A revision of East Asian *Acanthomysis* (Crustacea: Mysida: Mysidae) and redefinition of *Orientomysis*, with description of a new species

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Abstract
Twenty species of *Acanthomysis* s. l., distributed in Japanese, Korean and Chinese coastal waters, are revised. These species are distinguished from *Acanthomysis* s. str. by the following characters: the carpopropodus of the endopod of the third to eighth thoracic limbs divided into three to eight subsegments; the exopod of the fourth male pleopod with two long subequal terminal setae; the telson long linguiform or triangular without basal dilated portion and armed with spines throughout margins. On the basis of these characters, the genus *Orientomysis*, which was revived by Holmquist (1981b) and comprised *O. japonica* and *O. mitsukurii*, is redefined and recognized to contain the following 18 valid species: *O. aokii*, *O. aspera*, *O. crassispinosa*, *O. fujinagai*, *O. hwanhaiensis*, *O. koreana*, *O. leptura*, *O. meridionalis*, *O. okayamaensis*, *O. pseudomitsukurii*, *O. robusta*, *O. rotundicauda*, *O. sagamiensis*, *O. serrata*, *O. sheni*, *O. tamurai*, *O. tenella*, and *O. tenuicauda*. *Acanthomysis longicauda* and *A. nakazatoi* are synonymized with *O. rotundicauda* and *O. japonica*, respectively. A new species, *O. arenaria*, is described from Japan.

Keywords: *Acanthomysis*, Crustacea, East Asia, Mysida, Orientomysis, taxonomy

Introduction
Nakazawa (1910) established *Metamysis* for the accommodation of *M. mitsukurii* and *M. sagamiensis* from Japan. This genus was a junior homonym of *Metamysis* Sars, 1895, so Derzhavin (1913) introduced a new replacement name for it, *Orientomysis*. Subsequently, *Orientomysis* was placed in synonymy with *Neomysis* Czerniavsky, 1882, by reason of the similarity in the fourth male pleopod (Zimmer 1915).

W. Tattersall (1932) divided *Neomysis* species into two groups on the basis of the apical feature of the antennal scale, “group I” having an acutely pointed apex and “group II” having a rounded apex with setae, and he suggested the detachment of “group II” from *Neomysis* and reinstated *Acanthomysis* for its reception. On the basis of W. Tattersall’s suggestion, Ii (1936) revived *Acanthomysis* and moved 13 species of “group II”, including...
Nakazawa's two species, to it. Subsequently, *Acanthomysis* expanded to as many species as 38 until the middle of the 1970s due to the works of Pillai (1964, 1973), Ii (1964) and O. Tattersall (1965).

Holmquist (1979, 1980, 1981a, 1981b) recognized the taxonomic confusion in *Acanthomysis* and revised nine species distributed in the eastern North Pacific. As a result, she redefined *Acanthomysis* and transferred these nine species to six genera established for their reception. These genera are: *Holmesimysis* Holmquist, 1979 for *A. costata* (Holmes 1900), *A. nuda* (Banner, 1948) and *A. sculpta* (W. Tattersall, 1933); *Xenacanthomysis* Holmquist, 1980 for *A. pseudomacropsis* (W. Tattersall, 1933); *Exacanthomysis* Holmquist, 1981 for *A. alaskensis* (Banner, 1954) and *A. davisi* (Banner, 1948); *Alienacanthomysis* Holmquist, 1981 for *A. macropsis* (W. Tattersall, 1932); *Disacanthomysis* Holmquist, 1981 for *A. dybowskii* (Derzhavin, 1913); *Pacificacanthomysis* Holmquist, 1981 for *A. nephrophthalma* (Banner, 1948). Furthermore, she (Holmquist 1981b) reinstated *Orientomysis*, whose type species was *O. mitsukurii* (Nakazawa, 1910), and tentatively placed *A. japonica* (Marukawa, 1928) and *A. nakazatoi* Ii, 1964 in this genus.

Fukuoka and Murano (2000a, 2000b, 2001, 2002, 2004) reviewed species belonging to *Acanthomysis* s. lat. and proposed four genera, *Notacanthomysis* Fukuoka and Murano, 2000 for *A. hodgarti* (W. Tattersall, 1922) and *A. laticauda* Liu and Wang, 1980, *Hyperacanthomysis* Fukuoka and Murano, 2000 for *A. brevirostris* Wang and Liu, 1997 (*=A. sinensis* Ii, 1964) and *A. longirostris* Ii, 1936, *Telacanthomysis* Fukuoka and Murano, 2001 for *A. columbiae* (W. Tattersall, 1933), *Hemiacanthomysis* Fukuoka and Murano, 2002 for *A. dimorpha* Ii, 1936, and *Boreoacanthomysis* Fukuoka and Murano, 2004 for *A. schrencki* (Czerniavsky, 1882). However, 26 species still remain in *Acanthomysis* s. l. as incertae sedis.

In the present study, we examined 20 species of *Acanthomysis* s. l. inhabiting East Asian coastal waters and two species of *Orientomysis*. All of them are different from *Acanthomysis* in the characters of the carpopropodus of the endopod of the third to eighth thoracic limbs, the male pleopods and the telson. The present paper deals with a redefinition of *Orientomysis* and the transference of these species to this genus. A new species, *O. arenaria*, is described from Japanese waters, and a key to the species of *Orientomysis* is provided.

Body length was measured under a light microscope along the dorsal median line from the tip of the rostrum to the posterior end of the telson excluding apical spines. Illustrations were drawn with the aid of a camera lucida.

The specimens, except those on loan, are deposited in the National Science Museum, Tokyo (NSMT). The specimens of Ii’s collection are in preparation by the second author for permanent storage at NSMT.

**Taxonomy**

**Family MYSIDAE**

**Subfamily MYSINAE**

**Tribe MYSINI**

**Genus Orientomysis** Derzhavin, 1913

*Metamysis* Nakazawa 1910: 250.

*Orientomysis* Derzhavin 1913: 200–202.

**Type species**

*Metamysis mitsukurii* Nakazawa, 1910.
Diagnosis

Carapace anteriorly produced to triangular rostral plate; anterolateral corner rounded; posterior margin emarginate. Eye somewhat dorsoventrally compressed. Antennal scale lanceolate with rounded apex, setose throughout margins; subapical suture present. Antennal sympod with spiniform process at outer distal angle. Labrum with anterior spiniform process. Carpopropodus of endopod of third to eighth thoracic limbs divided into three to eight subsegments. Penis armed with several setae on posterior margin, several medially curved setae on distal margin, and several plumose setae on distal half of anterior margin. Marsupium composed of two pairs of developed oostegites; oostegite of seventh limb with baling lobe. First, second, third, and fifth pleopods of male and all pleopods of female reduced to unsegmented single lobe, gradually increasing in length from first to fifth; pseudobranchial lobe poorly developed. Fourth pleopod of male biramous; endopod reduced to unsegmented lobe; exopod elongate, extending to last abdominal somite, but not overreaching distal end of abdomen, two-segmented, proximal segment long, distal segment short, one-seventh to one-fourth of length of proximal segment, with two long, strong, subequal terminal setae (except *O. leptura* and *O. tenuicauda*, being unequal). Endopod of uropod armed with one to six spines on inner ventral surface of statocyst region (except in *O. crassispinosa* with no spine). Telson elongate triangular or linguiform; lateral margin with spines throughout (except *O. sagamensis* and *O. tamurai*, with spineless part), on distal half to three-fourths these spines more or less arranged in clusters.

Other species

*Orientomysis aokii* (Ii, 1964) comb. nov.; *O. arenaria* sp. nov.; *O. aspera* (Ii, 1964) comb. nov.; *O. crassispinosa* (Liu and Wang, 1980) comb. nov.; *O. fujinagai* (Ii, 1964) comb. nov.; *O. hwanhaiensis* (Ii, 1964) comb. nov.; *O. japonica* Marukawa, 1928; *O. koreana* (Ii, 1964) comb. nov.; *O. leptura* (Liu and Wang, 1980) comb. nov.; *O. meridionalis* (Liu and Wang, 1983) comb. nov.; *O. okayamaensis* (Ii, 1964) comb. nov.; *O. pseudomitsukuri* (Ii, 1964) comb. nov.; *O. robusta* (Murano, 1984) comb. nov.; *O. rotundicauda* (Liu and Wang, 1980) comb. nov.; *O. sagamensis* (Nakazawa, 1910); *O. serrata* (Liu and Wang, 1980) comb. nov.; *O. sheni* (Wang and Liu, 1989) comb. nov.; *O. tamurai* (Ii, 1964) comb. nov.; *O. tenella* (Liu and Wang, 1983) comb. nov.; *O. tenuicauda* (Murano, 1984) comb. nov.

General morphology

**Integument.** Body not hispid except *O. aspera* and *O. crassispinosa*; thoracic somites without sternal process except *O. sheni*, in which a process is present on each of second to sixth and eighth somites of female; abdominal somites with or without transverse grooves, folds and/or row of spines (Table I).

**Carapace.** Rostral plate triangular with concave lateral margins; anterolateral corner rounded; posterior margin emarginate, exposing posterior one to four thoracic somites dorsally, with or without minute setae on median part (Table I).

**Eye.** Well-developed, slightly depressed dorsoventrally; eyestalk with or without papilla on dorsal surface (Table I).
Table I. Comparison of morphological characters among *Orientomysis* species.

|                | Abdomen | Carapace | Eyestalk | Antennal scale | Maxilla | 3rd to 8th thoracopods | Exopod of 4th male pleopod | Endopod of uropod | Telson |
|----------------|---------|----------|----------|----------------|---------|------------------------|----------------------------|------------------------|--------|
|                | 1st     | 2nd      | 3rd      | 4th           | 5th     | 6th        | Length/ breadth | Tiny spines on 2nd segment of endopod | No. of subsegments of carpopodopod | 2nd/1st segment in length | Two long terminal setae | No. of spines | Spines on dorsal surface | Lateral spines |
| *O. aokii* (Ii, 1964) | gr      | sm       | sm       | sm            | sm      | sm         | –             | –                        | 5.0                  | –                  | 1/4             | Subequal | 1 | –                  | Entire length |
| *O. aspera* (Ii, 1964) | sm/gr   | sm       | sm       | sm            | sm      | sm         | –             | –                        | 4.5–5.0              | –                  | 1/5–1/4         | Subequal | 1 | –                  | Entire length |
| *O. crassipinosa* (Liu and Wang, 1980) | sm      | sm       | sm       | sm            | sm      | sm         | Unknown       | –                        | 4.5                  | Unknown           | Unknown          | Unknown | – | –                  | Entire length |
| *O. fujinagai* (Ii, 1964) | gr      | gr       | gr       | gr            | sp      | sp         | Unknown       | –                        | 5.0                  | ++                | 5, 6             | 1/5             | Subequal | 3 | ++                  | Entire length |
| *O. koreanus* (Ii, 1964) | sm/fo   | sm/fo    | sm/fo    | sm/fo         | sm      | sm         | ++            | ++                       | 6.5–7.3              | ++                | 5, 6             | 1/5             | Subequal | 4 | –                  | Entire length |
| *O. leptura* (Liu and Wang, 1980) | fo      | fo       | fo       | fo            | sp      | sp         | ++            | –                        | 4.5–4.8              | ++                | 7, 8             | 1/5–1/4         | Subequal | 3–5 | ++                  | Entire length |
| *O. meridionalis* (Liu and Wang, 1983) | fo      | fo       | fo       | fo            | sp      | sp         | ++            | –                        | 4.3–5.0              | ++                | 4, 5             | 1/6–1/5         | Subequal | 2, 3 | +                  | Entire length |
| *O. mitsukurii* (Nakazawa, 1910) | fo+sp   | fo+sp    | fo+sp    | fo+sp         | sp      | sp         | –             | ++                       | 6.0                  | –                  | 5, 6             | 1/5–1/4         | Subequal | 2, 3 | ++                  | Entire length |
| *O. okayaanaeformis* (Ii, 1964) | fo      | fo       | fo       | fo            | sm      | sp         | ++            | –                        | 5.4–6.0              | ++                | 6–8              | 1/6             | Subequal | 3–6 | ++                  | Entire length |
| *O. pseudomitsukurii* (Ii, 1964) | gr      | gr/fo    | gr/fo    | gr/fo         | sm/fo   | sm         | –             | ++                       | 5.5                  | –                  | 5–7              | 1/5–1/4         | Subequal | 2–4 | –                  | Entire length |
| *O. robusta* (Muran, 1984) | gr      | gr       | gr       | sm/sp         | sp      | ++         | ++            | ++                       | 4.5–5.0              | ++                | 5, 6             | 1/4             | Subequal | 3, 4 | ++                  | Entire length |
Table I. (Continued).

| Species                        | Abdomen | Carapace | Eyestalk | Antennal scale | Maxilla | 3rd to 8th thoracopods | Exopod of 4th male pleopod | Endopod of uropod | Telson |
|-------------------------------|---------|----------|----------|----------------|---------|------------------------|---------------------------|-------------------|--------|
|                              | 1st     | 2nd | 3rd | 4th | 5th | 6th | Minute setae on posterior margin | Papilla | Tiny spines on 2nd segment of endopod | No. of subsegments of carpopropodus | 2nd/1st segment in length | Two long terminal setae | No. of spines | Spines on dorsal surface | Lateral spines |
| O. rotundicauda (Liu and Wang, 1980) | gr | sm | gr | gr | sm | sp | −/++ | − | 5.0–5.3 | ++ | 3, 4 | 1/7–1/5 | Subequal | 2, 3 | − | Entire length |
| O. sagamienis (Nakazawa, 1910) | sm/fo | sm/fo | sm/fo | sm/fo | sm | sm | ++ | ++ | 5.6–6.0 | ++ | 5, 6 | 1/5 | Subequal | 3–7 | − | Unarmed interval present near base |
| O. serrata (Liu and Wang, 1980) | gr | gr | gr | gr | sm | sp | −/++ | − | 4.6–5.0 | ++ | 4, 5 | 1/5–1/4 | Subequal | 2–4 | − | Entire length |
| O. sheni (Wang and Liu, 1989) | sm/gr/fo | gr/fo | gr/fo | gr/fo | sp | sp | ++ | − | 4.5–5.0 | ++ | 5, 6 | 1/5 | Subequal | 3–5 | ++ | Entire length |
| O. tamurai (Ii, 1964) | fo | fo | fo | fo | sm | sm | ++ | ++ | 6.0 | ++ | 5 | 1/4 | Subequal | 3 | − | Unarmed interval present near base |
| O. tenella (Liu and Wang, 1983) | sm | sm | sm | sm | sm | sm | − | − | 4.5–5.0 | − | 3–5 | 1/5–1/4 | Subequal | 1, 2 | − | Entire length |
| O. tenuicauda (Murano, 1984) | gr | gr | gr | gr | sm | sp | − | ++ | 5.6–6.0 | ++ | 4, 5 | 1/5–1/4 | Longer seta 1.3 times as longer as shorter one | 4–6 | ++ | Entire length |
| O. arenaria sp. nov. | fo | gr | gr | gr | sm | sm | ++ | ++ | 6.0–6.5 | ++ | 5 | 1/5 | Subequal | 2, 3 | − | Entire length |

sm, smooth; gr, groove present; fo, fold present; sp, spine present; ++, present; −, absent.
Antennule. Peduncle of male more robust than that of female, with developed appendix masculina on distal segment.

Antenna. Scale lanceolate with rounded apex, setose on all margins, with subapical suture; sympod with spiniform process at outer distal angle.

Labrum. Anterior margin with acute process.

Mandible. Second segment of palp slightly expanded in middle.

Maxillule. Outer lobe with 11–15 robust spines on distal margin and three slender setae on ventral surface, with hump on middle of outer margin.

Maxilla. Distal segment of endopod longer than broad, with or without tiny spines among long setae on outer margin (Table I).

Thoracic limbs. Endopod of first pair short and robust, with expanded inner lobe on preischium, ischium and merus; endopod of second pair robust; endopods of third to eighth pairs long, slender, with carpopropodus three- to eight-subsegmented (Table I); exopods with flagellum eight-segmented in first and eighth pairs and nine-segmented in second to seventh pairs; basal plate of exopods with several spinules on outer distal angle.

