



Title	A New Species of the Genus <i>Bathyleberis</i> Kornicker from Hokkaido, with Reference to the Larval Stages (Ostracoda: Myodocopina) (With 17 Text-figures and 1 Table)
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**A New Species of the Genus *Bathyleberis* Kornicker from  
Hokkaido, with Reference to the Larval Stages  
(Ostracoda: Myodocopina)<sup>1)</sup>**

By

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(With 17 Text-figures and 1 Table)

For the subfamily Cylindroleberidinae, our knowledge on the developmental stages, especially on the early larval stages is still poor, though some investigators have so far reported on some juvenile stages of about twenty species. With regard to the early juveniles, the sixth limb of the first larval stage of *Cylindroleberis grimaldi vicina* (Skogsberg, 1920) was reported by G.W. Müller (1894, p. 185, Taf. 34), and the morphology of an early larval stage of *Parasterope meulleri* (Skogsberg, 1920) was described by Poulsen (1965).

The present paper deals with the morphology of all the successive stages of a new *Bathyleberis*-species within the subfamily Cylindroleberidinae, as the third report on the ontogeny of myodocopid ostracods. The specimens were collected from bottom sediment of muddy sand (3~5 m depths) sampled at Oshoro, on the Japan Sea coast of Hokkaido by means of the decanting and sieving method. The type specimens are deposited in the Zoological Institute, Faculty of Science, Hokkaido University.

Before going further, I would like to express my sincere gratitude to Professor Mayumi Yamada of Hokkaido University for his guidance and improvement of the manuscript.

***Bathyleberis yamadai* n. sp.**

(Figs. 1~17)

*Female. Carapace* (Fig. 1-1~3) 2.21 mm long, elongate with evenly rounded anterior and posterior margins and with slit-like incisur; greatest height middle and about four-ninths the length of carapace; surface smooth; melanophores present in the areas of anterior and middle surface (see Fig. 1-1). Approximately 65

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setae, of which about 25 setae form a row along incisur, and about 25 setae present on anterior infold above and below incisur respectively; list parallel to posterior margin with about 16 hyaline spines; several setae present between hyaline spines; 4 or 5 processes present between list and posterior shell margin.

*First antenna* (Fig. 1-5). First segment slightly longer than second, with many groups of hairs on broad surface; second segment widened distally, with a dorsal bristle furnished with stiff hairs along ventral margin, some clusters of short hairs on proximal half of ventral margin, and with a group of long hairs on middle of medial surface; third and fourth segments triangular; third segment with two single proximal and two pairs of distal bristles of subequal lengths on dorsal margin and a minute distal bristle on short ventral margin; fourth segment about one-third the length of first, with a long dorsodistal bristle and two juxtaposed ventrodorsal bristles of subequal lengths, which are about three times as long as ventral margin of fifth segment; dorsal margin of fifth segment as long as dorsal margin of third segment; sensory bristle of fifth segment with one short proximal and six long distal filaments; sixth segment as long as fifth, slightly tapering distally, with a long bristle on distal margin; seventh segment with stout curved a-claw, b-bristle which is about 1.3 times as long as a-claw, and c-bristle which is about twice as long as a-claw and furnished with seven filaments; d-bristle somewhat shorter than e-bristle, tapering from the base to the tip, that is, bristle-like; e-bristle about 1.5 times as long as a-claw; f-bristle about 1.7 times as long as a-claw, with some filaments; g-bristle as long as c-bristle, with several filaments.

*Second antenna* (Fig. 2-1). Protopodite oval, with a short medial bristle. Exopodite: second to eighth segments with short spinules forming a row along distal margin; third to ninth segments with one stout basal spine; bristle of second segment with spinules along ventral margin and spines along dorsal margin; bristles of third to eighth segments with natatory hairs and spines along proximal part of ventral margin; end segment with two long natatory bristles and a short bristle. Endopodite three-segmented; first segment slightly shorter than second; third segment terminating in a round tip, with a subterminal bristle.

