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A New Species of Marine Interstitial Harpacticoid
Copepod of the Genus *Arenopontia* from
the Bonin Islands, Southern Japan

With 4 Text-figures

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ABSTRACT A new species of the genus *Arenopontia* (Copepoda, Harpacticoida) is reported from an interstitial habitat in the Kita Harbor of Hahajima in the Bonin Islands, southern Japan. The new species resembles *A. longiremis* Chappuis in various characteristics, but markedly differs from the latter in the structure of leg 6 of the male. This new species is the third member of the genus in Japan.

The present paper deals with a new species of the genus *Arenopontia* Kunz (Harpacticoida, Cylindropsyllidae), based upon some specimens which were selected from a sample of marine interstitial fauna collected from sand and pebble just below the tide-line in the Kita Harbor of Hahajima during my stay in the Bonin Islands (see Itô, 1975). The genus was divided into two subgenera, *Arenopontia* and *Neoleptastacus*, by Wells (1967) taking account of a structure in the fifth pair of thoracic legs. The present new species apparently belongs to the subgenus *Neoleptastacus*, because of the presence of "a styliform projection" on the fifth pair of legs in both sexes, and is the third member of the genus in Japan.

The material was obtained by means of so-called decanting and sieving method. Specimens dissected were mounted into Sasa's gum-chloral medium. All the specimens of the type-series are deposited in the Zoological Institute, Faculty of Science, Hokkaido University.

Arenopontia (Neoleptastacus) sakagamii n. sp.

(Figs. 1-4)

Female (Holotype). Body (Figs. 1-1, 2) cylindrical, colorless and transparent, about 0.48 mm long, rostrum and furcal setae excluded; anterior half of body somewhat narrower than the remaining half. Nauplius eye wanting. Rostrum (Fig. 1-3) not exceeding first antennular segment, furnished with a pair of delicate