Penis. Oval in lateral view, armed with one to four long plumose setae on distal half of anterior margin, four to eight inwardly curved setae on distal margin, and two to eight short and three to seven long setae on posterior margin.

Marsupium. Seventh and eighth thoracic limbs with developed oostegites; oostegite of seventh limb with baling lobe.

First to third and fifth pleopods of male and all pleopods of female. Reduced to uniramous unsegmented lobe, gradually increasing in length from first to fifth; pseudobranchial lobe poorly developed.

Fourth pleopod of male. Biramous; endopod reduced to unsegmented lobe; exopod long, not extending beyond posterior end of last abdominal somite, two-segmented; proximal segment long, armed with one short seta at outer distal corner in all species and with one long plumose seta at inner distal corner (except O. aokii and O. aspera, having one short plumose seta, and O. fujinagai and O. leptura, having no seta); distal segment short, one-seventh to one-fourth of length of proximal segment (Table I), armed with one or two short setae on corners and two long, barbed, spiniform setae on terminal end; latter setae subequal in length (except O. leptura and O. tenuicauda), not forming slender, naked, spiniform termination (Table I).

Uropod. Endopod armed with one to six spines on ventral surface near statocyst region (except O. crassispinosa, having no spine) (Table I).

Telson. Elongate triangular or linguiform, with or without spines on dorsal surface near base (Table I); lateral margin armed with numerous spines along entire length (except
O. sagamiensis and O. tamurai, in which unarmed part is inserted) (Table I), on distal two-thirds to half these spines arranged in clusters, each cluster composed of one to five small spines and one large spine.

Remarks

Comparisons of important characters among Orientomysis and related genera are shown in Table II.

Orientomysis is distinguished from Acanthomysis by the male pleopods and the telson as follows: (1) in Orientomysis the two terminal setae of the fourth male pleopod are subequal in length with normal plumose termination, whereas in Acanthomysis these are unequal, one seta 1.3–1.5 times longer than the other, and have a slender, naked and spiniform termination; (2) the pseudobranchial lobe of the pleopods is not as well developed in Orientomysis as in Acanthomysis; and (3) the telson of Orientomysis is elongate linguiform or triangular and armed with spines along the entire lateral margin, while that of Acanthomysis is linguiform with markedly dilated basal part, and the lateral margin has a naked part inserted between one to three spines on the dilated part and numerous spines on distal two-thirds.

Orientomysis aokii (Ii, 1964) comb. nov.

Acanthomysis aokii Ii 1964: 489–492, Figure 125; Mauchline and Murano 1977: 44 (list); Müller 1993: 190 (list); Wang and Liu 1997: 215 (list); Liu and Wang 2000: 230, 231, Figure 82.

Type locality

Port Tainan, southwestern Taiwan.

Material examined

Twelve males (6.6–7.5 mm), two immature males (4.2 and 4.6 mm), two females (damaged) and one immature female (4.6 mm), Port Tainan, southwestern Taiwan, 11 January 1938, Ii’s coll. no. 295 (not types).

Remarks

Location of type specimens is unknown.

Distribution

Known only from the type locality in Taiwan (Ii 1964).

Orientomysis aspera (Ii, 1964) comb. nov.

(Figure 1)

Acanthomysis aspera Ii 1964: 492–495, Figure 126; Mauchline and Murano 1977: 44 (list); Shen et al. 1989: 215–217, Figure 13; Müller 1993: 190 (list); Jo and Ma
## Table II. Comparison of characters and geographical distribution among *Acanthomysis* and its related genera.

|                     | *Acanthomysis* | *Alienacanthomysis* | *Boreoacanthomysis* | *Columbiaemysis* | *Disacanthomysis* | *Exacanthomysis* | *Holmesimysis* | *Hyperacanthomysis* | *Notacanthomysis* | *Orientomysis* | *Pacifacanthomysis* | *Telacanthomysis* |
|---------------------|----------------|---------------------|---------------------|------------------|-------------------|------------------|-----------------|---------------------|-------------------|----------------|----------------------|------------------|
| **Rostrum**         | Triangular     | Rounded             | Triangular          | Triangular       | Triangular        | Triangular       | Triangular      | Triangular          | Triangular        | Triangular      | Triangular            | Rounded          |
| **Anterolateral**   |               |                     | Round               | Acutely pointed  | Acutely pointed   | Round            | Round           | Round               | Round             | Round           | Round               | Acutely pointed   |
| **corner of carapace** |               |                     |                     | Acutely or       | Acutely or       | Round            | Round           | Round               | Round             | Round           | Round               | Acutely pointed   |
|                     |               |                     |                     | bluntly pointed  | bluntly pointed  | Round            | Round           | Round               | Round             | Round           | Round               | Acutely pointed   |
| **Anterior process** |               |                     |                     | Present           | Present           | Present          | Present         | Present             | Present           | Present         | Present             | Present          |
| of labrum           |               |                     |                     | Present           | Present           | Present          | Present         | Present             | Present           | Present         | Present             | Present          |
| **Carpopropodus of** |               |                     |                     | 3-subsegmented    | 5- to 7-          | 4- to 6-subseg   | 5- to 8-        | 4- to 7-            | 5- to 9-          | 9- to 11-       | 3- to 8-            | 4- or 6-         |
| endopod of 3rd to   |               |                     |                     |                  |                  | segmented        | segmented       | segmented           | segmented        | segmented       | segmented           | 5-subsegmented    |
| 8th thoracopods     |               |                     |                     |                  |                  |                  |                 |                    |                  |                |                     |                  |
| **Distal segment of** |               |                     |                     | 1/9–1/5 of       | 1/10 of proximal  | 1/6 of proximal  | 1/5–1/3         | 1/4–1/3 of       | 1/10 of proximal  | 1/4–1/3 of      | 1/7–1/4 of          | 1/6 of           |
| exopod of 4th male |               |                     |                     | proximal one     | proximal one     | proximal one     | proximal one    | proximal one      | proximal one     | proximal one    | proximal one       | proximal one     |
| pleopod             |               |                     |                     | one in length    | one in length    | one in length    | one in length   | in length           | in length         | in length       | in length           | in length        |
| **Two terminal**    | Long, unequal; | Long, unequal;      | Long, unequal;     | Long, unequal;   | Long, unequal;   | Long, unequal;   | Long, unequal;  | Long, unequal;     | Long, unequal;   | Long, unequal;  | Long, unequal;      | Long, unequal;   |
| setae of exopod of  | longer seta   | longer seta         | longer seta        | longer seta      | longer seta      | longer seta      | longer seta     | longer seta        | longer seta      | longer seta     | longer seta         | longer seta      |
| 4th male pleopod    | 1.3–1.5 times as | 1.3–1.5 times as    | 1.3–1.5 times as   | 1.3 times as     | 1.3 times as     | 1.3 times as     | 1.3 times as    | 1.3 times as       | 1.3 times as     | 1.3 times as    | 2.5 times as         | 1.3 times as     |
|                     | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; | long as shorter one; |
|                     | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform | distal part naked and spiniform |
| **Endopod**         | With 1–6 spines in ventral statocyst region | With 1 spine in ventral statocyst region | With 20–30 spines in ventral statocyst region | With 4 spines in ventral statocyst region | With 12 spines in ventral statocyst region | With 3–5 spines in ventral statocyst region | With 22–29 spines along inner margin | With 3–8 spines in ventral statocyst region | With 1–3 spines in ventral statocyst region | With 1 spine in ventral statocyst region | With 1–6 spines in ventral statocyst region | No spines |
| **Shape**           | Linguiform with markedly dilated basal part | Linguiform | Linguiform | Linguiform | Linguiform | Narrowly triangular or triangular | Linguiform | Narrowly linguiform or triangular | Elongate triangular | Linguiform or triangular | Elongate triangular |
| of telson           |               |                     |                     |                   |                   |                  |                 |                    |                   |                 |                     |                  |
Table II. (Continued).

| Lateral margin of telson | Acanthomysis Milne-Edwards, 1837 | Alienacanthomysis Holmquist, 1981 | Boreoacanthomysis Fukuoka and Murano, 2004 | Columbiacanthomysis Holmquist, 1982 | Disacanthomysis Holmquist, 1981 | Escacanthomysis Holmquist, 1981 | Holmeacanthomysis Holmquist, 1981 | Hyperacanthomysis Fukuoka and Murano, 2000 | Notacanthomysis Fukuoka and Murano, 2000 | Orientomysis Derzhavin, 1913 | Pacifacanthomysis Holmquist, 1981 | Telacanthomysis Fukuoka and Murano, 2001 |
|-------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| With 1–3 spines in basal part and numerous ones in distal 2/3; later spines arranged or not arranged in clusters | With spines along entire margin; on distal 1/2 arranged in clusters of spines | With spines along entire margin; not arranged in clusters of spines | With spines along entire margin; on distal 1/2 arranged in clusters of spines | With spines along entire margin; not arranged in clusters of spines | With spines along entire margin; not arranged in clusters of spines | With spines along entire margin; not arranged in clusters of spines | With spines along entire margin; on distal 1/2–2/3 arranged in clusters of spines | With 2–6 spines in basal part and numerous in distal 2/3; not arranged in clusters of spines | With spines along entire margin (naked basal part present in O. sagamiensis and O. tamurai); on distal 1/2–3/4 arranged in clusters of spines |
| Geographical distribution | West Europe, Mediterranean, West Africa, East Africa, South Asia, South-East Asia, East Asia | Western North America | East Asia, Western North America | East Asia, Western North America | East Asia | Western North America | East Asia | South Asia, South-East Asia, East Asia | East Asia | Western North America | Western North America |

Revision of East Asian Acanthomysis 665
Type locality
Atsu, mouth of Kojima Bay, Seto Inland Sea, western Japan.

Material examined
Syntype: 33 males (7.2–13.6 mm) and 17 females (8.5–11.1 mm), Atsu, mouth of Kojima Bay, Okayama, western Japan, 18 March 1936, Ii’s coll. no. 216.

Figure 1. Orientomysis aspera (Ii, 1964) comb. nov. Telson, dorsal. (A) Male (8.0 mm), Ise Bay (34°55.10′N, 136°46.60′E), NSMT-Cr 15553; (B) female (8.6 mm), Ise Bay (34°55.10′N, 136°46.60′E), NSMT-Cr 15553.
Others. One immature female (7.9 mm), Ryubai Island, Haeju Bay, Hwanghaenamdo, western Korea, 13 April 1936, Ii’s coll. no. 33 (part). Two males (6.2 and 6.4 mm) and two females (5.3 and 6.4 mm), Ariake Sea, Kyusyu, western Japan, mud, 5 m, 7 October 1975, coll. T. Takita, NSMT-Cr 15549. One male (9.8 mm), Yongyoodo, Inchon, western Korea, dip net by diver, 27 April 1986, on loan from S.-G. Jo. Five males (7.0–8.3 mm) and seven females (7.5–10.2 mm), 34°41.00′N, 136°43.20′E, Ise Bay, central Japan, 35.0–36.1 m, bottom net, 15 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15550. Seven males (6.0–6.8 mm) and 10 females (5.7–7.3 mm), 34°44.00′N, 137°14.00′E, Mikawa Bay, central Japan, 11.3 m, bottom net, 15 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15551. Seven males (7.4–8.6 mm) and seven females (6.2–8.7 mm), 34°49.97′N, 136°47.23′E, Mikawa Bay, central Japan, 23.2 m, bottom net, 16 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15552. Eleven males (7.3–9.0 mm) and nine females (7.1–8.5 mm), 34°55.10′N, 136°46.60′E, Ise Bay, central Japan, 24.1 m, bottom net, 16 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15553. Fifty-five males (5.1–7.8 mm), 10 immature males (4.3–5.1 mm), 47 females (5.1–7.5 mm) and 12 immature females (3.7–5.1 mm), 34°59.08′N, 136°44.37′E, Ise Bay, central Japan, 15 m, bottom net, 15 July 1996, R/V Tansei-Maru cruise, NSMT-Cr 15554. Seven males (8.0–10.9 mm), three immature males (4.5–7.1 mm), seven females (8.0–10.4 mm) and one immature female (4.5 mm), 35°33.00′N, 139°55.00′E, Tokyo Bay, central Japan, 25.0 m, bottom net, 15 April 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15555. One immature female (5.0 mm), 35°35.00′N, 140°00.00′E, Tokyo Bay, central Japan, 13.5 m, bottom net, 15 April 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15556. One male (8.2 mm), 34°38.88′N, 135°21.88′E, Osaka Bay, central Japan, 14 m, bottom net, 16 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15557. Seven males (4.3–5.1 mm), two immature males (3.2 and 3.9 mm) and nine females (4.2–6.6 mm), Omura Bay, Nagasaki, western Japan, date unknown, coll. T. Takita, NSMT-Cr 15558.

Remarks

Ii (1964) described the outer pair of the apical spines of the telson as more strongly curved medially in females than in males. In the present specimens a similar feature is observed. Furthermore, these apical spines of the female are larger and more robust than those of the male (Figure 1).

This species most closely resembles *O. aokii*, but is distinguished from it only by the hispid body (smooth in *O. aokii*).

Distribution

This species is recorded from the Japanese embayments, Kojima Bay (Ii 1964), Tokyo Bay (Ii 1964; present study), the Ariake Sea, Omura Bay, Ise Bay, Mikawa Bay and Osaka Bay (present study); the Chinese coastal waters of the Bohai Sea (the Gulf of Zhili), the Yellow Sea and the East China Sea (Shen et al. 1989; Wang and Liu 1997); southern and western coastal waters of Korea (Jo and Ma 1996); and Sacramento-San Joaquin estuary, California (Modlin and Orsi 1997). The occurrence in the Sacramento-San Joaquin estuary of this species is surely a result of the transportation from Asian waters with ballast water of ships (Modlin and Orsi 1997).

The present specimens from Japan were collected from depths of 10–40 m in eutrophic embayments.
**Orientomysis crassispinosa** (Liu and Wang, 1980) comb. nov.

*Acanthomysis crassispinosa* Liu and Wang 1980: 322–324, Figure 2; 1986: 195 (list); Müller 1993: 191 (list); Liu and Wang 2000: 243–245, Figure 90.

*Acanthomysis crossispinosa* [sic]: Wang and Liu 1997: 215 (list).

**Type locality**

22°00′N, 113°30′E, coastal waters of Guangdong, southern China.

**Remarks**

Direct examination of this species was not made. This species, however, clearly belongs to *Orientomysis* because it is in agreement with the new generic diagnosis. *Orientomysis crassispinosa* was originally described by Liu and Wang (1980) on the basis of two female specimens collected from the South China Sea off Guangdong; no male specimens have been recorded.

This species is similar to *O. aokii* and *O. aspera* in that the telson is armed with two pairs of robust spines on the apex and the abdominal somites are without any spine rows. However, it is distinguished from the latter two species by the absence of spines in the statocyst region of the endopod of the uropod (single spine present in *O. aokii* and *O. aspera*), and from *O. aokii* by the hispid body (smooth in *O. aokii*).

**Distribution**

This species is known only from the South China Sea off Guangdong. Specimens were collected from a depth of 55 m (Liu and Wang 1980).

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**Orientomysis fujinagai** (Ii, 1964) comb. nov.

*Acanthomysis fujinagai* Ii 1964: 502–504, Figure 129; Mauchline and Murano 1977: 44 (list); Müller 1993: 192 (list); Jo and Ma 1996: 814, 815, Figure 8; Wang and Liu 1997: 215; Liu and Wang 2000: 233–234, Figure 84.

**Type locality**

Tatairi, near Pusan, southeastern Korea.

**Material examined**

Three males (damaged) and five females (damaged), Youngkwang, Chollanamdo, western Korea, dip net by diver, 10 August 1986, on loan from S.-G. Jo.

**Remarks**

Location of type specimens is unknown.