*Mandible* (Fig. 2-2 ~ 4). Ventral branch of coxale endite with spines forming five rows; tip of branch with two or three teeth; one short bristle present near base of ventral branch; ventral margin of dorsal branch with two proximal pairs of pointed teeth followed by a pair of rounded teeth, three groups of teeth, and main spine; terminal part of branch as shown in figure. Basale: endite with three terminal bristles, two dwarf bristles, two subterminal triaenid bristles and one proximal triaenid bristle, all triaenid bristles with three pairs of marginal spines; one short bristle present near the base of endite; dorsal margin of basale with one backward-pointing midbristle and two subterminal bristles. Exopodite very small, with two short terminal bristles of an equal length and terminal hairs. Endopodite: ventral margin of first segment with three distal bristles, of which two long ones with long stiff hairs along dorsal margin; dorsal margin of second segment with stout a-, b-, c-, and d-bristles, and with 1 short proximal bristle, 1

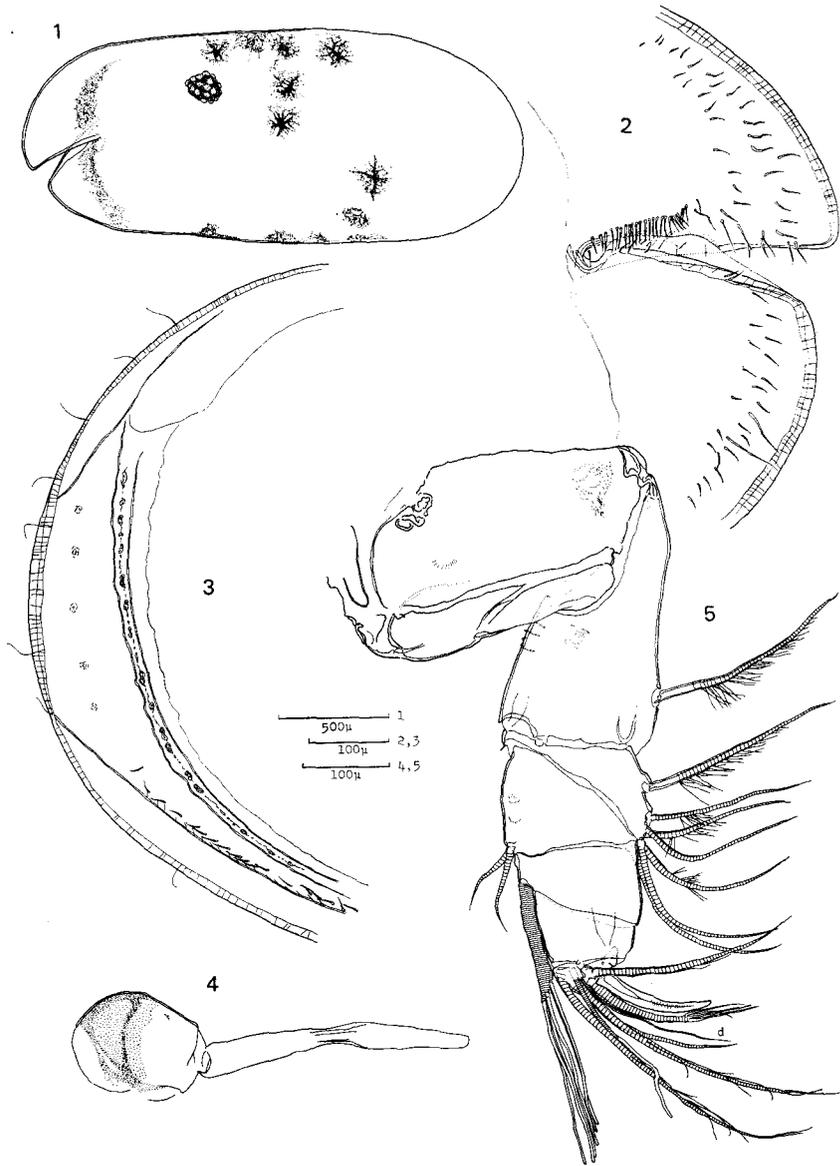


Fig. 1. *Bathyleberis yamadai* n. sp. Female. (Holotype). 1. lateral view; 2. medial view of anterior part; 3. medial view of posterior part; 4. rod-shaped organ and median eye; 5. first antenna.

