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Authors: Takekawa, Atsushi, and Ishimaru, Shin-ichi

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# A New Species of the Genus *Scopelocheirus* (Crustacea: Amphipoda: Gammaridea) from Onagawa Bay, Northeastern Japan

Atsushi Takekawa<sup>1</sup> and Shin-ichi Ishimaru<sup>2</sup>

<sup>1</sup>Graduate School of Agricultural Science, Tohoku University, 1-1  
Tsutsumi-dori Amamiya-machi, Aoba-ku, Sendai  
981-8555, Japan

<sup>2</sup>No-machi, 3-19-60, Kanazawa, Ishikawa 921-8031, Japan

**ABSTRACT**—A new species of scopelocheirid amphipod, *Scopelocheirus onagawae*, was found during an ecological study of the marine scavenging amphipods in Onagawa Bay, Northeastern Japan. This species is closely similar to *S. hopei* and *S. polymedus* in the elongate gnathopod 1 and the broad merus of pereopod 5, but clearly distinguished from them by lateral cephalic lobe, maxilla 2, pereopod 6, epimeron 2 and uropods 1–3. This paper also describes some taxonomic commentary on the generic identity of the genus *Scopelocheirus* and a related genus *Aroui*.

## INTRODUCTION

In an ecological study of scavenging amphipods in Onagawa Bay conducted by the first author, five species of lysianassoid amphipods were abundantly captured by means of baited traps. The most abundant was a species of *Scopelocheirus* (Gammaridea: Lysianassoidea: Scopelocheiridae). The species was thought to be the most important scavenger in Onagawa Bay, because of its abundance and predominancy over other small crustaceans collected through the survey (Takekawa, in prep.).

Scopelocheirid amphipods have been recorded twice from the vicinity of Japan (Ishimaru, 1994): *Scopelocheirus hopei* (Costa, 1851) from the shallow water of Seto Inland Sea (Nagata, 1965), and from the continental slope near the Pacific coast of the central part of Japan (Sekiguchi and Yamaguchi, 1983). Unfortunately descriptions in these papers were incomplete, and were not enough to compare with European populations of *S. hopei*. Detailed study of us revealed that the Onagawa population of *Scopelocheirus* is an undescribed species, though it is very similar to *S. hopei*. This paper describes the new species, with some taxonomic commentary on the generic identity of *Scopelocheirus* and a related genus *Aroui*.

## MATERIALS AND METHODS

All specimens treated herein were collected at a sampling station of 30 m depth in Onagawa Bay (38°25'45"N, 141°32'00"E), on

the Pacific coast of northeastern Japan, on July 17, 1996. The specimens were caught with a baited trap made of a polyethylene bottle with a 18 mm entrance. The trap was set at about 0.2 m above the bottom from sunset until the next morning, a saury (*Cololabis saira*) of ca 150 g being fastened inside with a stainless wire.

The type series is deposited in the Graduate School of Agricultural Science, Tohoku University.

## DESCRIPTION

### Scopelocheiridae

#### *Scopelocheirus onagawae* sp. nov.

(Figs. 1–6)

**Type Material. Holotype:** Male, 10.4 mm (collection number AM 110). **Paratypes:** Males, 10.0, 10.5, 9.8, 6.0 mm (AM 101, 102, 104, 105); Ovigerous females, 11.1, 10.5 mm (AM 108, 109); Non-ovigerous female, 7.7 mm (AM 106); Juveniles, 3.4, 2.8 mm (AM 103, 107). Appendages were dissected and embedded in a gum-chloral medium on glass slides.