*Orientomysis fujinagai* is characterized by fifth and sixth abdominal somites with one and two transverse spine rows, respectively, the lateral margin of the telson armed with small subequal spines between larger ones, and the apex of the telson with two pairs of stout...
spines. This species is similar to *A. koreana* and *A. robusta* which also have the above-mentioned characters. Morphological differences among these three species are summarized in Table III.

**Distribution**

This species has been collected from western and southeastern coasts of Korea (Ii 1964; Jo and Ma 1996) and Zhejiang, Chinese coast of the East China Sea (Wang and Liu 1997). In the East China Sea, this species was collected from a depth of 11 m (Wang and Liu 1997).

**Orientomysis hwanhaiensis** (Ii, 1964) comb. nov.

(Figure 2)

*Acanthomysis hwanhaiensis* Ii 1964: 486–488, Figure 124; Mauchline and Murano 1977: 44 (list); Shen et al. 1989: 217–219, Figure 14; Müller 1993: 192 (list); Jo and Ma 1996: 815, Figure 9; Wang and Liu 1997: 216; Liu and Wang 2000: 234–236, Figure 85; Modlin and Orsi 2000: 693–694, Figures 1, 2.

**Type locality**

Ryubai Island, Haeju Bay, Hwanghaenamdo, western Korea.

| O. fujinagai | O. koreana | O. robusta |
|-------------|-------------|-------------|
| Body length | Up to 9 mm  | 23.5 mm     | Up to 16.4 mm |
| Abdomen     | With row of spines on 5th and 6th somites | With row of spines on 5th and 6th somites | With row of spines on 5th and 6th somites or on 6th somite |
| Rostrum     | Low triangular; apex extends to base of antennular peduncle | Narrowly triangular; apex extends near anterior margin of 1st segment of antennular peduncle | Narrowly triangular; apex extends beyond middle of 1st segment of antennular peduncle |
| Eye         | Large; overreaches lateral margin of carapace in dorsal view | Small; barely reaches lateral margin of carapace in dorsal view | Large; overreaches lateral margin of carapace in dorsal view |
| Fourth male pleopod | Without setae | On distal end with a long seta, which extends far beyond end of 2nd segment | On distal end with a long seta, which does not extend to end of 2nd segment |
| First segment of exopod | | | |
| Telson      | No. of smaller spines between larger ones on lateral margin | 1–3 | 1–5 | 1–3 |
| Apical spines | 1/12 of telson length | 1/10 of telson length | 1/13 of telson length |
| Dorsal spines near base | Absent | Present | Present |
Figure 2. Orientomysis hwanhaiensis (Ii, 1964) comb. nov. (A, B) Telson, dorsal; (C–F) distal end of telson, dorsal. (A) Male (12.2 mm), syntype; (B) female (13.6 mm), syntype; (C) male (9.8 mm), East China Sea, NSMT-Cr 15559; (D) male (7.5 mm), East China Sea, NSMT-Cr 15559; (E) female (10.7 mm), East China Sea, NSMT-Cr 15559; (F) female (10.6 mm), East China Sea, NSMT-Cr 15559.
Material examined

Syntype: 20 males (damaged, up to 12.4 mm) and 61 females (damaged, up to 13.2 mm), Ryubai Island, Haeju Bay, Hwanghaenamdo, western Korea, 13 April 1936, Ii’s coll. no. 33.

Others. Three males (7.0–9.8 mm) and five females (8.8–10.7 mm), 31°50.5’N, 124°02.0’E, the East China Sea, 42 m, bottom net, 20–21 May 1968, NSMT-Cr 15559. Eight males (damaged) and two females (damaged), Boryong, Chunchongnamdo, western Korea, dip net by diver, 1 April 1992, on loan from S.-G. Jo.

Remarks

The number of minute spines inserted between inner and outer pairs of larger apical spines on the telson is one or two, rarely three (Figure 2) against one in the original description by Ii (1964).

This species is distinguishable from the other species of Orientomysis by the armature of the telson: the apical margin is armed with two pairs of large spines, which are subequal to the larger spines on the lateral margin, and with one to three minute spines between the inner and outer larger spines.

Distribution

This species has been recorded from southern and western coasts of Korea (Ii 1964; Jo and Ma 1996) and Chinese coast of the Bohai Sea, the Yellow Sea and the East China Sea (Shen et al. 1989; Wang and Liu 1997; present study). Modlin and Orsi (2000) reported this species from the San Francisco Bay estuary, California, resulting from the transportation with ship ballast water from East Asia.

Orientomysis japonica Marukawa, 1928
(Figures 3, 4)

Orientomysis japonica Marukawa 1928: 5–6, Figures 23–29.
Acanthomysis japonica: Banner 1948: 86 (key); Gordan 1957: 337 (list); Mauchline and Murano 1977: 44 (list); Müller 1993: 193 (list).
Acanthomysis sp. Ii 1964: 507–509 (part), Figure 131B, D, G, J, K.
Acanthomysis nakazatoi Ii 1964: 519–521, Figure 135 (type locality: Iwai, near Tateyama, Chiba, central Japan); Mauchline and Murano 1977: 45 (list); Müller 1993: 195 (list).
Acanthomysis japonica ?: Ii 1964: 522–524, Figure 136.

Type locality

Sagami and Suruga Bays, central Japan.

Material examined

Syntype of A. nakazatoi: 29 males (9.5–13.5 mm) and 40 females (8.6–13.2 mm), Iwai, near Tateyama, Chiba, central Japan, 1 May 1940, Ii’s coll. no. 283.
Others. Two males (7.2 and 9.5 mm) and two females (damaged), Todoro, Miyazaki, western Japan, 31 October 1937, Ii's coll. no. 299, described as “A. japonica?” by Ii (1964). Eighteen males (8.1–14.2 mm), 23 immature males (6.0–8.0 mm), 20 females (8.0–12.4 mm) and 35 immature females (5.2–8.0 mm), Uchiura Bay, Chiba, central Japan, 29 April 1975, NSMT-Cr 15560. Five males (11.2–12.5 mm) and three females (13.8–14.4 mm), Akita, northern Japan, shrimp net, 27 July 1976, NSMT-Cr 15561. One male (11.0 mm) and two females (10.2 and 10.6 mm), Tateyama Bay, Chiba, central Japan, 19 June 1978, NSMT-Cr 15562. One male (9.7 mm), two immature males (5.6 and 8.0 mm), one female (13.2 mm) and five immature females (6.5–8.5 mm), Ohno Bay, Iwate, northern Japan, 4 m, 31 July 1989, NSMT-Cr 15563. One male (7.8 mm) and two females (8.9 and 9.0 mm), Ohno Bay, Iwate, northern Japan, 4 m, sledge net, 11 September 1990, coll. H. Yamada, NSMT-Cr 15564. Ten males (9.8–15.3 mm) and five

Figure 3. Orientomysis japonica Marukawa, 1928. (A) First to sixth abdominal somites, lateral; (B–E) telson, dorsal. (A) Male (11.0 mm), Tateyama Bay, Pacific, NSMT-Cr 15562; (B) male (11.0 mm), Tateyama Bay, NSMT-Cr 15562; (C) male (14.2 mm), Uchiura Bay, Pacific, NSMT-Cr 15560; (D) female (17.0 mm), Kashima, Pacific, NSMT-Cr 15570; (E) male (10.6 mm), Japan Sea side of Aomori, NSMT-Cr 15571.
Figure 4. Orientomysis japonica Marukawa, 1928. Distal end of telson, dorsal. (A) Female (13.9 mm), Kashima, Pacific, NSMT-Cr 15569; (B) male (10.2 mm), Uchiura Bay, Pacific, NSMT-Cr 15560; (C) female (broken), Uchiura Bay, Pacific, NSMT-Cr 15560; (D) male (11.8 mm), type of Acanthomysis nakazatoi, Iwai, Pacific; (E) male (11.7 mm), type of A. nakazatoi, Iwai, Pacific; (F) female (10.2 mm), Tateyama Bay, Pacific, NSMT-Cr 15562; (G) female (11.5 mm), Japan Sea side of Aomori, NSMT-Cr 15571; (H) female (11.4 mm), Japan Sea side of Aomori, NSMT-Cr 15571; (I) female (13.0 mm), Tottori, Japan Sea, NSMT-Cr 15572; (J) female (15.8 mm), Tottori, Japan Sea, NSMT-Cr 15572.
females (8.7–14.0 mm), Ohno Bay, Iwate, northern Japan, 4 m, sledge net, 26 April 1991, coll. H. Yamada, NSMT-Cr 15565. Eight males (8.3–13.2 mm), five females (8.5–11.4 mm) and one immature female (6.2 mm), Ohno Bay, Iwate, northern Japan, 10 m, sledge net, 5 August 1991, coll. H. Yamada, NSMT-Cr 15566. Three males (14.4–16.0 mm) and four females (13.7–15.7 mm), Ohno Bay, Iwate, northern Japan, 10 m, sledge net, 12 June 1992, coll. H. Yamada, NSMT-Cr 15567. One male (8.2 mm) and one female (9.3 mm), Yugahama, Yamagata, northern Japan, 10 August 1996, coll. K. Kimoto, NSMT-Cr 15568. One female (13.9 mm), Kashima, Ibaraki, central Japan, sledge net, 4 December 1996, coll. K. Kimoto, NSMT-Cr 15569. One female (17.0 mm), Kashima, Ibaraki, central Japan, sledge net, 16 January 1997, coll. K. Kimoto, NSMT-Cr 15570. Nine males (8.0–11.7 mm) and 18 females (7.0–12.4 mm), between mouth of Jusan-ko and Ajigasawa, Japan Sea side of Aomori, northern Japan, 5–10 m, trawl net, date unknown, 1984, coll. H. Ikeuchi, NSMT-Cr 15571. Nineteen males (11.4–13.8 mm) and 23 females (10.8–16.8 mm), Tottori, western Japan, date unknown, NSMT-Cr 15572.

Remarks

Location of type specimens is unknown.

Orientomysis japonica was established by Marukawa (1928) on the basis of specimens collected from Sagami and Suruga Bays, central Japan. Ii (1964) identified specimens obtained from coastal waters near Nobeoka, Miyazaki, western Japan, and near Shimoda, Shizuoka, central Japan, as “Acanthomysis japonica?” with some doubts, because the second to fourth abdominal somites of his specimens were observed to have one dorsal fold each while all the abdominal somites of O. japonica were illustrated to be smooth. Ii (1964) thought that Marukawa (1928) may have overlooked these folds.

On the other hand, Ii (1964) established Acanthomysis nakazatoi, which is a similar species to O. japonica, based on specimens collected from the coast of Iwai, near Tateyama, Chiba, central Japan. He mentioned differences between A. nakazatoi and O. japonica as follows: (1) in A. nakazatoi the apical margin of the telson bears small spines between outer and inner pairs of large spines, whereas in O. japonica there are no small spines; (2) the distal part of the lateral margin of the telson in A. nakazatoi is armed with three to five small spines between larger spines instead of one or two small spines in O. japonica; (3) in A. nakazatoi each of the anterior four abdominal somites is furnished with one or two dorsal folds, whereas all the abdominal somites of O. japonica lack dorsal folds; and (4) the uropodal endopod is armed in the ventral statocyst region with three spines in A. nakazatoi compared to four spines in O. japonica. Ii (1964) also noted a variation in the spination on the apical margin of the telson of A. nakazatoi: the apical margin, in most cases, bears four equally long stout spines and two small spines in each of three intervals between these long spines, but the number of small spines varied from zero to two.

In the present specimens, the number of small spines between inner and outer pairs of large spines on the telson apex and between lateral large spines of the telson varies from zero to four and two to six, respectively (Figures 3, 4; Table IV), and the number of spines in the statocyst region of the uropodal endopod varies from two to five. The spine arrangement on the telson and uropod varies with individuals and these specimens cannot be divided into species groups.

As for the abdomen, specimens from Pacific coasts, except those of Miyazaki, are always furnished with two dorsal folds on the first somite and with a single dorsal fold on the
second to fourth somites (Table IV). Four specimens from Miyazaki have no folds on the first somite, except for one specimen which has two dorsal folds (Table IV). However, specimens from the coasts of the Japan Sea are considerably variable in this respect, although the majority are without folds (Table IV). In some specimens the first to fourth somites have an indistinct groove instead of folds.

As a result, it is concluded that the differences between *A. nakazatoi* and *O. japonica* mentioned by Ii (1964) are not markedly distinct and fall within the realm of intraspecific variation. Consequently, *A. nakazatoi* is synonymized with *O. japonica*.

The telson is somewhat different morphologically between specimens from Pacific coasts and those from Japan Sea coasts. Telsons of Japan Sea specimens are slightly more slender compared with those of Pacific specimens: 2.2–2.7 times as long as basal breadth in the Japan Sea specimens against 2.0–2.6 times as long as basal breadth in Pacific specimens (Figure 3; Table IV). The distal end of the telson is truncate in Pacific specimens (Figures 3B–D, 4A–F), whereas in the Japan Sea specimens it is rather rounded and narrower and the outer pair of apical long spines arises from a more proximal position than the inner pair (Figures 3E, 4G–J).

Ii (1964) reported six males and four female specimens of *Acanthomysis* sp. collected from the mouth of Mogami River, Yamagata, northern Japan. According to Ii (1964), these specimens, except one female which was identified with *Acanthomysis robusta* by Murano (1984), were different from *A. nakazatoi* in the rostrum, with a bluntly pointed apex, and in the telson, with lateral spines being more slender than those of *A. nakazatoi*. Re-examination of the type specimens of *A. nakazatoi* indicated that the apex of the rostrum was not so sharply pointed, as illustrated by Ii (1964), in most specimens. The lateral spines of the telson are more slender in the Japan Sea specimens than in Pacific specimens in the present study. Under the circumstances, Ii’s *Acanthomysis* sp. is identified as *O. japonica*.

Distribution

This species is known only from coastal waters of Japan: Japan Sea coasts from Aomori to Yamaguchi (Ii 1964; Hirota et al. 1989; present study) and Pacific coasts from Iwate to Miyazaki (Marukawa 1928; Ii 1964; present study).

This species inhabits coastal waters shallower than 10 m depth (Ii 1964; present study).

*Orientomysis koreana* (Ii, 1964) comb. nov.

*Acanthomysis koreana* Ii 1964: 499–501, Figure 128; Mauchline and Murano 1977: 44 (list); Shen et al. 1989: 208–210, Figure 10; Müller 1993: 193 (list); Jo and Ma 1996: 815, Figure 10; Wang and Liu 1997: 215; Liu and Wang 2000: 236–238, Figure 86.

Type locality

Ryubai Island, Haeju Bay, Hwanghaenamdo, western Korea.

