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Two New Species of the Genus *Anonyx* (Amphipoda: Gammaridea: Lysianassoidea) from Onagawa Bay, Northeastern Japan

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ABSTRACT—Two new species of lysianassoid amphipods, *Anonyx omorii* sp. nov. and *A. abei* sp. nov. were described from shallow waters of Onagawa Bay, northeastern Japan. The genus *Anonyx* has been divided into five informal groups by the morphological characters of the uropod 2 (Steele, 1979). According to the morphological features of uropod 2, *A. omorii* sp. nov. is assigned to *A. compactus* group with the inner ramus of uropod 2 completely constricted beyond the insertion point of a long distal spine, and *A. abei* sp. nov. to *A. nugax* group with the inner ramus of uropod 2 constricted at the insertion point of the long distal spine.

INTRODUCTION

Lysianassoid amphipods (Gammaridea: Lysianassoidea) are well known as dominant scavengers in cold-water seas such as polar and deep-sea areas (e.g., Sainte-Marie, 1992). During an ecological study of scavenging amphipods conducted by the first author in the shallow waters of Onagawa Bay, northeastern Japan, five species of lysianassoid amphipods were abundantly captured. Among them, the most dominant was a species of the family Scopelocheiridae, being described by Takekawa and Ishimaru (2000) as *Scopelocheirus onagawae* Takekawa and Ishimaru, 2000. Also abundant in the study area were two undescribed species of the genus *Anonyx*.

The *Anonyx* is one of the largest genus within this superfamily, and 50 species have so far been described from boreal-arctic regions (Barnard and Karaman, 1991; Steele, 1989, 1991). The genus was subdivided into five informal groups mainly based on the amount of constriction of the inner ramus of uropod 2 (Steele, 1979, 1982, 1983, 1986, 1989, 1991) as follows. 1) *Anonyx laticoxae* group: species without a constriction of the inner ramus of uropod 2. 2) *A. validus* group: species with the inner ramus of uropod 2 expanded laterally and lacking a constriction. 3) *A. nugax* group: species with a constriction of the inner ramus at the point of insertion of a distal spine. 4) *A. compactus* group: species with the inner ramus completely constricted beyond the point of insertion of the distal spine. 5) *A. bispinosus* group: species with the inner ramus completely constricted beyond the point of insertion of the distal spine, and the proximal portion of the inner ramus laterally flattened.

Taxonomic investigation of the *Anonyx* in Japan is still insufficient, while it is common especially in northern Japan (Ishimaru, personal observations). To date, nine species have been recorded from around the coastal waters of Japan (Ishimaru, 1994). *Anonyx stebbingi* Steele, 1989 (= *A. ampulloides* sensu Stebbing, 1888) was recorded from 1417 m depth in Sagami Bay (Stebbing, 1888; Steele, 1989), *A. lilljeborgi* Boeck, 1871 and *A. hayashii* Sekiguchi and Yamaguchi, 1983 from 330–1015 m depth in Kumano-nada and Enshu-nada (Sekiguchi and Yamaguchi, 1983), and *A. simplex* Hirayama, 1985 from Tomioka Bay (Hirayama, 1985). Other 5 species (*A. lebedi* Gurjanova, 1962; *A. makarovi* Gurjanova, 1962; *A. nugax* (Phipps, 1774); *A. sarsi* Steele and Brunel, 1968; *A. schefferi* Steele, 1986) were shown to be present only by the distributional map of each species (Steele,1982, 1986). The present paper is intended to describe additional two new species of the *Anonyx*, collected by baited traps set in the shallow waters of Onagawa Bay, northeastern Japan.

MATERIALS AND METHODS

Specimens were collected at two stations with water depth of 30 and 35 m in Onagawa Bay, northeastern Japan, on July 18, 1996. Baited traps made of a polyethylene bottle (3000 ml) with a 18-mm entrance were set about 0.2 m above the bottom from the sunset to the next morning, a saury (*Cololabis saira*) of ca. 150 g being fastened inside as a bait with a stainless wire. Specimens captured in the traps were immediately fixed with 10%-formalin solution diluted

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with seawater, and preserved in the same solution.

The appendages of type specimens were dissected and embedded in a gum-chloral medium on glass slides. Terminology of the spine-teeth arrangement follows Lowry and Stoddart (1992). The type series is deposited in the Graduate School of Agricultural Science, Tohoku University.

DESCRIPTION

Anonyx omorii sp. nov.
(Figs. 1–5)

Type Material. All specimens were collected at a station 30 m deep (38° 26' 12" N, 141°30' 30" E). Holotype: male, body length (BL) 11.1 mm (registration number: AM 201). Paratypes: males, BL 11.0 mm, 10.8 mm (AM 202, 204); ovigerous female, BL 13.5 mm (AM 205); non-ovigerous female, BL 11.8 mm (AM 203); juvenile, BL 9.3 mm (AM 206).

Diagnosis

Posteroventral angle of epimeron 3 produced into a prominent acute tooth. Lateral cephalic lobe well produced with sub-acute angle. Eyes reniform. Antenna 1 (male) as long as head and pereonites 1–4 combined, peduncular article 1 very stout. Antenna 2 (male) very long, reaching urosome. Upper lip slightly produced in front of epistome. Incisor of mandible with 2 teeth (left) and 1 tooth (right) on medial edge; mandibular palp attached nearly midway between incisor and molar, 1.5 times as long as mandibular body. Distal article of palp of maxilla 1 with deeply indentated distal margin, distomedial corner lacking cusp. Carpus of gnathopod 1 1.3 times as long as propodus; palm oblique, short; dactylus large, with 1 accessory tooth. Gnathopod 2 minutely parachelate. Merus to propodus of pereopods 3 and 4 heavily setose along posterior margin, lacking marginal spines. Inner ramus of uropod 2 completely constricted beyond insertion point of long distal spine. Both rami of uropod 3 setose along medial margin, without setae along lateral margin. Apex of telson roundly beveled.

Description of male (holotype, AM 201)

Body: Body rather slender, smooth dorsally; color glossy white after a few months preservation in 10% formalin. Epimeron 1: posteroventral margin evenly rounded, anteroventral angle bluntly produced. Epimeron 2: ventral margin slightly concave, posterior margin gently expanded, posteroventral angle weakly produced. Epimeron 3: ventral margin slightly convex, with 5 slender spines, posteroventral angle produced into a prominent acute tooth. Urosomite 1 with slight dorsal depression. Urosomite 3 with a pair of tiny spines near insertion of telson.

Head: Head 1.2 times as long as pereonite 1. Lateral cephalic lobe well produced, with sub-acute angle, ventral margin nearly straight, anterior margin slightly convex. Rostrum obsolete. Eyes large, reniform, reddish brown after preservation.

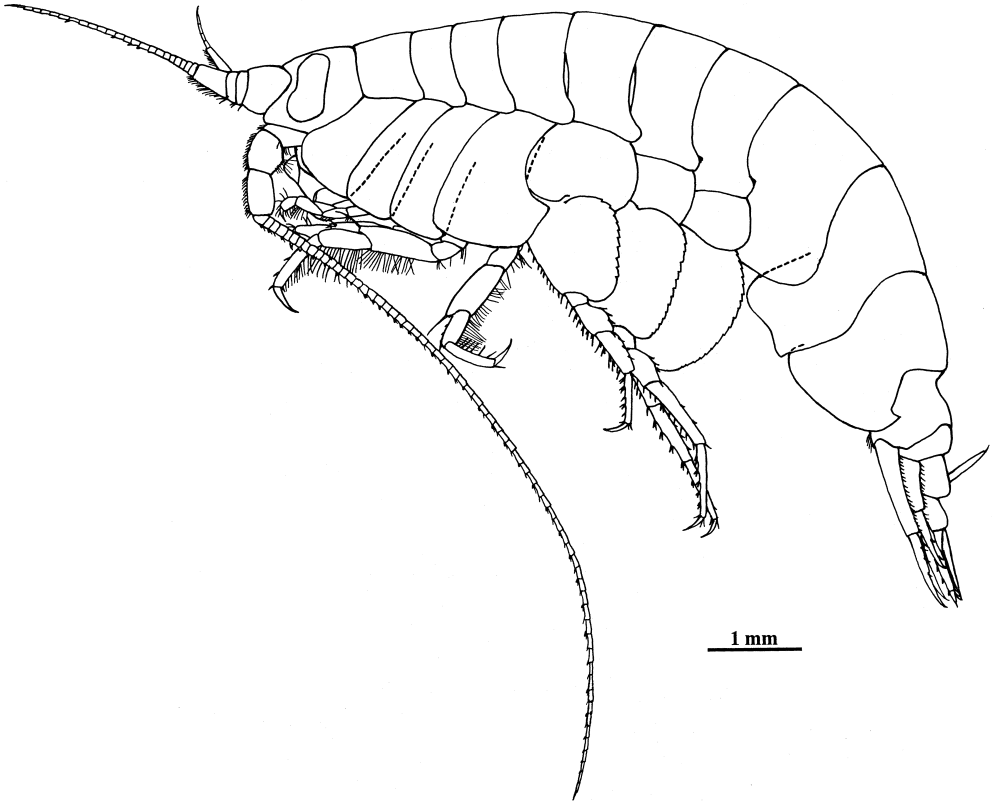

Fig. 1. *Anonyx omorii* sp. nov. holotype, male, 11.1 mm (AM 201).