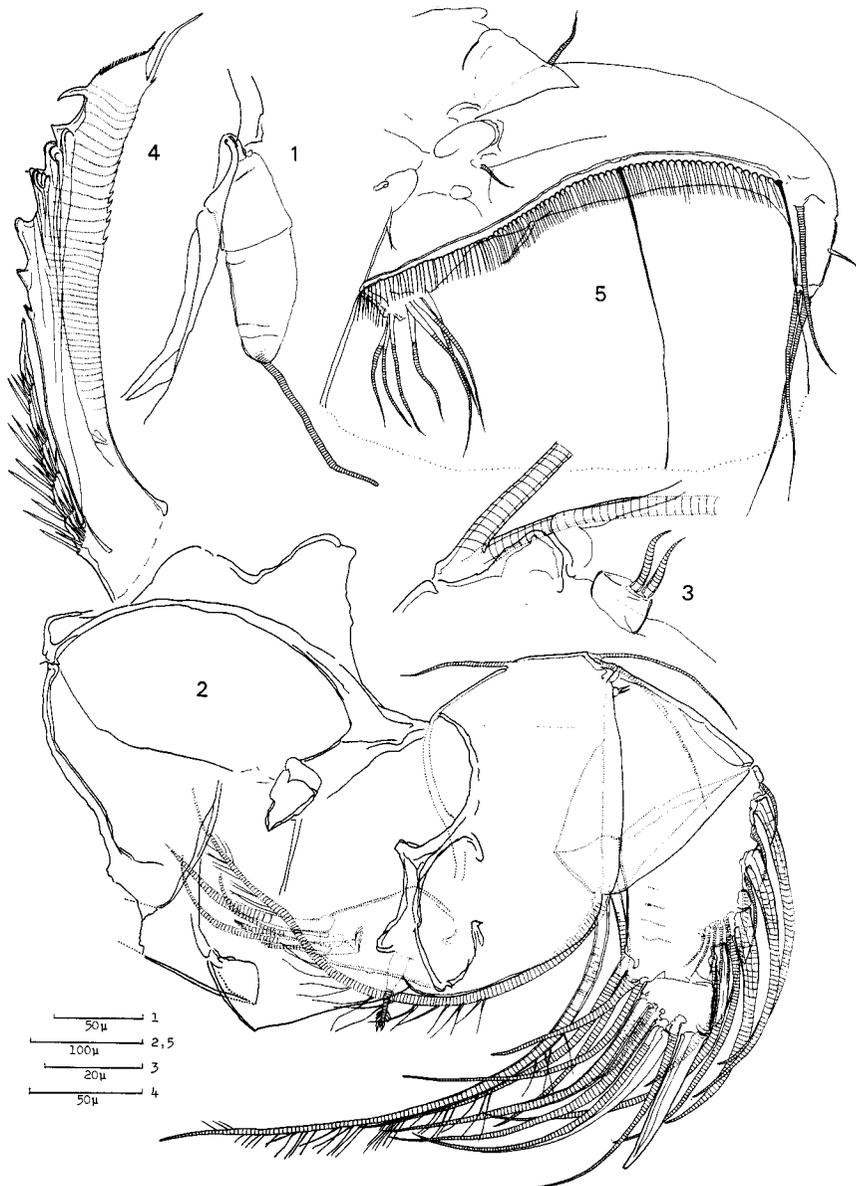


Fig. 2. *Bathyleberis yamadai* n. sp. Female. (Holotype). 1. endopodite of second antenna; 2. mandible; 3. ditto, exopodite; 4. ditto, coxale endite; 5. maxilla.

short bristle between a- and b-bristles, 1 short and 1 long medial bristles between b- and c-bristles, 1 long bristle and an oblique row of 5 short medial bristles between c- and d-bristles, and 1 medial bristle distal to base of d-bristle; ventral margin of second segment with three stout terminal bristles of different lengths; some rows of short spines present on medial surface of second segment; end segment with a strong dorsal claw, three juxtaposed stout bristles of an equal length, and two bristles, one is twice as long as the other.

*Maxilla* (Fig. 2-5). Epipodite short, triangular, hirsute; proximal endite with four bristles; distal endite with three bristles. Basale hirsute, with five bristles: 1 medial and 1 lateral bristles near base of epipodite, 1 near middle of ventral margin, and 1 long terminal bristle. Endopodite two-segmented; first one with one short anterior bristle and one long terminal bristle; end segment with a long terminal bristle.