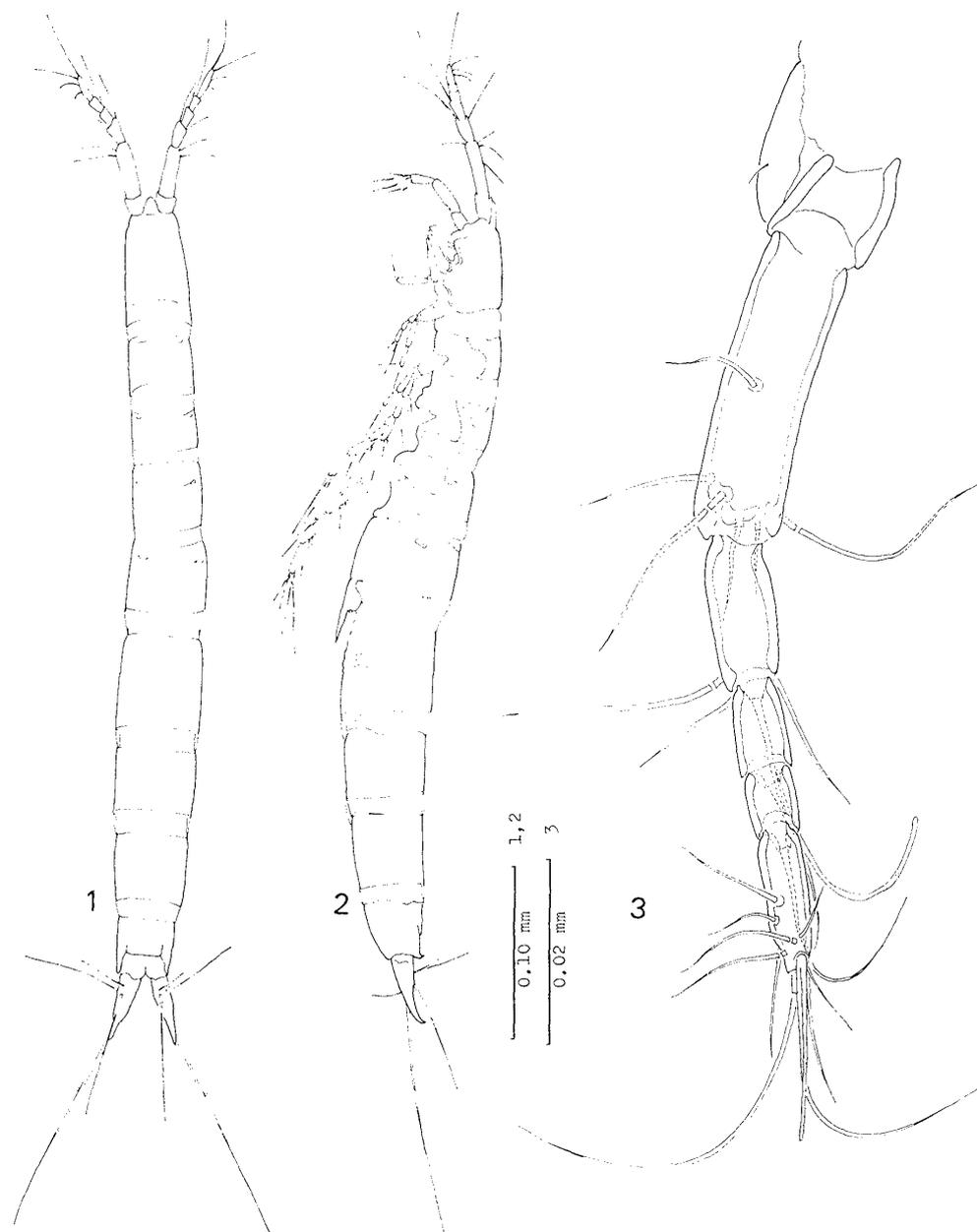


Fig. 1. *Arenopontia sakagami* n. sp. Female (holotype). — 1, Habitus, dorsal; 2, ditto, lateral; 3, rostrum and antennule.

sensillae. Genital double-somite (Fig. 2-1) without any trace of subdivision, and with no seta representing rudimental leg 6. Anal somite (Figs. 2-2, 3) furnished with an arched spur-shaped process on both lateral sides of anal operculum. Furcal ramus approximately three times as long as proximal diameter; so-called principal terminal seta arising from a ledge located on almost mid ventral side, basally furnished with a delicate branch (see Fig. 2-4), and outwards accompanied with a

setula near its base; of the three setae arising from dorsal side, the inner one of the anterior two is somewhat spatulate and aesthetasc-like, and the outer one is accompanied with a fine setula close to its posterior side, and the other one is the longest and more than 1.5 times as long as furcal ramus. *Antennule* (Fig. 1-3) six-segmented; second segment longest, about three times as long as the first one which is not furnished with any seta; main aesthetasc arising from fourth segment. *Antenna* (Fig. 3-5). Coxa short and unornamented. Allobasis about 2.5 times as long as the greatest diameter. Exopodite represented by a small cylindrical process which attaches near proximal end of allobasis and terminates in a simple seta. Distal endopodite segment almost as long as allobasis, furnished with three geniculate spines, one of which is bifurcate basally, two simple spines on distal end, and two short spines on lateral side; a few spinules attaching near distal end. *Mandible* (Fig. 3-6; see also Fig. 3-7). Praecoxa narrow, with a seta on dorsal side near cutting edge. Coxa-basis elongate, more than twice as long as the greatest width. Endopodite represented by a subcylindrical segment with a setula arising from a point a third the length of inner edge and terminating in three setulae. *Maxillula* (see Fig. 3-11). Arthrite of praecoxa well protruded, furnished with at least five spines along inner edge and two parallel setae on anterior side. Inner process of coxa reaching a midway of arthrite of praecoxa and terminating in two setae. Basis furnished with three setae on distal end and a setula on ventral side. *Maxilla* (see Fig. 2-8). Syncoxa ornamented with two endites, each well-developed, cylindrical and terminating in two setae. Basis forming itself a strong spine accompanied with two setae, each on dorsal side and ventral side. Endopodite represented by a small segment with three setae. *Maxillipede* (see Fig. 2-9). Basal segment short and unornamented. First endopodite segment elongate, more than three times as long as greatest diameter. Second endopodite segment forming itself a narrow sharp spine with a basal thickening.

