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Euphilomedes nipponica n. sp. from Hokkaido, with a Redescription of *E. sordida* (G.W. Müller) (Ostracoda; Myodocopina)[1)]

By

ShinIchi Hiruta

Zoological Institute, Hokkaido University

(*With 12 Text-figures*)

The first contribution to the knowledge of the members of the family Philomedidae G.W. Müller from Japan was made by G.W. Müller (1890) who described two new species; *Philomedes japonica* G.W. Müller from Enoshima, Kanagawa Pref. and *Philomedes sordida* G.W. Müller from Hakodate, Hokkaido. The next and last contribution was made by Kajiyama (1912) in his report on the Ostracoda from Misaki, Kanagawa Pref. He described two species, one of which was new species; *Philomedes japonica* G.W. Müller, 1890 and *Philomedes iijimai* Kaiyama, 1912. All the species above-mentioned are now referred to the genus *Euphilomedes* which was established by Poulsen (1962).

The present paper deals with two species of the genus *Euphilomedes* from Oshoro, Hokkaido, one of which is identifiable with *E. sordida* (G.W. Müller, 1890), and the other is new to science. Taxonomic situation of *E. japonica* (G.W. Müller, 1890) sensu Kajiyama (1912) is also discussed, since his identification is now doutful and, further, he referred *E. sordida* to a synonym of *E. japonica*, on the basis of the observation on his specimens of "*E. japonica*".

Specimens were collected from shallow bottom (0–4 m in depth) and rinsed from bottom mud or sand, stirred in sea-water, filtrated with a plankton net. The type specimens are deposited in the Zoological Institute, Faculty of Science, Hokkaido University.

Before going further I express my sincere thanks to Professor Mayumi Yamada of the Hokkaido University for his guidance and reading the manuscript. Sincere gratitude is also due to Dr. Tetsuro Hanai of the Tokyo University, who gave me much important information for my study.

1) Studies on the recent marine Ostracoda from Hokkaido, III.

Euphilomedes nipponica n. sp.

(Figs. 1~6)

Female. *Carapace* (Fig. 1-1~5) 1.98 mm in length, oval in lateral view with greatest height near middle and about three-fourths the length of carapace

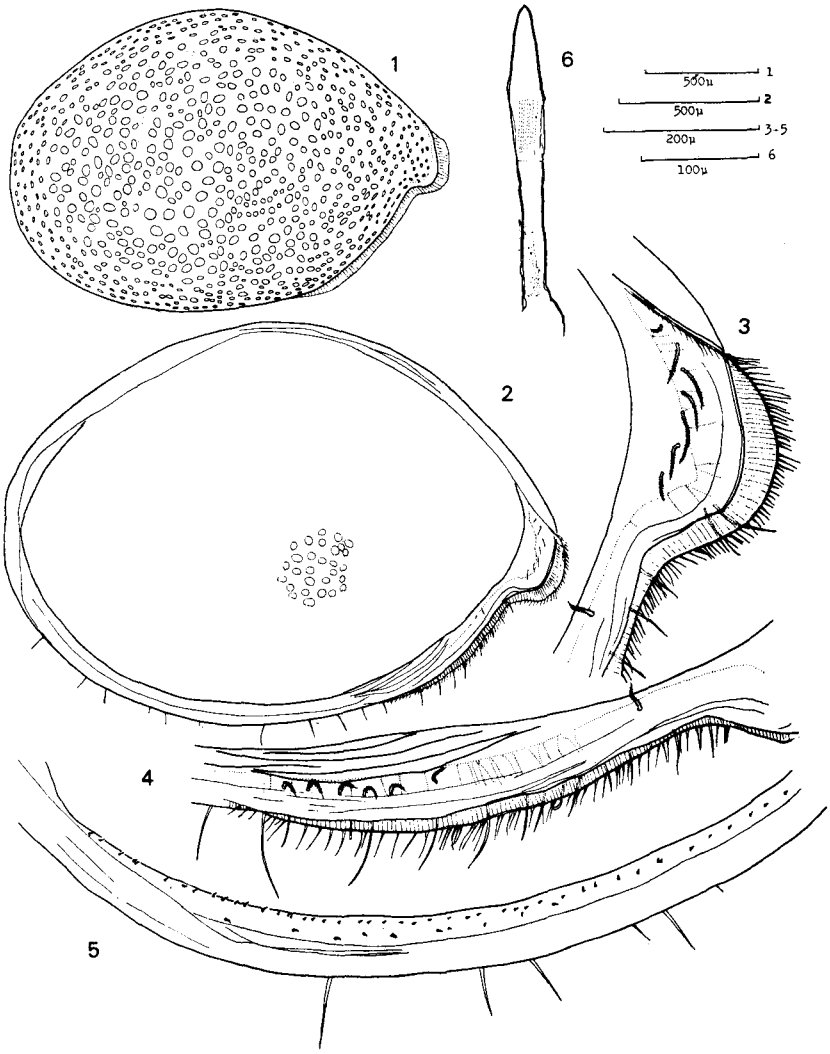

Fig. 1. *Euphilomedes nipponica* n. sp. Female (Holotype). 1. lateral view; 2. inside view of left valve; 3. inside view of rostrum; 4. anteroventral part of inner lamella of left valve; 5. ventral to posterior part of inner lamella of left valve; 6. rod-shaped organ.

and with prominent rostrum and shallow rostral incisure; left valve overlaps right valve along anterodorsal margin; carapace oblong oval in dorsal view with greatest width near middle and about three-fifths the length of carapace; hingement not distinct; surface of valves with numerous small oval pits which are as large as or slightly larger than individual scars of adductor muscle and with setae on lateral surfce of shell near outer margins; adductor muscle scars consisting of about thirty individual muscle scars locating below anterior middle of valve. Line of concresence lies about halfway between inner and outer margin of inner lamella, closer to inner margin in anteroventral section, closer to inner margin in posteroventral section; marginal zone with simple, fairly closely spaced radial pore canals; selvage with corrugated, lamellar prolongation having fringe of hairs along outer margin; seven plumose bristles forming row on inner lamella behind rostrum; inner lamella ventral to rostral incisure with small plumose bristles, followed by wide space and then about six plumose bristles; about sixty spinules on posteroventral half of inner lamella; about five striations between list and inner margin of anterior part of inner lamella.