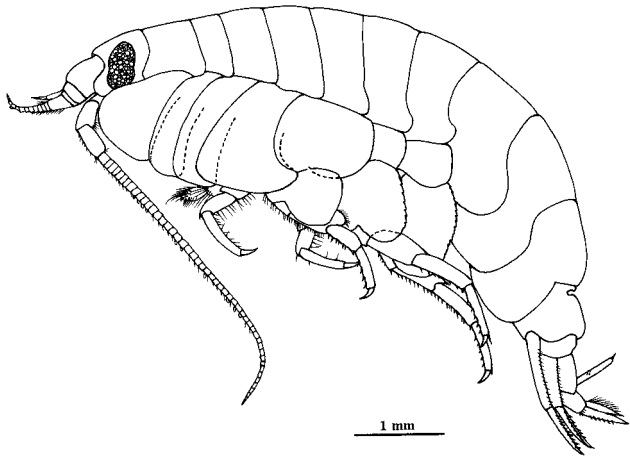
### Diagnosis

Lateral cephalic lobe gently rounded. Eyes broadly oval. Outer plate of maxilla 2 shorter than inner plate, with long feeble distally-barbed setae. Coxae 1–4 naked ventrally. Propodus of pereopod 6 with 8 terminally-serrate long spines along posterior margin, with 1 long spine posterodistally. Epimeron 2, ventral margin slightly concave, posteroventral corner rounded, without setal tuft. Uropods 1 and 2 densely spinose. Urosome 3, inner ramus not exceeding apex of proximal article of outer ramus; proximal article of outer ramus lined with plumose setae along medial margin.

\* Corresponding author: Tel. +022-717-8729;  
FAX. +022-717-8731.

**Description of male (holotype, AM 110)**

**Body:** Body rather robust, back smooth; color yellowish white with numerous orange markings after a few months preservation in 10% formalin. Epimeron 1, posteroventral margin evenly rounded; anterior margin with 5 plumose setae, anteroventral angle bluntly produced, tipped with 1 long seta.



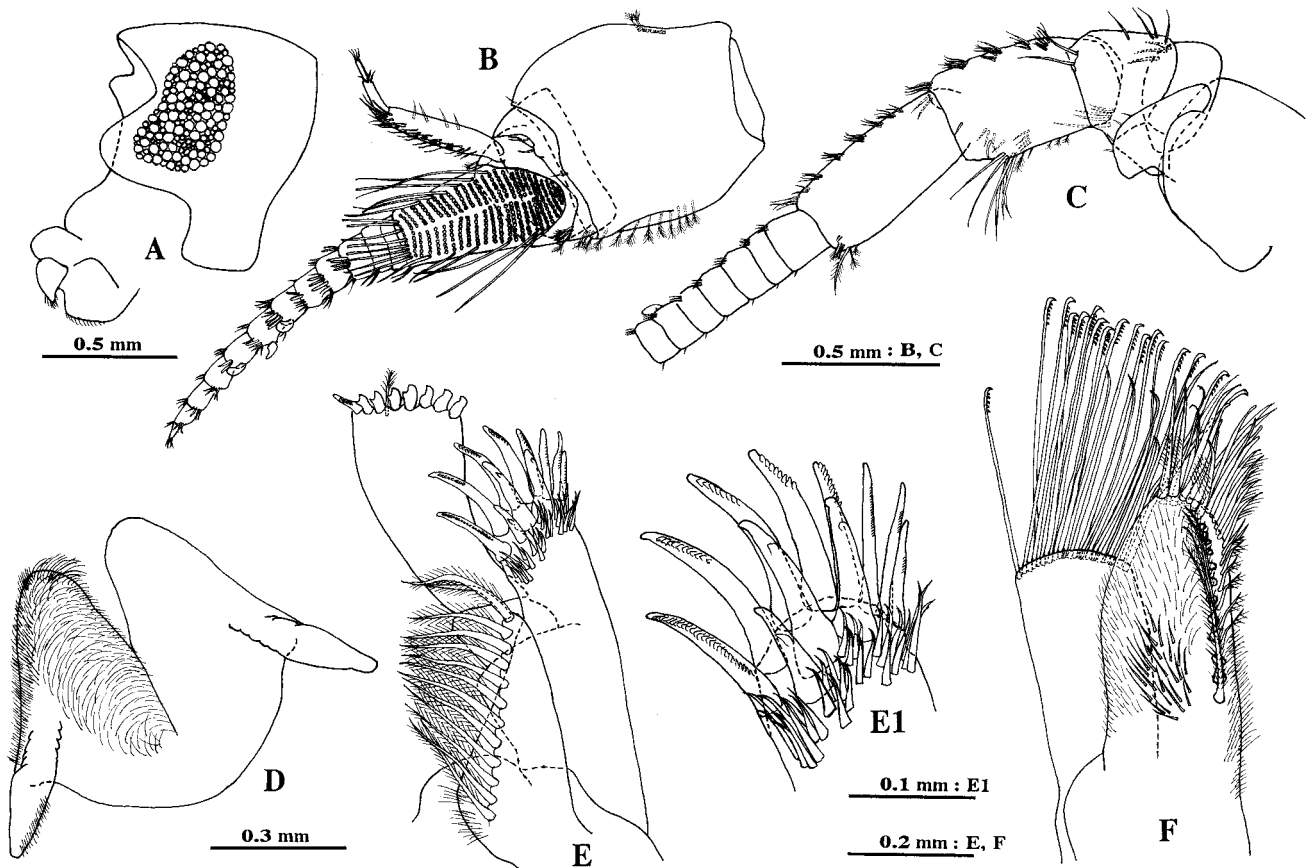
**Fig. 1.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110).

