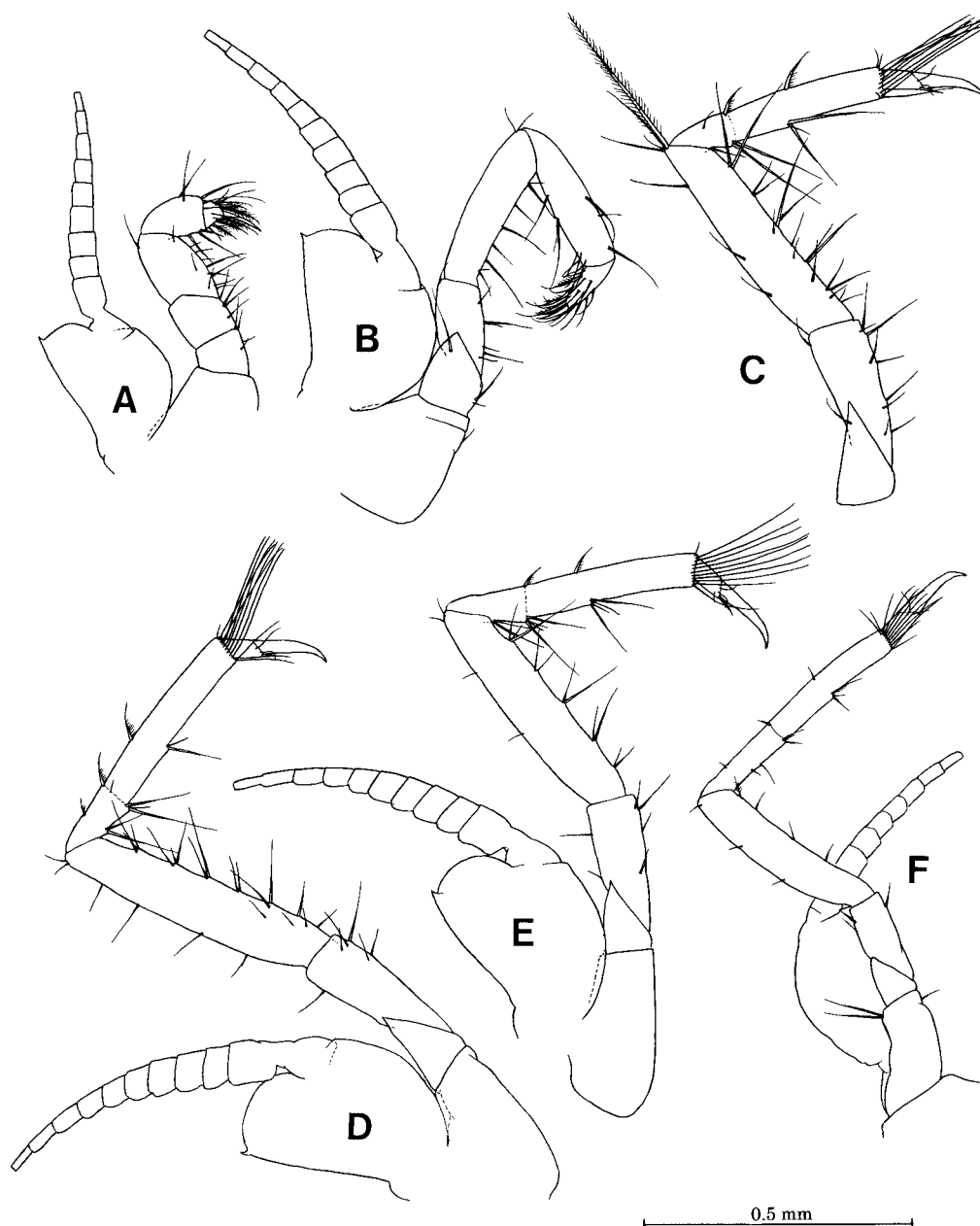


Fig. 83. *Siriella* sp. 4; from Labuan, Indonesia (NSMT-Cr 17962); gravid female (5.6 mm). A, B, first and second thoracic limbs; C, endopod of third thoracic limb; D–F, fifth, sixth and eighth thoracic limbs.