Material examined

Syntype: four males (19.2–19.4 mm) and 20 females (14.6–21.2 mm), Ryubai Island, Haeju Bay, Hwanghaenamdo, western Korea, 13 April 1936, Ii’s coll. no. 36.
Table IV. Morphological variation of abdominal somites, uropod and telson in *Orientomysis japonica*.

| Locality                     | N   | 1st | 2nd | 3rd | 4th | 5th | 6th | No. of spines | Length/breadth | No. of small spines between larger spines on lateral margin | No. of small spines between inner and outer pairs of apical long spines |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|---------------|----------------|------------------------------------------------------------|---------------------------------------------------------------|
| **Pacific Ocean coast**      |     |     |     |     |     |     |     |               |                |                                                           |                                                              |
| Iwate                        | 48  | ++  | +   | +   | +   | –   | –   | 2–5           | 2.0–2.6         | 2–4                                                        | 0, 1                                                          |
| Kashima, Ibaraki             | 2   | ++  | +   | +   | +   | –   | –   | 4, 5          | 2.3             | 2, 3                                                       | 0                                                             |
| Uchiura, Chiba               | 96  | ++  | +   | +   | +   | –   | –   | 2–5           | 2.0–2.4         | 2–4                                                        | 0–2                                                           |
| Tateyama, Chiba              | 3   | ++  | +   | +   | +   | –   | –   | 3–5           | 2.2–2.5         | 1, 2                                                       | 2–4                                                           |
| Iwai, Chiba (syntype of A. nakazatoi) | 69  | ++  | +   | +   | +   | –   | –   | 3–5           | 2.2–2.5         | 3–5                                                        | 0–2                                                           |
| Miyazaki                     | 4   | –/+ | +   | +   | +   | –   | –   | 2–4           | 2.1–2.2         | 2, 3                                                       | 0                                                             |
|                              |     |     |     |     |     |     |     |               |                |                                                            |                                                              |
| 1                           | ++  | +   | +   | +   | +   | –   | –   |               |                |                                                            |                                                              |
| 3                           | –   | +   | +   | +   | +   | –   | –   |               |                |                                                            |                                                              |
| **Japan Sea coast**          |     |     |     |     |     |     |     |               |                |                                                            |                                                              |
| Aomori                       | 22  | –   | –   | –   | –/+ | –/+ | –   | 3–5           | 2.2–2.7         | 3–5                                                        | 0–2                                                           |
|                              |     |     |     |     |     |     |     |               |                |                                                            |                                                              |
| 2                           | –   | –   | +   | +   | –   | –   | –   |               |                |                                                            |                                                              |
| 3                           | –   | –   | –   | –   | +   | –   | –   |               |                |                                                            |                                                              |
| Akita                        | 8   | –   | –   | –/+ | –/+ | –   | –   | 2–5           | 2.4–2.8         | 4, 5                                                       | 1–4                                                           |
|                              |     |     |     |     |     |     |     |               |                |                                                            |                                                              |
| 1                           | –   | –   | +   | +   | –   | –   | –   |               |                |                                                            |                                                              |
| 2                           | –   | –   | –   | –   | +   | –   | –   |               |                |                                                            |                                                              |
| Yamagata                     | 36  | –/+ | –/+ | –/+ | –/+ | –   | –   | 3, 4           | Damaged         | 4                                                          | 1                                                              |
| Tottori                      | 42  | –/+ | –/+ | –/+ | –/+ | –   | –   | 2–5           | 2.3–2.7         | 3–6                                                        | 1–3                                                           |
|                              |     |     |     |     |     |     |     |               |                |                                                            |                                                              |
| 25                          | –   | –   | –   | –   | –   | –   | –   |               |                |                                                            |                                                              |
| 1                           | ++  | +   | +   | +   | –   | –   | –   |               |                |                                                            |                                                              |
| 3                           | –   | –   | +   | +   | –   | –   | –   |               |                |                                                            |                                                              |
| 10                          | –   | –   | –   | +   | –   | –   | –   |               |                |                                                            |                                                              |
| 2                           | +   | –   | –   | –   | +   | –   | –   |               |                |                                                            |                                                              |
| 1                           | ++  | –   | –   | –   | –   | –   | –   |               |                |                                                            |                                                              |

*N*, number of individuals examined; +, a single dorsal fold present; ++, two dorsal folds present; –, fold absent. The inside of the brackets shows the items.
Others. Two females (damaged), Yongyoodo, Inchon, western Korea, dip net by diver, 27 April 1986, on loan from S.-G. Jo.

Remarks

Ii (1964) described the first to fourth abdominal somites having a lateral fold which is discontinuous dorsally. On the other hand, Shen et al. (1989) illustrated the fourth abdominal somite with a lateral fold as well as a transverse dorsal fold. In the type specimens, an obscure transverse dorsal fold or groove was recognized on the fourth abdominal somite.

Shen et al. (1989) and Jo and Ma (1996) observed the presence of spines on the dorsal surface near the base of the telson, which were neither described nor illustrated by Ii (1964). Re-examination of the type specimens confirmed that there are two or three pairs of spines.

Orientomysis koreana shows a sexual dimorphism in the size of apical spines of the telson as illustrated by Ii (1964), although he did not describe it. The outer pair of the large apical spines of the telson is only slightly longer than the apicalmost lateral spine in the male, compared with 1.5 times as long in the female.

Orientomysis koreana is allied to O. fujinagai and O. robusta. Morphological differences among these three species are summarized in Table III.

Distribution

This species has been recorded from the western Korea (Ii 1964; Jo and Ma 1996) and Chinese coasts of the Bohai Sea, the Yellow Sea and the East China Sea (Shen et al. 1989; Wang and Liu 1997).

This species was collected from depths of 11 to 41 m in Chinese waters (Wang and Liu 1997).

Orientomysis leptura (Liu and Wang, 1980) comb. nov.

Acanthomysis leptura Liu and Wang 1980: 324, 325, Figure 3; 1986: 195; Müller 1993: 194 (list); Wang and Liu 1997: 216; Liu and Wang 2000: 247, 248, Figure 92.

Type locality

20°30′N, 111°00′E, off Guangdong, southern China.

Material examined

One male (6.1 mm) and one immature female (5.2 mm), 20°15′N, 111°00′E, off Guangdong, southern China, 30 m, fine sand bottom, 26 April 1959, on loan from Liu and Wang.

Remarks

Orientomysis leptura is similar to O. pseudomitsukurii and O. tenella in the abdominal somites without spines and the shape of the telson. Morphological differences among the three species are summarized in Table V.
Table V. Comparison of characters among *Orientomysis leptura*, *O. pseudomitsukurii* and *O. tenella*.

|                        | *O. leptura* | *O. pseudomitsukurii* | *O. tenella* |
|------------------------|--------------|-----------------------|--------------|
| Abdomen                | Smooth       | With fold or groove on 1st to 5th somites | Smooth       |
| Maxilla                |              |                       |              |
| Distal segment of endopod | With tiny spines among long setae on outer margin | Without spines on outer margin | Without spines on outer margin |
| Fourth male pleopod    | Two terminal setae of exopod | Unequal; longer seta 1.3 times as long as shorter one | Subequal in length | Subequal in length |
| Telson                 | Larger spines on lateral margin | Increasing in size towards apex | Subequal in size | Subequal in size |
| Two pairs of apical spines | Subequal in size | Subequal in size | Inner pair longer than outer one |

**Distribution**

This species is known only from China: the South China Sea off Guangdong (Liu and Wang 1980) and the East China Sea off Zhejiang (Wang and Liu 1997).

This species was collected from depths of 6–32 m in the South China Sea (Liu and Wang 1980) and from depths of 11–63 m in the East China Sea (Wang and Liu 1997).

**Orientomysis meridionalis** (Liu and Wang, 1983) comb. nov. (Figure 5)

*Acanthomysis meridionalis* Liu and Wang 1983: 525, Figure 2; 1986: 195; Müller 1993: 195 (list); Liu and Wang 2000: 251–253, Figure 94.

**Type locality**

Shatian, Wuchuan, Guangdong, southern China.

**Material examined**

One male (5.2 mm) and one immature female (4.6 mm), Wuchuan, Guangdong, southern China, coastal water, 2 May 1978, on loan from Liu and Wang.

**Remarks**

The specimens examined in this study are a part of those collected together with the type specimens of *O. meridionalis*. These specimens are slightly different from the original description by Liu and Wang (1983) in the maxilla, the endopod of the fourth male pleopod and the telson. The maxilla illustrated by Liu and Wang (1983) is not armed with tiny spines on the outer margin of the second endopod segment, whereas in the present specimens the outer margin is armed with five tiny spines in the male and two in the female among long setae (Figure 5B). The exopod of the fourth male pleopod is not armed with...
setae on the distal end of the proximal segment in the original illustration, while in the present specimen the proximal segment bears a long plumose seta at the inner distal angle and a tiny seta at the outer distal angle (Figure 5C, D). The dorsal surface of the telson is smooth in the original illustration, whereas it is armed with a pair of short spines in the present specimens (Figure 5E).

*Orientomysis meridionalis* is allied to *O. okayamaensis* and *O. serrata* in the following characters: last one or two abdominal somites are furnished with a row of spines; the larger lateral spines of the telson increase in size posteriorly; and the apex of the telson is armed with two pairs of strong spines. Differences among these species are summarized in Table VI.

**Distribution**

This species has only been recorded from the South China Sea off Guangdong, southern China (Liu and Wang 1983, 1986).
**Table VI. Comparison of characters among Orientomysis meridionalis, O. okayamaensis and O. serrata.**

| Character                        | O. meridionalis | O. okayamaensis | O. serrata |
|----------------------------------|-----------------|-----------------|------------|
| Abdomen                          | With row of spines on 5th and 6th somites | With row of spines on 6th somite | With row of spines on 6th somite |
| Rostrum                          | Low triangular; apex extends to proximal 1/3 of 1st segment of antennular peduncle | Narrowly triangular; apex extends beyond middle of 1st segment of antennular peduncle | Low triangular; apex extends or not extends to base of antennular peduncle |
| Telson                           | 1–4             | 1, 2            | 1, 2       |
| No. of smaller spines between larger ones on lateral margin | 2, 3 | Absent | 1, 2 |
| No. of spines between outer apical spine and distalmost larger lateral spine | | | |
| Apical breadth/maximum breadth    | 0.16            | 0.23–0.27       | 0.24–0.28  |
| Dorsal spines near base          | Present         | Present         | Absent     |

**Orientomysis mitsukurii** (Nakazawa, 1910)

*Metamysis mitsukurii* Nakazawa 1910: 250, 251, Plate 8, Figures 9, 11, 13, 18, 26.

**Orientomysis mitsukurii**: Derzhavin 1913: 202; Müller 1993: 245, 246 (list).

**Neomysis mitsukurii**: Illig 1930: 597 (key); W. Tattersall 1932: 317 (key).

**Acanthomysis mitsukurii**: Ii 1936: 589 (list), 600–603, Figures 56–66; Banner 1948: 87 (key); Gordan 1957: 337 (list); Ii 1964: 495–499, Figure 127; Mauchline and Murano 1977: 44 (list).

**Type locality**

Off Oarai, Ibaraki, central Japan; off Maisaka, Shizuoka, central Japan.

**Material examined**

One hundred and seventy males (4.7–7.3 mm), 23 immature males (4.6–4.8 mm), 202 females (5.3–7.6 mm) and 132 immature females (4.1–5.2 mm), 34°54.8’N, 138°27.9’E, Suruga Bay, central Japan, 20 m, bottom net, 8 July 1969, R/V Tansei-Maru cruise, NSMT-Cr 15573. Sixty males (6.0–8.3 mm) and 207 females (5.8–8.2 mm), Tateyama Bay, Chiba, central Japan, 19 June 1978, NSMT-Cr 15574. Fourteen males (6.3–7.2 mm) and six females (5.8–6.7 mm), Tateyama Bay, Chiba, central Japan, 19 June 1978, NSMT-Cr 15575. Twenty males (6.4–8.2 mm), Tateyama Bay, Chiba, central Japan, 0.7–3 m, sandy beach, sledge net, 19 June 1980, NSMT-Cr 15576. Thirty-two males (6.2–9.1 mm), nine immature males (5.3–5.8 mm), 31 females (6.5–9.0 mm) and 32 immature females (5.2–6.3 mm), Ohno Bay, Iwate, northern Japan, 8 m, 31 July 1989, NSMT-Cr 15577. Twenty-one males (7.6–11.8 mm), 12 immature males (5.0–7.0 mm), 13 females (9.4–11.0 mm) and 12 immature females (6.6–7.4 mm), Ohno Bay, Iwate, northern Japan, 11 m, sledge net, 26 April 1991, coll. H. Yamada, NSMT-Cr 15578.
Forty-three males (10.8–11.2 mm) and 151 females (8.0–11.4 mm), Ohno Bay, Iwate, northern Japan, 4 m, sledge net, 12 June 1992, coll. H. Yamada, NSMT-Cr 15579.

Remarks

Location of type specimens is unknown.

Orientomysis mitsukurii is readily distinguished from related species by the presence of a number of small spines on the abdominal somites (Ii 1964).

Distribution

This species is distributed in Pacific coastal waters of Japan from Aomori to Miyazaki (Nakazawa 1910; Ii 1936, 1964; Yamada et al. 1994; present study).

Along the Sanriku coast, northern Japan, this species predominates in mysid assemblages in waters shallower than 10 m deep, especially in depths of 7–10 m, in sandy bottom areas facing the open sea (Yamada et al. 1994).

**Orientomysis okayamaensis** (Ii, 1964) comb. nov.

_Acanthomysis okayamaensis_ Ii 1964: 504–506, Figure 130; Mauchline and Murano 1977: 45 (list); Shen et al. 1989: 215, Figure 12; Müller 1993: 196 (list); Jo and Ma 1996: 815–818, Figure 12; Wang and Liu 1997: 216; Liu and Wang 2000: 238–240, Figure 87.

Type locality

Atsu, mouth of Kojima Bay, Seto Inland Sea, western Japan.

Material examined

Syntype: one male (18.6 mm) and two females (19.4 mm and damaged), Atsu, mouth of Kojima Bay, Okayama, western Japan, 18 March 1936, Ii’s coll. no. 215.

Others. One male (damaged) and two immature females (9.7 and 11.3 mm), Atsu, mouth of Kojima Bay, Okayama, western Japan, Ii’s coll. no. 216. Two females (damaged), Boryong, Chungchongnamdo, western Korea, plankton net, 1 April 1992, on loan from S.-G. Jo. One male (10.5 mm), 34°24.70’N, 135°04.83’E, Osaka Bay, central Japan, 40 m, bottom net, 16 June 1997, TR/V _Seiyo-Maru_ cruise, NSMT-Cr 15580.

Remarks

Shen et al. (1989) and Jo and Ma (1996) noted the presence of dorsal spines on the telson, a character not mentioned in the original description by Ii (1964). The presence of these spines was confirmed in the type specimens.

_Orientomysis okayamaensis_ is related to _O. meridionalis_ and _O. serrata_. Differences among the three species are shown in Table VI.

Distribution

This species has been collected from Japanese embayments, Kojima Bay (Ii 1964) and Osaka Bay (present study); Chinese coastal waters, Qingdao (Shen et al. 1989) and the
mouth of the Yangtze River (Wang and Liu 1997); and West Korean coastal waters (Jo and Ma 1996).

This species was collected from a depth of 30 m in the mouth of the Yangtze River (Wang and Liu 1997) and from a depth of 40 m in Osaka Bay (present study).

**Orientomysis pseudomitsukurii** (Ii, 1964) comb. nov.

(Figure 6)

*Acanthomysis pseudomitsukurii* Ii 1964: 513–516, Figure 133; Mauchline and Murano 1977: 45 (list); Müller 1993: 196, 197 (list).

**Type locality**

Coast near Marine Biological Center of Tokyo Bunrika University (now University of Tsukuba), Shimoda, Shizuoka, central Japan.

**Material examined**

Sixty-three males (5.2–8.5 mm) and 54 females (4.5–8.2 mm), Nii-jima Island, Izu Islands, central Japan, among seaweeds, May 1973, coll. M. Muto, NSMT-Cr 15581. One

Figure 6. *Orientomysis pseudomitsukurii* (Ii 1964) comb. nov. First to sixth abdominal somites, lateral. (A) Female (7.5 mm), Nii-jima Island, Pacific, NSMT-Cr 15581; (B) female (8.2 mm), Nii-jima Island, NSMT-Cr 15581.
female (6.9 mm), Uchiura Bay, Chiba, central Japan, 29 April 1975, NSMT-Cr 15582. One female (8.0 mm), Fukiage-hama Beach, East China Sea side of Kagoshima, western Japan, 20 March 1988, coll. T. Noichi, NSMT-Cr 15583. Three females (8.0–8.5 mm), Fukiage-hama Beach, Kagoshima, western Japan, 21 March 1988, coll. T. Noichi, NSMT-Cr 15584. Nine males (5.7–6.7 mm), three immature males (4.5–5.3 mm) and 18 females (5.5–7.5 mm), Tottori, western Japan, 5 m, sledge net, 8 June 1988, coll. Y. Hirota, NSMT-Cr 15585. Two males (5.5 and 6.3 mm), Banda Beach, Tateyama, Chiba, central Japan, 4 m, sledge net, 13 July 1994, coll. K. Fukuoka, NSMT-Cr 15586. Two females (6.1 and 6.2 mm), Banda Beach, Tateyama, Chiba, central Japan, 0–0.5 m, sandy beach, sledge net, 20 September 1994, coll. K. Fukuoka, NSMT-Cr 15587. Fourteen males (7.8–9.8 mm) and 19 females (7.3–9.5 mm), Tottori, western Japan, date unknown, NSMT-Cr 15588.