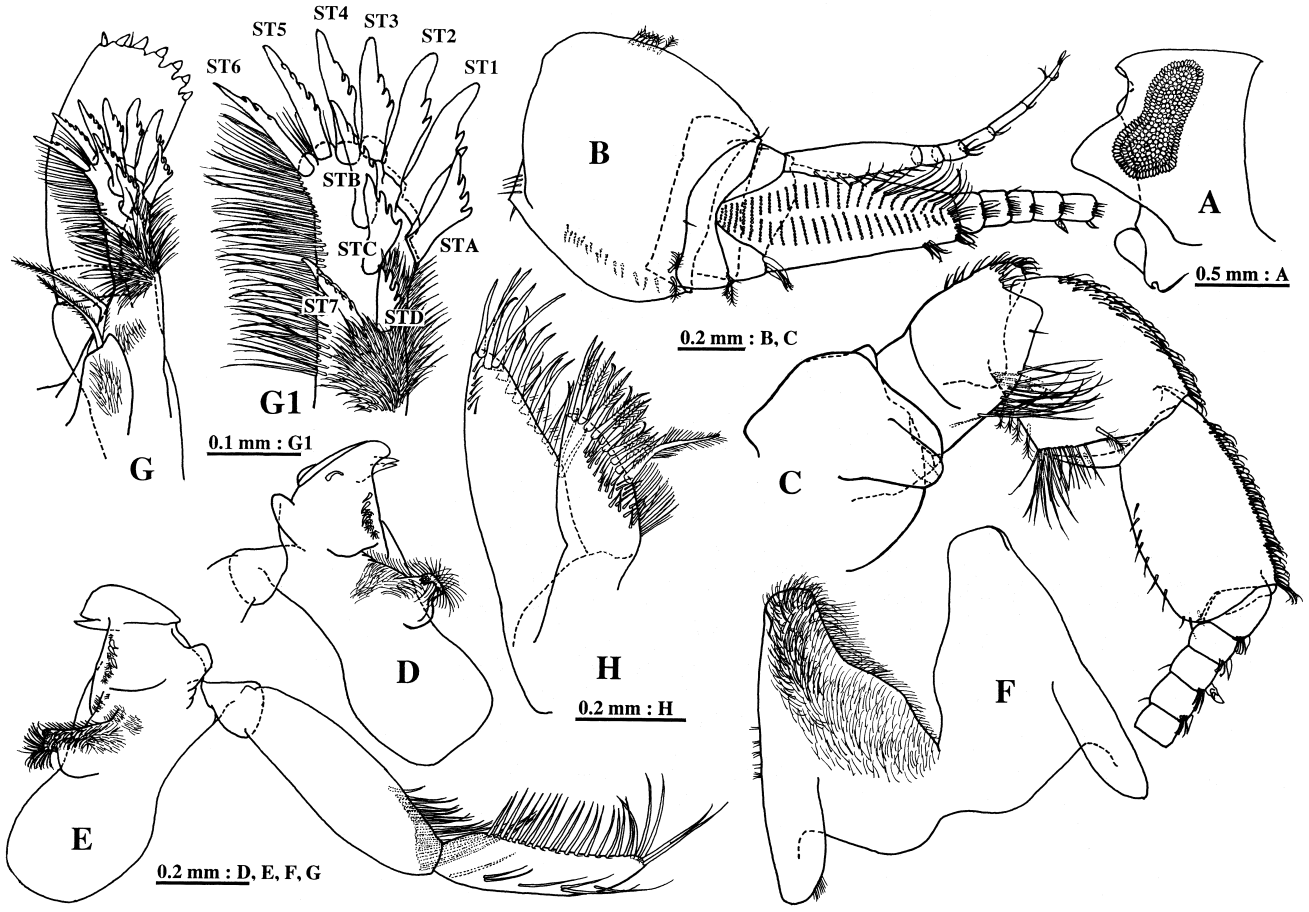

Fig. 2. *Anonyx omorii* sp. nov. holotype, male, 11.1 mm (AM 201). A, head; B, antenna 1; C, antenna 2; D, left mandible; E, right mandible; F, lower lip; G, maxilla 1; G1, outer plate of maxilla 1; H, maxilla 2.

Antenna 1: Antenna 1 as long as head and pereonites 1–4 combined. Peduncle shorter than head; peduncular article 1 very stout, ventrally expanding, as long as wide, with a row of penicillate setae near ventral margin; peduncular articles 2 and 3 strongly telescoped. Primary flagellum long, 3.7 times as long as peduncle, 24-articulate, calceoli present on ventral margin; article 1 long, callynophore well developed, in 2-field. Accessory flagellum 0.3 times as long as primary flagellum, 7-articulate; article 1 weakly expanding, not reaching distal margin of article 1 of primary flagellum.

Antenna 2: Antenna 2 very long, reaching urosome, 3.6 times as long as antenna 1. Peduncular article 1 enlarged; gland cone with blunt apex; peduncular article 3 almost as long as article 4, 1.3 times as long as wide; peduncular article 4 expanding, subcircular; peduncular article 5 weakly expanding, 1.1 times as long as article 4. Flagellum 66-articulate, 6 times as long as peduncle, calceoli present on dorsal margin.

Epistome and Upper lip: Epistome slightly concave, ridged. Upper lip separate from epistome, anteriorly ridged, slightly produced in front of epistome as evenly rounded lobe.

Mandible: Incisor broad, cutting margin smooth and strongly convex, with 2 large teeth (left) and 1 large tooth (right) on medial edge. Lacinia mobilis on left, weak, slender, devoid of sculpturing. Spine row with 3 long spines and several short pappose spines. Molar small, flap-shaped, distally truncate, densely pubescent; triturating area small, weakly sclerotized, covered with tiny denticles. Palp 1.5 times as long as mandibular body, attached nearly midway between incisor and molar, 3-articulate; article 1 short, broadend distally; article 2 0.7 times as long as mandibular body, robust, with submarginal row of setae along distal 1/3 of posterior margin; article 3 0.8 times as long as article 2, weakly falcate, distal 4/5 of posterior margin with setae, lateral face with 1 seta anteroproximally, medial face with several submarginal setae anteriorly.

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

Maxilla 1: Inner plate small, beveled, apex subacute, with 2 apical plumose setae. Outer plate bristly along lateral margin; spine-teeth 7/4 crown arrangement, STA-STD distally cuspidate, ST1-ST4 midway cuspidate, ST5-ST7 marginally cuspidate, brush-like tuft of bristles present under ST7. Palp 2-articulate; distal article large, slightly expanding, distal margin deeply indentated, with 6 tooth-like spines and 1 flag spine, 1 small seta arising from apex, distomedial corner lacking cusp.