Epimeron 2, ventral margin slightly concave, lined with a row of short spines; posterior margin gently convex; posteroventral corner rounded, without setal tuft; anterior margin broadly expanded, with several plumose setae, anterior expansion provided with facial spines. Epimeron 3, ventral margin slightly convex, lined with a row of short spines. Urosomite 1 with transverse dorsal depression followed by low keel.

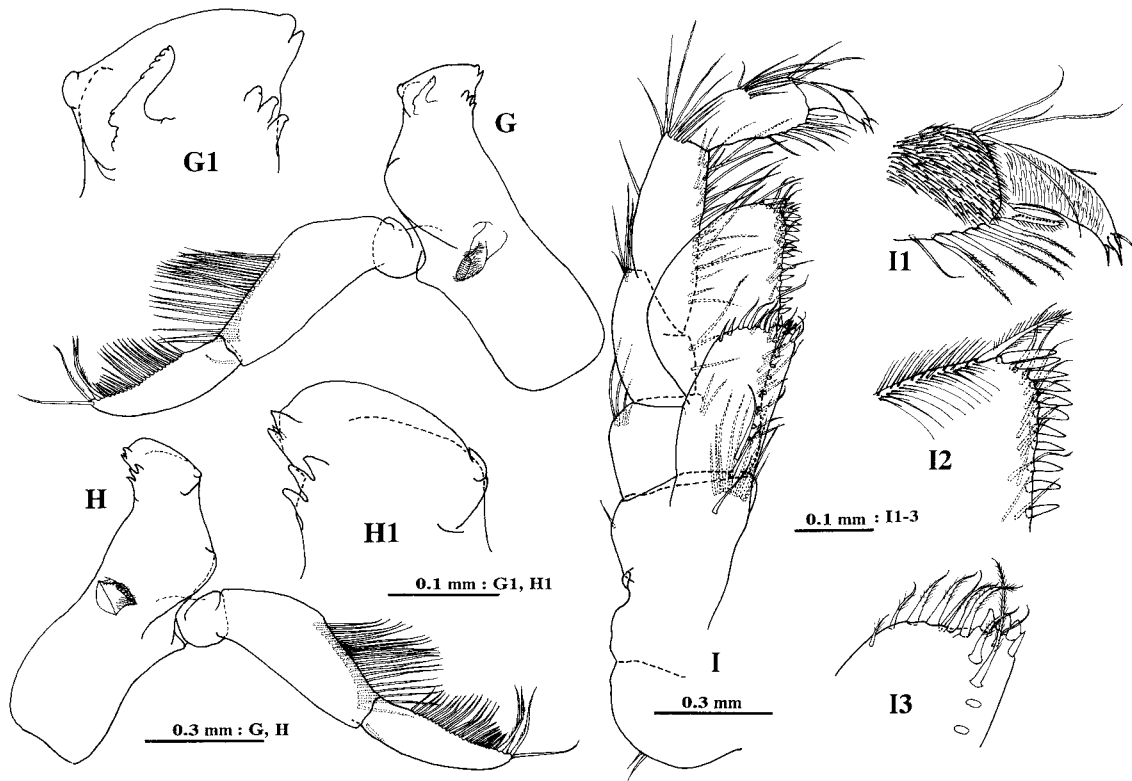
**Head:** Head as long as deep, as long as 1st pereon segment. Rostrum medium, roundly produced. Lateral cephalic lobe well developed, broad, gently rounded. Midcephalic margin not keeled, concave. Eyes broadly oval, brownish-black in color after preservation.