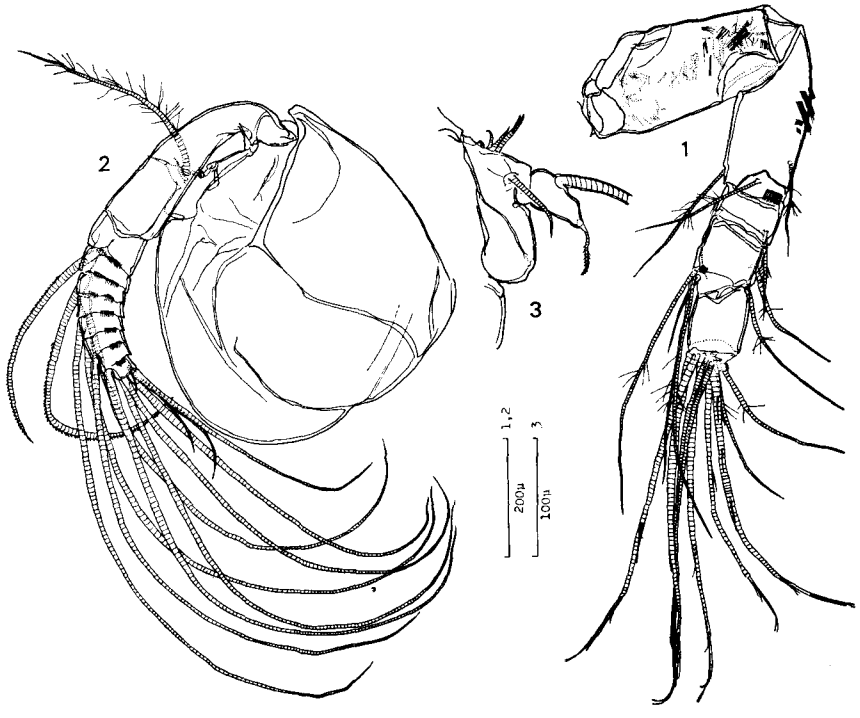

Fig. 2. *Euphilomedes nipponica* n. sp. Female (Holotype; 2. paratype). 1. first antenna; 2. second antenna; 3. endopodite of second antenna.

First antenna (Fig. 2–1). First segment slightly longer than second, with clusters of hairs on broad surface; second segment with clusters of hairs on anterior middle surface, a comb of hairs on anterior distal edge and three bristles, one of which arises from near anterodistal edge, one from near posterodistal edge and one from distolateral margin, all with wreaths of hairs; third segment about one-sixth the length of first, with two anterodistal bristles with wreaths of hairs, one is two-thirds the length of the other, one bare bristle on posterodistal edge; fourth segment twice as long as third, with two anterior bristles wreathed by hairs, one of which arises from a point of two-thirds the length, the other from distal edge, and four posterodistal bristles, of which one bare bristle is much shorter than others with wreaths of hairs; fifth segment somewhat longer than fourth, with one slender bristle on distal edge wreathed by hairs; end segment (or segments) with one short a-bristle, two long d- and e-bristles without filament and five long birstles (b-, c-, c-, f-, and g-bristles) with filaments which and preceding longer bristles about equal to second to end segment combined in length.

Second antenna (Fig. 2–2, 3). Exopodite nine-segmented; first segment slightly longer than following segments combined; second to ninth segments trapezoidal, tapering distally, all without basal spines; mediodistal margin of second to eighth segments with comb of hairs; second to ninth segments with long bristles; bristles of second and third segments with denticulation along anterior margin, no natatory hairs; bristles on fourth to eighth segments with natatory hairs; end segment with seven bristles, four of which long with natatory hairs, one very short and two short without hairs. Endopodite two-segmented; first one with five proximal bristles and one distal bristle; second one about as long as preceding distal bristle, bearing long bristle with wreaths of stiff hairs on anteromedial surface and short slender ciliated bristle at distal end of segment.

Mandible (Fig. 3–1). Coxale endite large, bifurcate, with secondary teeth and clusters of spinules, accompanied with small bristle near its base. Basale: surface hirsute; ventral margin with six bristles, of which the distalmost is long, the rest five are equal in length, all with wreaths of hairs; dorsal margin with three long bristles wreathed by hairs midst, one of which arises from middle of margin, others from distal edge; medioproximal surface with two bristles wreathed by hairs and two spines with secondary teeth; mediocentral surface with bristle wreathed by hairs. Exopodite one-third the length of first endopodite segment with terminal spine and two bristles, one of which is short, bare, extending to the distal end of first endopodite segment, the other long, reaching to distal end of third endopodite segment; dorsal margin of exopodite with a row of fine hairs. Endopodite three-segmented; first one three-fifths the length of second, with comb of hairs dense on broad inner surface, four bristles on distoventral edge, three of which long, wreathed by hairs, one short, bare; second one with some combs of hairs on inner surface; dorsal margin of second segment with nine bristles, which are separated into two groups, three in proximal group, six in distal group near middle of margin; ventral margin of second segment with two clusters of bristles,

two in proximal group, three in terminal group; end segment small, one-tenth the length of second, with two long claws of subequal lengths, one short dorsal claw and three bristles.

Maxilla (Fig. 3-2~5). Dorsal margins of precoxale and coxale with long fine hairs; coxale with plumose bristle on anterior distal margin; basale with three

Fig. 3. *Euphilomedes nipponica* n. sp. Female (Holotype; 7. paratype). 1. mandible; 2. Maxilla; 3. distal part of maxillary endopodite; 4. first endite of maxilla; 5. second and third endites of maxilla; 6. distal part of fifth limb; 7. sixth limb; 8. seventh limb; 9. furca.

distal bristles, one of which long, wreathed by hairs, arising from anterior margin, one bare and one with stiff hairs extending to end of endopodite from ventral margin. Exopodite with one bare, short bristle, two long bristles, one of which with stiff hairs, reaching to distal end of endopodite bristles. Endopodite: first segment elongate, with some clusters of hairs on middle surface and one α-bristle wreathed by long hairs and three β-bristles of different lengths; end segment very small, with three claws (one b-bristle and two d-bristles) of different lengths on distal edge and eight bristles, of which one (b-bristle) arises from near anterodistal edge with wreaths of hairs, juxtaposed three (a-bristles) of different lengths from near posterodistal edge, and the rest four (c- and d- bristles) from distal edge. Three endites: first one with ten bristles, six annulate with short marginal hairs, four spiniform, pectinate; second one with six bristles, four annulate, two spiniform, pectinate; third one with nine bristles, six annulate, three spiniform, pectinate and one proximal bristle.

Fifth limb (Fig. 3–6). Epipodial appendage with about 49 bristles; first exopodite segment with two bristles with wreaths of stiff hairs on middle of anterodistal margin; main tooth of first exopodite segment comprising some constituent teeth; distal triangular tooth anterior to main tooth about same size as distal tip of second exopodite segment; second exopodite segment with one bristle on near distolateral corner; third segment with two long, plumose bristles on outer margin and five bristles wreathed by stiff hairs on inner margin; fourth segment with seven bristles wreathed by stiff hairs; endites with about twenty bristles wreathed by stiff hairs.

Sixth limb (Fig. 3–7) with clusters of hairs on broad surface; epipodial appendage with two plumose bristles; first endite with two bristles of different lengths; second one with one proximal and three distal bristles; third one with eight bristles; fourth one with seven bristles; all endite bristles wreathed by stiff hairs; end segment subtriangular, with thirteen to fifteen bristles, generally fourteen, all with long hairs.

Seventh limb (Fig. 3–8). Terminal comb with about seven teeth; two pegs present opposing comb, both ciliated on lateral margin; six cleaning bristles of different lengths in distal group, four of an equal length in proximal group; each bristle with short spines laterally and three to six bells distally.

Furca (Fig. 3–9). Each lamella with nine claws; 1, 2, 4 primary, remaining claws secondary; all claws separated from lamellae; primary claws and secondary claws decrease in length proximally; lamella near base of claws 1 to 6 with clusters of hairs and its near proximoventral margin to middle of proximal margin with hairs; primary claw number 1 and 2 with cluster of long hairs near base; primary claws with two rows of teeth: secondary claws with spinules along both anterior and posterior margins.

Rod-shaped organ (Fig. 1–6) indistinctly two-segmented, swelling in distal third the length and tapering distally. *Eyes.* Median eye large, with dark brown pigments; lateral eyes small, with orange red tint. *Eggs.* Seven individuals

examined with 25 to 35 eggs in brood pouch.