lobe of the antennal scale (Fig. 82C) 0.65 as long as broad and occupying 1/5 to 1/6 parts of the total scale length; (6) the third segment of the mandibular palp (Fig. 82E) armed with one long seta on the outer margin of the proximal part; (7) the endopod of the third to seventh thoracic limbs (Fig. 83C–E) rather stout, becoming more slender posteriorly, the terminal claw long and stout; (8) the endopod of the eighth thoracic limb (Fig. 83F) with carpopropodus 1.25 times longer than merus; (9) the uropodal exopod (Fig. 84B) overreaching the posterior end of the telson for 1/4 of its length, and its proximal segment armed with 3 graded spines occupying the dis-

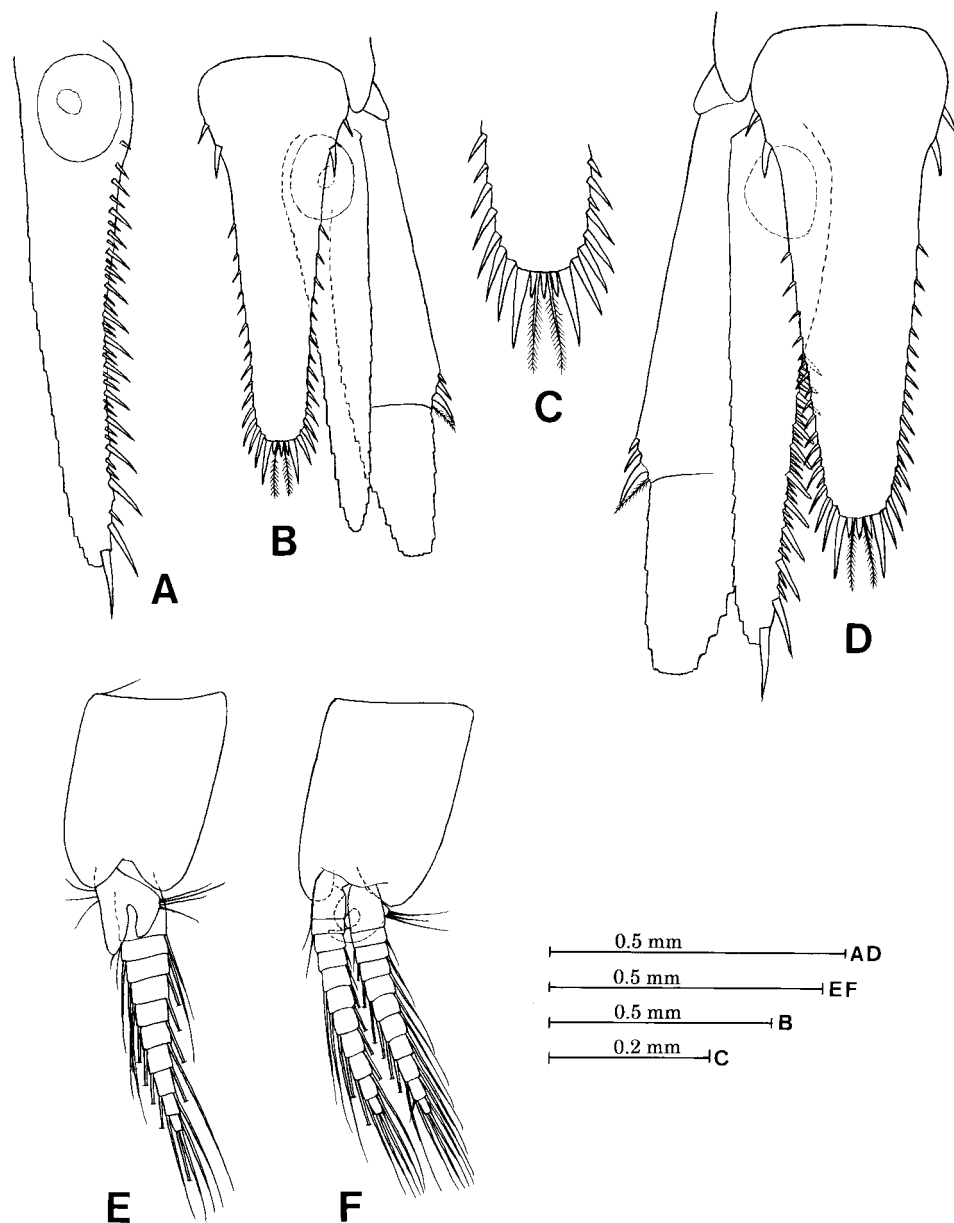


Fig. 84. *Siriella* sp. 4; from Labuan, Indonesia (NSMT-Cr 17962); A–C, gravid female (5.6 mm); D–F, immature male (5.4 mm). A, uropodal endopod; B, uropod and telson; C, posterior part of telson; D, uropod and telson; E, first pleopod; F, fourth pleopod.

tal 1/9 part of the outer margin; (10) the uropodal endopod (Fig. 84A, B) shorter than the exopod, and armed with about 37 spines along the inner margin from the statocyst region to the apex, these spines showing the alternate arrangement of one longer and one to three shorter ones, except 2 distal long spines between which shorter spines are not inserted; (11) the telson (Fig. 84B) elongated linguiform, 1.15 times longer than the sixth abdominal somite, extending posteriorly beyond the articulation of the uropodal exopod, and 2.5 times as long as broad at the base; (12) the lateral margin of the telson with 2 stout spines in the basal broadened part, followed by a naked part occupying less than 1/5 of the lateral margin, then a distal series of about 15 spines, of which those of middle part show the tendency of falling into groups, each group comprising graded spines, and distal 4 or 5 spines are long and gradually lengthened distally; (13) the body length is 5.3 to 5.6 mm in adult.

Doubtful species

66. *Siriella robusta* Pillai, 1964