Remarks

Location of type specimens is unknown.

Some differences exist between Ii’s description and the present specimens. According to Ii (1964), the eyestalk was not armed with a papilliform process on the dorsal surface, whereas a small but distinct process is present in our material. Ii (1964) also described a single distinct transverse dorsal fold on each of the second to fourth abdominal somites, but the state of the abdomen varies with individuals in the present specimens (Figure 6; Table VII). The folds on the second to fifth abdominal somites are frequently indistinct.

*Orientomysis pseudomitsukurii* resembles *O. leptura* and *O. tenella*. Differences among these three species are summarized in Table V.

Distribution

This species is recorded only from the Japanese warm water region: Shizuoka (Ii 1964), Yamaguchi, Tottori (Hirota et al. 1989), Nii-jima Island of Izu Islands, Chiba, and western Kagoshima (present study).

In Japan Sea coasts, this species is abundantly distributed in depths of 4–5 m (Hirota et al. 1989). They were collected from near shoreline and among seaweeds (present study).

**Orientomysis robusta** (Murano, 1984) comb. nov.

*Acanthomysis* sp. Ii 1964: 507–509 (part), Figure 131A.

*Acanthomysis robusta* Murano 1984: 107–110, Figures 1, 2, 3a; Müller 1993: 197 (list).

Type locality

Off Tsuchisaki, Akita, northern Japan.

Material examined

Holotype: female (13.3 mm), off Tsuchisaki, Akita, northern Japan, 4.5–5 m, sandy bottom, 23 April 1975, NSMT-Cr 8606. Allotype: male (13.3 mm), same data as
holotype, NSMT-Cr 8607. Paratype: eight males (12.4–14.4 mm) and 10 females (13.4–16.2 mm), same data as holotype, NSMT-Cr 8608.

Others. Eighty-nine males (7.0–16.4 mm) and 171 females (7.7–14.2 mm), same data as holotype, NSMT-Cr 15589. Two females (7.2 mm and damaged), Okushiri Island, southwestern Hokkaido, northern Japan, 2 September 1986, on loan from Y. Hanamura.

Remarks

It was observed for the first time that the carpopropodus of the endopod of the third to eighth thoracic limbs is divided into five or six subsegments.

*Orientomysis robusta* is similar to *O. fujinagai* and *O. koreana* in the abdominal somites with a spine row, the lateral margin of the telson with several subequal small spines between larger ones, and the apex of the telson with two pairs of strong spines. Morphological differences among these three species are shown in Table III.

Distribution

This species has been recorded from Japan Sea coastal waters of Japan, from Hokkaido to Niigata (Ii 1964; Murano 1984; Hirota et al. 1989; present study).

This species inhabits waters shallower than 10 m deep (Ii 1964; Murano 1984; Hirota et al. 1988). In Igarashi-hama beach, Niigata, this is a dominant species in mysid assemblages in depths of 2–10 m (Hirota et al. 1988).

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Table VII. Variation in abdominal somites of *Orientomysis pseudomitsukurii*.

| Locality                          | Fold on abdomen | N 1st | 2nd | 3rd | 4th | 5th | 6th |
|----------------------------------|-----------------|-------|-----|-----|-----|-----|-----|
| Banda Beach, Tateyama, Chiba     |                 | 3     | −   | +   | +   | +   | +   |
| (Pacific side)                   |                 | 1     | −   | +   | +   | +   | −   |
| Uchiura Bay, Chiba (Pacific side)|                 | 1     | −   | +   | +   | +   | −   |
| Nii-jima Island, Izu Islands (Pacific side) |     | 20    | −   | +   | +   | +   | +   |
|                                  |                 | 68    | −   | +   | +   | +   | −   |
|                                  |                 | 1     | −   | +   | −   | −   | −   |
|                                  |                 | 7     | −   | −   | +   | −   | −   |
|                                  |                 | 1     | −   | −   | +   | +   | −   |
|                                  |                 | 1     | −   | −   | −   | +   | +   |
|                                  |                 | 4     | −   | −   | −   | +   | −   |
|                                  |                 | 12    | −   | −   | −   | −   | −   |
| Tottori (Japan Sea side)         |                 | 13    | −   | +   | +   | +   | −   |
|                                  |                 | 31    | −   | +   | +   | +   | −   |
|                                  |                 | 1     | −   | +   | −   | −   | −   |
|                                  |                 | 1     | −   | +   | −   | −   | −   |
|                                  |                 | 3     | −   | −   | +   | −   | −   |
|                                  |                 | 2     | −   | −   | −   | +   | −   |
|                                  |                 | 11    | −   | −   | −   | −   | −   |
| Fukiage-hama Beach, Kagoshima    |                 | 4     | −   | +   | +   | +   | −   |
| (East China Sea side)            |                 |       |     |     |     |     |     |

*N*, number of individuals examined; +, a dorsal transverse fold present; −, fold absent.
**Orientomysis rotundicauda** (Liu and Wang, 1980) comb. nov.

(Figure 7)

*Acanthomysis rotundicauda* Liu and Wang 1980: 326–327, Figure 4(1–7); 1986: 195; Müller 1993: 197 (list); Liu and Wang 2000: 249–250, Figure 93.

*Acanthomysis longicauda* Murano 1991: 86–89, Figures 3, 4 (type locality: Tateyama Bay, Chiba, Japan); Müller 1993: 194 (list).

**Type locality**

18°30′N, 108°30′E, Gulf of Tongking, southern China.

**Material examined**

One male (damaged) and one female (4.9 mm), 19°00′N, 111°30′E, off eastern Hainan, the South China Sea, 23 m, sand bottom, 18 May 1960, on loan from Liu and Wang. Forty-seven males (6.1–7.9 mm) and 114 females (6.2–9.0 mm), Tateyama Bay, Chiba, central Japan, 1–2 m, 19 June 1978, NSMT-Cr 11079. Thirty-one males (5.0–8.0 mm), 10 immature males (3.6–5.0 mm), 11 females (5.2–6.4 mm), 31 immature females (3.5–5.7 mm) and 56 juveniles (2.5–3.7 mm), Kyoto, central Japan, 6–8 m, sledge net, 2 November 1983, NSMT-Cr 11081. Sixty-nine males (4.9–7.0 mm), 76 immature males (3.7–4.3 mm), 47 females (5.8–6.5 mm), 103 immature females (3.4–5.3 mm) and 70 juveniles (2.3–3.2 mm), Yura, Kyoto, central Japan, sledge net, 13 July 1988, NSMT-Cr 15590. One male (6.9 mm) and one female (damaged), between Jusan-ko and Ajigasawa, Japan Sea side of Aomori, northern Japan, 5–10 m, date unknown, NSMT-Cr 11080.

**Remarks**

When *Acanthomysis longicauda* was established, Murano (1991) mentioned three points distinguishing this species from a similar species, *O. rotundicauda*: the length of the rostrum, the size of the eye, and the length-breadth ratio of the telson. The rostrum of the present specimens collected from the South China Sea extends to the proximal fourth to middle of the first segment of the antennular peduncle, as seen in the original description by Liu and Wang (1980) (Figure 7A). On the other hand, in the majority of Japanese specimens the rostrum does not overreach the base of the antennular peduncle as described by Murano (1991) (Figure 7G), but in some individuals it extends to the proximal fourth of the first antennular peduncle segment (Figure 7J). As to the eyes, Murano (1991) noted that those of *A. longicauda* were large and far extending laterally beyond the lateral margin of the carapace, whereas those of *O. rotundicauda* were rather small and barely extending beyond the lateral margin of the carapace. In the present specimens from the South China Sea, the eyes were observed to be an intermediate form between the two species (Figure 7A). The telson also is not distinctly different; 2.3 times as long as broad in the female from the South China Sea (Figure 7F), whereas 2.3–2.6 times as long as broad in those from Japanese waters (Figure 7I).

Other differences between *O. rotundicauda* and *A. longicauda* are also observed in the original descriptions and illustrations. The plumose seta at the inner distal angle of the proximal exopodal segment of the fourth male pleopod is slightly longer than the distal segment in *O. rotundicauda* (Liu and Wang 1980, Figure 4(4)), whereas it is twice as long as
Figure 7. *Orientomysis rotundicauda* (Liu and Wang, 1980) comb. nov. (A, B, F) Female (4.9 mm), South China Sea; (C–E) male (damaged), South China Sea; (G, H), male (7.3 mm), Tateyama Bay, Pacific, NSMT-Cr 15590; (J), male (6.9 mm), Japan Sea side of Aomori, NSMT-Cr 11080. (A, G, J) Anterior part of body, dorsal; (B) maxilla, posterior; (C) penis, lateral; (D) fourth pleopod, anterior; (E) distal part of fourth pleopod, anterior; (F) uropod and telson, dorsal; (H) distal part of fourth pleopod, posterior; (I) telson, dorsal.
the distal segment in *A. longicauda* (Murano 1991, Figure 3I, J). In the present specimen from the South China Sea, however, it is nearly twice as long as the distal segment (Figure 7E). The larger apical spines of the telson are subequal in size to the larger spines on the lateral margin in *O. rotundicauda* (Liu and Wang 1980, Figure 4(6)), while these are shorter than the larger spines on the lateral margin in *A. longicauda* (Murano 1991, Figure 4A–D) and the present specimens from the South China Sea (Figure 7F).

Differences between these two species are small and considered to fall within the range of intraspecific variation. Consequently, *A. longicauda* is declared to be a junior synonym of *O. rotundicauda*.

**Distribution**

China: the South China Sea off Hainan and Guangdong (Liu and Wang 1980). Japan: Tateyama Bay, Chiba; between Jusan-ko and Ajigasawa, Japan Sea side of Aomori; Kyoto (Murano 1991).

This species was collected from depths of 6–31 m in the South China Sea (Liu and Wang 1980) and from depths of 1–10 m in Japanese waters (Murano 1991).

**Orientomysis sagamiensis** (Nakazawa, 1910)

(Figures 8, 9)

*Metamysis sagamiensis* Nakazawa 1910: 251, 252, Plate 8, Figure 32.

*Orientomysis sagamiensis*: Derzhavin 1913: 202.

*Neomysis sagamiensis*: Illig 1930: 597 (key); W. Tattersall 1932: 317 (key); Gordan 1957: 369 (list).

*Acanthomysis sagamiensis*: Ii 1936: 589 (list); Banner 1948: 86 (key); Ii 1964: 488–489 (only remarks); Mauchline and Murano 1977: 45 (list); Müller 1993: 197 (list).

**Type locality**

Near Enoshima, Sagami Bay, central Japan.

**Material examined**

One male (8.6 mm), Uchiura Bay, Chiba, central Japan, 29 April 1975, NSMT-Cr 15591. Two males (10.9 and 11.4 mm), Uchiura Bay, Chiba, central Japan, 31 July 1976, NSMT-Cr 15592. Twelve males (9.9–13.0 mm) and seven females (10.1–11.9 mm), Sendai Bay, Miyagi, northern Japan, 8 m, sledge net, 22 November 1991, coll. H. Yamada, NSMT-Cr 15593. Four females (10.7–11.4 mm), Kashima, Ibaraki, central Japan, sledge net, 8 September 1996, coll. K. Kimoto, NSMT-Cr 15594. One female (9.7 mm), Kashima, Ibaraki, central Japan, sledge net, 16 October 1996, coll. K. Kimoto, NSMT-Cr 15595. One male (13.0 mm), Kashima, Ibaraki, central Japan, sledge net, 15 November 1996, coll. K. Kimoto, NSMT-Cr 15596. Ten females (12.3–14.2 mm), Kashima, Ibaraki, central Japan, sledge net, 4 December 1996, coll. K. Kimoto, NSMT-Cr 15597. Seven males (damaged, up to 15.2 mm) and 24 females (damaged, up to 17.0 mm), Kashima, Ibaraki, central Japan, sledge net, 16 January 1997, coll. K. Kimoto, NSMT-Cr 15598.
Figure 8. *Orientomysis sagamiensis* (Nakazawa, 1910). (A, C–H), Male (15.6 mm), NSMT-Cr 15598; (B) female (17.0 mm), NSMT-Cr 15598. (A, B) Anterior part of body, dorsal; (C) antenna, ventral; (D) mandible; (E) maxillule, posterior; (F) maxilla, posterior; (G) first thoracic limb, posterior; (H) second thoracic limb, posterior.
Figure 9. Orientomysis sagamiensis (Nakazawa, 1910). (A–J) Male (15.6 mm), NSMT-Cr 15598; (K) female (17.0 mm), NSMT-Cr 15598. (A) Third thoracic limb, posterior; (B) eighth thoracic limb, posterior; (C) penis, lateral; (D–H) first to fifth pleopods; (I) basal part of uropod, ventral; (J) uropod and telson, dorsal; (K) telson, dorsal.
Description

Body robust, not hispid. All thoracic somites without sternal process. First to fifth abdominal somites subequal in length, sixth somite slightly longer than preceding one; first somite with two dorsal folds, second to fourth somites with one dorsal fold, fifth and sixth somites smooth.

Carapace produced frontally into long triangular rostral plate with bluntly pointed apex and concave lateral margins; apex extending to middle to distal margin of first segment of antennular peduncle (Figure 8A, B); anterolateral corner of carapace rounded; posterior margin of carapace emarginate, leaving last two thoracic somites exposed dorsally, furnished with minute setae on medial part.

Eye somewhat flattened dorsoventrally, about 1.2 times as long as broad in dorsal view; cornea reniform and occupying two-fifths of eye in dorsal view; eyestalk hispid, with minute papilliform process on dorsal surface (Figure 8A, B).

Antennular peduncle with first segment 1.2 times as long as broad; third segment almost same in length with proximal two segments combined, about 1.4 times as long as broad; in male distal segment with developed appendix masculina (Figure 8A, B).

Antennal scale lanceolate with rounded apex, about 1.5 times longer than antennular peduncle, 5.6–6 times as long as broad, setose on entire margin, with suture near apex (Figure 8A–C). Antennal peduncle extending to middle of scale; second segment 1.4 times as long as broad in male, and 1.7 times as long as broad in female; third segment slightly shorter than second, 1.3 times as long as broad in male and 1.6 times as long as broad in female (Figure 8C). Antennal sympod with spiniform process at outer distal corner (Figure 8C).

Labrum armed with forwardly directed, long, spiniform process.

Mandibular palp three-segmented; second segment slightly expanded, 2.3 times as long as broad; third segment about half of length of second (Figure 8D).

Outer lobe of maxillule armed with 12 stout spines on distal margin and with three setae on ventral surface; middle of outer margin with hump-like process armed with a few tiny spines (Figure 8E).

Endopod of maxilla two-segmented; distal segment 1.5 times as long as broad, armed with two to six minute spines among plumose setae on outer margin (Figure 8F). Exopod of maxilla reaching distal margin of proximal segment of endopod, armed with plumose setae on outer and apical margins (Figure 8F). Basal endite with spinous surface (Figure 8F).

Endopod of first thoracic limb short and robust; preischium, ischium and merus with expanded inner lobe (Figure 8G). Endopod of second thoracic limb short; merus 3.2 times as long as broad; carpopropodus slightly shorter than merus (Figure 8H). Endopods of third to eighth thoracic limbs long and slender; carpopropodus divided into five subsegments in third to seventh limbs and into six subsegments in eighth limb; dactylus with long, slender claw (Figure 9A, B). Exopods with flagellum eight-segmented in first and eighth limbs and nine-segmented in second to seventh limbs; basal plate with outer distal corner rounded with several minute spines, inner and outer margins partly spinulose (Figures 8G, H, 9A, B).

Penis 1.5 times as long as broad in lateral view, armed with six to eight short, plumose and five or six long, naked setae on posterior margin, four or five inwardly curved setae on distal margin, and three long plumose setae on distal half of anterior margin (Figure 9C).