Male. Carapace (Fig. 4–1∼5) 1.91 mm in length, elongate oval in lateral view with greatest height near middle and about three-fifths the length of carapace and with prominent rostrum and shallow rostral incisure; posterior dorsal margin joining posterior margin in a slight angle; left valve overlaps right valve along anterodorsal margin; carapace oblong in dorsal view with greatest width near middle and less than one-half the length of carapace; hingement not distinct; surface of valves with numerous small oval pits which are as large as or slightly smaller than individual scars of adductor muscle and with slender setae on lateral surface of shell near outer margins; posterior surface with many long slender setae; adductor muscle scars consisting of about twenty-five individual muscle scars located slightly posterior to center of valve. Line of concrescence about halfway between inner and outer margin of inner lamella. Selvage with wide, corrugated lamellar prolongation, having fringe of hairs along outer margin; no parallel striations observed on inner lamella; seven plumose bristles forming row on inner

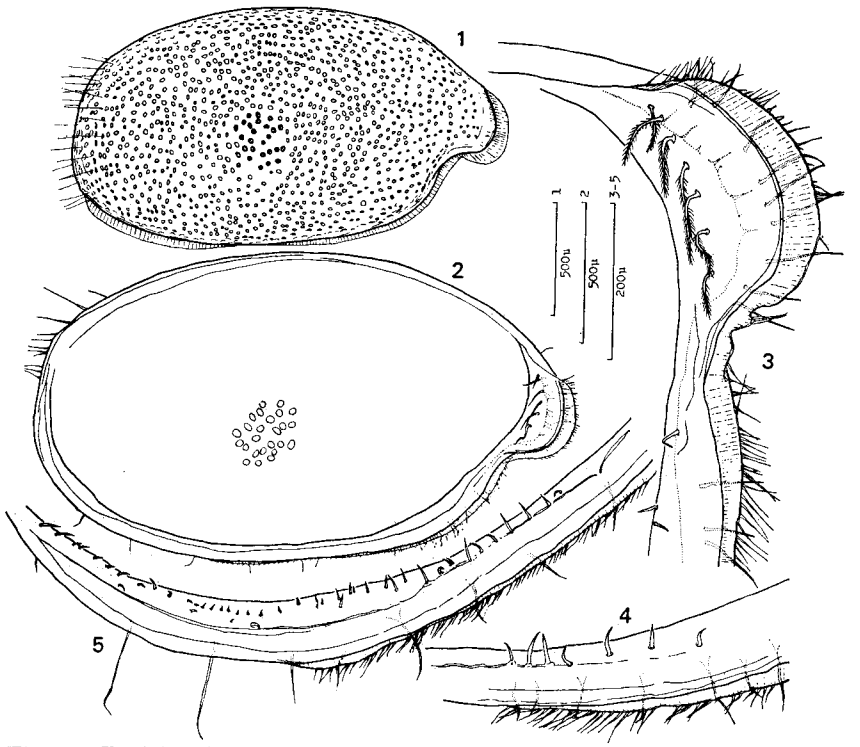

Fig. 4. *Euphilomedes nipponica* n. sp. Male (Allotype). 1. lateral view; 2. inside view of left valve; 3. inside view of rostrum; 4. anteroventral part of inner lamella of left valve; 5. ventral to posterior part of inner lamella of left valve.

lamella behind rostrum; inner lamella ventral to rostral incisure with small three spinules, followed by wide space and then about seven spinules; about fifty spinules on posteroventral half of inner lamella.

First antenna (Fig. 5–2): first segment about four-fifths the length of second, with clusters of hairs on anterior margin; second segment with many clusters of hairs on anterior and posterior surface, combs of hairs on distolateral margin, and three bristles wreathed by hairs, one of which arises from near anterodistal edge, one from near posterodistal edge and one from distolateral margin; third segment about two-ninths the length of second, with three bristles, one of which arises from posterodistal edge, the rest two from near anterodistal edge; fourth segment about twice as long as third, with four bristles of different lengths on posterodistal edge, two bristles, one arising from near distal edge, the other from distal edge; third and fourth segments with some clusters of hairs on surface; fifth segment, inferred to be inserted posteriorly between fourth and sixth ones, bearing sensory bristle with broad base and provided with numerous filaments; sixth segment somewhat shorter than fourth, with single bristle on distal edge; end segments with seven bristles, anterior one (a-bristle) short, bare, medial two (b- and g-bristle) short with filaments, two (d- and e-bristle) slender, and two (c- and f-bristle) long stout.

Second antenna (Fig. 5–3, 4). Protopodite subtriangular. Exopodite nine-segmented; first one about 2.6 times as long as second; second one about five-ninths the length of third; third one about nine-tenths the length of following segments combined; fourth to ninth segments trapezoidal, tapering distally; all exopodite segments without basal spines; mediodistal margin of second to ninth segments with long bristles; bristle of second segment with denticulation along anterior margin, no natatory hairs, extending beyond distal end of fifth segment; bristles of third to eighth segments with natatory hairs; end segment with six bristles, four of which are long, the rest two short, all with natatory hairs. Endopodite three-segmented; first one with five proximal bristles and one distal bristle; second one elongate, with two bristles of an equal length on anterior middle surface; third one elongate, arcuate, shorter than second, with slender bristle arising from a point of about one-fourth the length, and two short, bare subterminal bristles, and several serrate ridges on distal margin.

Mandible (Fig. 5–5, 6). Coxale endite small, bifurcate, accompanied with small bristle near its base. Basale: surface hirsute; ventral margin with five to eight bristles wreathed by hairs, which are longer than those of female; dorsal margin with three bristles wreathed by hairs midst, one of which arises from middle of margin, two from distal edge; medioproximal surface with four bristles; mediocentral surface with one ciliated bristle. Exopodite one-half the length of first endopodite segment, with small terminal spine and two bristles, one of which short, extending to distal end of first endopodite segment, the other long, wreathed by stiff hairs midst, extending to distal end of third endopodite segment; dorsal margin of exopodite with a row of fine hairs. Endopodite three-segmented; first one about three-fifths the length of second, with combs of hairs on broad inner

surface and four bristles on distoventral edge, two of which wreathed by stiff hairs; second one with combs of hairs on inner surface; dorsal margin of second segment with nine bristles, which are not clearly separated into two groups as in female; ventral margin of second segment with two clusters of bristles, two in proximal group, three in terminal group; end segment very small, with two subequal long claws, one short dorsal claw and three bristles.