Maxilla 2: Inner plate small and tapering apically, medial margin setose in 3 rows, ventral row consisting of 10 plumose setae. Outer plate 1.8 times as long as inner plate,

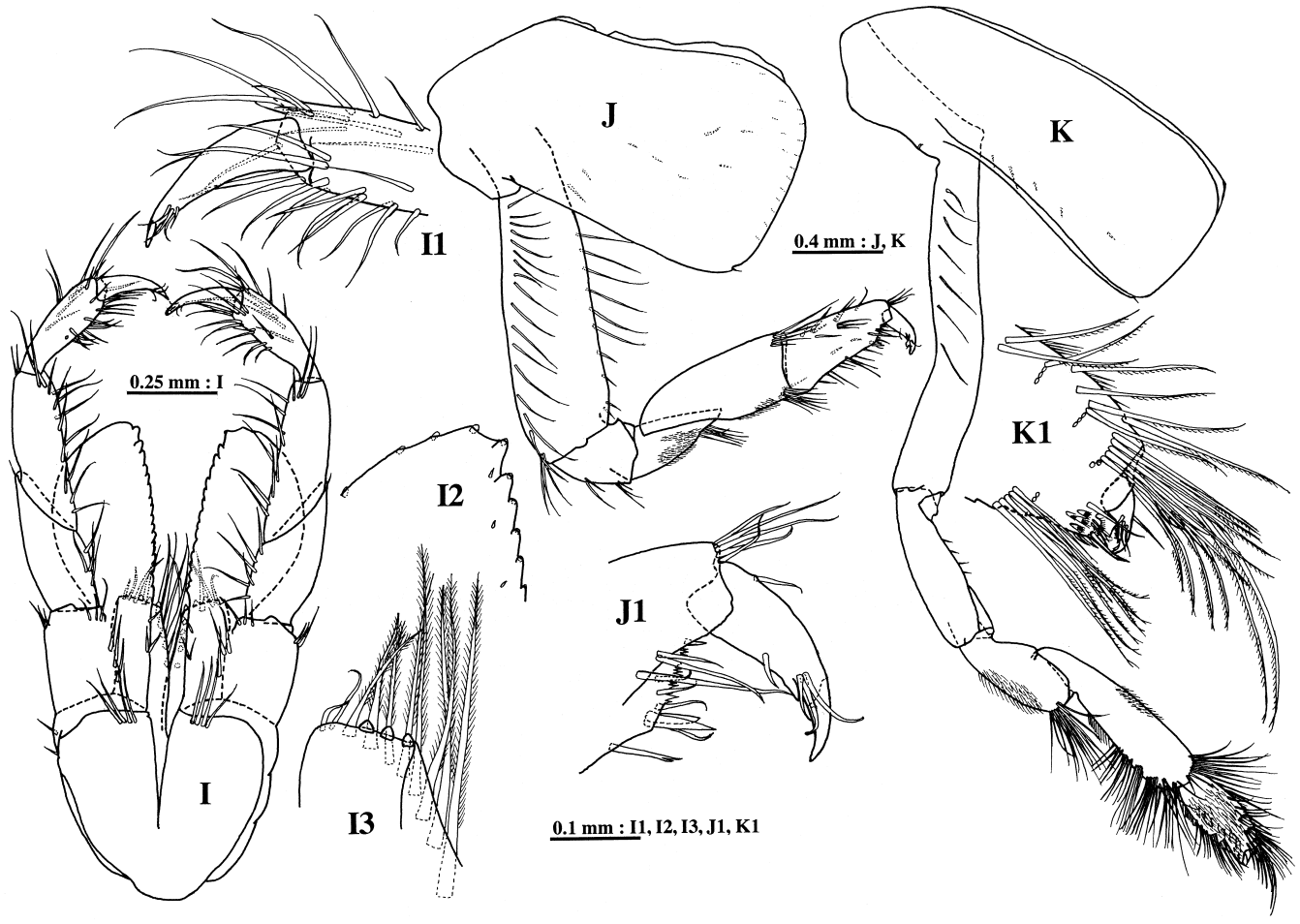

Fig. 3. *Anonyx omorii* sp. nov. holotype, male, 11.1 mm (AM 201). I, maxilliped; I1, palp of maxilliped; I2, outer plate of maxilliped; I3, inner plate of maxilliped; J, gnathopod 1; J1, propodus of gnathopod 1; K, gnathopod 2; K1, propodus of gnathopod 2.

tapering apically, medial margin with long setae in 2 rows.

Maxilliped: Inner plate small and rectangular, with 8 long plumose setae obliquely, apical margin with 2 slender simple setae and 3 nodular spines spaced from each other. Outer plate semi-circular, with 17 marginal low nodular teeth, submarginal spines vestigial, apex with 4 small conical spines, without apical setae. Palp 4-articulate, medial margin of articles 1-3 setose, article 3 weakly expanding distally, article 4 falcate, with unguis.

Gnathopod 1: Coxa 1 slightly expanding anteroventrally, with 1 small seta on posteroventral corner. Basis setose anteriorly and posteriorly. Carpus 2.3 times as long as wide, 1.3 times as long as propodus. Propodus gradually narrowing distally, 2 times as long as wide, posterior margin slightly concave; palm oblique, short, finely dentate, 1 spine present beneath hinge, posterodistal corner with 2 large defining spines. Dactylus slightly exceeding palm, with a few setules and accessory tooth, unguis strong.

Gnathopod 2: Coxa 2 narrow and rectangular, with 1 short seta on posteroventral corner. Carpus 4 times as long as wide, 2 times as long as propodus. Propodus 2.2 times as long as wide, minutely parachelate; palm weakly serrate, posterodistal corner with 2 short and 1 long setae laterally and with 3 short setae medially. Dactylus fitting palm, with minutely dentate cutting margin and 1 accessory tooth.

Pereopod 3: Coxa 3 similar to coxa 2. Merus densely setose posteriorly, with several setae on anterodistal corner. Carpus 0.7 times as long as merus, densely setose posteriorly, with 1 seta on anterodistal corner. Propodus 1.3 times as long as carpus, posterior margin with a row of single or paired setae, lacking spines; locking spine robust, apex blunt and hooked, without accessory tooth. Dactylus with unguis.

Pereopod 4: Preopod 4 similar to prereopod 3, except: coxa 4 much broader than coxa 3, posteroventral lobe medium; merus to propodus slightly shorter.

Pereopod 5: Coxa 5 equilobate, each lobe semi-circular. Basis expanding proximally, with a row of single spines along anterior margin, posterior margin nearly straight and weakly crenulate. Anterior margin of ishium with spines and setae. Merus slightly expanding, posterior margin with 3 short spines and 1 apical spine, anterior margin lined with clusters of 2 spines and 1 seta. Carpus 1.3 times as long as merus, anterior margin lined with clusters of 2 spines and 1 seta, posterior margin with 2 short spines. Propodus 1.2 times as long as carpus, anterior margin with a row of paired spines, posterodistal edge with several short setae and 1 long spine.