Marsupium composed of two pairs of developed oostegites; oostegite on seventh limb with baling lobe.
First to third pleopods in both genders reduced to uniramous, unsegmented lobes, gradually increasing in size from first to third (Figure 9D–F). Fourth pleopod of male biramous; endopod rudimentary, unsegmented; exopod extending to middle to posterior third of last abdominal somite, two-segmented; proximal segment 1.7 times longer than endopod, armed at outer distal corner with one short seta and at inner distal corner with one long plumose seta which is 1.6 times longer than distal segment; distal segment one-fifth of length of proximal segment, armed with short seta on inner and outer distal corners and with two long, stout, barbed terminal setae, one of which is slightly longer than other (1.1 times) and 2.5 times as long as distal segment (Figure 9G). Fourth pleopod of female uniramous, reduced to unsegmented lobe, 1.1 times as long as third pleopod. Fifth pleopod of both genders uniramous, reduced to unsegmented lobe, about 1.5 times as long as third pleopod (Figure 9H). Pseudobranchial lobe poorly developed in all pleopods (Figure 9D–H).

Endopod of uropod slightly shorter than telson, armed with two to five spines on inner ventral surface of statocyst region; spines increasing in size distally (Figure 9I, J). Exopod of uropod 1.4 times as long as endopod (Figure 9J).

Telson triangular with rounded apex, 2.1 times as long as last abdominal somite, 2.2–2.6 times as long as broadest part near base (Figure 9K, J). Lateral margin of telson armed with five to nine spaced spines on proximal one-fifth, followed by about one-seventh of margin naked, distal three-fourths densely armed with 10–13 clusters of spines, each cluster composed of one larger spine and one to four subequal smaller spines (Figure 9K, J). Distal margin of telson armed with two pairs of stout spines; in male these spines almost straight and 1.4–1.6 times as long as larger lateral spines, those of female slightly curved medially and 1.8–2.2 times as long as larger lateral spines (Figure 9K, J).

Remarks

*Orientomysis sagamiensis* was established by Nakazawa (1910), as *Metamysis sagamiensis*, on the basis of specimens collected from near Enoshima, Sagami Bay, central Japan. However, his description was brief with only one illustration, and after that there is no record of collection. Ii (1964: 488), who examined a number of mysid specimens in Japanese coastal waters, noted that “no specimens which should rightly be referred to this species were found in any hauls, which made not only in the waters near the type locality but also done in those around Japan”. The location of Nakazawa’s specimens is unknown (they were probably lost during World War II), so that we cannot know the morphological aspect of this species at present.

This species seems to be characterized by (1) the abdominal somites being smooth; (2) the endopod of the uropod with seven spines in the ventral statocyst region; (3) the lateral margin of the telson with a spineless part; and (4) the broad apex of the telson with four uniform and remarkably strong spines (Nakazawa 1910). The present specimens identified as *O. sagamiensis* agree well with the original description of this species in two characters of the telson, but are not in agreement in characters of the abdominal somite and the uropodal endopod. In the majority of the present specimens, a fold exists on each of the anterior four abdominal somites, but in a few specimens, the fold is so obscure that its observation is difficult. The abdominal fold may have been overlooked in previous investigation or may vary intraspecifically as is observed in *O. japonica* and *O. pseudomitsukurii*. The uropodal endopod is armed with two to five spines in the present
specimens compared with seven in the original description. The number of spines varies with individuals, but those which have as many spines as seven were not found in the present specimens.

The present specimens closely resemble *O. tamurai*, but cannot be identified with this species in the apical spines of the telson: these spines in *O. sagamiensis* are uniform and more than twice as long as the larger lateral spines (Figure 9J, K), whereas in *O. tamurai* the inner pair of apical spines is slightly shorter than the outer pair in most cases, and as long as and rarely longer than the outer pair in some cases; the outer pair is slightly longer than the larger lateral spines (Figure 11D, E).

The present specimens are identified with *O. sagamiensis* with some doubts and a full description is given here.

**Distribution**

This species is recorded only from Japanese coastal waters of the Pacific side, from Miyagi to Kanagawa (Nakazawa 1910; present study).

This species was collected from a depth of 8 m in Sendai Bay, northern Japan (present study).

**Orientomysis serrata** (Liu and Wang, 1980) comb. nov.

*Acanthomysis serrata* Liu and Wang 1980: 328, Figure 4(8–14); 1986: 195; Möller 1993: 198 (list); Liu and Wang 2000: 250–251.

**Type locality**

22°00′N, 113°30′E, off Guangdong, southern China.

**Material examined**

One male (7.4 mm) and one female (6.8 mm), 22°00′N, 113°30′E, off Guangdong, southern China, 6–8 m, soft mud bottom, 21 February 1959, on loan from Liu and Wang.

**Remarks**

*Orientomysis serrata* resembles *O. meridionalis* and *O. okayamaensis* in characters of the abdominal somites and the armature of the telson. Differences among these three species are summarized in Table VI.

**Distribution**

This species is known only from the depths of 6–8 m in the South China Sea off Guangdong, southern China (Liu and Wang 1980).

**Orientomysis sheni** (Wang and Liu, 1989) comb. nov.

*Acanthomysis sheni* Wang and Liu 1989 (MS in Shen et al. 1989): 210–211, Figure 11; Liu and Wang 2000: 255–257, Figure 96.
Type locality
North Yellow Sea off Yantai, Shandong, China.

Material examined
One male (11.2 mm) and one female (9.2 mm), Yantai, Shangdong, China, coastal water, 30 June 1956, on loan from Liu and Wang.

Remarks
In the present examination, some characters, which were probably overlooked by Wang and Liu (MS in Shen et al. 1989), were observed. The second segment of the endopod of the maxilla is armed with three tiny spines in the male and seven in the female, among long setae on the outer margin (Figure 10B). Sternal processes are present on the second to sixth and eighth thoracic somites in the female (Figure 10A). Those on the second to sixth somites are large and blunt, and covered with numerous spinules. The seventh somite has no process. The process on the eighth somite is knob-like without spinules.

Figure 10. Orientomysis sheni (Wang and Liu, 1989) comb. nov. (A, B) Female (9.2 mm); (C–E) male (11.2 mm). (A) Sternal process on thoracic somites, lateral; (B) maxilla, posterior; (C) fourth pleopod, anterior; (D) distal part of fourth pleopod, posterior; (E) telson, dorsal.
Distribution

This species has been recorded only from Chinese waters: the Bohai Sea off Hebei and the Yellow Sea off Shangdong (Wang and Liu, in Shen et al. 1989).

**Ori*entomysis tamurai** (Ii, 1964) comb. nov.

(Figure 11)

*Acanthomysis tamurai* Ii 1964: 516–519, Figure 134; Mauchline and Murano 1977: 45 (list); Müller 1993: 199 (list).

**Type locality**

Tomiura, near Tateyama, Chiba, central Japan.

**Material examined**

Two hundred and eighty-eight males (6.0–10.4 mm), five immature males (5.7–6.3 mm), 64 females (7.3–10.8 mm), 31 immature females (6.3–7.7 mm) and two juveniles (4.7 and 5.7 mm), Tateyama Bay, Chiba, central Japan, 19 June 1978, NSMT-Cr 15599.

Figure 11. Orientomysis tamurai (Ii, 1964) comb. nov. (A–D) Male (9.8 mm), NSMT-Cr 15599; (E) female (10.4 mm), NSMT-Cr 15599. (A) Penis, lateral; (B) fourth pleopod, posterior; (C) proximal part of uropod, ventral; (D, E) uropod and telson, dorsal.
Other material
Syntype: abundant males and females (dried), Tomiura Bay, near Tateyama, central Chiba, Japan, 1 May 1940, Ii’s coll. no. 437.

Remarks
Orientomysis tamurai is readily distinguishable from the other species of the genus except O. sagamiensis by the telson, with a hiatus in the spine rows of the lateral margin (Figure 11D, E).

This species is distinctly different from O. sagamiensis in the size of the apical spines of the telson.

Distribution
This species has been collected only from coastal water of Chiba, central Japan (Ii 1964; present study).

Orientomysis tenella (Liu and Wang, 1983) comb. nov.

*Orientomysis tenella* Liu and Wang 1983: 522–525, Figure 1; 1986: 192; Müller 1993: 199 (list); Liu and Wang 2000: 253–255, Figure 95.

Type locality
Wuchauan, Guangdong, southern China.

Material examined
One male (4.6 mm) and one female (4.5 mm), coastal water of Wuchuan, Guangdong, southern China, 18 May 1978, on loan from Liu and Wang.

Remarks
*Orientomysis tenella* resembles *O. leptura* and *O. pseudomitsukurii*. Differences among them are shown in Table V.

Distribution
Known only from the South China Sea off Guandong, southern China (Liu and Wang 1983).

Orientomysis tenuicauda (Murano, 1984) comb. nov.

*Acanthomysis* sp. Ikematsu 1963: 87, Plate 5, Figure 2.
*Acanthomysis tenuicauda* Murano 1984: 112–116, Figures 3b, 4, 5; Müller 1993: 199 (list); Jo and Ma 1996: 818–820, Figure 13.

Type locality
31°50.5′N, 124°02.0′E to 31°49.0′N, 124°03.0′E, the East China Sea.
Material examined

Holotype: female (10.3 mm), the East China Sea (31°50.5'N, 124°02.0'E to 31°49.0'N, 124°03.0'E), 42 m, bottom net, 20–21 May 1968, NSMT-Cr 8609. Allotype: male (11.6 mm), same data as holotype, NSMT-Cr 8610. Paratype: 10 males (9.8–11.4 mm) and 10 females (9.7–11.9 mm), same data as holotype, NSMT-Cr 8611.

Others. Five males (8.3–11.1 mm) and five females (10.4–12.4 mm), collection data same as holotype, NSMT-Cr 15600. Three females (10.8–10.9 mm), Boryong, Chungchongnamdo, western Korea, dip net by diver, 1 April 1992, on loan from S.-G. Jo. Abundant males (7.2–8.8 mm) and females (6.7–8.4 mm), Hiuchi-nada, Seto Inland Sea, western Japan, 14–24 m, sledge, 14 September 1995, on loan from Y. Hanamura. Eleven males (8.7–12.2 mm) and 10 females (7.9–11.4 mm), 34°29.80'N, 137°01.70'E, Enshu-nada, central Japan, 26.8 m, bottom net, 13 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15601. Nine males (11.2–12.7 mm) and 11 females (10.8–13.6 mm), 34°23.40'N, 137°02.90'E, Enshu-nada, central Japan, 55.7 m, bottom net, 14 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15602. Eighteen males (7.3–11.9 mm) and 21 females (8.1–12.9 mm), 34°23.40'N, 137°02.90'E, Enshu-nada, central Japan, 55.7 m, bottom net, 14 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15603. Eleven males (9.4–12.4 mm) and 10 females (8.5–11.4 mm), 34°36.60'N, 137°57.49'E, Ise Bay, central Japan, 42 m, bottom net, 14 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15604. Eleven males (7.6–11.3 mm) and eight females (7.8–12.2 mm), 34°41.00'N, 136°43.20'E, Ise Bay, central Japan, 23.2 m, bottom net, 15 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15605. Eight males (7.8–10.3 mm) and 10 females (8.3–11.2 mm), 34°41.00'N, 136°43.20'E, Ise Bay, central Japan, 23.2 m, bottom net, 15 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15606. Two males (8.3 mm and damaged) and five females (6.5–7.9 mm), 34°49.97'N, 136°47.23'E, Ise Bay, central Japan, 23.2 m, bottom net, 16 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15607. Two males (8.2 and 8.5 mm) and one female (8.4 mm), 34°55.10'N, 136°46.60'E, Ise Bay, central Japan, 24.1 m, bottom net, 16 June 1996, TR/V Seiyo-Maru cruise, NSMT-Cr 15608. Three males (9.4–11.1 mm), 10 immature males (4.4–6.1 mm), three females (9.1–10.0 mm), eight immature females (4.3–6.1 mm) and 12 juveniles (3.0–4.8 mm), 34°37.09'N, 137°30.06'E, Enshu-nada, central Japan, 39 m, bottom net, 17 July 1996, R/V Tansei-Maru cruise, NSMT-Cr 15609. Two males (6.2 and 6.6 mm), 33°51.58'N, 134°58.21'E, Kii Channel, central Japan, 59 m, bottom net, 15 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15610. Seven males (6.6–8.7 mm), 11 immature males (4.5–5.6 mm), 17 females (6.8–9.4 mm), eight immature females (4.7–5.8 mm) and 36 juveniles (3.3–5.0 mm), 34°02.16'N, 134°57.94'E, Kii Channel, central Japan, 73 m, bottom net, 15 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15611. Two males (6.1 and 6.1 mm), four immature males (5.0–5.3 mm), one female (9.3 mm), three immature females (5.2, 5.7 mm and damaged) and 14 juveniles (3.5–5.2 mm), 34°07.22'N, 134°58.00'E, Kii Channel, central Japan, 74 m, bottom net, 15 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15612. Three immature females (4.2–4.4 mm) and two juveniles (3.6 and 3.7 mm), 34°11.79'N, 134°57.95'E, Kii Channel, central Japan, 59 m, bottom net, 15 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15613. Nine males (8.2–11.2 mm) and seven females (8.5–10.4 mm), 34°24.70'N, 135°04.83'E, Osaka Bay, central Japan, 40 m, bottom net, 16 June 1997, TR/V Seiyo-Maru cruise, NSMT-Cr 15614. Eight males (7.1–9.3 mm), two immature males (6.0 mm and damaged), four females (7.4–8.8 mm), six immature females (4.8–6.8 mm) and three juveniles (2.7–3.7 mm), 34°32.03'N,
Remarks

Orientomysis tenuicauda is closely related to *O. sheni* in the shape of the telson, but differs from the latter species in the following points: (1) the inner margin of the second segment of the mandibular palp is armed with setae and several peculiar protuberances in *O. tenuicauda*, whereas it is armed only with setae in *O. sheni*; (2) the abdomen is furnished with a transverse row of spinules on only the sixth somite in *O. tenuicauda* compared with spinules on the fourth and fifth somites in *O. sheni*; (3) in *O. tenuicauda* the two terminal long setae on the exopod of the fourth male pleopod are unequal in length, longer seta 1.3 times as long as shorter one, whereas in *O. sheni* these are subequal; and (4) in *O. tenuicauda* the outer pair of apical spines of the telson is as long as or a little shorter than the larger lateral spines, while in *O. sheni* it is markedly longer than the larger lateral spines.

Distribution

This species has been collected from embayments and shallow water regions around Japan and Korea: the Ariake Sea (Ikematsu 1963), Suruga Bay, Ise Bay, Mikawa Bay, Enshunada, Osaka Bay, Kii Channel, the Seto Inland Sea (present study), the East China Sea (Murano 1984), and Pyonsan and Boryong, western Korea (Jo and Ma 1996).

This species was collected from a depth of 42 m in the East China Sea (Murano 1984) and from depths of 14–74 m in the Japanese waters (present study).

**Orientomysis arenaria** sp. nov.

(Figures 12, 13)

Material examined

Holotype: male (9.6 mm), dissected, Tateyama Bay, Chiba, central Japan, 0.7–3 m, sledge net, 20 May 1980, NSMT-Cr 15618. Paratypes: one female (9.2 mm), dissected, Tateyama Bay, Chiba, central Japan, 0.7–3 m, sledge net, 23 April 1980, NSMT-Cr 15619; two males (10.0 and 10.4 mm) and five females (14.0–17.8 mm), collection data same as NSMT-Cr 15619, NSMT-Cr 15620.