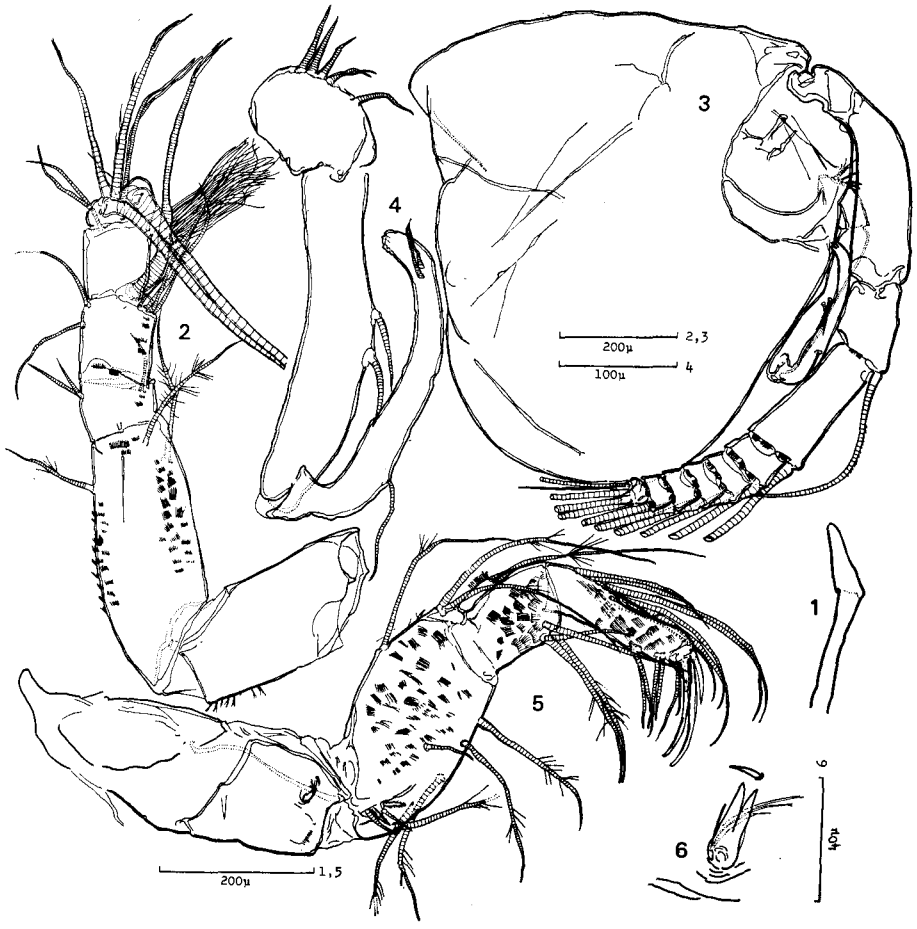

Fig. 5. *Euphilomedes nipponica* n. sp. Male (Allotype). 1. rod-shaped organ; 2. first antenna; 3. second antenna; 4. endopodite of second antenna; 5. mandible; 6. coxale endite of mandible.

Maxilla (Fig. 6–1, 2) smaller than that of female: bristles and endites more weakly developed than in female; dorsal margin of precoxale and coxale with

fringe of hairs; coxale with plumose bristle on anterior distal margin; basale with plumose bristle on anterior distal margin; ventral margin of basale not observable. Exopodite with one bare short bristle and two long plumose bristles. Endopodite: first segment elongate, with hairs on broad surface and one α-bristle and three β-bristles of different lengths; end segment with eleven bristles. Three endites with many bristles.

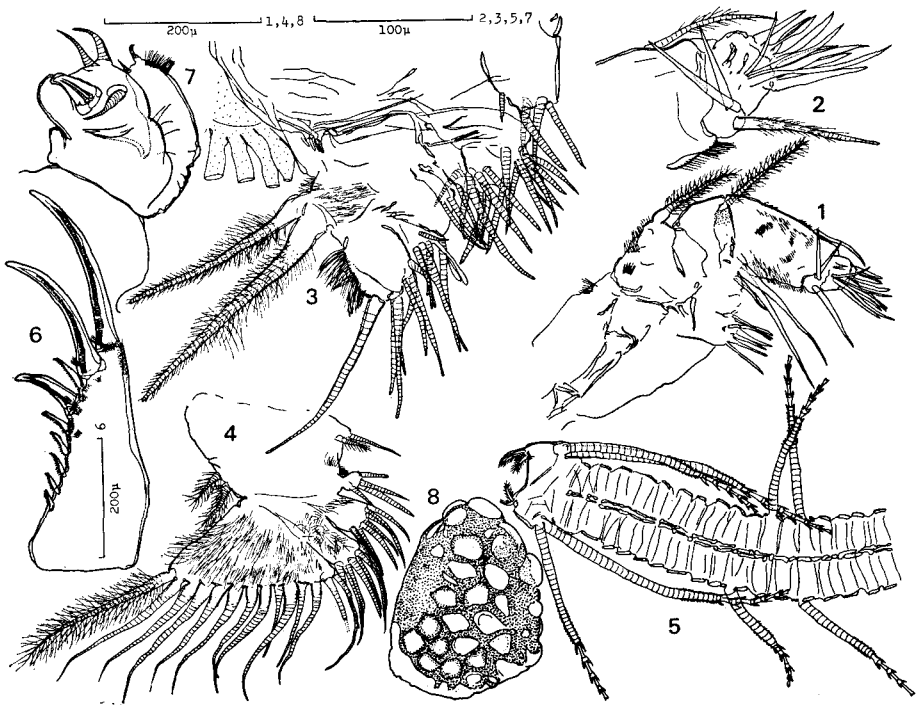

Fig. 6. *Euphilomedes nipponica* n. sp. Male (Allotype; 7. paratype). 1. maxilla; 2. distal part of maxillary endopodite; 3. distal part of fifth limb; 4. sixth limb; 5. seventh limb; 6. furca; 7. copulatory limb; 8. lateral eye.

Fifth limb (Fig. 6–3). Epipodial appendage with about fifty plumose bristles; segmentation of endites and exopodite not clear; third exopodite segment with two long plumose bristles on outer margin; end segment with seven bristles and long hairs along outer margin.

Sixth limb (Fig. 6–4). Surface hirsute; epipodial appendage with two plumose bristles; first endite with two bristles of different lengths, second one with four bristles; third one with eight bristles; fourth one with seven bristles; all endite bristles with short hairs on lateral margin; end segment triangular, with thirteen to

fourteen bristles, generally fourteen, all with long hairs.

Seventh limb (Fig. 6–5) slender than that of female; terminal comb with about seven teeth; two pegs present opposing comb, both ciliated on lateral margin; four cleaning bristles in distal group, four of an equal length in proximal group; each bristle with short spines laterally and four to six bells distally.

Furca (Fig. 6–6). Each lamella with generally nine claws; 1, 2, 4 primary, remaining claws secondary; all claws separated from lamella and decrease in length proximally; lamella near base of claws 1 to 5 with clusters of hairs; primary claws with cluster of hairs near base.

Copulatory limb (Fig. 6–7) short, round; distal part of lobes with short bristles. *Rod-shaped organ* (Fig. 5–1) indistinctly two-segmented, swelling in distal third the length and tapering distally. *Eyes* (Fig. 6–8). Median eye with dark brown pigments. Large lateral eyes with about 25 ommatophores.

Remarks. The present new species resembles *E. japonica* reported by Müller (1890) from Enoshima, Kanagawa, in the lateral view of carapace, but is clearly discernible from the latter in the distribution of primary and secondary claws on furcal lamella; in *E. nipponica* n. sp., the claw no. 3 is only being a secondary claw inserted between the primary claws, but in *E. japonica* both the claw no. 3 and 5 are being secondary ones. In addition, the present new species is distinguishable from *E. sordida* described by Müller (1890) from Hakodate, Hokkaido, chiefly in the size of carapace and oval pits on the shell surface and the shape of the endopodite of the second antenna of the female. There are seven plumose bristles on the inner lamella behind the rostrum in *E. nipponica* n. sp., but *E. sordida* described later in this paper has ten bristles and, further, the number of β-bristles on maxilla is three in the former, while that of the latter is four.