**Antenna 1:** Antenna 1 short. Peduncle almost as long as head; peduncular article 1 very stout, as long as deep, dorsal margin with weak depression; peduncular articles 2 and 3 short. Primary flagellum short, 13-articulate, 1.8 times as long as peduncle, calceoli present; flagellar article 1 large, callynophore well developed, in 2-field. Accessory flagellum 0.4 times as long as primary flagellum, 3-articulate; article 1 0.7 times as long as accessory flagellum, weakly expanding.

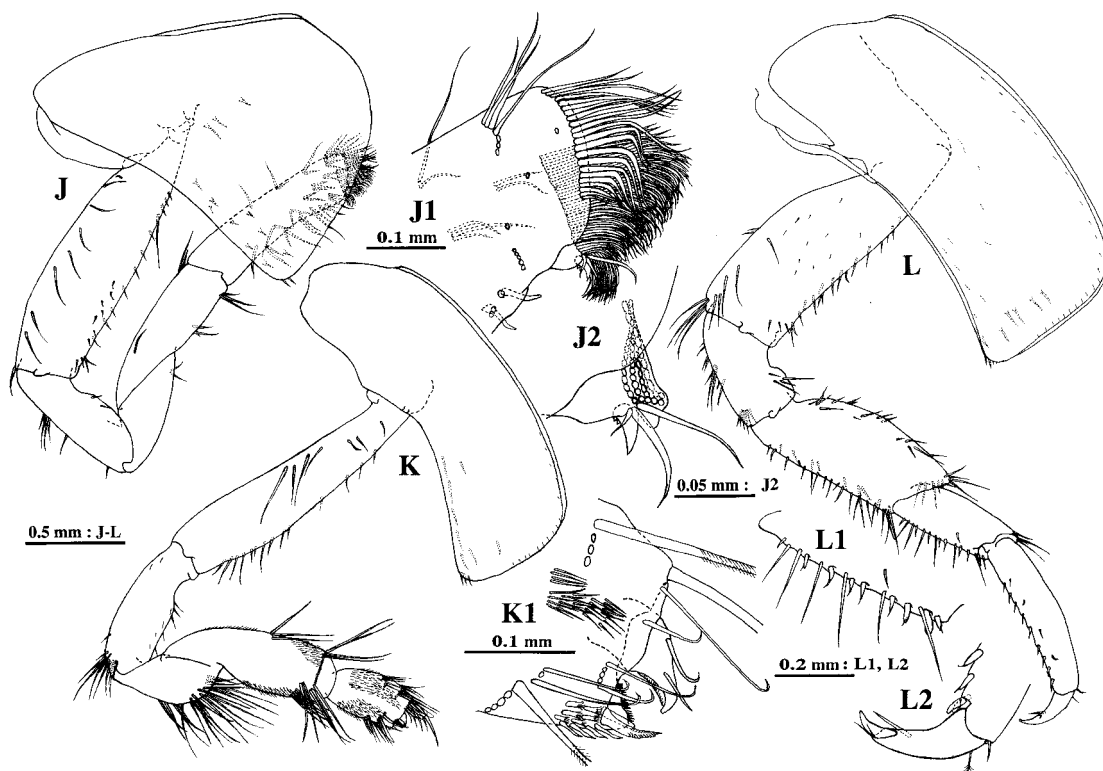
**Antenna 2:** Antenna 2 3.5 times as long as antenna 1. Peduncular article 1 enlarged; gland cone with blunt apex;