Siriella robusta Pillai, 1964: 8–11, figs. 3, 4; 1965: 1689, fig. 9; Mauchline and Murano, 1977: 77 [catalogue]; Müller, 1993: 53 [catalogue].

Type locality. Indian Ocean between 02° and 16°N, and 69° and 78°E.

No specimen in the present study.

Remarks. Specimens described by Pillai (1964) are considered to be immature, because the third segment of the antennular peduncle is furnished with one seta on the inner margin and a few setae at the inner distal corner (Pillai, 1964, fig. 3a), and the fourth male pleopod has primitive pseudobranchial rami (Pillai, 1964, fig. 4e). Furthermore, the fourth male pleopod without any modified setae might be an evidence that these specimens are immature which specific characters do not appear yet. There is a possibility that his specimens are young forms of a known species belonging to the Aequiemis-group or the Inornata-group by analogy with the arrangement of the spines on the telson.

Distribution. Known only from the Arabian Sea off India (Pillai, 1964).

Invalid species

67. *Siriella intermedia* Panampunnayil, 1981

Siriella intermedia Panampunnayil, 1981: 89–90, figs. 3, 4; Müller, 1993: 48 [catalogue].

Remarks. This species name is a junior homonym of *Siriella intermedia* Gourret, 1888, which is known as *Siriella armata* (Milne-Edwards, 1837) at present (Tattersall and Tattersall, 1951; Gordan, 1957). This specific name, therefore, must be abolished as *nomen nudum*.

Panampunnayil (1981) established this species based on a single female specimen. The telson of this specimen is unique in the feature of the posterior part, i.e. the lack of three median small spines, the presence of three plumose setae, and the asymmetrical arrangement of strong spines on the posterior margin. Panampunnayil (1981) recognized these features as important specific characters, but such aberrant condition must have been caused by some injury. Therefore, the taxonomic value of these characters is doubtful, and a new specific name, instead of *intermedia*, can not be given.