Specimens examined: Holotype ♀, allotype ♂, paratypes 1♀ and 3♂♂ (Oshoro, 9–V–'75; S. Hiruta leg.) and 2♀♀ (Oshoro, 11-VII-'75; S. Hiruta leg.).

Euphilomedes sordida (G.W. Müller, 1890)

(Figs. 7~12)

Philomedes sordida G.W. Müller, 1890, p. 237, 238, pl. 25, fig. 17, pl. 26, fig. 17, pl. 27, figs. 28, 33; (non G.S. brady, 1902, p. 186, t. 24, fig. 23~26); G.W. Müller, 1912, p. 28. *Philomedes japonica* G.W. Müller: Kajiyama, 1912, (in part), p. 613, fig. 16a. *Euphilomedes sordida* (G.W. Müller): Poulsen, 1962, p. 359, 362, 363.

Female. Carapace (Fig. 7–1~4) oval in lateral view with greatest height middle and about three-fourths the length of carapace and with prominent rostrum and shallow rostral incisure; dorsal margin well arched; left valve overlaps right valve along anterodorsal margin; carapace oblong oval in dorsal view with greatest width near middle and about three-fifths the length of carapace; hingement not distinct; surface of valves with numerous oval pits, most of which are larger than individual scars of adductor muscle and some of which in the area of adductor muscle are

small, oblong and with many puncta; adductor muscle scars consisting of about twenty individual muscle scars locating below anterior middle of valve. Line of concrescence lies about half-way between inner and outer margin of inner lamella; marginal zone with simple, fairly closely spaced radial pore canals; selvage with corrugated, lamellar prolongation having fringe of hairs along outer margin; ten plumose bristles forming row on inner lamella behind rostrum; inner lamella ventral to rostral incisure with small plumose bristle; about forty spinules on posteroventral part of inner lamella; about five striations between list and inner margin of anterior part of inner lamella.

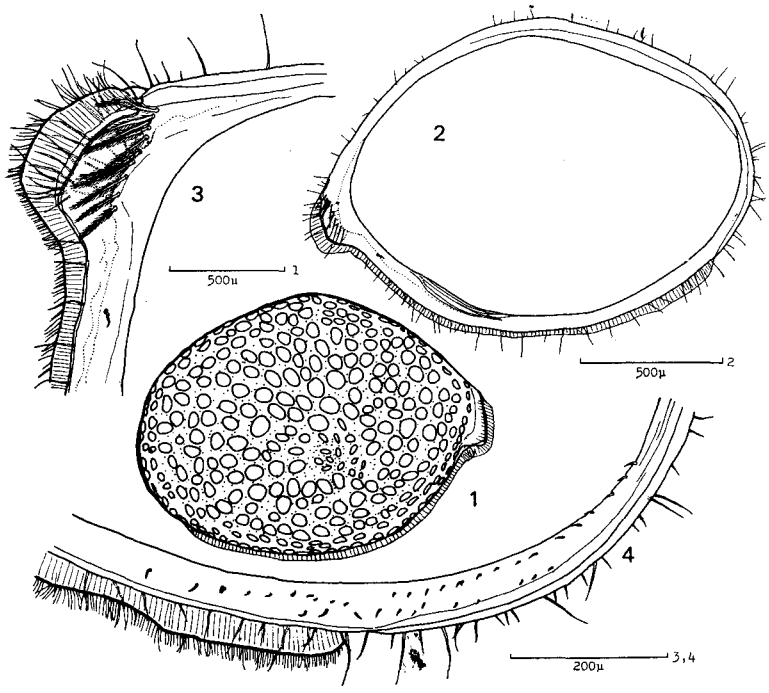

Fig. 7. *Euphilomedes sordida.* Female. 1. lateral view; 2. inside view of right valve; 3. inside view of rostrum; posteroventral part of inner lamella of right valve.

First antenna (Fig. 8–2): first segment slightly longer than second, with clusters of hairs on broad surface, especially with long hairs on anterodistal surface; second segment with clusters of hairs along anterior surface and middle of posterior margin and comb of hairs of anterodistal edge; third segment about one-third the length of posterior margin of second one; fourth segment twice as long as third; fifth segment with clusters of hairs on middle and distal surface; end

segments small; second to end segments having the same bristle formulae as those of preceding species respectively; a bristle on near anterodistal edge of fourth segment nearer to distal edge than that of preceding species.

Second antenna (Fig. 8–3, 4). Exopodite nine-segmented; first one longer than following segments combined, with clusters of hairs along anterior and posterolateral surface; second to ninth segments with long bristles; bristles of second and third segment with denticulation along anterior margin, no natatory hairs; bristles of fourth to eighth segments with natatory hairs; end segment with seven bristles, four of which long with natatory hairs, one very short and two short of different lengths without natatory haris. Endopodite two-segmented; first one with five proximal bristles and one distal bristle; second segment elongate, bearing long bristle with wreaths of stiff hairs on near anteroproximal edge, one setule at a point of three-fourths the length of anterodistal margin and one distal strong bristle about 1.8 times as long as second segment.

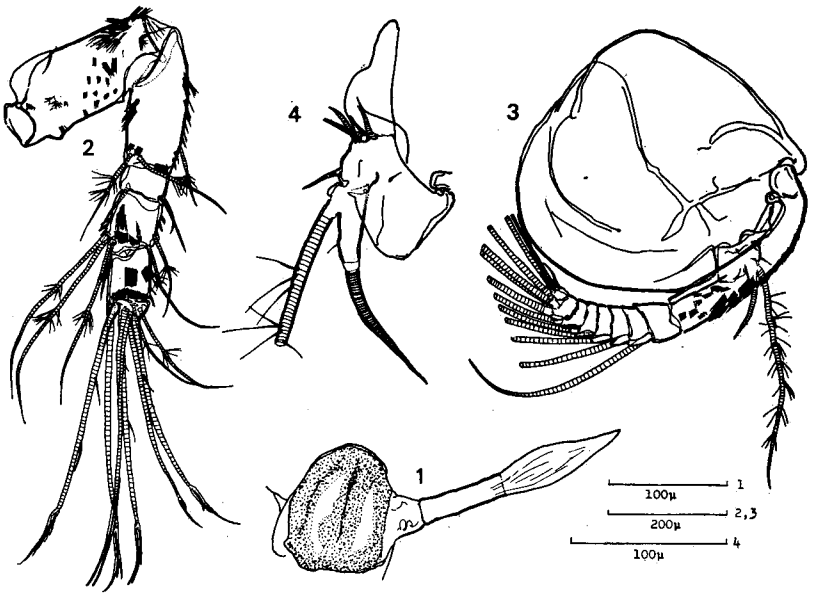

Fig. 8. *Eupilomedes sordida.* Female. 1. median eye and rod-shaped organ; 2. first antenna; 3. second antenna; 4. endopodite of second antenna.