*Fifth limb* (Fig. 3-1). Epipodial appendage with about 68 bristles; plumose exopodite bristle extending beyond distal edge of comb; ventral margin of comb with about 70 bristles, some of which arise from lateral surface near ventral margin, as shown in figure; dorsodistal margin of comb with long stiff hairs. *Sixth limb* (Fig. 3-2). Anterior margin hirsute, with two distinct sutures, each with 1 short bristle; anterior corner with six bristles; ventral to posterior margin with 20 to 22 plumose bristles; medial and lateral surface and posterior and anteroventral margins hirsute. *Seventh limb* (Fig. 3-3). Each limb with twelve bristles, six proximal, three on each side and six distal, three on each side, of which middle one is about twice as long as others. *Furca* (Fig. 3-4). Each lamella with nine claws; proximal three claws bristle-like; proximalmost claw sometimes pointing backwards; most of claws with short teeth or spinules along posterior concave margin and hairs along anterior convex margin.

*Rod-shaped organ* (Fig. 1-4) elongate, terminating in a round tip. *Eyes* (Fig. 1-1, 4). Median eye oval, with dark brown pigments. Each lateral eye with about 16 ommatidia. *Genitalia and brush-like organ* (Fig. 3-5). Genitalia on each side with sclerotized structure, as shown in figure. Brush-like organ consisting of six short bristles present in front of genitalia. *Eggs*: specimens examined with 4 to 31 eggs in brood pouch. *Upper lip* similar to that of congeneric species.

*Male. Carapace* (Fig. 4-1, 2) 2.40 mm long, 1.10 mm height, elongate, with widened anterior half, large rostrum, and long hairs near posterior margin; posterodorsal margin of shell sinuate; surface smooth; coloration similar to female. Anterior infold above and below incisur with more setae than in female; list parallel to posterior margin with about 16 hyaline spines; four processes present between list and posterior valve margin.

*First antenna* (Fig. 5-1). First segment as long as second; second segment with a dorsal bristle furnished with stiff hairs along ventral margin and number of clusters of hairs on lateral surface; third segment triangular, with one proximal and five distal bristles on dorsal margin, three of which with stiff hairs along ventral