Leg 1 (Fig. 3-1; see also Fig. 3-6). Coxa unornamented. Basis furnished with a spine near inner edge; outer seta absent (?). Exopodite; first segment somewhat longer than others and with one outer spine; distal two segments subequal in length; second one lacking in outer spine; third one furnished with four spines, of which terminal two are extremely elongate and geniculate midst. Endopodite two-segmented; first segment about 1.5 times as long as the second one, furnished with one seta on just middle inner edge; second one terminating in two spines, of which inner one is very much elongate and geniculate midst.

Leg 2 (Fig. 3-2). Outer edge of basis ornamented with some spinules (outer seta absent ?). Exopodite consisting of three segments of a subequal length; first two segments ornamented with one outer spine and some well-developed spinules along outer edge; last one with one outer spine near distal end and two terminal setae, inner one of which is elongate and almost as long as three exopodite segments combined. Two endopodite segments subequal in length; first segment without any spine or seta, but with three spinules along outer edge; second one furnished

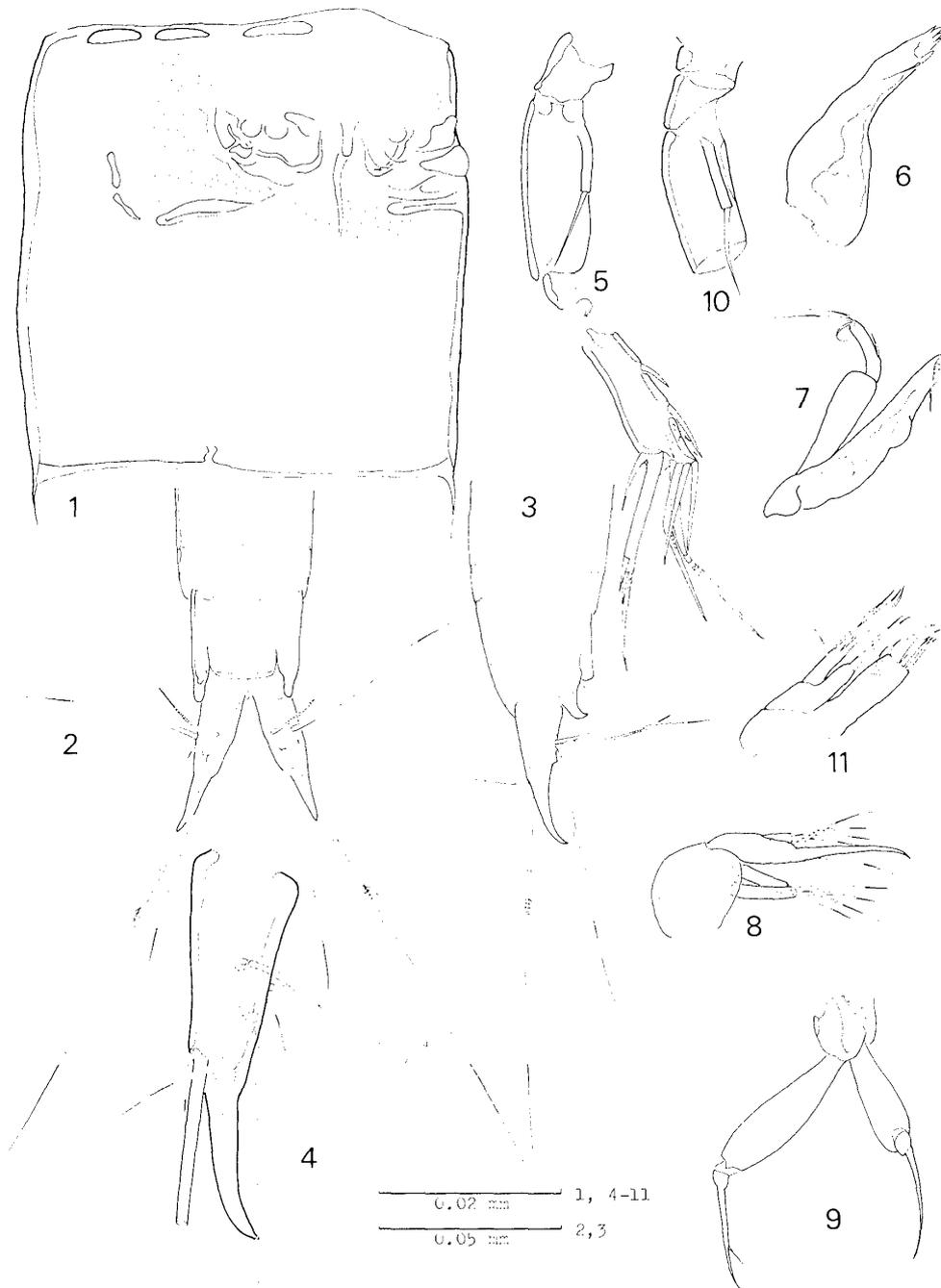


Fig. 2. *Arenopontia sakagami* n. sp.; 1-9, female (4, 7-9, a paratype; others, holotype). — 1, Genital area; 2, anal somite with furcal rami, dorsal view; 3, ditto, lateral; 4, ventro-lateral view of a left furcal ramus; 5, antenna; 6, mandibular praecoxa; 7, mandible; 8, maxilla; 9, a pair of maxillipede. — 10-11. Male (allotype). — 10, Antenna, the last endopodite segment omitted; 11, maxillula.