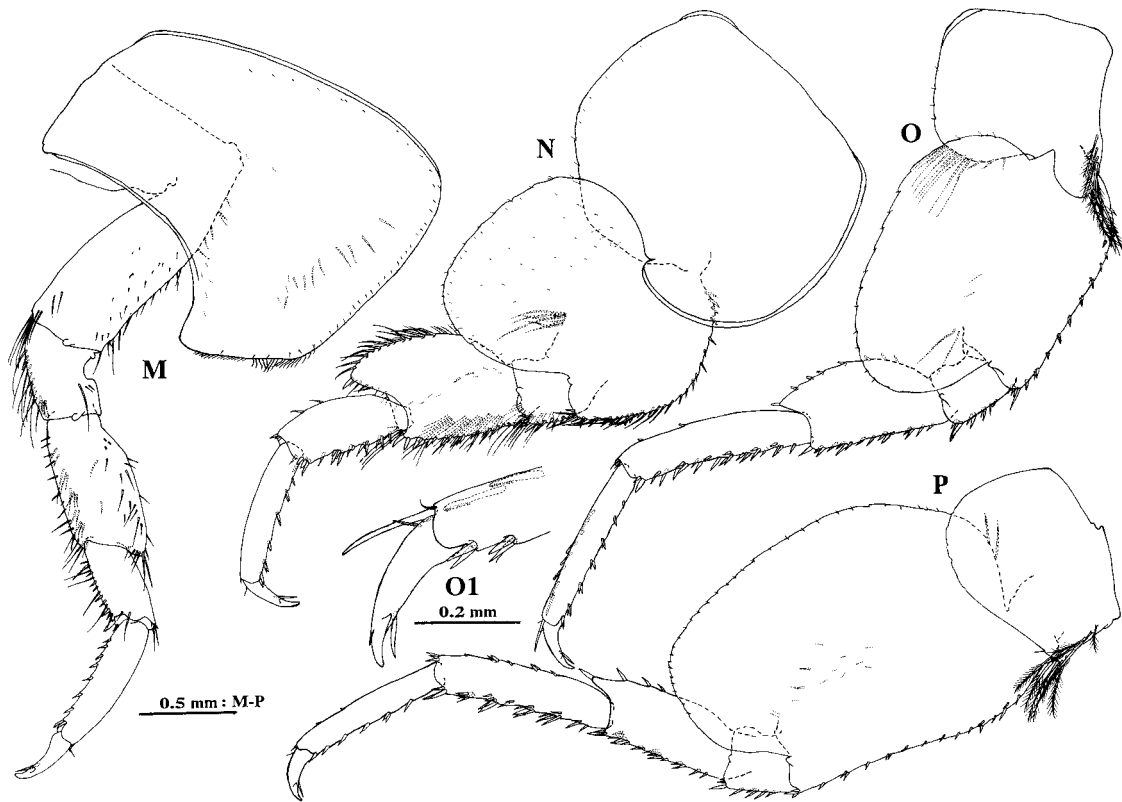
**Fig. 2.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110). **A**, head; **B**, antenna 1; **C**, antenna 2; **D**, lower lip; **E**, maxilla 1; **E1**, outer plate of maxilla 1; **F**, maxilla 2.



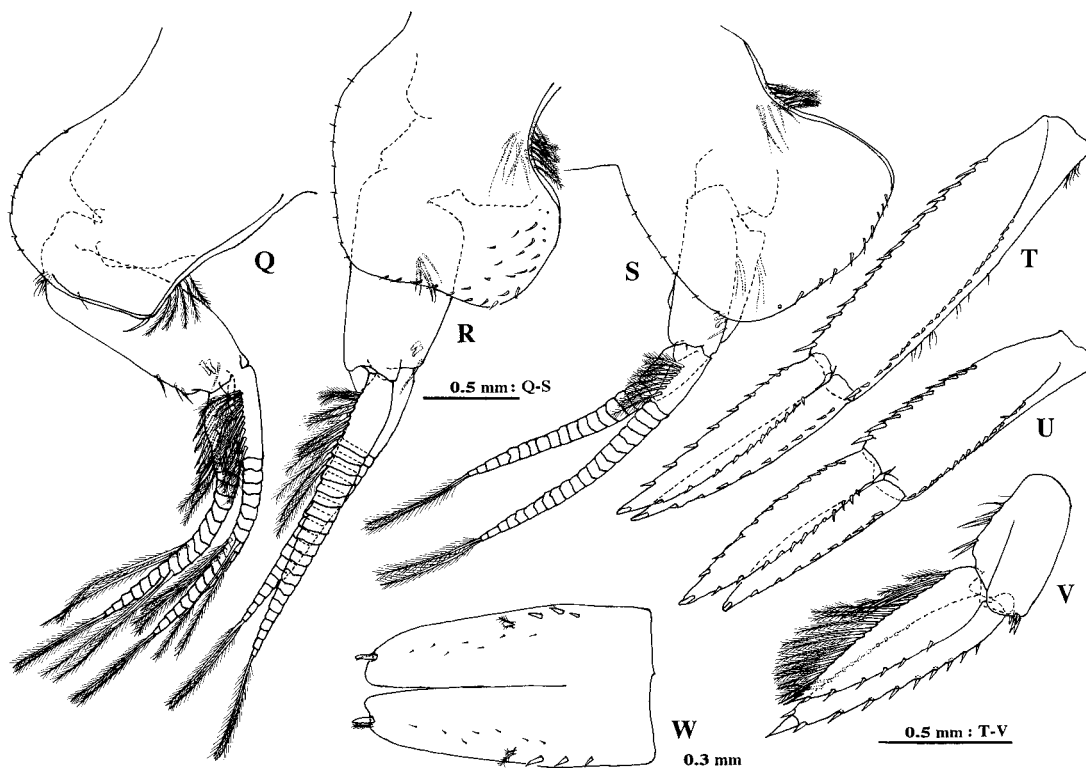
**Fig. 3.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110). **G**, left mandible; **G1**, incisor of left mandible; **H**, right mandible; **H1**, incisor of right mandible; **I**, maxilliped; **I1**, palp of maxilliped; **I2**, outer plate of maxilliped; **I3**, inner plate of maxilliped.