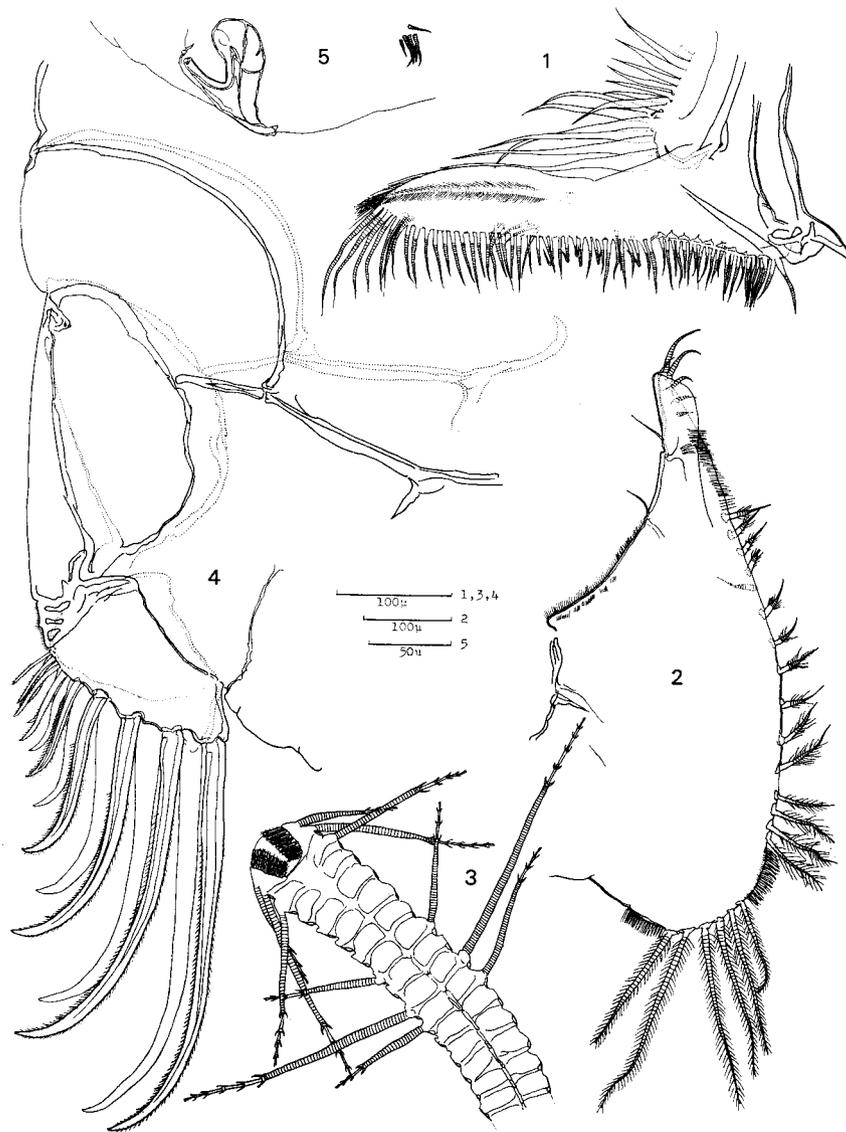


Fig. 3. *Bathyleberis yamadai* n. sp. Female. (Holotype; 5. paratype). 1. fifth limb; 2. sixth limb; 3. seventh limb; 4. furca; 5. genitalia and brush-like organ.

margin, and one minute bristle on short ventral margin; fourth segment with a long dorsodistal bristle and two juxtaposed ventral bristles of different lengths; sensory bristle of fifth segment about 1.5 times as long as distal three segments combined, with numerous long filaments along whole length; sixth segment with a long terminal bristle; seventh segment with a-claw, b-bristle, which has five filaments, and very long c-bristle; eighth segment with bristle-like d-bristle, which is two-sevenths the length of e-bristle; e-bristle about twice as long as a-claw; f-bristle very long; g-bristle slender, longer than b-bristle, with some filaments.

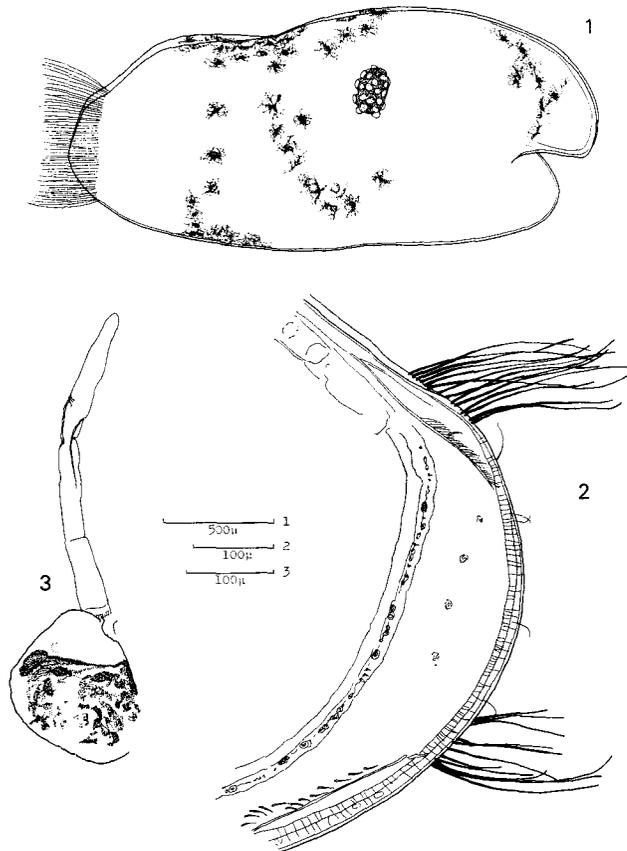


Fig. 4. *Bathyleberis yamadai* n. sp. Male (Allotype). 1. lateral view; 2. medial view of posterior part; 3. rod-shaped organ and median eye.

*Second antenna* (Fig. 5-2). Protopodite with a short medial bristle. Exopodite: first segment about twice as long as second; all segments without basal spines; bristles of second to eighth segments with natatory hairs; ninth

segment with three long and short natatory bristles. Endopodite three-segmented; first segment as long as second; second one swelling in middle part and tapering distally, with three short juxtaposed bristles on anterior margin; end segment recurved, with one bristle, which is as long as end segment, near proximal edge and