Mandible (Fig. 9–1). Coxale endite large, bifurcate, with secondary teeth and clusters of spinules, accompanied with small bristle near its base. Basale: surface with clusters of hairs; ventral margin with seven to eight bristles, of which distal one long, others subequal in length, all with wreaths of hairs; dorsal margin with three long bristles wreathed by hairs midst, one of which arises from middle of

margin, others from distal edge; medioproximal surface with two bristles wreathed by hairs and two spines with secondary teeth; mediocentral surface with bristle wreathed by hairs. Exopodite about one-third the length of first endopodite segment with terminal spine and two bristles, one of which short, bare, somewhat extending beyond distal end of first endopodite segment, the other long, reaching to near distal edge of second endopodite segment; dorsal margin of exopodite with a row of fine hairs. Endopodite three-segmented; first one one-half the length of second, with combs of hairs dense on broad inner surface and four bristles on distoventral edge, of which one short, bare, the rest three long, wreathed by stiff hairs; second segment with combs of hairs on inner surface, nine bristles on dorsal margin, which are separated into two groups, three in proximal group, six in distal group near middle of margin, and two clusters of bristles on ventral margin, two in proximal group, three in terminal group; end segment very small, with two long claws, one short dorsal claw and three bristles.

Maxilla (Fig. 9–2, 3). Dorsal margins of precoxale and coxale with long fine hairs; coxale with plumose bristle on anterodistal margin; basale with three distal bristles, one of which is plumose, arising from anterior margin, one bare and one with stiff hairs from ventral margin. Exopodite with one bare short bristle and two long bristles, one of which with stiff hairs, extending beyond second endopodite segment. Endopodite: first segment elongate with clusters of hairs on surface and one α-bristle wreathed by hairs and four β-bristles of different lengths; second segment small with three claws (one b-bristle and two d-bristles) of different lengths on distal edge, and seven bristles, of which one (b-bristle) arises from near anterodistal edge, juxtaposed three (a-bristles) of different lengths from near posterodistal edge, and others (c- and d-bristles) from distal edge. Three endites: first one with ten brisltes; second one with six bristles; third one with nine bristles and one proximal bristle.

Fifth limb (Fig. 9–4) quite similar to that of preceding species; epipodial appendage with about 45 bristles; first exopodite segment with two bristles wreathed by stiff hairs on middle of anterodistal margin; main tooth of first exopodite segment comprising some constituent teeth; distal triangular tooth anterior to main tooth about same size as distal tip of second expodite segment; second exopodite segment with one bristle on near distolateral corner; third segment with two long plumose bristles on outer margin; fourth segment with seven bristles wreathed by stiff hairs; endites with about twenty bristles furnished with wreaths of stiff hairs.

Sixth limb (Fig. 9–5) with clusters of hairs on broad surface; epipodial appendage with two plumose bristles; first endite with two bristles of different lengths; second one with four bristles; third one with eight bristles; fourth one with seven bristles; all endite bristle with wreaths of stiff hairs; end segment triangular, with nineteen to twenty-four plumose bristles.

Seventh limb (Fig. 9–6). Terminal comb with about eight teeth; two pegs present opposing comb, both ciliated on lateral margin; generally six cleaning

bristles of different lengths in distal group (only one limb of three specimens had seven cleaning bristles in distal group, as illustrated), four of an equal length in proximal group; each bristle with short spines laterally and three to five bells distally.

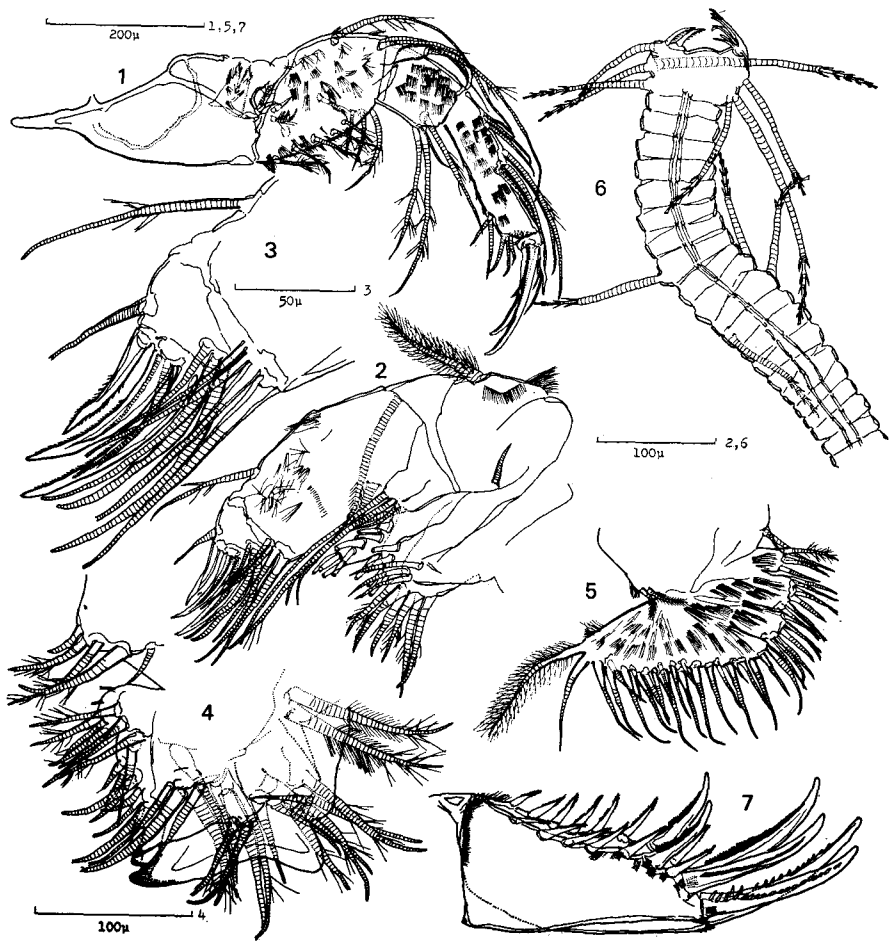

Fig. 9. *Euphilomedes sordida.* Female. 1. mandible; 2. maxilla; 3. distal part of maxillary endopodite; 4. fifth limb; 5. sixth limb; 6. seventh limb; 7. furca.

Furca (Fig. 9–7). Each lamella with generally ten claws; 1, 2, 4 primary, remaining claws secondary; all claws separated from lamellae; lamella near base of claw 1 to 6 with clusters of hairs and its near proximoventral margin to middle of proximal margin with hairs; primary claws number 1 and 2 with rows of secondary

teeth and secondary claws with spinules along both anterior and posterior margins.

Rod-shaped organ (Fig. 8–1) indistinctly two-segmented, swelling in distal third the length and tapering distally. *Eyes.* Median eye (Fig. 8–1) large, with dark brown pigments. Lateral eyes small, with orange red tint. *Eggs*; three individuals examined with 18, 20, 29 eggs in brood pouch respectively.

Male. Carapace (Fig. 10–1~4) elongate oval in lateral view with greatest height near middle and about three-fifths the length of carapace and with prominent rostrum and shallow rostral incisure; posterodorsal margin joining posterior margin in a slight angle; left valve overlaps right valve along anterodorsal margin; carapace oblong in dorsal view with greatest width near middle and about one-half the length of carapace; hingement not distinct; surface of valves with numerous small oval pits which are relatively larger than those of preceding male species and with slender setae on lateral surface of shell near outer margins; posterior surface with long slender setae; adductor muscle scars consisting of about twenty-five individual muscle scars locating below center of valve. Line of concresence lies near inner margin of inner lamella; marginal zone with simple, fairly closely spaced radial pore canales; selvage with corrugated lamellar prolongation having fringe of hairs along outer margin; no parallel striations observed on inner lamella; ten plumose bristles forming row on inner lamella behind rostrum; inner lamella ventral to rostral incisure with small plumose bristle, followed by wide space and then three spinules; about forty spinules on posteroventral to posterior part of inner lamella.