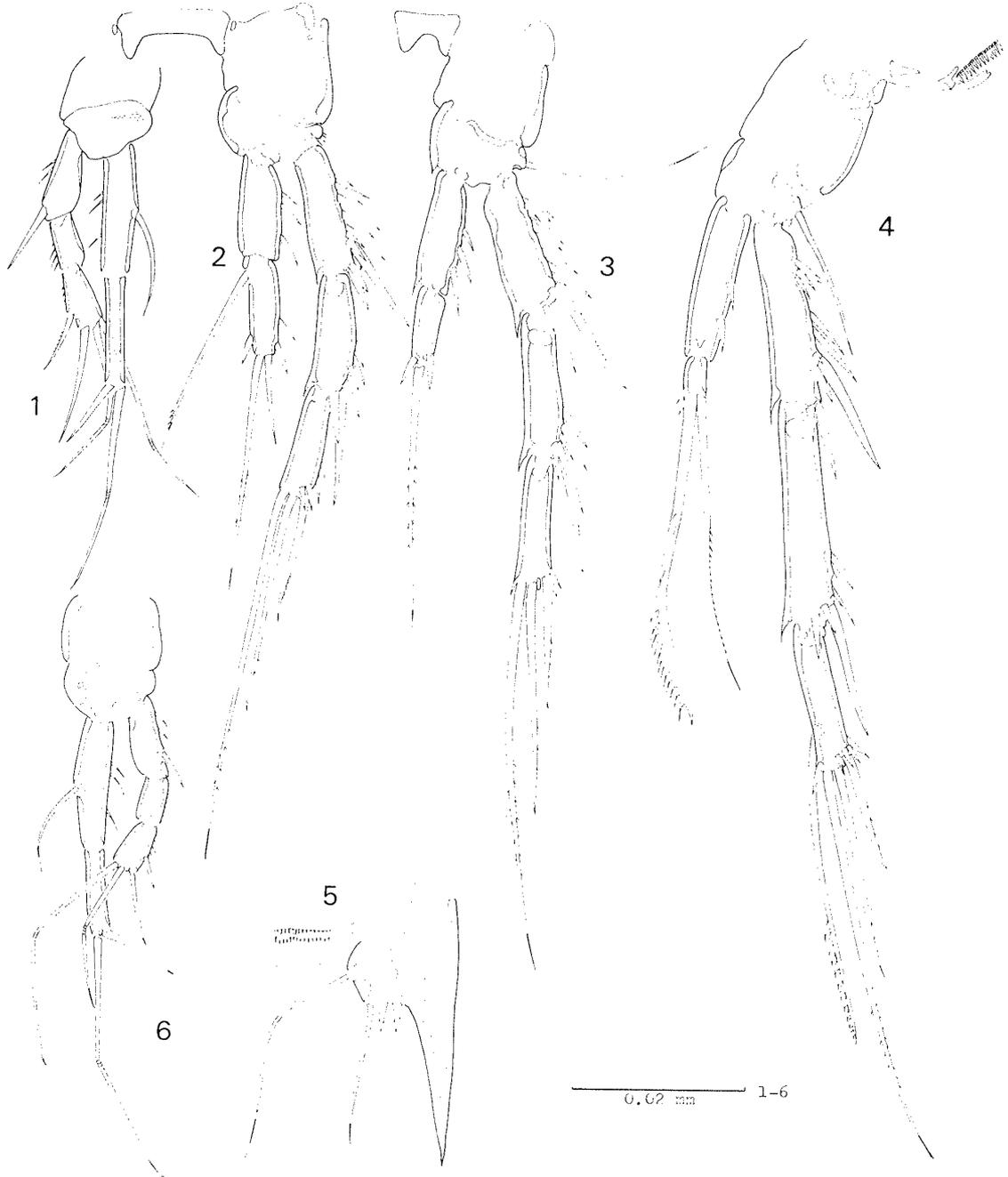


Fig. 3. *Arenopontia sakagamii* n. sp. Female (6, a paratype; others, holotype). — 1, Leg 1; 2, leg 2; 3, leg 3; 4, leg 4; 5, leg 5; 6, leg 1.

with one inner seta, which arises from subproximal edge and is apically serrate, one spine and one seta on distal end, and one and two spinules on inner and outer subdistal edge, respectively. *Leg 3* (Fig. 3-3). Basis furnished with one well-developed outer seta. Segmentation and setal and spinal ornamentation of exopodite as in leg 2. First endopodite segment about 1.5 times as long as second one, with three spinules along outer edge; second segment terminating in one seta accompanied with a pair of spinules near its base. *Leg 4* (Fig. 3-4). Basis ornamented as in leg 3. Third exopodite segment shorter than preceding segment, and furnished with one inner seta which is serrate along distal half and arises from a point of distal third. First endopodite segment with two spinules on outer edge. Second endopodite segment small, and terminating in two well-developed setae, of which outer one is defined at base and delicately spinulose, and the other is confluent with this segment, stout and remarkably serrate along distal half. *Leg 5* (Fig. 3-5). Spur-shaped process well-developed, without any articulation at base and entirely bare. Two short spines (or rather spiniform setae) attaching on distal edge, and one bare and elongate seta arising from outer distal corner. Outer seta well-developed.

Male (Allotype). Body (Fig. 4-1) about 0.43 mm long. Ornamentations of anal somite and furcal rami as in female. *Antennule* (Fig. 4-2) haplocer. Apical segment terminating in a single aesthetasc and furnished with a trifurcate seta, of which a branch is aesthetasc, on subdistal edge. *Antenna* ornamented as in female. The left antenna, however, has another short segment (?) proximally. It is not clear whether this part is a protuberance of cephalic somite or a distinct antennal segment. The right antenna has not such a part. *Mandible, maxillula* (Fig. 2-11), *maxilla* and *maxillipede* as in female.

Leg 1 - leg 5 as in female. *Leg 6* (Fig. 4-3) widely separated from each other. Each leg represented by a small square plate furnished with two simple setae, each on inner and outer distal corner.

Variability. Two females and two males, other than the holotype and allotype, were dissected and thoroughly examined. The body length is 0.48, 0.45, 0.45 and 0.47 mm, respectively. Among them, the female of 0.45 mm long has an aberrant furcal ramus (Figs. 4-4, 5), and some of setae of its thoracic legs are more or less broken. Except for this aberrant case, no conspicuous difference in the shape and ornamentation of furcal rami as well as thoracic legs was detected among them.