**Fig. 4.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110). **J**, gnathopod 1; **J1**, propodus of gnathopod 1; **J2**, dactylus of gnathopod 1; **K**, gnathopod 2; **K1**, propodus of gnathopod 2; **L**, pereopod 3; **L1**, carpus of pereopod 3; **L2**, dactylus of pereopod 3.



**Fig. 5.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110). **M**, pereopod 4; **N**, pereopod 5; **O**, pereopod 6; **O1**, dactylus of pereopod 6; **P**, pereopod 7.



**Fig. 6.** *Scopelocheirus onagawae* sp. nov. holotype, male, 10.4 mm (AM 110). **Q-S**, pereopod and epimera 1–3; **T-V**, uropods 1–3 **W**, telson.



peduncular article 5 1.2 times as long as article 4. Flagellum 49-articulate, almost half as long as body, calceoli present.

**Epistome:** Epistome slightly produced frontally, vaulted, separated from midcephalic margin.

**Mandible:** Incisor broad, cutting margin smooth and slightly convex, with blunt cusp on each side, 1 subacute tooth (left) and 3 acute teeth (right) on medial side. Lacinia mobilis on left, with 5 rounded cusps. Spine row with 3 small spines. Palp attached to level of molar, 3-articulate; article 1 short, as long as wide; article 2 about 1.2 times as long as article 3, expanded at proximal 1/3, with submarginal row of long setae along distal 2/3 of posterior margin; article 3 weakly falcate, with comb setae along distal 3/4 of posterior margin, with 4 long apical setae. Molar triturating, molar process narrow, densely pubescent.

**Lower lip:** Lower lip lacking inner lobe, outer lobe densely pubescent.

**Maxilla 1:** Inner plate relatively large, tapering distally, with 13 plumose setae along medial margin. Outer plate apically armed with 11 robust spines in 2 rows; ventral row with 3 spines, subapically 1-cuspidate; dorsal row with 8 spines, innermost spine multicuspidate near base to apex, next 4 spines multicuspidate subapically, outer 3 spines finely multicuspidate at middle. Palp 2-articulate, distally expanded, distal article with 7 bifid spines and 1 serrate spine, 1 plumose seta arising from apex.

**Maxilla 2:** Inner plate broad, with 3 setal rows; ventral row confined to apex, consisting of basally-plumose strong setae; middle row running from apex to medial margin, consisting of short plumose setae; dorsal row running from apex to medial margin, setae fully plumose and proximally longer. Outer plate reaching distal 1/5 of inner plate, 0.8 times as broad as inner, apically truncate, with long feeble distally-barbed setae in 2 rows.

**Maxilliped:** Inner plate rectangular, with 1 narrow conical and 3 broad spines apically, with 16 long plumose setae medially. Outer plate semi-circular, with 16 conical spines and marginal row of slender setae medially, 1 distal plumose seta present. Palp 4-articulate, medial margin of articles 1-3 setose, article 3 weakly expanding, with 1 denticulated plumose spine mediolaterally, article 4 falcate, with unguis.