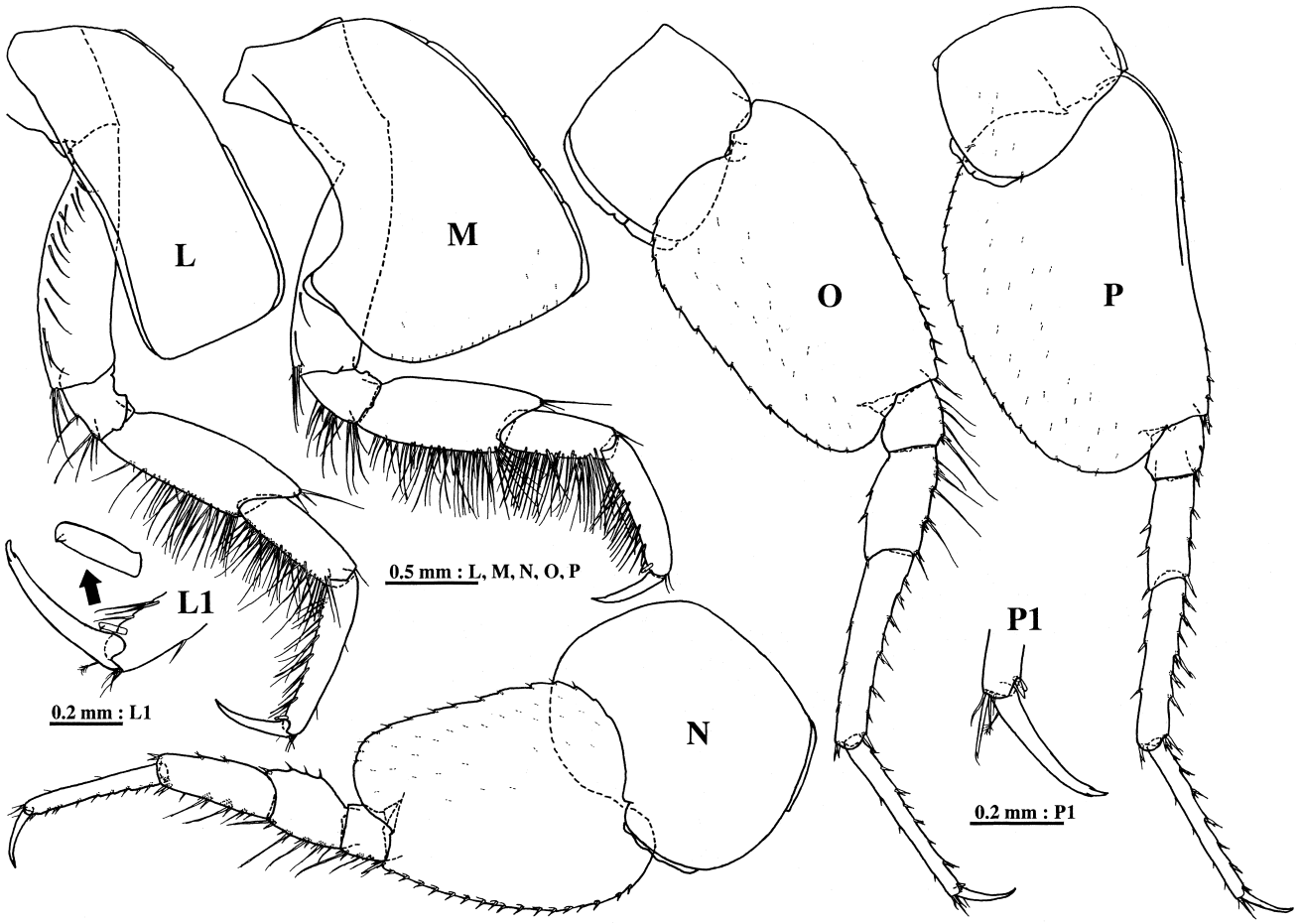

Fig. 4. *Anonyx omorii* sp. nov. holotype, male, 11.1 mm (AM 201). L, pereopod 3; L1, propodus of pereopod 3; M, pereopod 4; N, pereopod 5; O, pereopod 6; P, pereopod 7; P1, propodus of pereopod 7.

Pereopod 6: Coxa 6 small, posteroventral lobe slightly expanding. Basis 1.5 times as long as wide, anterior margin with a row of single spines, posterior margin nearly straight and weakly crenulate. Anterior margin of ishium with spines and long setae. Merus weakly expanding, anterior margin lined with clusters of 2 spines and 1 seta, posterior margin with 2 short spines and 1 apical spine. Carpus 1.7 times as long as merus, anterior margin with a row of single to triad spines, without long setae, posterior margin with 3 short spines. Propodus 0.9 times as long as carpus, anterior margin with a row of paired spines, posterior margin with 3 short setae, posterodistal edge with several short setae and 1 long spine.

Pereopod 7: Coxa 7 small and semi-circular. Basis 1.6 times as long as wide, anterior margin weakly concave, with a row of single spines, posterior margin convex and weakly crenulate. Ishium without long setae. Merus narrow, anterior margin with 2 paired spines and 1 large spine, without long setae, posterior margin with 2 short spines and 1 apical spine. Carpus to dactylus similar to those of pereopod 6, but carpus slightly shorter than in pereopod 6.

Gills: Gills on pereopods 2 to 7, large, pleated.

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

Uropod 1: Peduncle with 13 long dorsomedial spines, 21 small dorsolateral spines, and 1 apicolateral spine. Rami subequal in length, 0.7 times as long as peduncle; inner ramus with 5 medial spines and 4 lateral spines; outer ramus with 2 small medial spines and 4 small lateral spines.

Uropod 2: Uropod 2 0.7 times as long as uropod 1. Peduncle with 5 small dorsomedial spines and 1 apicomedial spine, with 14 small dorsolateral spines and 1 apicolateral spine. Inner ramus as long as peduncle, completely constricted beyond insertion point of a long distal spine, medial margin with 5 small proximal spines, lateral margin with 2 small spines. Outer ramus 1.1 times as long as inner, medial margin naked, lateral margin with 6 small spines.

Uropod 3: Uropod 3 as long as uropod 2. Peduncle short, dorsomedial margin with several slender setae and 3 small spines, ventrodistal margin with 2 large spines. Inner ramus 1.7 times as long as peduncle, reaching midway along distal article of outer ramus, medial margin with 26 long plumose setae and 2 small spines, lateral margin with 3 spines. Outer ramus 2-articulate, proximal article with 13 long plumose setae and 1 distal spine along medial margin, lateral margin with 3 paired spines proximally and 5 single spines distally, 1

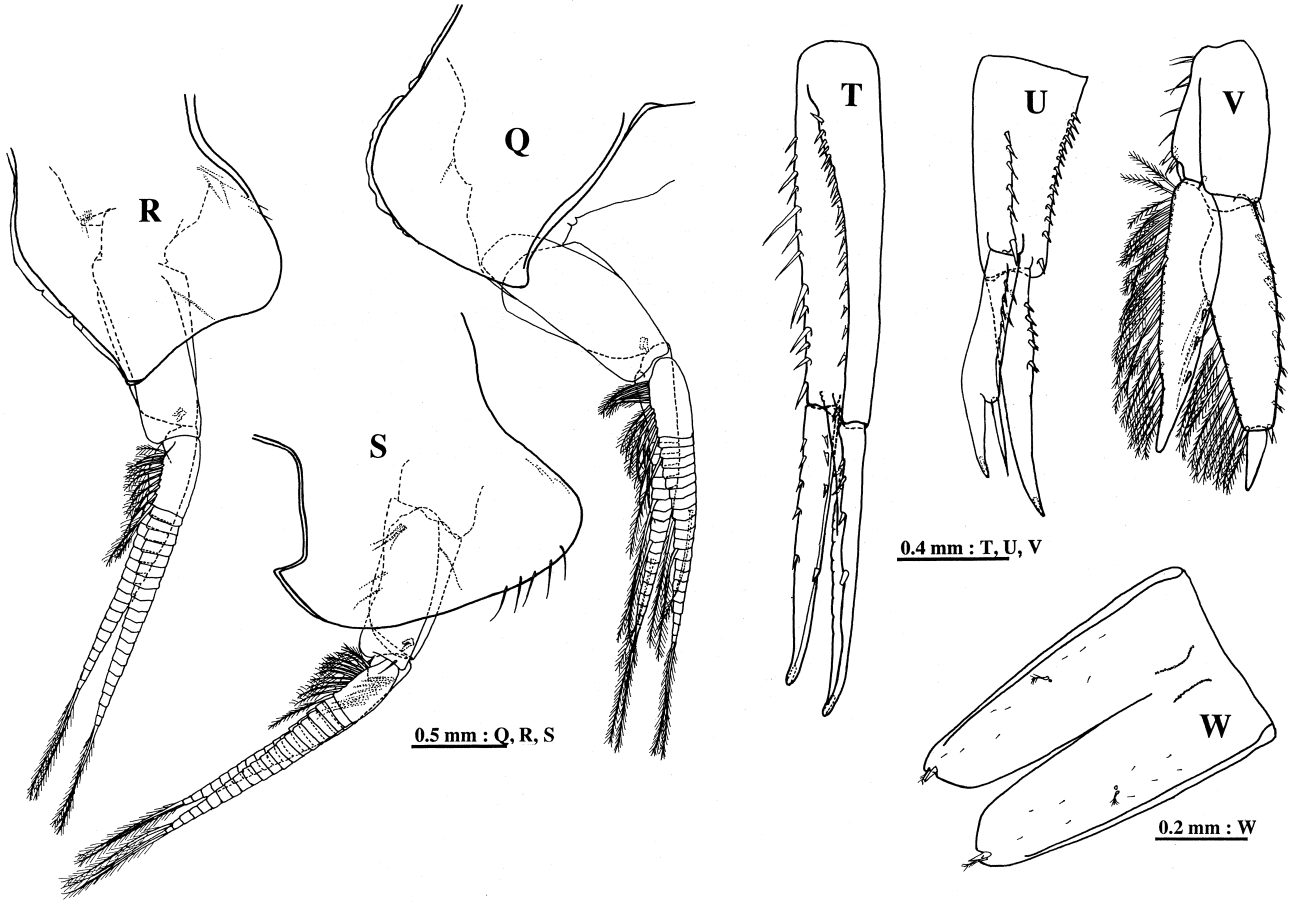

Fig. 5. *Anonyx omorii* sp. nov. holotype, male, 11.1 mm (AM 201). Q–S, pleopods and epimera 1–3; T–V, uropods 1–3; W, telson.

distal spine on distolateral edge; distal article 0.3 times as long as proximal article.