**Key to the species groups and subgroups within the genus *Siriella*
of the Pacific and Indian Oceans**

- 1 Terminal setae on only fourth, or both third and fourth, or second to fourth pairs of male pleopods modified. 2
- 1' Terminal setae on male pleopods not modified. 8
- 2 Pseudobranchial rami on male pleopods nearly straight. 3
- 2' Pseudobranchial rami on second to fourth male pleopods spirally coiled or at least C-shaped. 4
- 3 Endopod of fourth male pleopod with modified setae. **Aequiremis-group**
- 3' Endopod of both third and fourth male pleopods with modified setae. . . . **Anomala-group**
- 4 Proximal segment of uropodal exopod armed with both spines and setae on outer margin. **Dubia-group**
- 4' Proximal segment of uropodal exopod armed with only spines on outer margin. 5
- 5 Terminal setae on second to fourth male pleopods modified. **Singularis-group**
- 5' Terminal setae on only fourth or both third and fourth male pleopods modified. 6
- 6 Terminal setae on both rami of fourth male pleopod modified. **Inornata-group**
- 6' Terminal setae on both third and fourth male pleopods modified. 7
- 7 Terminal setae on exopod or endopod of third male pleopod and both rami of fourth male pleopod modified. **Australiensis-group**
- 7' Terminal setae on both rami of both third and fourth male pleopods modified. **Pacifica-group**
- 8 Telson short, less than twice as long as broad at base; labrum with small and short frontal process. **Brevicaudata-group**
- 8' Telson long, more than twice as long as broad at base; labrum with long frontal process. **Thompsonii-group** (9)
- 9 Third segment of antennular peduncle of female with 5 or 6 long setae on inner margin; distal 4 to 6 spines on inner margin of uropodal endopod recurved. **Halei-subgroup**
- 9' Third segment of antennular peduncle of female with 1 long seta on inner margin; spines on inner margin of uropodal endopod straight, not recurved. 10
- 10 Spines on inner margin of uropodal endopod becoming gradually longer distally; endopod of middle pairs of thoracic limbs remarkably longer than in anterior and posterior pairs . . . 11
- 10' Spines on inner margin of uropodal endopod arranged alternately with longer and shorter ones; endopod of middle pairs of thoracic limbs only slightly longer than in anterior and posterior pairs (excl. *S. longipes*). **Thompsonii-subgroup**
- 11 Telson armed with 3 to 5 spines on proximal broadened part of lateral margin. **Trispina-subgroup**
- 11' Telson armed with 1 or 2 spines on proximal broadened part of lateral margin, in case of 2 spines those situated close to each other. 12
- 12 Carapace of female with 2 notable protuberances along dorsal median line; telson with 1 spine on basal broadened part of lateral margin. **Nodosa-subgroup**
- 12' Carapace of female with 1 protuberance anterior to cervical sulcus along dorsal median line; telson with 2 spines on basal broadened part of lateral margin. . . **Brevirostris-subgroup**

- Key to the species of the Pacifica-group
of the Pacific and Indian Ocean**

- 1' Third and fourth pleopods of male armed with straight or slightly curved, stout, terminal setae. 3
- 2 Terminal modified setae on both rami of third male pleopod almost straight; exopod of fourth male pleopod armed with 2 modified setae terminally, one very short and naked, the other long, stout, naked and strongly bent in peculiar way. *S. pacifica* Holmes, 1900
- 2' Both rami of third male pleopod armed with 2 modified setae terminally, one stout and straight, the other almost equally stout but bent into strong hook; terminal modified setae on both rami of fourth male pleopod almost straight. *S. panamensis* W. Tattersall, 1951
- 3 Ultimate segment of both rami of both third and fourth male pleopods 1.5 to 2 times as long as penultimate segment; exopod of fourth male pleopod with 2 modified setae terminally, shorter one about as long as ultimate segment. *S. roosevelti* W. Tattersall, 1941
- 3' Ultimate segment of both rami of both third and fourth male pleopods equal to or shorter than penultimate segment; exopod of fourth male pleopod with 2 setae terminally, shorter one more than twice as long as ultimate segment. 4
- 4 Two terminal modified setae on endopod of fourth male pleopod subequal in length; exopod of fourth male pleopod armed with 2 modified setae terminally, longer seta 3 times as long as shorter. *S. dollfusi* Nouvel, 1944
- 4' Two terminal modified setae on endopod of fourth male pleopod unequal in length, longer seta twice as long as shorter; exopod of fourth male pleopod terminating in 1 stout modified seta and 1 normal plumose seta. 5
- 5 Whole eye, including eyestalk, as long as broad or slightly wider than long; terminal modified setae on both rami of third male pleopod overreaching normal plumose setae arising from preceding segments. *S. paulsoni* Czerniavsky, 1882
- 5' Whole eye, including eyestalk, slightly longer than broad; terminal modified setae on both rami of third male pleopod not extending beyond tip of normal plumose setae arising from preceding segments. *S. tadjourensis* Nouvel, 1944