Others. Three males (9.4–10.1 mm), six immature males (6.9–9.1 mm) and 20 females (11.7–15.8 mm), collection data same as paratype (NSMT-Cr 15619), NSMT-Cr 15621. Fifty-five males (8.9–14.8 mm), 15 immature males (7.6–9.3 mm), 40 females (9.8–13.9 mm) and 23 immature females (7.0–10.0 mm), Fukiage-hama Beach, East China Sea side of Kagoshima, western Japan, 21 March 1988, coll. T. Noichi, NSMT-Cr 15622. Three males (10.0–11.4 mm) and two females (10.4 and 11.7 mm), mouth of Abukuma
River, Miyagi, northern Japan, 1.5–4 m, 25 August 1989, NSMT-Cr 15623. Five males (10.0–12.8 mm) and one immature female (8.3 mm), Sendai Bay, Miyagi, northern Japan, 8 m, sledge, 23 October 1991, coll. H. Yamada, NSMT-Cr 15624. Two males (10.0 and 13.0 mm), three immature males (6.0–8.0 mm) and two immature females (5.2 and 8.2 mm), Sendai Bay, Miyagi, northern Japan, 8 m, sledge, 22 November 1991, coll. H. Yamada, NSMT-Cr 15625. Three males (10.1–12.8 mm), seven immature males (6.3–7.6 mm), three females (12.0–13.2 mm) and three immature females (8.0–9.6 m), Sendai Bay, Miyagi, northern Japan, 8 m, sledge, 23 October 1992, coll. H. Yamada, NSMT-Cr 15626. One male (15.7 mm) and one female (15.2 mm), mouth of Hamaoka River, Shizuoka, central Japan, beach seine, 9 April 1997, NSMT-Cr 15627. One male (damaged), Kashima, Ibaraki, central Japan, sledge net, 16 January 1997, coll. K. Kimoto, NSMT-Cr 15628.

Description

Body robust; surface not hispid. All thoracic somites without sternal processes. All abdominal somites subequal in length; first abdominal somite with lateral fold, second to fourth somites with lateral groove, fifth and sixth somites without folds or spines.

Carapace with anterior margin produced to long triangular rostral plate with obtusely pointed apex, extending near distal margin of first segment of antennular peduncle; lateral margin of rostrum concave (Figure 12A, B); anterolateral corner of carapace rounded; posterior margin of carapace emarginate, leaving last one or two thoracic somites exposed dorsally, furnished medially with minute setae.

Eye somewhat depressed dorsoventrally, about 1.2 times as long as broad in dorsal view; cornea comprising two-fifths of eye in dorsal view; eyestalk with very small, blunt papilliform process on dorsal surface, hispid proximally (Figure 12A, B).

Antennular peduncle of male more robust than that of female; in male first segment 1.2 times as long as broad, third segment almost same length of first and second segments combined and 1.3 times as long as broad, with developed appendix masculina (Figure 12A); in female first segment 1.3 times as long as broad, third segment slightly longer than proximal two segments combined and 1.7 times as long as broad (Figure 12B).

Antennal scale lanceolate with rounded apex, 1.6 times longer than antennular peduncle, 6–6.5 times as long as broad, setose on entire margin; subapical suture present (Figure 12C). Antennal peduncle extending to proximal two-fifths of scale; second segment longest, 1.5 times as long as broad in male, and twice as long as broad in female; third segment four-fifths of length of second, 1.3 times as long as broad in male, and 1.5 times as long as broad in female (Figure 12C). Antennal sympod with spiniform process at outer distal angle (Figure 12C).

Labrum with short, spiniform process on anterior margin (Figure 12D).

Mandibular palp three-segmented; second segment expanded in middle, 2.2 times as long as broad; third segment two-fifths of second in length (Figure 12E).

Outer lobe of maxillule armed with 13 stout spines on distal margin and with three setae on ventral surface; outer margin with hump-like process armed with a few minute spines on distal base (Figure 12F).

Endopod of maxilla with second segment armed with five or six small spines among long setae on outer margin; exopod not reaching distal margin of first segment of endopod, armed with plumose setae on outer and apical margins; basal endite armed with many small spines on surface (Figure 12G).
Figure 12. Orientomysis arenaria sp. nov. (A, C–I) Male (9.6 mm), holotype, NSMT-Cr 15618; (B) female (17.8 mm), paratype, NSMT-Cr 15619. (A, B) Anterior part of body, dorsal; (C) antenna, ventral; (D) labrum, lateral; (E) mandible; (F) maxillule, posterior; (G) maxilla, posterior; (H) first thoracic limb, posterior; (I) second thoracic limb, posterior.
Endopod of first thoracic limb short and robust; preischium, ischium and merus slightly expanded inwards (Figure 12H). Endopod of second thoracic limb robust; merus 3.2 times as long as broad; carpopropodus slightly shorter than merus (Figure 12I). Endopods of third to eighth thoracic limbs with five-subsegmented carpopropodus; dactylus with long, slender claw terminally (Figure 13A, B). Exopods of thoracic limbs with flagellum eight-segmented in first and eighth limbs and nine-segmented in second to seventh limbs; basal plate with outer distal corner rounded armed partly with many spinules on margin (Figures 12H, I, 13A, B).

Penis 1.7 times as long as broad in lateral view, armed with five short, plumose and four long, naked setae on posterior margin, with five long, medially curved setae on distal margin, and with four long, plumose setae on distal half of anterior margin (Figure 13C).

Female with setose tuft on basis of third to sixth thoracic limbs and developed oostegites on seventh and eighth limbs; oostegite on seventh limb with baling lobe.

First to third pleopods of both genders uniramous, reduced to unsegmented lobes, gradually increasing in length from first to third (Figure 13D–F). Fourth pleopod of male biramous; endopod short, unsegmented; exopod extending to middle of last abdominal somite, two-segmented; proximal segment 1.8 times longer than endopod, armed with one tiny seta at outer distal corner and one long plumose seta at inner distal corner, latter seta 1.4 times as long as distal segment; distal segment one-fifth length of proximal segment, armed with one tiny seta at outer distal corner, one short seta at inner distal corner, and two long, barbed terminal setae which are subequal in length and 3.3 times as long as distal segment (Figure 13G). Fourth pleopod of female uniramous, reduced to unsegmented lobe, 1.2 times as long as third pleopod. Fifth pleopod of both genders reduced to uniramous and unsegmented lobe, 1.7 times as long as third (Figure 13H). Pseudobranchial lobe poorly developed in all pleopods (Figure 13D–H).

Endopod of uropod slightly shorter than telson, armed in ventral statocyst region with two or three spines increasing in size distally (Figure 13I–K). Exopod of uropod 1.3 times as long as endopod (Figure 13J, K).

Telson elongate triangular with rounded apex, twice as long as last abdominal somite, 2.3 times as long as maximum breadth near base, armed with spines throughout margins; lateral spines in proximal two-fifths spaced and subequal, in distal three-fifths these arranged in about 13 clusters, each cluster consisting of one larger spine and one to four subequal smaller spines, larger spines almost same in length; distal margin with two pairs of subequal spines, which are almost as long as apicalmost larger lateral spines (Figure 13J, K).

Etymology
The specific name is derived from Latin arenarius, sandy, referring to the habitat, sandy beach.

Remarks
Orientomysis arenaria is characterized by the following points: (1) the antennal scale is rather long, more than 1.5 times as long as the antennular peduncle; (2) the labrum is armed with a rather short spiniform process on the anterior margin; (3) the second endopod segment of the maxilla is armed with a few tiny spines among long plumose setae on the outer margin; (4) all the abdominal somites lack spine rows; (5) the telson is armed with numerous spines
Figure 13. *Orientomysis arenaria* sp. nov. (A–J) Male (9.6 mm), holotype, NSMT-Cr 15618; (K) female (17.8 mm), paratype, NSMT-Cr 15619. (A) Third thoracic limb, posterior; (B) eighth thoracic limb, posterior; (C) penis, lateral; (D–H) first to fifth pleopods; (I) basal part of uropod, ventral; (J, K) uropod and telson, dorsal.
on the entire lateral margin; and (6) the distal margin of the telson is armed with two pairs of spines which are as long as the larger lateral spines.

Orientomysis arenaria is allied to O. robusta and O. koreana in the shape and armature of the telson. However, O. arenaria is distinctly different from the latter two species by the abdominal somites without a row of spines and by the absence of dorsal spines near the base of the telson.

This species is also similar to O. sagamiensis and O. tamurai, but is distinguished from the latter two species by having the spines along the entire length of the lateral margin of the telson.

**Distribution**

This species was collected from the Pacific coast of the Japanese waters from Miyagi to Shizuoka and the East China Sea coast of Kagoshima.

This species was collected from waters shallower than 10 m.

**Discussion**

The current taxonomic positions of the nominal Acanthomysis species revised by Holmquist (1979, 1980, 1981a, 1981b) and Fukuoka and Murano (2000, 2001a, 2001b, 2002, 2004, present study) are listed in Table VIII. Seven species, A. anomala Pillai, 1961 (India), A. borealis Banner, 1954 (East Russia and Alaska), A. californica Murano and Chess, 1987 (California), A. macrops Pillai, 1973 (India), A. ornata O. Tattersall, 1965 (Malacca Strait), A. stelleri (Derzhavin, 1913) (East Russia and Alaska), and A. thailandica Murano, 1988 (Thailand), still remain in Acanthomysis s. l. as insertae sedis.

Concerning two Indian species, A. anomala and A. macrops, Holmquist (1981b) excluded them from her discussion on Acanthomysis, because she could not refer to the original descriptions of the two species. Acanthomysis anomala possesses characteristics of Acanthomysis s. str. as follows: the three-subsegmented carpopropodus of the endopod of the third to eighth thoracic limbs, the exopod of the fourth male pleopod with two terminal setae unequal in length, and the telson with lateral margins with a naked portion between the proximal spine group in the expanded basal part and the distal spine group composed of numerous spines. However, this species is not in agreement with the genus in having an acute anterolateral corner of the carapace. Furthermore, features of the setae terminating the exopod of the fourth male pleopod and of the pseudobranchial lobe of the pleopods, which indicate the generic character, are not known from the original description and illustration. Acanthomysis macrops also has characteristics of Acanthomysis s. str. in the number of the subsegments of the carpopropodus and in the shape of the terminal setae of the exopod of the fourth male pleopod, but disagrees with the genus in the telson without a prominent basal dilation, and the feature of the pseudobranchial lobe of the pleopods is unknown. The decision on the taxonomic position of these two species must await further examination of specimens.

Acanthomysis thailandica is closely related to Acanthomysis s. str. with the exception of the telson without a prominent basal dilation. Suitable taxonomic position will be decided through the examination of the type specimens stored at NSMT in the near future.

Acanthomysis californica seems to be related to Orientomysis rather than Acanthomysis s. str. in the four-subsegmented carpopropodus of the endopod of the third to eighth thoracic limbs, the poorly developed pseudobranchial lobe of the pleopods, and the shape of the
Tabel VIII. Present status of nominal species of *Acanthomysis*, revised by Holmquist (1979, 1980, 1981a, 1981b) and Fukuoka and Murano (2000a, 2000b, 2001, 2002, 2004, present study).

| Nominal species          | Present status                      | Reference         |
|--------------------------|-------------------------------------|-------------------|
| *A. costata* (Holmes, 1900) | *Holmesimysis costata*               | Holmquist (1979)  |
| *A. nuda* (Banner, 1948)   | *Holmesimysis nuda*                  | Holmquist (1979)  |
| *A. sculpa* (W. Tattersall, 1933) | *Holmesimysis sculpa*              | Holmquist (1979)  |
| *A. pseudomacropsis* (W. Tattersall, 1933) | *Xenacanthomysis pseudomacropsis*     | Holmquist (1980)  |
| *A. alaskensis* (Banner, 1954) | *Exacanthomoysis alaskensis*         | Holmquist (1981a) |
| *A. davisi* (Banner, 1948)  | *Exacanthomoysis davisi*             | Holmquist (1981a) |
| *A. indica* (W. Tattersall, 1922) | *Acanthomysis indica*               | Holmquist (1981b) |
| *A. longicornis* (Milne-Edwards, 1837) | *Acanthomysis longicornis*         | Holmquist (1981b) |
| *A. pelagica* (Pillai, 1957) | *Acanthomysis pelagica*               | Holmquist (1981b) |
| *A. platycauda* (Pillai, 1964) | *Acanthomysis platycauda*           | Holmquist (1981b) |
| *A. quadrispinosa* Nouvel, 1965 | *Acanthomysis quadrispinosa*          | Holmquist (1981b) |
| *A. dybowskii* (Derzhavin, 1913) | *Disacanthomysis dybowskii*          | Holmquist (1981b) |
| *A. nephrophthalma* (Banner, 1948) | *Pacifacanthomysis nephrophthalma*   | Holmquist (1981b) |
| *A. hodgarti* (W. Tattersall, 1922) | *Notacanthomysis hodgarti*          | Fukuoka and Murano (2000a) |
| *A. longirostris* Ii, 1936  | *Hyperacanthomysis longirostris*     | Fukuoka and Murano (2000b) |
| *A. bowmani* Modlin and Orsi, 1997 | Synonym of *Hyperacanthomysis longirostris* | Fukuoka and Murano (2000b) |
| *A. brevirostris* Wang and Liu, 1997 | *Hyperacanthomysis brevirostris*    | Fukuoka and Murano (2000b) |
| *A. sinensis* Ii, 1964     | *Synonym of Hyperacanthomysis brevirostris* | Wang and Liu (1997); Fukuoka and Murano (2000b) |
| *A. columbiae* (W. Tattersall, 1933) | *Telacanthomysis columbiae*         | Fukuoka and Murano (2001) |
| *A. dimorpha* Ii, 1936     | *Hemiacanthomysis dimorpha*          | Fukuoka and Murano (2002) |
| *A. schrencki* (Czerniavsky, 1882) | *Boreoaacanthomysis schrencki*      | Fukuoka and Murano (2004) |
| *A. aokii* Ii, 1964        | *Orientomysis aokii*                 | Present study     |
| *A. aspera* Ii, 1964       | *Orientomysis aspera*                | Present study     |
| *A. crassispinosa* Liu and Wang, 1980 | *Orientomysis crassispinosa*         | Present study     |
| *A. fujinagai* Ii, 1964    | *Orientomysis fujinagai*             | Present study     |
| *A. hwanchaiensis* Ii, 1964 | *Orientomysis hwanchaiensis*        | Present study     |
| *A. japonica* (Marukawa, 1928) | *Orientomysis japonica*             | Holmquist (1981b) |
| *A. koreana* Ii, 1964      | *Orientomysis koreana*               | Present study     |
| *A. leptura* Liu and Wang, 1980 | *Orientomysis leptura*              | Present study     |
| *A. longicauda* Murano, 1991 | Synonym of *Orientomysis rotundicauda* | Present study     |
| *A. meridionalis* Liu and Wang, 1983 | *Orientomysis meridionalis*         | Present study     |
| *A. mitsukuri* (Nakazawa, 1910) | *Orientomysis mitsukuri*            | Holmquist (1981b) |
| *A. nakazatoi* Ii, 1964    | *Synonym of Orientomysis japonica*  | Present study     |
| *A. okayamaensis* Ii, 1964 | *Orientomysis okayamaensis*         | Present study     |
| *A. pseudomitsukuri* Ii, 1964 | *Orientomysis pseudomitsukuri*      | Present study     |
| *A. robusta* Murano, 1984   | *Orientomysis robusta*               | Present study     |
| *A. rotundicauda* Liu and Wang, 1980 | *Orientomysis rotundicauda*       | Present study     |
| *A. sagamiensis* (Nakazawa, 1910) | *Orientomysis sagamiensis*         | Present study     |
| *A. serrata* Liu and Wang, 1980 | *Orientomysis serrata*              | Present study     |
| *A. sheni* Wang and Liu, 1989 | *Orientomysis sheni*                | Present study     |
| *A. tamurai* Ii, 1964      | *Orientomysis tamurai*               | Present study     |
| *A. tenella* Liu and Wang, 1983 | *Orientomysis tenella*              | Present study     |
| *A. tenicauda* Murano, 1984 | *Orientomysis tenicauda*            | Present study     |
| *A. brunnea* Murano and Chess, 1987 | Synonym of *Columbiaemysis ignota* | Fukuoka and Murano (2001) |
| *A. anomalae* Pillai, 1961  | incertae sedis                      |                  |
However, it is different from *Orientomysis* in having two unequal terminal setae on the exopod of the fourth male pleopod. The shape of the terminal setae of the exopod of the fourth male pleopod is not known from the original description. Appropriate taxonomic position should be decided after the examination of the type specimens.