Telson: Telson 1.5 times as long as wide, cleft to 70% of its length; apex roundly beveled, with 1 stout spine.

Description of non-ovigerous female (paratype, AM 203)

Eyes slightly smaller than in male. Antenna 1 much shorter, 0.2 times as long as body; primary flagellum 18-articulate, 1.9 times as long as peduncle; accessory flagellum 6-articulate, article 1 reaching distal margin of primary flagellar article 1. Antenna 2 shorter than in male, 1.4 times as long as antenna 1; peduncular article 3 almost as long as article 4, 1.5 times as long as wide, peduncular article 4 not expanding, 1.6 times as long as wide, subequal to article 5; flagellum 32-articulate, 0.3 times as long as peduncle. Antennae 1 and 2 lacking calceoli. Merus to propodus of pereopods 3 and 4 less setose than in male. Oostegites present on pereopods 2-5, linear, fringed with many setae along distal margin. Uropod 3 sparsely setose.

Remarks

The subdivision of the *Anonyx* on the basis of the amount of constriction of the inner ramus of uropod 2 (Steele, 1979, 1982, 1983, 1986, 1989, 1991) may be artificial, as suggested by Steele (1983) himself. The authors consider that the phylogenetic significance of the above condition in the *Anonyx* should be reassessed. But the purpose of this paper is not to do such a reassessment, so that the authors provisionally adopted Steele's subdivision because of its convenience for α-taxonomy.

Following Steele's subdivision, the present new species is assignable to *Anonyx compactus* group, which is characterized by: 1) the inner ramus of uropod 2 is completely constricted at the middle, 2) a long spine is present on the constriction, and 3) the inner ramus is equal in depth to and only slightly shorter than the outer ramus. In the condition of the gnathopod 2, *A. omorii* sp. nov. resembles the following three species of the *A. compactus* group, namely, *A. attenuatus* Steele, 1989, *A. ochoticus* Gurjanova, 1962, and *A. robustus* Gurjanova, 1962. The new species is discriminable from *A. ochoticus* and *A. robustus* mainly by the oblique palm of gnathopod 1, and the longer carpus and propodus of gnathopod 1. From *A. attenuatus*, the new species is different in the subacute apex of lateral cephalic lobe, the concavity of the ventral margin of epimeron 2, and the less-produced posteroventral angle of epimeron 3.

Anonyx abei sp. nov.
(Figs. 6–10)

Type Material. All specimens were collected at a station 35

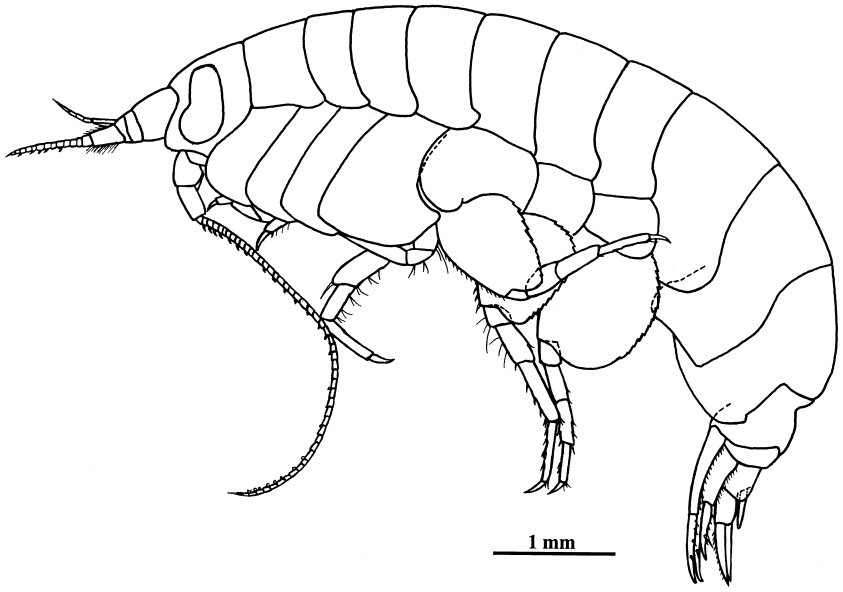

Fig. 6. *Anonyx abei* sp. nov. holotype, male, 8.3 mm (AM 303).

m deep (38° 25' 48" N, 141° 31' 30" E). Holotype: male, BL 8.3 mm (AM 303). Paratypes: males, BL 8.0 mm, 8.0 mm, 9.0 mm (AM 301, 304, 306); ovigerous female, BL 8.6 mm (AM 305); non-ovigerous female, BL 8.9 mm (AM 302).

Diagnosis

Body small-sized. Posteroventral angle of epimeron 3 produced into very small angular projection. Lateral cephalic lobe gently rounded. Eyes semioval. Antenna 1 as long as head and pereonites 1 and 2 combined, peduncular article 1 ordinary. Antenna 2 long, reaching pereonite 7. Upper lip slightly produced in front of epistome. Incisor of mandible with 2 teeth (left) and 1 tooth (right) on medial edge; mandibular palp attached nearly at level of molar, as long as mandibular body. Distal article of palp of maxilla 1 with weakly indentated distal margin, distomedial corner with small unsocketed cusp. Carpus of gnathopod 1 about as long as propodus; palm semitransverse; dactylus large, with 1 accessory tooth. Gnathopod 2 minutely parachelate. Merus and carpus of pereopods 3 and 4 sparsely setose along posterior margin; posterior margin of propodus with a row of pairs of single spine and seta. Inner ramus of uropod 2 slightly constricted at insertion point of long distal spine. Both rami of uropod 3 setose along medial margin, without setae along lateral margin; distal article of outer ramus long. Apex of telson rounded.

Description of male (holotype, AM 303)

Body: Body small-sized, rather slender, smooth dorsally; color glossy white after a few months preservation in 10% formalin. Epimeron 1: posteroventral margin evenly rounded, anteroventral angle bluntly produced. Epimeron 2: ventral margin slightly concave, anterior margin concave, posterior margin gently expanded, posteroventral angle weakly produced. Epimeron 3: ventral margin slightly convex, with 3 slender spines, posteroventral angle produced into very small angular projection. Urosomite 1 with slight dorsal depression. Urosomite 3 with a pair of small spines near insertion of telson.

Head: Head 1.3 times as long as pereonite 1. Lateral cephalic lobe right-angled, apex rounded, ventral margin slightly concave, anterior margin slightly convex. Rostrum obsolete. Eyes remarkably large, semioval, reddish brown after preservation.

Antenna 1: Antenna 1 as long as head to pereonite 2 combined. Peduncle shorter than head; peduncular article 1 large, not expanding, 1.2 times as long as wide, ventral margin nearly straight, with a row of penicillate setae near ventral margin; peduncular articles 2 and 3 weakly telescoped. Primary flagellum 1.7 times as long as peduncle, 14-articulate, calceoli present on ventral margin; article 1 long, callynophore well developed, in 2-field. Accessory flagellum 0.6 times as long as primary flagellum, 6-articulate; article 1 nearly reaching distal margin of article 1 of primary flagellum.

Antenna 2: Antenna 2 long, reaching pereonite 7, 2.6 times as long as antenna 1. Peduncular article 1 enlarged; gland cone with blunt apex; peduncular article 3 almost as long as article 4; peduncular article 4 distally expanding; peduncular article 5 as long as article 4. Flagellum 51-articulate, 4.7 times as long as peduncle, calceoli present on dorsal margin.