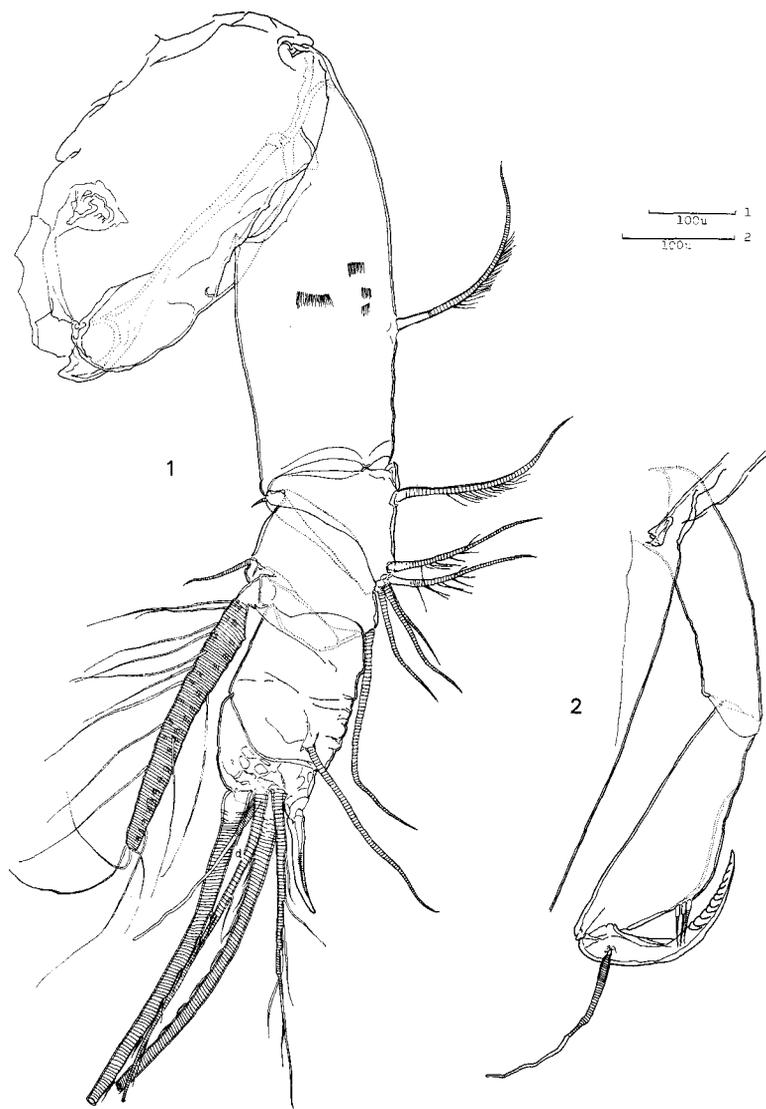


Fig. 5. *Bathyleberis yamadai* n. sp. Male (Allotype). 1. first antenna; 2. endopodite of second antenna.

about fifteen ridges along distal half of concave margin.

*Mandible* (Fig. 6-1, 2). Coxale endite of almost same structure as in female. Basale: endite with three terminal bristles, of which one is three times as long as others, two dwarf bristles, two subterminal bristles of an equal length and one proximal bristle; dorsal margin with one midbristle and two long subterminal bristles of an equal length. Exopodite very small, of almost same structure as in