**Gnathopod 1:** Scopelocheirin form. Coxa 1 large, antero-ventrally expanded, anterior margin straight, posterior margin straight, with 2 setules on posteroventral corner. Carpus 3.6 times as long as wide, subequal in length to propodus, anterior and posterior margins parallel. Propodus 3.6 times as long as wide, posterior margin slightly sinuate, with 2 small spines near dactylus, distal margin extending distally as hood; hood densely fringed with slender setae, setae on anterior portion

of hood directed distally, setae on lateral and medial portions bent ventrally. Dactylus extremely reduced, bulbous, anterior face widened, apex thin and acute, accompanied with 2 accessory teeth; anterior face densely covered with transverse rows of strong setae, similar to shoe brush.

**Gnathopod 2:** Coxa 2 subquadrate, long and narrow, with 3 setules on posteroventral corner. Carpus 2.9 times as long as wide, anterior and posterior margins subparallel. Propodus subrectangular, minutely parachelate; palm weakly serrate, posterodistal corner with large dentate spine laterally and small spine medially. Dactylus fitting palm, with minutely dentate cutting margin.

**Pereopod 3:** Coxa 3 similar to coxa 2. Carpus 0.6 times as long as merus, with posterior row of 8 stumpy spines accompanied with setules. Propodus 1.5 times as long as carpus, with 8 single stumpy spines along posterior margin, locking spines paired and slightly curved. Dactylus with long accessory spine.

**Pereopod 4:** Coxa 4 much broader than coxa 1, with well-developed posteroventral lobe, posteroventral margin straight, fringed with fine hairs. Other articles similar to pereopod 3, though carpus and propodus shorter.

**Pereopod 5:** Coxa 5 equilobate, each lobe semi-circular. Basis broadly expanded, with a row of single slender spines along anterior margin, weakly crenulate along posterior margin, with several plumose setae distally on medial face. Merus expanded, medial face bristly in part; posterior expansion with a row of 11 long setae and 1 apical spine; anterior margin lined with transverse clusters of spines, submarginally covered with slender setae on medial face. Carpus lined with transverse clusters of slender spines anteriorly. Propodus 1.2 times as long as carpus, with a row of paired spines along anterior margin, locking spines same as penultimate ones. Dactylus with long accessory spine anteriorly.

**Pereopod 6:** Coxa 6 small, with 9 long plumose setae on distal margin of posterior lobe, with narrowly-extended anterior lobe bearing 9 long plumose setae. Basis slightly longer than wide, suboval, with a row of single or paired spines along anterior margin, weakly crenulate along posterior margin. Merus slightly broad but much narrower than that of pereopod 5, anterior margin lined with transverse clusters of slender spines, posterior margin with 8 short spines. Carpus 1.2 times as long as merus, spinose along anterior margin, with 2 short spines on posterior margin. Propodus 0.9 times as long as carpus, with a row of paired spines along anterior margin; posterior margin with 8 terminally-serrate long spines submarginally, posterodistal edge with 1 long spine.

**Pereopod 7:** Coxa 7 subcircular, with 10 plumose setae anteriorly. Basis 1.4 times as long as wide, anterior margin weakly concave, posterior margin convex, posterodistal lobe obtusely

subquadrate. Merus narrow, 1.5 times as wide as carpus. Carpus to propodus similar to those of pereopod 6 but each article slightly shorter, lacking submarginal long serrate spines and terminal long spine.

**Gills:** Gills on pereopods 2 to 7.

**Pleopods:** Pleopods well developed. Peduncle of pleopod 3 slightly smaller than those of pleopods 1 and 2. Peduncles with 2 serrated coupling spines and 1 plumose seta. Rami subequal.

**Uropods:** Uropod 1, peduncle with 21 small dorsolateral and 1 large apicolateral spine, with 14 dorsomedial long spines; rami subequal in length, 0.7 times as long as peduncle, each with 1 apical spine; inner ramus with 11 lateral spines and 9 medial spines; outer ramus with 10 lateral spines, medial margin naked. Uropod 2 0.8 times as long as uropod 1; peduncle as long as inner ramus, with 15 small lateral spines and 10 long medial spines; inner ramus with 12 lateral spines and 12 medial spines; outer ramus slightly shorter than inner, with 9 lateral spines, medial margin naked. Uropod 3 0.8 times as long as uropod 2; peduncle short, with 3 paired long and 1 small spine along medial margin, with 5 spines on distoventral margin; rami lanceolate; inner ramus 0.9 times as long as outer ramus, with 19 long plumose setae along medial margin, with 6 spines along lateral margin; outer ramus 2-articulate, proximal article with 1 apical spine and 11 long plumose setae along medial margin, with 9 marginal spines along lateral margin; distal article 0.1 times as long as proximal article, with acute tip.