Epistome and Upper lip: Epistome slightly concave, ridged. Upper lip separate from epistome, anteriorly ridged, slightly produced in front of epistome as evenly rounded lobe.

Mandible: Incisor slightly short, cutting margin smooth and strongly convex, with 2 large teeth (left) and 1 large tooth (right) on medial edge. Lacinia mobilis on left, weak, slender, devoid of sculpturing. Spine row with 3 long spines and several short pappose spines. Molar small, flap-shaped, densely

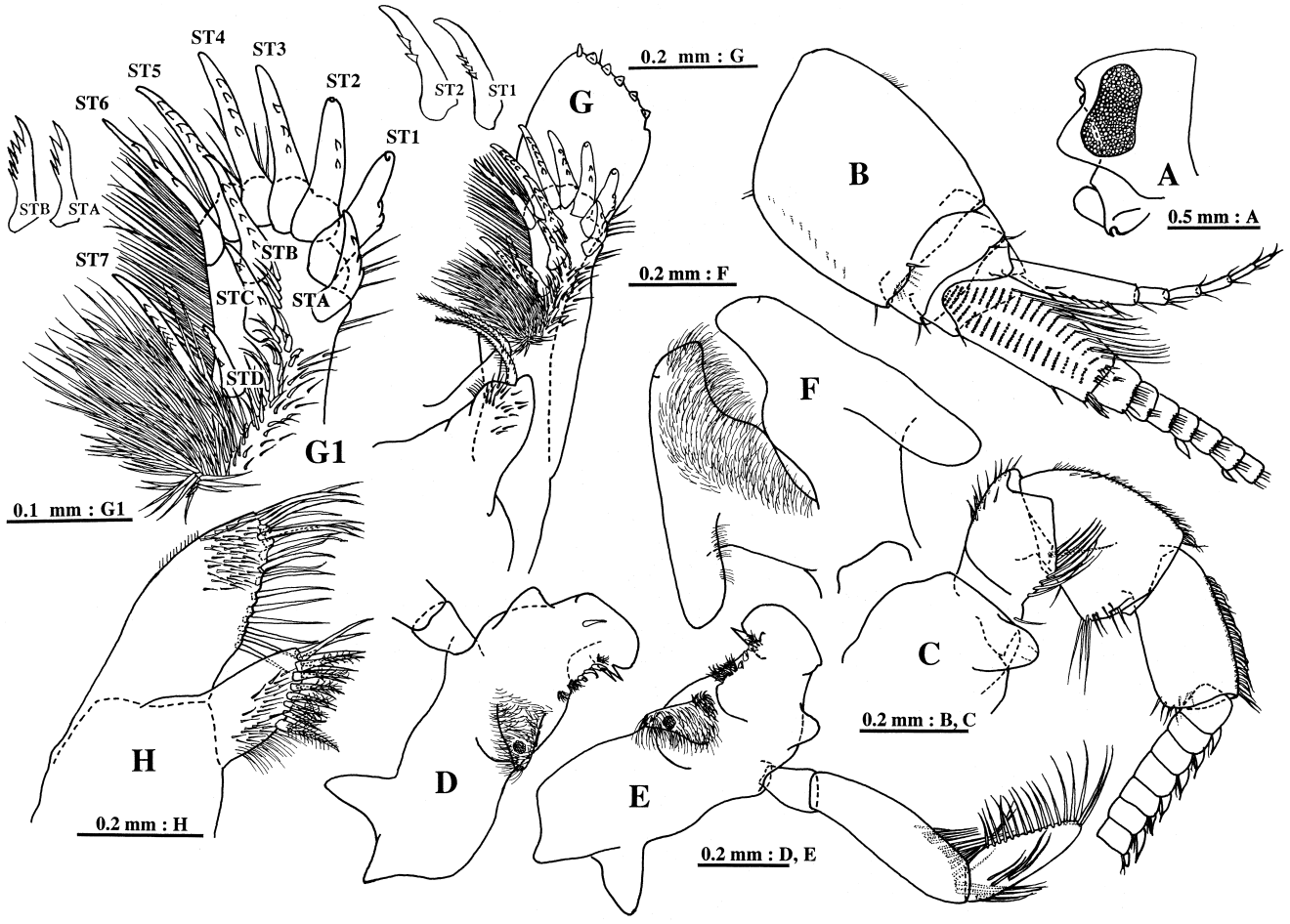

Fig. 7. *Anonyx abei* sp. nov. holotype, male, 8.3 mm (AM 303). A, head; B, antenna 1; C, antenna 2; D, left mandible; E, right mandible; F, lower lip; G, maxilla 1; G1, outer plate of maxilla 1; H, maxilla 2.

pubescent; triturating area small, weakly sclerotized, covered with tiny denticles. Palp as long as mandibular body, attached nearly at level of molar, 3-articulate; article 1 short, slightly broadend distally; article 2 0.5 times as long as mandibular body, with submarginal row of setae along distal 2/5 of posterior margin; article 3 0.7 times as long as article 2, weakly falcate, distal 4/5 of posterior margin with setae progressively longer to apex, lateral face with a pair of setae anteroproximally, medial face with several submarginal setae anteriorly.

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

Maxilla 1: Inner plate small, beveled, apex subacute, with 2 apical plumose setae. Outer plate bristly along lateral margin; spine-teeth 7/4 crown arrangement, STA-STD nearly distally cuspidate, ST1 and ST2 midway cuspidate, ST3-ST7 marginally cuspidate, bush-like tuft of bristles present under ST7. Palp 2-articulate; distal article large, slightly expanding, distal margin slightly indentated, with 5 tooth-like spines and 1 flag spine, 1 small seta arising from apex, distomedial corner with small unsocketed cusp.

Maxilla 2: Inner plate small and tapering apically, medial margin setose in 2 rows, setae in ventral row thick and plumose, proximalmost seta pappose, longer and thicker, ventral setae proximally plumose. Outer plate 1.4 times as long as inner plate, tapering apically; medial margin with 2 rows of setae, ventral setae strong and proximally plumose, dorsal setae confined to distomedial margin, simple.

Maxilliped: Inner plate small and rectangular, with 7 long plumose setae obliquely, apical margin with 2 slender simple setae and 3 closely-set nodular spines. Outer plate ovoid, with 17 marginal small nodular spines, submarginal spines vestigial, apex with 3 small conical spines, without apical setae. Palp 4-articulate, medial margins of articles 1–3 setose, article 3 weakly expanding distally, article 4 falcate, with unguis.

Gnathopod 1: Coxa 1 slightly expanding anteroventrally, with 1 small seta on posteroventral corner. Basis sparsely setose anteriorly and posteriorly. Carpus 1.9 times as long as wide, as long as propodus. Propodus gradually narrowing distally, 1.9 times as long as wide, posterior margin slightly concave; palm semi-transverse, short, strongly dentate, 1 spine present beneath hinge, posterodistal corner with 2 large defining spines. Dactylus slightly exceeding palm, with a few setules and accessory tooth, unguis strong.