Key to the species of *Brevicaudata*-group of the Pacific and Indian Oceans

- 1 Telson trapezoid; posterior margin of telson slightly concave, armed with long and robust spines; lateral margin of telson armed with 3 spines on each of middle part and distal part. *S. brevicaudata* Paulson, 1875
- 1' Telson linguiform with convex posterior margin; lateral margin of telson with 3 to 6 spines on basal broadened part and 8 to 15 spines on distal part. 2
- 2 Lateral margin of telson with 5 or 6 large stout spines on basal widened part, followed by short unarmed part, then distal series of 8 or 9 spines; a pair of apical stout spines of telson distinctly longer and stouter than next pair. *S. lingvura* Li, 1964
- 2' Lateral margin of telson with 3 spines on basal widened part, followed by short unarmed part, then distal series of 12 to 15 spines; a pair of stout spines on posterior margin of telson shorter or slightly longer than next pair. 3
- 3 Uropodal endopod armed with about 10 spines along inner ventral margin. *S. hanseni* W. Tattersall, 1922
- 3' Uropodal endopod armed with 15 to 27 spines along inner ventral margin. 4
- 4 Telson showing sexual dimorphism: in male, innermost pair of posterior spines longer than next pair; in female, innermost pair of posterior spines shorter than next pair.

- *S. spinula* Panampunnayil, 1995
 4' Telson with innermost pair of apical spines subequal in size to next pair.
 *S. vincenti* W. Tattersall, 1927

**Key to the species of the Thompsonii-subgroup
of the Pacific and Indian Oceans**

- 1 Telson armed with 1 spine on basal part and 7 or 8 spines on remaining part of lateral margin. *S. longiarticulis* sp. nov.
- 1' Telson armed with 2 to 4 spines on basal part and 10 or more spines on remaining part of lateral margin. 2
- 2 Uropodal endopod longer than or as long as exopod. 3
- 2' Uropodal endopod shorter than exopod. 5
- 3 Telson parallel-sided in distal half, slightly shorter than uropodal exopod.
 *S. pondoensis* O. Tattersall, 1962
- 3' Telson becoming more or less narrower posteriorly, clearly shorter than uropodal exopod. . . 4
- 4 Eyes large; antennal scale 4 to 5 times as long as broad; posterior margin of telson with 2 pairs of long spines. *S. thompsonii* (Milne-Edwards, 1837)
- 4' Eyes small; antennal scale about 3 times as long as broad; posterior margin of telson with single pair of long spines. *S. gracilis* Dana, 1852
- 5 Telson armed with 4 spines on basal broadened part of lateral margin. 6
- 5' Telson armed with 2 or 3 spines on basal broadened part of lateral margin. 8
- 6 Inner flagellum of male antennule normal; middle pairs of endopod of thoracic limbs conspicuously longer than anterior and posterior pairs. *S. longipes* Nakazawa, 1910
- 6' Inner flagellum of male antennule swollen in proximal part; middle pairs of endopod of thoracic limbs slightly longer than anterior and posterior limbs. 7
- 7 Inner flagellum of male antennule strikingly swollen in proximal part; antennal scale of male extending to or slightly beyond distal margin of third segment of antennular peduncle.
 *S. koreana* sp. nov.
- 7' Inner flagellum of male antennule moderately swollen in proximal part; antennal scale of male not extending to distal margin of third segment of antennular peduncle.
 *S. macropsis* sp. nov. (partly)
- 8 Telson armed with 3 spines on basal broadened part of lateral margin. 9
- 8' Telson armed with 2 spines on basal broadened part of lateral margin. 11
- 9 Inner flagellum of male antennule normal. *S. sinensis* Ii, 1964 (partly)
- 9' Inner flagellum of male antennule moderately swollen in proximal part. 10
- 10 Eyes not elongated; lateral spines of telson becoming gradually longer posteriorly.
 *S. watasei* Nakazawa, 1910
- 10' Eyes elongated; lateral spines of telson with tendency of falling into groups.
 *S. macropsis* sp. nov. (partly)
- 11 Spines on posterior part of telson barbed with secondary spinules. 12
- 11' Spines on posterior part of telson not barbed with secondary spinules. 16
- 12 Appendix masculina on male antennule bilobed distally. *S. rimata* sp. nov.
- 12' Appendix masculina on male antennule more or less conical in shape. 13
- 13 Proximal segment of uropodal exopod with more than 9 spines occupying more than distal 2/5 part of outer margin. 14