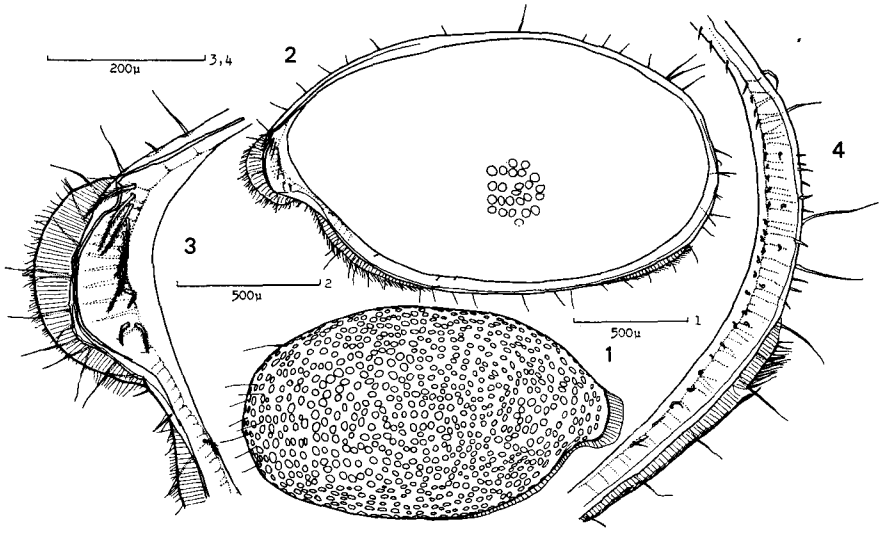

Fig. 10. *Euphilomedes sordida.* Male. 1. lateral view; 2. inside view of right valve; 3. inside view of rostrum; 4. posterior part of inner lamella of right valve.

First antenna (Fig. 11–2). First to fourth segments having the length ratio of 5:7:1:2; fifth one, inferred to be inserted posteriorly between fourth and sixth ones, bearing sensory bristle with broad base and provided with numerous filaments; sixth one somewhat shorter than fourth; second to end segments having the same bristle formulae as in preceding species respectively; each segment without distinct groups of hairs.

Second antenna (Fig. 11–3, 4). Protopodite subtriangular. Exopodite nine-segmented; first one about 3.5 times as long as second; second one about one-half the length of third, with anterodistal bristle which has denticulation along anterior margin, no natatory hairs, extending to distal end of sixth segment; bristles of third to eighth segments with natatory hairs; end segment with six bristles, four of which are long, two short, all with natatory hairs. Endopodite quite similar to preceding species; first segment with five proximal bristles and generally one distal bristle (only one endopodite of three specimens had two distal bristles, as illustrated).

Mandible (Fig. 11–5). Coxale endite small, bifurcate, accompanied with

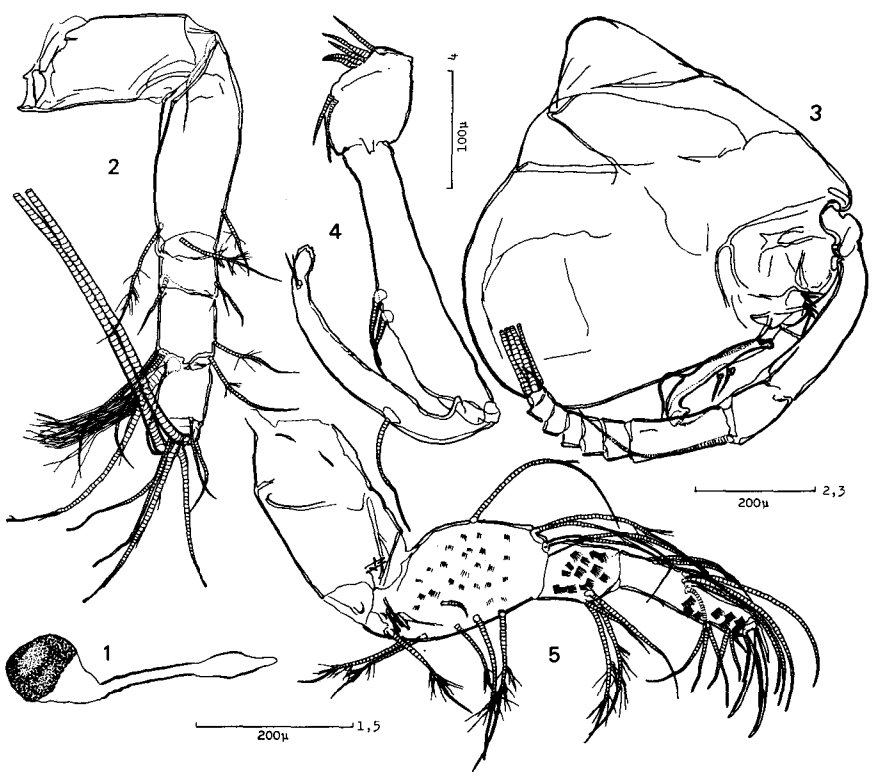

Fig. 11. *Euphilomedes sordida.* Male. 1. median eye and rod-shaped organ; 2. first antenna; 3. second antenna; 4. endopodite of second antenna; 5. mandible.

small bristle near its base. Basale: surface hirsute; ventral margin with six bristles wreathed by hairs, which are longer than those of female; dorsal margin with three bristles, one of which arises from middle of margin, two from distal edge; medioproximal surface with two bristles and two spines; mediocentral surface with ciliated brislte. Exopodite about one-half the length of first endopodite segment, with small terminal spine and two distal bristles, longer one twice as long as the other, extending to distal end of second endopodite segment; dorsal margin of exopodite with a row of fine hairs. Endopodite three-segmented; first one five-ninths the length of second, with combs of hairs on broad inner surface and four bristles on near distoventral margin, two of which are wreathed by hairs; second one with combs of hairs on distal half of inner surface; dorsal margin of second segment with nine bristles which are not clearly separated into two groups; ventral margin of second segment with two clusters of bristles, two in proximal group, three in terminal group; end segment very small, with two subequal long claws, one short dorsal claw and three bristles.

Maxilla (Fig. 12–1). Bristles and endites more weakly developed than those in female; dorsal margin of precoxale and coxale with fringe of hairs; coxale and