Gnathopod 2: Coxa 2 narrow, slightly expanding dis-

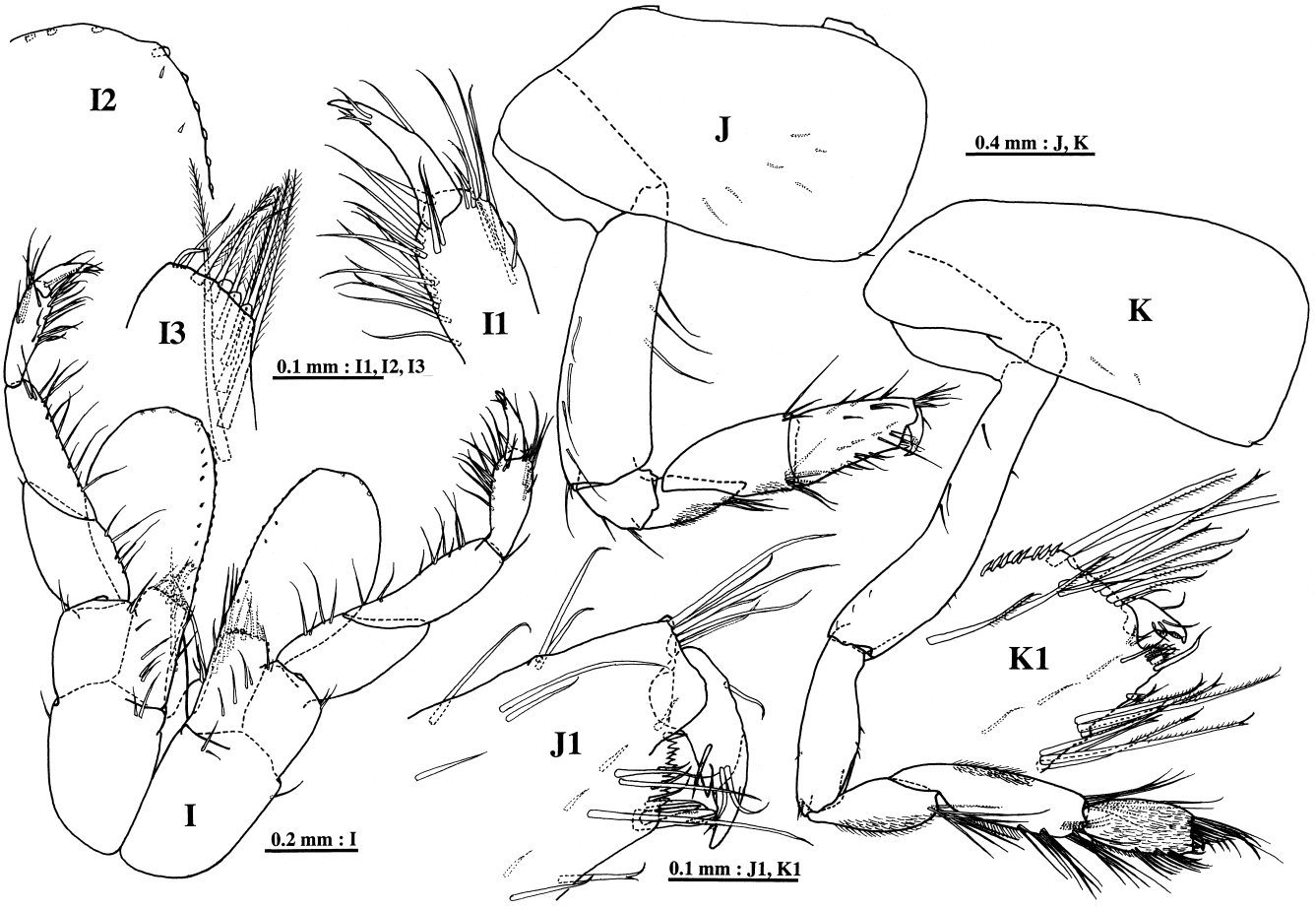

Fig. 8. *Anonyx abei* sp. nov. holotype, male, 8.3 mm (AM 303). I, maxilliped; I1, palp of maxilliped; I2, outer plate of maxilliped; I3, inner plate of maxilliped; J, gnathopod 1; J1, propodus of gnathopod 1; K, gnathopod 2; K1, propodus of gnathopod 2.

tally, with 1 short seta on posteroventral corner. Carpus 3.7 times as long as wide, 1.7 times as long as propodus. Propodus 2.2 times as long as wide, minutely parachelate; palm weakly serrate, posterodistal corner with 1 long and 2 short setae laterally and with 1 spine and 2 short setae medially. Dactylus fitting palm, with minutely dentate cutting margin and a few setules.

Pereopod 3: Coxa 3 similar to coxa 2. Merus sparsely setose posteriorly, with 1 seta on anterodistal corner. Carpus 0.7 times as long as merus, sparsely setose posteriorly, with 1 seta on anterodistal corner. Propodus 1.2 times as long as carpus, posterior margin with a row of pairs of single spine and seta; locking spine robust, apex blunt and hooked, with accessory tooth. Dactylus with unguis.

Pereopod 4: Pereopod 4 similar to pereopod 3, except: coxa 4 much broader than coxa 3, posteroventral lobe well developed; carpus and propodus slightly shorter.

Pereopod 5: Coxa 5 large, equilobate, each lobe semicircular. Basis expanding proximally, with a row of single stout spines along anterior margin, posterior margin nearly straight and weakly crenuate. Ishium, anterior margin with spines and long setae. Merus slightly expanding, posterior margin with 2 short spines and 1 apical spine, anterior margin with spines and long setae. Carpus 1.3 times as long as merus, anterior margin with clusters of 2 spines and 1 seta, posterior margin with 1 spine. Propodus 1.1 times as long as carpus, anterior margin with a row of paired spines, posterodistal edge with several short setae and 1 long spine.

Pereopod 6: Coxa 6 small, posteroventral lobe slightly expanding. Basis 1.3 times as long as wide, anterior margin with a row of single spines, posterior margin nearly straight and weakly crenulate. Anterior margin of ishium with spines and long setae. Merus weakly expanding but narrower than in pereopod 5, anterior margin with spines and long setae, posterior margin with 1 short spine. Carpus 1.5 times as long as merus, anterior margin with a row of single or paired spines, without long setae, posterior margin with 2 short spines. Propodus 0.9 times as long as carpus, anterior margin with a row of paired spines, posterior margin with 3 short setae, posterodistal edge with several short setae and 1 long spine.

Pereopod 7: Coxa 7 small and semi-circular. Basis broad, 1.3 times as long as wide, anterior margin weakly concave, with a row of single spines, posterior margin convex and weakly crenulate. Ishium without long setae. Merus narrow, anterior margin with a row of paired spines, without long setae, posterior margin with 1 short spine and 1 apical spine.