- 13' Proximal segment of uropodal exopod with less than 7 spines occupying less than distal 1/5 part of outer margin. 15
- 14 Proximal segment of uropodal exopod with 12 spines occupying more than distal half of outer margin; telson 3 times as long as broad. *S. longidactyla* W. Tattersall, 1940
- 14' Proximal segment of uropodal exopod with 9 spines occupying less than distal half of outer margin; telson 2.5 times as long as broad. *S. tenuiungula* sp. nov.
- 15 Posterior margin of telson narrowly rounded, armed with single pair of long spines, which is more than twice as long as 3 median spines. *S. wadai* Ii, 1964
- 15' Posterior margin of telson broadly rounded, armed with single pair of long spines, which is less than twice as long as 3 median spines. *S. brucei* sp. nov.
- 16 Posterior margin of telson armed with 3 pairs of long subequal spines. *S. quilonensis* Pillai, 1961
- 16' Posterior margin of telson armed with 1 or 2 pairs of long spines. 17
- 17 Inner flagellum of male antennule remarkably swollen in proximal part. *S. japonica* Ii, 1964
- 17' Inner flagellum of male antennule normal or contorted, not swollen in proximal part. 18
- 18 In both sexes, posterior margin of telson armed with 2 pairs of long spines, inner pair shorter than outer. *S. quadrispinosa* Hansen, 1910
- 18' In both sexes, posterior margin of telson armed with single pair of long spines, or in only female, posterior margin of telson armed with 2 pairs of long spines, inner pair equal to or shorter than outer. 19
- 19 In only female, posterior margin of telson armed with 2 pairs of long spines, inner pair equal to or shorter than outer. 20
- 19' In both sexes, posterior margin of telson armed with single pair of long spines. 22
- 20 Inner flagellum of male antennule not meandering; carpopropodus of endopod of eighth thoracic limb 1.1 times longer than merus. *S. amamiensis* sp. nov. (partly)
- 20' Inner flagellum of male antennule meandering in proximal 1/3 part; carpopropodus of endopod of eighth thoracic limb more than 1.2 times longer than merus. 21
- 21 Terminal claw of endopod of third to eighth thoracic limbs short and stout; genital organ of male armed with 1 short and 2 long, stout plumose setae on distal part of anterior margin. *S. okadai* Ii, 1964
- 21' Terminal claw of endopod of third to eighth thoracic limbs slender; genital organ of male armed with 7 slender, rather short plumose setae on distal part of anterior margin. *S. essingtonensis* sp. nov.
- 22 Inner flagellum of male antennule more or less meandering in proximal 1/3 part. 23
- 22' Inner antennular flagellum of male not meandering. 27
- 23 Anterior end of cephalon with noticeable spear-shaped or small projection. *S. vulgaris* Hansen, 1910 (partly)
- 23' Anterior end of cephalon rounded, without any projection. 24
- 24 Terminal lobe of antennal scale of male occupying almost 1/3 of scale in length; in female, ultimate lateral spine of telson shorter than penultimate one. *S. mulyadii* sp. nov.
- 24' Terminal lobe of antennal scale of male occupying less than 1/3 of scale in length; in female, ultimate lateral spine of telson equal to or longer than penultimate one. 25
- 25 Rostrum considerably longer in female than in male; terminal lobe of antennal scale short, occupying about 1/6 of scale in length. *S. affinis* Hansen, 1910
- 25' Rostrum almost same in shape in both sexes; terminal lobe of antennal scale occupying 1/5