Remarks. As the species which simultaneously have the two characters, the last endopodite segment of leg 3 with only one seta and the anal somite furnished with a pair of spur-shaped processes, it is included within the subgenus *Neoleptastacus* together with three other species: *A. longiremis* Chappuis, 1954, from Madagascar, *A. indica* Chandrasekhara Rao, 1967, from India, and *A. gussoae* Cottarelli, 1973, from Cuba. Some of the differences among them are shown in Table 1. The spinule found on the furcal ramus of *A. indica* would be comparable with the hair near the outer one of three dorsal setae described in the present new species. The

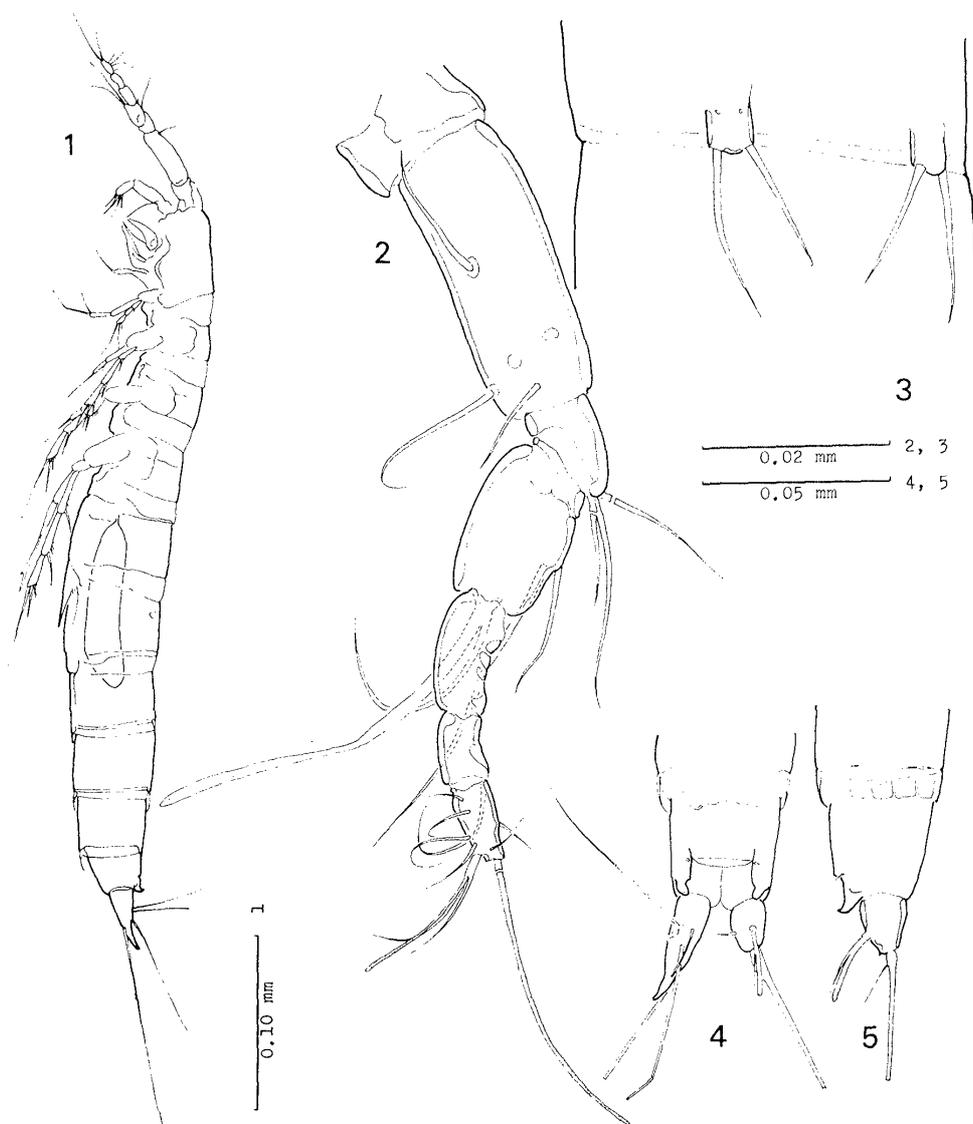


Fig. 4. *Arenopontia sakagamii* n. sp.; 1-3, male (allotype). — 1, Habitus, lateral; 2, antennule; 3, a pair of leg 6. — 4-5. Female (a paratype) — 4, Anal somite with furcal rami, dorsal; 5, ditto, lateral.