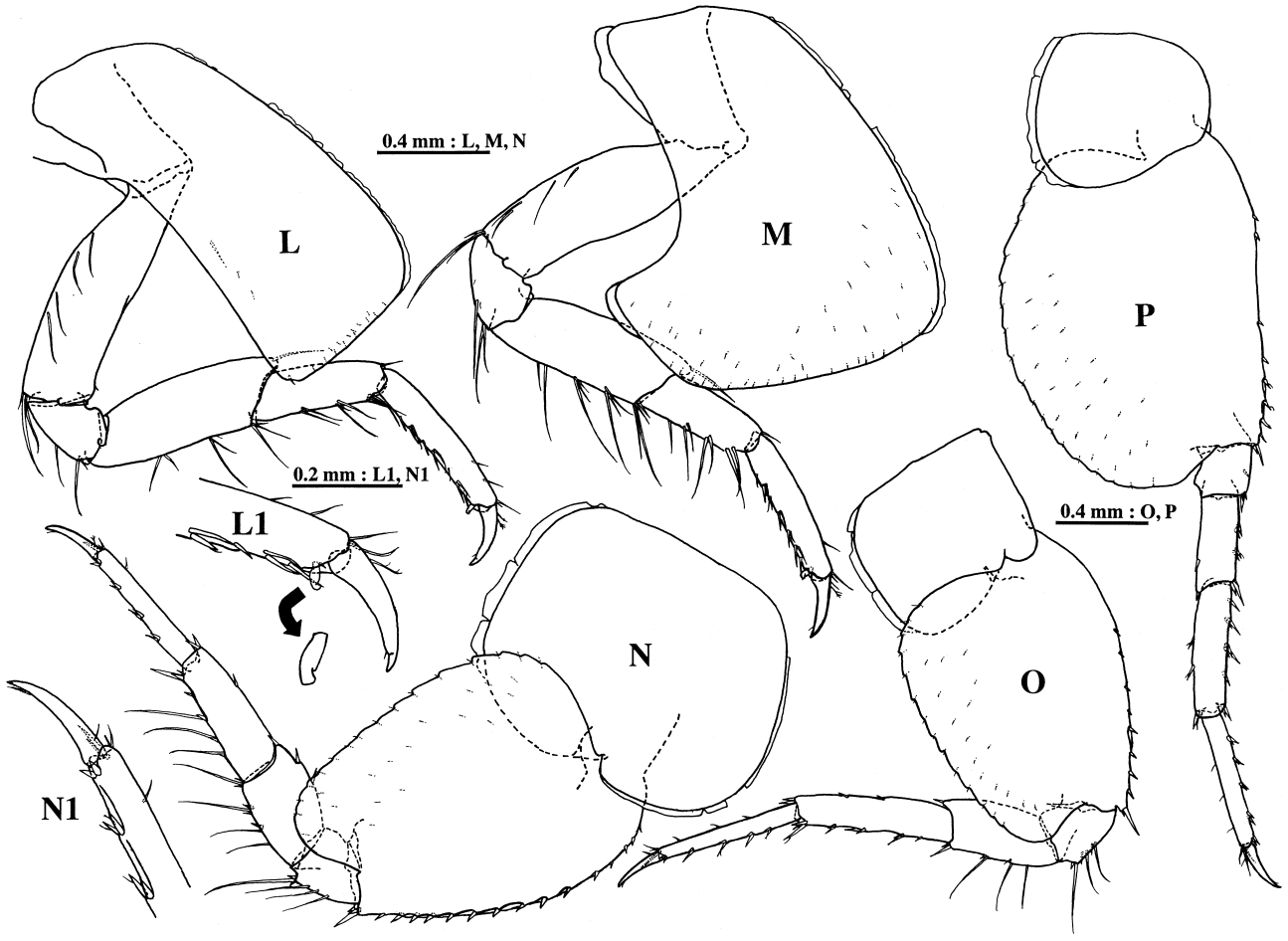

Fig. 9. *Anonyx abei* sp. nov. holotype, male, 8.3 mm (AM 303). L, pereopod 3; L1, propodus of pereopod 3; M, pereopod 4; N, pereopod 5; N1, propodus of pereopod 5; O, pereopod 6; P, pereopod 7.

Carpus to dactylus similar to those of pereopod 6, but carpus slightly shorter than in pereopod 6.

Gills: Gills on pereopods 2 to 7, large, pleated.

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

Uropod 1: Uropod 1: Peduncle with 6 large dorsomedial spines, 14 small dorsolateral spines, and 1 small apicolateral spine. Rami subequal in length, 0.8 times as long as peduncle. Inner ramus with 4 medial spines and 2 lateral spines. Outer ramus with 3 small lateral spines, medial margin naked.

Uropod 2: Uropod 2 0.7 times as long as uropod 1. Peduncle with 2 dorsomedial spines and 1 apicomedial spine, with 7 small dorsolateral spines and 1 apicolateral spine. Rami subequal to peduncle in length. Inner ramus slightly constricted at insertion point of a long distal spine, medial margin with 3 small proximal spines, lateral margin with 2 small spines. Outer ramus with 4 lateral spines, medial margin naked.

Uropod 3: Uropod 3 0.8 times as long as uropod 2. Peduncle short, dorsomedial margin with 2 spines, dorsolateral corner with 1 spine, ventrodistal margin with 2 large spines. Inner ramus 1.7 times as long as peduncle, reaching midway along distal article of outer ramus, medial margin with 11 long plumose setae and 4 small spines, lateral margin with 2 small spines. Outer ramus 2-articulate, proximal article with 7 long plumose setae and 1 distal spine along medial margin, with 4 paired submarginal spines on ventrolateral face, 1 distal spine on distolateral edge; distal article 0.4 times as long as proximal article.

Telson: Telson 1.7 times as long as wide, cleft to 80% of its length; apex rounded, with 1 stout spine.

Description of non-ovigerous female (paratype, AM 302)

Eyes slightly smaller than in male. Antenna 1 as long as head and pereonite 1 combined; primary flagellum 13-articulate, 1.3 times as long as peduncle; accessory flagellum 6-articulate, article 1 nearly reaching distal margin of primary flagellar article 1. Antenna 2 shorter than in male, 1.3 times as long as antenna 1; peduncular article 3 0.8 times as long as article 4, 1.7 times as long as wide; peduncular article 4 not expanding, 1.8 times as long as wide; flagellum 17-articulate, 0.3 times as long as peduncle. Antennae 1 and 2 lacking calceoli. Oostegites present on pereopods 2-5, linear, fringed with many setae along distal margin. Uropod 3 sparsely setose; rami shorter than in male, inner ramus 1.4 times as long as peduncle.

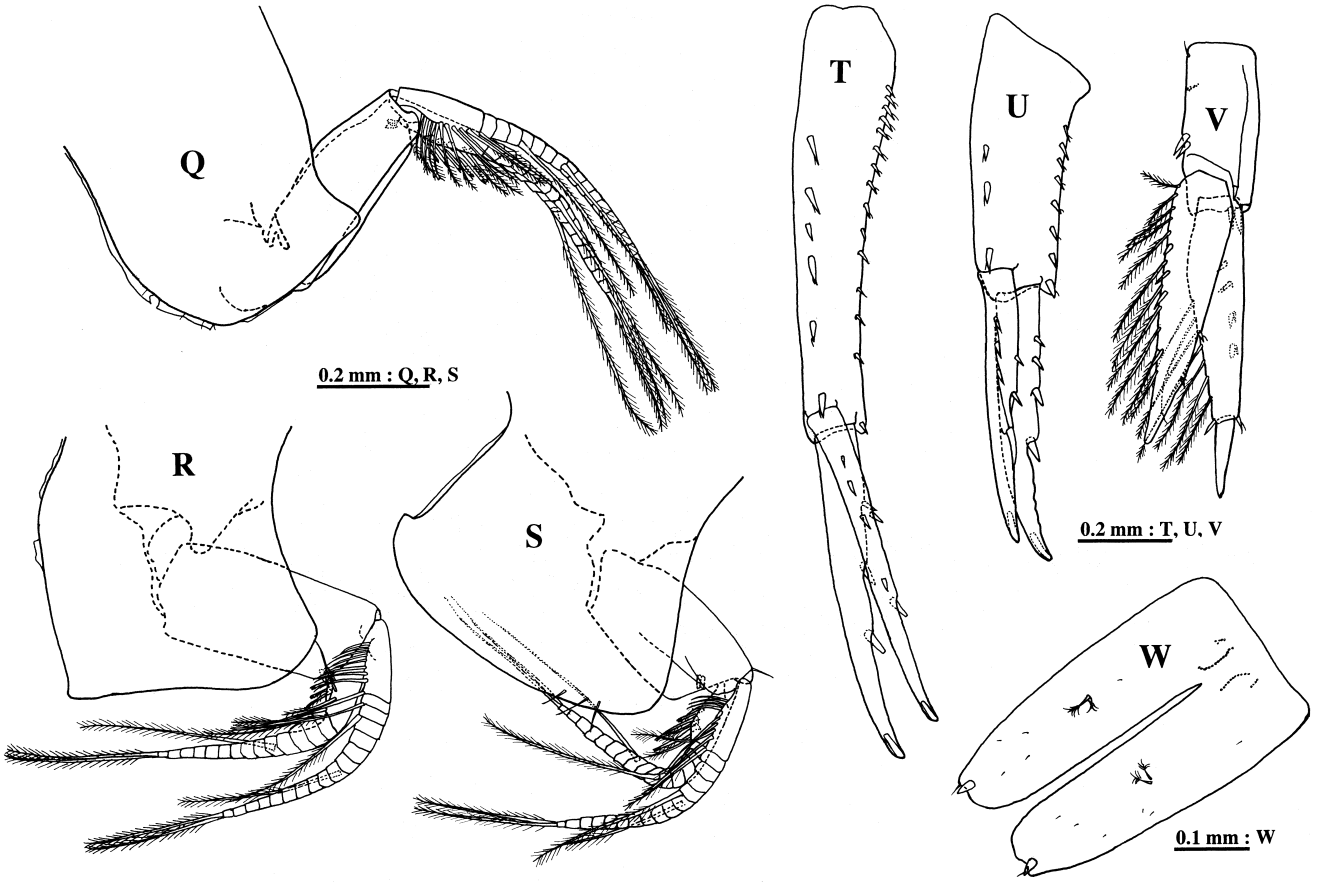

Fig. 10. *Anonyx abei* sp. nov. holotype, male, 8.3 mm (AM 303). Q–S, pleopods and epimera 1–3; T–V, uropods 1–3; W, telson.

Remarks

Anonyx abei sp. nov. is here assigned to *A. nugax* group of Steele (1982). The *A. nugax* group is characterized by: 1) the inner ramus of uropod 2 is slightly constricted at the middle, and 2) a long spine is present on the constriction. The new species has a distinctively small projection on the postero-ventral angle of epimeron 3. This condition is quite unique among the members of the *A. nugax* group.

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