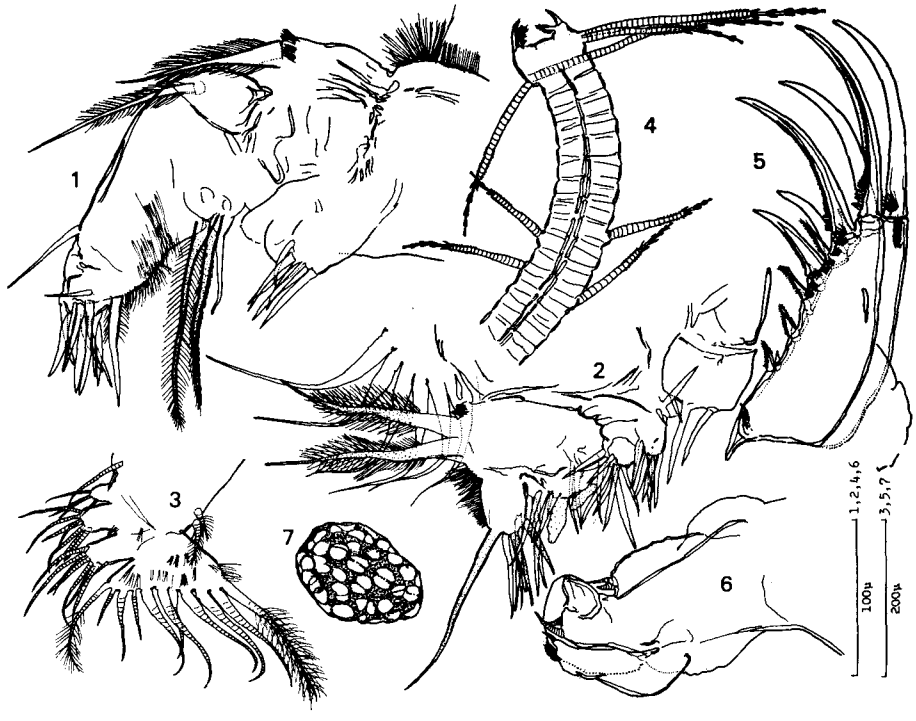

Fig. 12. *Euphilomedes sordida*. Male. 1. maxilla; 2. distal part of fifth limb; 3. sixth limb; 4. seventh limb; 5. furca; 6. copulatory limb; 7. lateral eye.

basale with plumose bristle on anterior distal margin; Exopodite with one bare, short bristle and two long plumose bristles. Endopodite: first segment hirsute; distal part of endopodite segment with about thirteen bristles. Number of bristles on three endites not clear.

Fifth limb (Fig. 12–2). Epipodial appendage with about fifty plumose bristles; segmentation of endites and exopodite not distinct; third exopodite segment with two long plumose bristles on outer margin; end segment with one long and six short bristles, and long hairs along outer margin.

Sixth limb (Fig. 12–3): surface with several clusters of hairs; epipodial appendage with two plumose bristles; first endite with two bristles of different lengths; second one with four bristles; third one with seven or eight bristles; fourth one with seven or eight bristles; end segment triangular, with eleven to eighteen bristles, all with long hairs.

Seventh limb (Fig. 12–4) slender than that of female; terminal comb with about seven teeth; two pegs present opposing comb, both ciliated on lateral margin; four cleaning bristles in distal group, four of subequal lengths in proximal group, each bristle with short spines laterally and three to five bells distally.

Furca (Fig. 12–5). Each lamella with seven or eight claws; 1, 2, 4 primary, remaining claws secondary; all claws separated from lamella and decrease in length proximally; lamella near base of claws 1 to 5 with clusters of hairs; primary claws with a cluster of hairs near bases.

Copulatory limb (Fig. 12–6) short, round; distal part of lobes with short bristles. *Rod-shaped organ* (Fig. 11–1) indistinctly two-segmented, swelling in distal part and tapering distally. *Eyes.* Median eye (Fig. 11–1) with dark brown pigments. Lateral eyes (Fig. 12–7) large, with more than twenty ommatophres.

Measurements (in mm)

	length	height	width
female	1.59–1.63	1.19–1.23	0.90–1.00
male	1.58–1.63	0.91–0.98	0.76–0.80

Remarks. The present species was originally described by G.W. Müller (1890) based upon only female specimens collected from Hakodate, Hokkaido. The present female specimens from Oshoro are quite identical with Müller's species in the size, outline and ornamentation of the shell, the shape of the endopodite of the second antenna and the distribution of the primary and secondary claws on furcal lamellae.

On the other hand, the present specimens are clearly discernible from *E. japonica* (Müller, 1890) in the ornamentation of the shell surface and the shape of the endopodite of the second antenna in female and the distribution of the primary and secondary claws on furcal lamellae. Kajiyama (1912), however, reported that *E. sordida* seemed to be synonymous with *E. japonica* because his female specimens of *E. japonica* collected from Misaki showed an intermediate condition between them, for example, his female specimens accord with *E.*

japonica in the structure of the furca, and with *E. sordida* in the shape of the seventh limb. As far as judging from the Kajiyama's description and his unpublished descriptions and illustrations (with regard to the specimens described by Kajiyama, see Hanai, 1974), the female of *E. japonica* sensu Kajiyama seems to be identical with the female of *E. sordida* described by Müller and the present specimens here reported. The male of *E. japonica* sensu Kajiyama does not seem to accord with *E. japonica* reported by Müller as well as *E. sordida* described in this paper in some characters. Therefore the taxonomic situation of the male of *E. japonica* sensu Kajiyama is uncertain and further study is needed.

While Kornicker (1967) referred to the relationship between *E. aspera* (G.W. Müller, 1894) and *E. sordida*, and said that it was difficult to distinguish the present species from *E. aspera* because the former was inadequately described and most appendages were unknown, the present species is clearly different from *E. aspera* in some characters described below. The rostral incisure in *E. sordida* is shallower than in *E. aspera*, and the posterior margin of carapace in *E. aspera* forms the angular caudal process, which is absent in *E. sordida*. The apipodial appendage of sixth limb in *E. aspera* is furnished with three plumose bristles, but that of *E. sordida* has two ones.

Specimens examined: three females and three males (Oshoro, 11–VI–'75; S. Hiruta leg.).

Discussion

Both the two species, *E. nipponica* and *E. sordida*, belong to the *agilis*-group of Poulsen (1962; p. 361), as far as judged from the distribution of the primary and secondary claws of the furca, namely the claw no. 3 being the only secondary one placed between the primary claws. With regard to *E. sordida*, Poulsen also stated that it seemed to be included in the *agilis*-group because of the same reason above-mentioned. The present two species, however, differ from the species of *agilis*-group in some characters described below (see Poulsen, 1962; p. 362). The group of plumose bristles at the posterodistal end of shell-list is absent in both *E. nipponica* and *E. sordida*, and also in the *nodosa*-group of Poulsen (1962; p. 361). The number of groups of bristles on the dorsal margin of the second endopodite segment of mandible is two in the present two species and the *nodosa*-group, while the species of *agilis*-group have three groups. The number of bristles on the end segment of mandible developed as claws is three in the present two species and the *nodosa*-group, while the species of *agilis*-group have not more than two claws. The number of bristles on the third endite of maxilla in the present two species and the *nodosa*-group is more than that of the species of the *agilis*-group.

Poulsen also took a special interest in the development of the maxilla of the male, namely the *nodosa*-group has a broad one with well-developed endites, while the *agilis*-group has a narrow one. In both *E. nipponica* and *E. sordida*, though

the maxillae of the males are weakly developed and narrower than those of the female, they do not seem to be conspicuously narrowed as in *E. bradyi* and *E. agilis* sensu Poulsen (1962).

On the other hand, Kornicker (1975) summarized the characters of *agilis*-group, in which the furcal structure aforementioned was adopted. He made much account of the morphology of the fifth limb of the *agilis*-group and said in *Remarks* (p. 293), "As noted by Poulsen (1962: 393) a special genus might be warranted". *E. nipponica* and *E. sordida*, however, have no such well-developed teeth on the inner margin of the large tooth on the second segment of the fifth limb as in *E. ferox* and *E. agilis*.

Judging from these comparison, *E. nipponica* and *E. sordida* are much related to the *nodosa*-group rather than the *agilis*-group.

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