spinulose spur-shaped process of leg 5 of *A. gussoae* is quite remarkable within the subgenus, because the process is entirely bare in the other species, except for only one case found in *A. acantha* reported by Bozic (1966), of which the process in question is fringed with a few spinules along its outer side. Such spinulose appearance of these processes seemingly approaches to the spinulose seta (or spine) found in most of the species of the other subgenus *Arenopontia*, for example *A. dillonbeachia* Lang (Lang, 1965; Itô, 1969). By these characteristics, both *A. indica* and *A. gussoae* would be easily discernible from the present new species.

Table 1
Comparison of character states among four species of *Arenopontia*.

Characters		Species			
		<i>longiremis</i>	<i>indica</i>	<i>gussoae</i>	<i>sakagami</i> n. sp.
Furcal ramus with . . .	{a spinule no spinule	+	+	+	+
Spur-shaped process of anal somite	{horizontally stretched arched	+		+	+
Spur-shaped process of leg 5	{spinulose bare	+	+	+	+
A pair of leg 6 of male	{a common plate separated from each other	+		+	+
Each leg 6 of male with . . .	{two setae one spine and one seta	+	+	+	+

The treatment of *A. longiremis*, on the other hand, is somewhat troublesome. The species reported from Accra, Africa, by Chappuis et Rouch (1961) under the name *A. longiremis* was regarded as a distinct one from that species by Lang (1965) taking account of some characteristic differences, such as the shape and ornamentation of anal somite and furcal ramus, and he designated it as *A. accraensis*. Both *A. longiremis* and *A. accraensis*, further, were regarded as the subspecies of *A. acantha* Chappuis, 1953 by Kunz (1971) who designated them as *A. acantha longiremis* and *A. acantha accraensis*. For the time being, I am unable to accept his opinion, because *A. acantha* s. str. is markedly different from the other two "subspecies" in the ornamentation of the last endopodite segment of leg 3. I, therefore, retain the former names, *A. longiremis* and *A. accraensis*. *A. longiremis* found in Inhaca Island, Mozambique, by Wells (1969) showed a clear dimorphism in their furcal rami. He reported them under the names *long variety* and *short variety*. Such a dimorphism of furcal rami has also been reported by Kunz (1971) in "*A. acantha accraensis*" from Angola and, further, Chandrasekhara Rao (1967) described that the furcal rami of *A. indica* were "with much variation in length". Connected with them, Chappuis (1954) emphasized the elongate shape of furcal rami in his original description of *A. longiremis* based upon "quelques mâles et femelles". The shape of furcal rami of the present new species, as far as can be seen in the present material, is rather similar to the "long variety" *sensu* Wells. According to the original description and figure by Chappuis (1954), on the other hand, the spur-shaped processes of anal somite of *A. longiremis* are straight and not curved (*droite et non recourbée*). The specimens of *A. longiremis* in Mozambique, however, seems to have dorsally curved processes (personal communication from Dr. J. B. J. Wells, 1977) as in the present species I reported. Despite of such confusion, the present new species is discernible from *A. longiremis* (at least the original one by Chappuis) in the structure of leg 6 of the male as already shown in Table 1.

Type-series. Holotype (female), allotype (male) and four paratypes (2 females and 2 males), all dissected and mounted on slides. The type-locality; Kita Harbor, Hahajima in the Bonin Islands (14-IV-1973; Itô leg.).

The trivial name is in honor of Dr. Sh. F. Sakagami of Hokkaido University, Sapporo.

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