**Telson:** Telson 1.7 times as long as wide, deeply cleft to 70% of its length; each lobe with 3 submarginal spines, several minute facial spines present; apex rounded, with 1 thick spine and 1 plumose seta.

#### Description of ovigerous female (paratype, AM 109)

Eyes slightly smaller than in male. Antenna 1 slightly shorter than in male; peduncular article 1 more slender, 0.8 times as long as wide; primary flagellum 11-articulate. Antenna 2 much shorter than in male; flagellum 35-articulate, 0.3 times as long as body. Antennae 1 and 2 lacking calceoli. Oostegites present on pereopods 2–5, linear, fringed with many long setae along distal margin.

## DISCUSSION

The lysianassoid family Scopelocheiridae, to which the genus *Scopelocheirus* belongs, is erected to encompass genera with two main characteristics: a 7/4 setal-tooth arrangement on the outer plate of maxilla 1, and an extremely reduced dactylus of gnathopod 1 covered with setae in varying degrees (Lowry and Stoddart, 1997). The family includes seven genera, that is, *Aroui*, *Bathycallisoma*, *Eucallisoma*, *Paracallisoma*, *Paracallisomopsis*, *Scopelocheiropsis*, and

*Scopelocheirus*. *Scopelocheirus* is thought to be most closely related to *Aroui* (Stroobants, 1976; Bellan-Santini, 1983; Lowry and Stoddart, 1989, 1997). Lowry and Stoddart (1997) proposed a *Scopelocheirus* group, an informal generic grouping within the Scopelocheiridae, and assigned *Scopelocheirus* and *Aroui* to the group.

*Aroui* is generally distinguished from *Scopelocheirus* by three characteristics (Barnard and Karaman, 1991; Lowry and Stoddart, 1989, 1997): 1) the reduced outer plate of maxilla 2; 2) long barbed setae on the outer plate of maxilla 2; and 3) the fringe of fine hairs (=short slender setae) along ventral margin on coxae 1 to 4. The present new species is noteworthy because of its characteristics which are intermediate between *Aroui* and *Scopelocheirus*. In *Aroui*, the outer plate of maxilla 2 is semi-circular, relatively truncate in its apex, and is apparently shorter than the inner plate. A similar condition is also found in *S. onagawae* sp. nov.; the outer plate is shorter than the inner, and the apex is truncate. The presence of peculiar barbed long setae, which are issued from the outer plate of maxilla 2, is shared with the new species and *Aroui*. On the other hand, the new species is easily discernible from all known species of *Aroui* by its naked ventral margin of coxae 1 to 4. The above conditions of the maxilla 2 make the boundary of *Scopelocheirus* and *Aroui* vague. The taxonomic identity of the two genera should be re-evaluated based on more detailed study (Ishimaru and Takekawa, in prep.).

The new species is here tentatively assigned to *Scopelocheirus*. This treatment is based on the naked ventral margin of coxae 1 to 4. Among 4 known species of *Scopelocheirus*, the new species is most similar to *S. hopei* (Costa, 1851) and *S. polymedus* Bellan-Santini, 1983 in its general morphology, particularly of the elongate gnathopod 1 and the broad merus of pereopod 5. The new species is, however, distinguishable from the two species in the following characteristics: 1) the more rounded apex of lateral cephalic lobe; 2) the reduced outer plate of maxilla 2, with long feeble distally-barbed setae; 3) the presence of terminally-serrate long spines along the posterior margin of the propodus of pereopod 6; 4) the rounded and non-setose posteroventral angle of epimeron 2; 5) more densely arranged marginal spines on uropods 1 and 2; 6) the presence of plumose setae along the medial margin of the outer ramus of uropod 3; and 7) the shorter inner ramus of uropod 3, which does not exceed the distal margin of the proximal article of outer ramus.

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