*Acanthomysis ornata* is characterized by the three-subsegmented carpopropodus of the endopod of the third to eighth thoracic limbs, the exopod of the fourth male pleopod with two long terminal setae different in length, the uropodal endopod armed with a row of large, evenly spaced and curved spines throughout the inner margin, and the long and narrow telson armed with regularly spaced, downwardly directed, curved spines on the lateral margin. These characters indicate clearly that *A. ornata* is different from *Acanthomysis* s. str., *Orientomysis* or any of their related genera.

As for the two boreal species, *A. borealis* and *A. stelleri*, Holmquist (1979) stated that they were similar to *Exacanthomysis* in the state of the abdominal somites and the shape and armature of the telson. However, she hesitated to conclude their systematic position because the male of both species was unknown at that time. Later, Petryashov (1992) described the fourth male pleopods of *A. borealis* and *A. stelleri*, and also pointed out that the specimens identified by Holmquist (1979) as *A. borealis* and *Exacanthomysis arctopacifica* Holmquist 1979, were *A. stelleri* and *A. borealis*, respectively. It appears that these two species should be transferred to *Exacanthomysis*.

When Holmquist (1981b) established *Pacifacanthomysis*, she noted that this genus was distinguished from *Acanthomysis* by the following characters: the carpopropodus of the endopod of the third to eighth thoracic limbs is divided into four or five subsegments; the exopod of the fourth male pleopod reaches slightly beyond the posterior end of the last abdominal somite and bears two long, subequal terminal setae; the fifth pleopod is not exceptionally long; the pseudobranchial lobe of the pleopods is small; and the telson is long, triangular and armed with unequal spines along the lateral margins. However, these characters are the same as those of *Orientomysis* except for the length of the fourth male pleopod (see Table II). Re-examination of the generic value of *Pacifacanthomysis* is needed.

**Key to species of *Orientomysis***

1. Telson with hiatus in spines of lateral margin ........................................... 2
   – Telson armed with spines throughout lateral margin .................................. 3

2. Distal margin of telson armed with two pairs of subequal spines, outer spines 1.3–2.2 times as long as distalmost larger lateral spines ............................................. *O. sagamienesis*
   – Distal margin of telson armed with two pairs of spines, inner spines usually shorter than outer spines, outer spines 0.9–1.3 times as long as distalmost larger lateral spines ............................................. *O. tamurai*

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**Nominal species**

| Nominal species                  | Present status | Reference       |
|----------------------------------|----------------|-----------------|
| *A. borealis* Banner, 1954       | incertae sedis |                 |
| *A. californica* Murano and Chess, 1987 | incertae sedis |                 |
| *A. macrops* Pillai, 1973        | incertae sedis |                 |
| *A. ornata* O. Tattersall, 1965  | incertae sedis |                 |
| *A. stelleri* (Derzhavin, 1913)  | incertae sedis |                 |
| *A. thailandica* Murano, 1988    | incertae sedis |                 |
Distal margin of telson armed with several small spines in addition to two pairs of large spines .................. 4

Distal margin of telson armed with one or two pairs of subequal spines ....... 5

All abdominal somites without spine rows. Distal margin of telson armed with two pairs of large spines, pair of median small spines, and zero to four small spines between inner and outer pairs of large spines. Apical large spines of telson considerably longer than larger lateral spines .................. O. japonica

All abdominal somites without spine rows. Distal margin of telson armed with two pairs of large spines and one to three small spines between inner and outer pairs of large spines. Apical large spines of telson subequal in size to larger lateral spines .................. O. hwanhaiensis

Sixth abdominal somite with spine row. Distal margin of telson armed with a pair of large spines and two median small spines. Apical large spines of telson subequal in size to larger lateral spines .................. O. rotundicauda

Distal margin of telson armed with two pairs of stout spines, these spines are considerably longer than larger lateral spines .................. 6

Distal margin of telson armed with one or two pairs of stout spines, these spines are subequal to or only slightly longer than larger lateral spines ....... 14

All abdominal somites without spine rows .................. 7

Posterior one or two abdominal somites with dorsal spine row .................. 9

Body smooth .................. O. aokii

Body hispid .................. 8

Uropodal endopod with one or two spines in ventral statocyst region. O. aspera

Uropodal endopod without spines .................. O. crassispinosa

Larger lateral spines of telson subequal in length .................. 10

Larger lateral spines of telson increasing in size towards apex .................. 12

Rostrum low triangular, extending to base of antennular peduncle. Exopod of fourth pleopod of male without setae on distal end of proximal segment O. fujinagai

Rostrum long triangular, extending to middle to distal end of proximal segment of antennular peduncle. Exopod of fourth pleopod of male armed with long seta at inner distal corner of proximal segment .................. 11

Eye rather small, only extending to lateral margin of carapace. Intervals between larger spines on lateral margin of telson occupied by one to five small spines. Apical spines of telson one-tenth of telson length .................. O. koreana

Eye large, extending beyond lateral margin of carapace. Intervals between larger spines on lateral margin of telson occupied by one to three small spines. Apical spines of telson one-thirteenth of telson length .................. O. robusta

Telson without spines on dorsal surface .................. O. serrata

Telson with spines on dorsal surface near base .................. 13

Telson with small spines between outer pair of apical spines and distalmost larger lateral spines; intervals of larger spines on lateral margin occupied by one to four small spines .................. O. meridionalis

Telson without small spines between outer pair of apical spines and distalmost larger lateral spine; intervals of larger spines on lateral margin occupied by one or two small spines .................. O. okayamaensis

Abdominal somites without spine row. Telson without spines on dorsal surface 15
- Abdominal somites with spine row. Telson with spines on dorsal surface near base .............................................. 18
- Small spines inserted between larger lateral spines of telson subequal in size ............................................. 16
- Small spines inserted between larger lateral spines of telson gradually increasing in size distally ......................... 17
- Rostrum long, extending near distal margin of first segment of antennular peduncle. Two setae terminating exopod of fourth male pleopod subequal in length. Telson with one to four small spines between larger spines on lateral margin ................................................. O. arenaria sp. nov.
- Rostrum rather short, extending beyond base of antennular peduncle. Two setae terminating exopod of fourth male pleopod different in length, longer one 1.3 times as long as shorter. Telson with one or two small spines between larger spines on lateral margin ................................................. O. leptura
- Distal margin of telson armed with two pairs of stout, subequal spines .......................................................... O. pseudomitsukurii
- Distal margin of telson armed with two pairs of stout, unequal spines; inner pair longer than outer pair ................... O. tenella
- Telson long, triangular. Small spines inserted between larger lateral spines of telson gradually increasing in size distally ........................................................................................................... O. mitsukurii
- Telson long and narrow, becoming subparallel in distal one-third. Small spines inserted between larger lateral spines of telson subequal in size ................................................................. 19
- Second segment of mandibular palp with inner margin armed only with setae. Two terminal long setae of exopod of fourth male pleopod subequal ........................................... O. sheni
- Second segment of mandibular palp armed on inner margin with setae and small peculiar protuberances. Two terminal long setae of exopod of fourth male pleopod different in length, longer seta 1.3 times as long as shorter .......................................................... O. tenuicauda

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References

Banner AH. 1948. A taxonomic study of the Mysidacea and Euphausiacea (Crustacea) of the northeastern Pacific: Part II, Mysidacea, from tribe Mysini through subfamily Mysidellinae. Transactions of the Royal Canadian Institute 27:65–125.
Czerniavsky V. 1882. Monographia Mysidarum inprimis Imperii Rossici. Trudy Sankt-Petersburgsko Obschestwo Estestwoitypatelei 12:1–170.
Derzhavin A. 1913. Neue Mysiden von der Küste der Halbinsel Kamtschatka. Zoologischer Anzeiger 43:197–204.
Revision of East Asian Acanthomysis

Fukuoka K, Murano M. 2000a. Taxonomic position of *Acanthomysis quadrispinosa*, and establishment of a new genus, *Notacanthomysis*, for *A. hodgarti* and *A. laticauda* (Crustacea: Mysidacea: Mysidae). Species Diversity 5:23–37.

Fukuoka K, Murano M. 2000b. *Hyperacanthomysis*, a new genus for *Acanthomysis longirostris* Ii, 1936, and *A. brevirostris* Wang & Liu, 1997 (Crustacea: Mysidacea: Mysidae). Plankton Biology and Ecology 47:122–128.

Fukuoka K, Murano M. 2001. *Telacanthomysis*, a new genus, for *Acanthomysis columbiae*, and redescription of *Columbiaemysis ignota* (Crustacea: Mysidacea: Mysidae). Proceedings of the Biological Society of Washington 114:197–206.

Fukuoka K, Murano M. 2002. A new genus, *Hemiacanthomysis*, for *Acanthomysis dimorpha* (Crustacea: Mysidacea: Mysidae). Species Diversity 7:209–215.

Fukuoka K, Murano M. 2004. A new genus for *Acanthomysis schrencki* (Czerniavsky, 1882) (Crustacea: Mysida: Mysidae) with the first description of the male. Journal of the Biological Society of Washington 117:279–394.

Gordan J. 1957. A bibliography of the order Mysidacea. Bulletin of the American Museum of Natural History 129:279–394.

Hirota Y, Noguchi M, Koshiishi Y. 1988. *Jiryou kankyo kara mita kankyo syuyouryoku no hyouka* [Evaluation of the carrying capacity based on prey]. Marine Ranching Progress Report, Seikai National Fisheries Research Institute 3:203–215. (Jpn).

Hirota Y, Tominaga O, Kamiharako T, Kodama K, Ogata T, Tanaka K, Furuta S, Kojima K, Koshiishi Y. 1989. *Nihonkai senkai-iki ni okeru amirui no tiribunnpu* [Zoogeography of mysids in shallow waters of the Japan Sea]. Contributions to the Fisheries Researches in the Japan Sea Block 15:43–57. (Jpn).

Holmquist C. 1979. *Mysis costata* Holmes, 1900, and its relations (Crustacea, Mysidacea). Zoologische Jahrbücher, Abteilung für Systematik, Ökologie, und Geographie der Tiere 106:471–499.

Holmquist C. 1980. *Xenacanthomysis*—a new genus for the species known as *Acanthomysis pseudomacropsis* (W. M. Tattersall, 1933) (Crustacea, Mysidacea). Zoologische Jahrbücher, Abteilung für Systematik, Ökologie, und Geographie der Tiere 107:501–510.

Holmquist C. 1981a. *Exacanthomysis* gen. nov., another detachment from the genus *Acanthomysis* Czerniavsky (Crustacea, Mysidacea). Zoologische Jahrbücher, Abteilung für Systematik, Ökologie, und Geographie der Tiere 108:247–263.

Holmquist C. 1981b. The genus *Acanthomysis* Czerniavsky, 1882 (Crustacea, Mysidacea). Zoologische Jahrbücher, Abteilung für Systematik, Ökologie, und Geographie der Tiere 108:386–415.

Ii N. 1936. Studies on Japanese Mysidacea. I. Description of new and some already known species belonging to the genera *Neomysis*, *Acanthomysis* and *Proneomysis*. Japanese Journal of Zoology 1:577–619.

Ii N. 1964. *Fauna Japonica, Mysidae* (Crustacea). Tokyo: Biogeographical Society of Japan) 610 p.

Ikemastu W. 1963. Ecological studies on the fauna of Macrura and Mysidacea in the Ariake Sea. Bulletin of the Seikai Regional Fisheries Research Laboratory 30:1–124. (Jpn with Eng abstract).

Illig G. 1930. Die Schizopoden der Deutschen Tiefsee-Expedition. Deutschen Tiefsee-Expedition 108–1899 22:400–625.

Jo S-G, Ma C-W. 1996. *Mysidacea* (Crustacea) from the west coast of Korea. Journal of the Korean Fisheries Society 29:805–827.

Liu R, Wang S. 1983. On three new species of *Mysidacea* (Crustacea) from the coastal waters of Guangdong, China. Oceanologia et Limnologia Sinica 14:522–530. (Chi with Eng abstract and description).

Liu R, Wang S. 1986. Studies on Mysinae (Crustacea Mysidacea) of the northern South China Sea. Studia Marina Sinica 26:159–202. (Chi with Eng abstract).

Liu R, Wang SS. 2000. *Fauna Sinica. Arthropoda, Crustacea, Malacostraca, Order Mysidacea*. Beijing: Science Press. 326 p. (Chi with Eng abstract).

Marukawa H. 1928. Ueber neue 5 Arten der Schizopoden. Annotation of the Oceanographical Research 2: 4–8.

Mauchline J, Murano M. 1977. World list of the Mysidacea, Crustacea. Journal of the Tokyo University of Fisheries 64:39–88.

Modlin RF, Orsi JJ. 1997. *Acanthomysis bowmani*, a new species, and *A. aspera* Ii, Mysidacea newly reported from the Sacramento-San Joaquin Estuary, California (Crustacea: Mysidacea). Proceedings of the Biological Society of Washington 110:439–446.

Modlin RF, Orsi JJ. 2000. Range extension of *Acanthomysis hwanhaiensis* Ii, 1964, to the San Francisco estuary, California, and notes on its description (Crustacea: Mysidacea). Proceedings of the Biological Society of Washington 113:690–695.
Müller H-G. 1993. World catalogue and bibliography of the recent Mysidacea. Wetzlar: Wissenschaftlicher Verlag. 491 p.

Murano M. 1984. Two new species of *Acanthomysis* (Crustacea, Mysidacea) from Japan. Bulletin of the National Science Museum, Tokyo, Series A (Zoology) 10:107–116.

Murano M. 1988. Mysidacea from Thailand with descriptions of two new species. Crustaceana 55:294–305.

Murano M. 1991. Two new species of the tribe Mysini (Crustacea, Mysidacea) and a new record of *Acanthomysis quadrispinosa* from Japan. Bulletin of the National Science Museum, Tokyo, Series A (Zoology) 17:81–91.

Nakazawa K. 1910. Notes on Japanese Schizopoda. Annotationes Zoologicae Japonenses 7:247–261, Plate 8.

Petryashov VV. 1992. Notes on mysid systematics (Crustacea, Mysidacea) of Arctic and the north-western Pacific. Zoologicheskii Zhurnal 71 (10):47–58. (Rus with Eng abstract).

Pillai NK. 1964. Report on the Mysidacea in the collections of the Central Marine Fisheries Research Institute, Mandapam Camp, South India-Part I. Journal of the Marine Biological Association of India 6:1–41.

Pillai NK. 1973. Mysidacea of the Indian Ocean. Handbook to the International Zooplankton Collections, Indian Ocean Biological Centre 4:1–125.

Shen J, Liu R, Wang S. 1989. Mysidacea in waters off the North China Coasts. Studia Marina Sinica 30:189–227. (Chi with English abstract and description).

Tattersall OS. 1957. Report on a small collection of Mysidacea from the Sierra Leone estuary together with a survey of the genus *Rhopalophthalmus* Illig and a description of a new species of *Tenagomysis* from Lagos, Nigeria. Proceedings of the Zoological Society of London 129:81–128.

Tattersall OS. 1965. Report on a small collection of Mysidacea from the northern region of the Malacca Strait. Journal of Zoology 147:75–98.

Tattersall WM. 1932. Contributions to a knowledge of the Mysidacea of California, II: The Mysidacea collected during the survey of San Francisco Bay by the U.S.S. "Albatross" in 1914. University of California Publications in Zoology 37:315–347.

Wang S, Liu R. 1997. Mysidacea fauna of the East China Sea. Studia Marina Sinica 38:191–222. (Chi with Eng abstract).

Yamada H, Nagahori S, Sato K, Musashi T, Fujita T, Nihira A, Kageyama Y, Kumagai A, Kitagawa D, Hirota Y, Yamashita Y. 1994. Species composition and distributional patterns of Mysidacea in Pacific Ocean coast of Japan. Bulletin of Tohoku National Fisheries Research Institute 56:57–67. (Jpn with Eng abstract).

Zimmer C. 1915. Die Systematik der Tribus Mysini H. J. Hansen. Zoologischer Anzeiger 46:202–216.