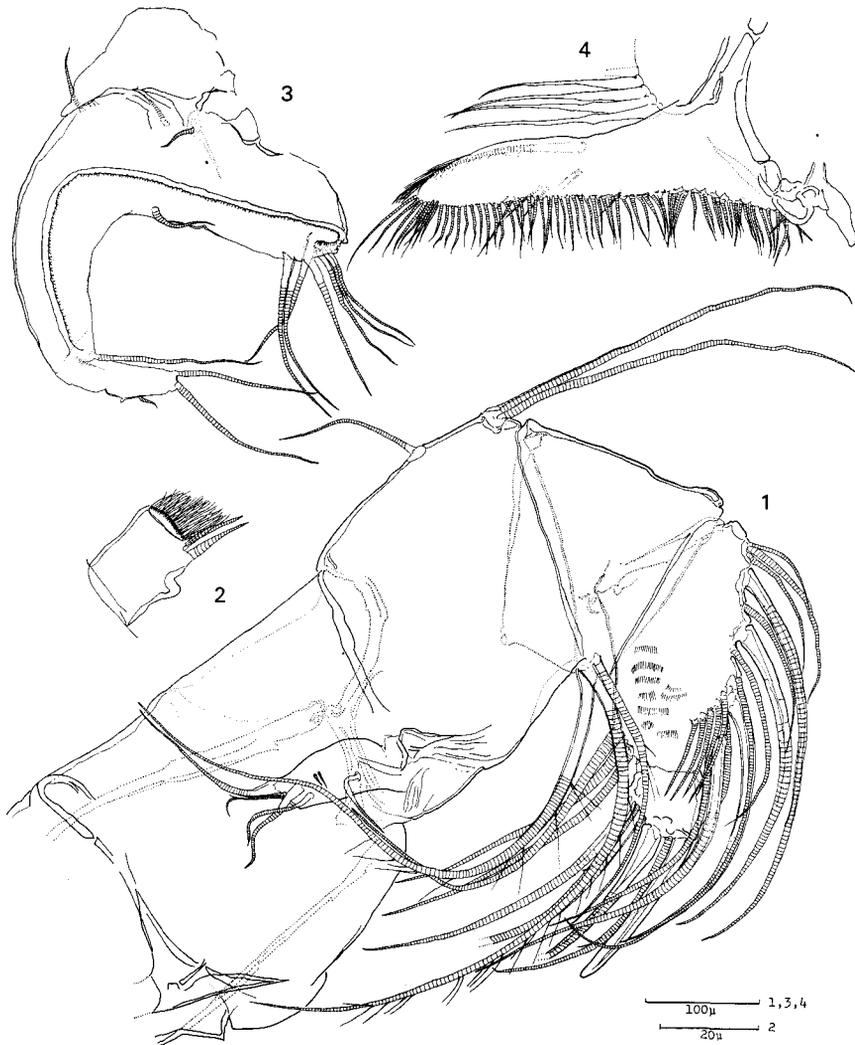


Fig. 6. *Bathyleberis yamadai* n. sp. Male. (Allotype). 1. mandible; 2. ditto, exopodite; 3. maxilla; 4. fifth limb.

female. Endopodite: ventral margin of first segment with three distal bristles, two of which is long, with a number of long stiff hairs along dorsal margin; dorsal margin of second segment with stout a-, b-, c-, and d-bristles, and with three proximal bristles of different lengths, 1 bristle between a- and b-bristles, 1 bristle and 1 long medial bristle between b- and c-bristles, 1 long bristle and an oblique row of five short medial bristles between c- and d-bristles, and 1 long medial bristle distal to base of d-bristle; ventral margin of second segment with three long terminal bristles; several groups of spinules present on medial surface of second segment; end



Fig. 7. *Bathyleberis yamadai* n. sp. Male. (Allotype; 3,4, paratype). 1. sixth limb; 2. seventh limb; 3. furca; 4. copulatory limb.

segment with a stout dorsal claw, three stout bristles, and two bristles, one is 2.7 times as long as the other.

*Maxilla* (Fig. 6-3). Epipodite short, triangular, hirsute; proximal endite with four bristles of subequal lengths; distal endite with three bristles of an equal length. Basale with five or six bristles; 1 medial and 1 lateral bristles near base of epipodite, 1 near middle of ventral margin, 1 or 0 short medial bristle on distal edge, and 1 long terminal bristle. Endopodite indistinctly two-segmented; first segment with one short anterior bristle and a long terminal bristle; end segment with a long terminal bristle.

*Fifth limb* (Fig. 6-4). Epipodial appendage with about 70 bristles; plumose exopodite bristle extending beyond distal edge of comb; ventral margin of comb with about 75 bristles, some of which arise from lateral surface near ventral margin; two juxtaposed bristles present on lateral surface below base of exopodite bristle; dorsodistal margin of comb with long stiff hairs.

*Sixth limb* (Fig. 7-1). Anterior margin hirsute, with two distinct sutures, each with one short bristle; anterior corner with six bristles; ventral to posterior margin with 19 to 25 plumose bristles; medial and lateral surface, and posterior and anteroventral margins hirsute. *Seventh limb* (Fig. 7-2). Each limb with 12 bristles, 6 proximal, 3 on each side and 6 distal, 3 on each side; each bristle with 1 to 4 bells. *Furca* (Fig. 7-3). Each lamella with eight claws; ornamentation of claws almost same as in female. *Copulatory limb* (Fig. 7-4) as shown in figure; two short bristles present on distal margin of lobe. *Rod-shaped organ* (Fig. 4-3) almost same as in female. *Eyes* (Fig. 4-1,3). Median eye with dark brown pigments. Each lateral eye with about 16 ommatidia.