- about of scale in length. 26
- 26 Antennal scale almost same in shape in both sexes; terminal claw of endopod of third to eighth thoracic limbs short and stout (carpopropodus/terminal claw=3.1). *S. iii* sp. nov.
- 26' Antennal scale more slender in male than in female; terminal claw of endopod of third to eighth thoracic limbs long and slender (carpopropodus/terminal claw=2.4). *S. akajimaensis* sp. nov.
- 27 Terminal claw of endopod of third to eighth thoracic limbs short and stout. *S. australis* W. Tattersall, 1927
- 27' Terminal claw of endopod of third to eighth thoracic limbs slender. 28
- 28 Terminal lobe of antennal scale occupying less than 1/4 of scale in length. 29
- 28' Terminal lobe of antennal scale occupying more than 1/4 of scale in length. 30
- 29 Terminal claw of endopod of third to eighth thoracic limbs long; rostrum extending beyond basal margin of antennules. *S. sinensis* Li, 1964 (partly)
- 29' Terminal claw of endopod of third to eighth thoracic limbs short; rostrum extending to basal margin of antennules. *S. izuensis* Li, 1964
- 30 Antennal scale 2.6 to 2.8 times as long as broad; proximal segment of uropodal exopod armed with 3 or 4 spines occupying distal 1/6 part of outer margin. *S. bacescui* Udrescu, 1981
- 30' Antennal scale 3 times as long as broad; proximal segment of uropodal exopod armed with 3 to 9 spines occupying distal 1/3 to 1/5 part of outer margin. 31
- 31 Anterior end of cephalon with short or long projection between pair of antennules. *S. vulgaris* Hansen, 1910 (partly)
- 31' Anterior end of cephalon rounded. 32
- 32 Genital organ of male with considerably long recurved setae; spine arrangement of telson same in both sexes. *S. seafdeci* sp. nov.
- 32' Genital organ of male with considerably short recurved setae; spine arrangement of telson different between both sexes, in female spine arrangement variable. *S. amamiensis* sp. nov. (partly)

Key to the species of the *Trispina*-subgroup of the Pacific and Indian Oceans

- 1 Proximal segment of uropodal exopod armed with 6 to 10 spines occupying less than distal 1/3 part of outer margin; inner margin of uropodal endopod armed with 24 to 28 spines. *S. trispina* Li, 1964
- 1' Proximal segment of uropodal exopod armed with 9 to 11 spines occupying slightly less than distal half of outer margin; inner margin of uropodal endopod armed with 13 to 17 spines. *S. denticulata* (Thomson, 1880)

Key to the species of the *Brevirostris*-subgroup of the Pacific and Indian Oceans

- 1 Eyes small, not extending to distal margin of first segment of antennular peduncle. *S. jonesi* Pillai, 1964
- 1' Eyes large, extending to distal margin of first segment of antennular peduncle. 2
- 2 Posterior half of lateral margin of telson armed with short spines becoming slightly longer

- posteriorly; uropodal endopod with 22 or 23 spines along inner margin. *S. tuberculum* Fukuoka and Murano, 1996
- 2' Posterior half of lateral margin of telson armed with longer and shorter spines; uropodal endopod with 16 to 18 spines along inner margin. 3
- 3 Cephalon without median digitate process on dorsal surface just in front of apex of rostrum; third segment of male antennular peduncle 1.5 times as long as broad; carpopropodus of endopod of third to eighth thoracic limbs divided into 2 subsegments; characteristic setae surrounding terminal claw of endopod of eighth thoracic limb half as long as combined length of dactylus and terminal claw. *S. brevirostris* Nouvel, 1944
- 3' Cephalon with median digitate process on dorsal surface just in front of apex of rostrum; third segment of male antennular peduncle 1.2 times as long as broad; carpopropodus of endopod of third to eighth thoracic limbs not divided into subsegments; characteristic setae surrounding terminal claw of endopod of eighth thoracic limb extending to near apex of terminal claw. *S. chaitiamvongae* sp. nov.

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