*Remarks.* This new species is characterized by the well developed d-bristle on the first antenna, which is slightly shorter than e-bristle in female and about two-sevenths the length of e-bristle in male, and shows bristle-like form, and the very small exopodite of the mandible. The former is the main characteristic for the genus *Bathyleberis* and the latter clearly distinguishes this new species from the three congeneric species so far known: *B. grossmani*, *B. monothrix*, and *B. oculata* Kornicker, 1975 from the Antarctic region. Some distinguishing characters of *Bathyleberis*-species are shown in Table 1.

On the other hand, Kajiyama (1912) reported a species belonging to the subfamily Cylindroleberidinae from Misaki, Kanagawa Pref.: *Cylindroleberis oblonga* (Grube 1859). Since his descriptions and illustrations are insufficient, the generic and specific identification of his specimens is now difficult (see Hanai et al., 1977). However, judging from the following three characteristics found in Kajiyama's published and unpublished descriptions, the present new species and *Cylindroleberis oblonga* sensu Kajiyama might be conspecific: the shape and coloration of the shell, the well-developed d-bristle of the first antenna (it is not clear whether the d-bristle shows a bristle-like form or not), and the very small mandibular exopodite. In addition, the present new species was also collected

Table 1. The distinguishing characters of four species of *Bathyleberis*

	<i>grossmani</i>	<i>monothrix</i>	<i>oculata</i>	<i>yamadai</i>
First antenna No. of filaments on sensory bristle	0+7	1+6	1+6	1+6
Length of d-bristle against e-bristle	ca. 1/2	ca. 3/4	ca. 1/5	1 ≥ ♀, 2/7 ♂
Mandible No. of midbristle on basale	1	1	3 or 4	1
Length of exopodite against first endopodite segment	ca. 1/2	1/2 <	1/2 <	1/18 ♀, 1/8 ♂ very short
Sixth limb No. of bristles on anterior margin	6 or 7	1+0	1+1	1+1
Seventh limb No. of bristles	12 6+6	14 8+6	12 6+6	12 6+6
Lateral eyes	absent	absent	present	present
Shell size (mm)	2.51-2.63	2.02-2.30	ca. 2.60	2.21♀, 2.40♂

by the author from Misaki and Amakusa, Kumamoto Pref.

*Specimens examined.* Holotype ♀; allotype ♂; paratypes 2 ♀♀ and 1 ♂ (Oshoro, 27-VI-'75) and 1 ♂ (Oshoro, 29-VIII-'77) Sh. Hiruta leg. The species name was selected in honor of Professor Mayumi Yamada of Hokkaido University.

#### Larval development

*First larval stage* (A-5 instar; sex undetermined)

*Carapace* (Fig. 8-1) about 0.60 mm in length, about 0.31 mm in height, with dark brown pigments. *First antenna* (Fig. 9-1) similar to adult female in total appearance; third segment with one long dorsodistal bristle furnished with long hairs along ventral margin and a short bristle on ventral margin; second and fourth segments without bristles; long sensory bristle on fifth segment without filaments; d-bristle short, bristle-like. *Second antenna* (Fig. 9-2,3) similar to adult female; segmentation of endopodite obscure; ninth segment of exopodite with a short triangular spine and two bristles. *Rod-shaped organ* (Fig. 9-4) similar to adult female.

*Mandible* (Fig. 10-1) similar to adult female in total appearance. Ventral branch of coxale endite with spines forming two rows; a short bristle present near base of ventral branch; ventral margin and terminal part of dorsal branch as

shown in figure. Basale endite with three terminal bristles; dorsal margin of basale with two terminal bristles. Exopodite not observed. Endopodite: ventral margin of first segment with two bristles of different lengths, of which one is twice as long as the other, furnished with stiff long hairs along dorsal margin; dorsal margin of second segment with two small proximal spines and four long bristles, of which two are stout; one stout bristle present on ventrodistal corner of second segment; end segment with strong dorsal claw and two stout ventral bristles of an equal length. *Maxilla* (Fig. 10-2) similar to adult; epipodite short, triangular; endites with five bristles of an equal length; basale with one short dorsal, one short ventral, and one long terminal bristles. Endopodite two-segmented; first segment with one short anterior bristle and a long terminal bristle; end segment with one long terminal bristle.

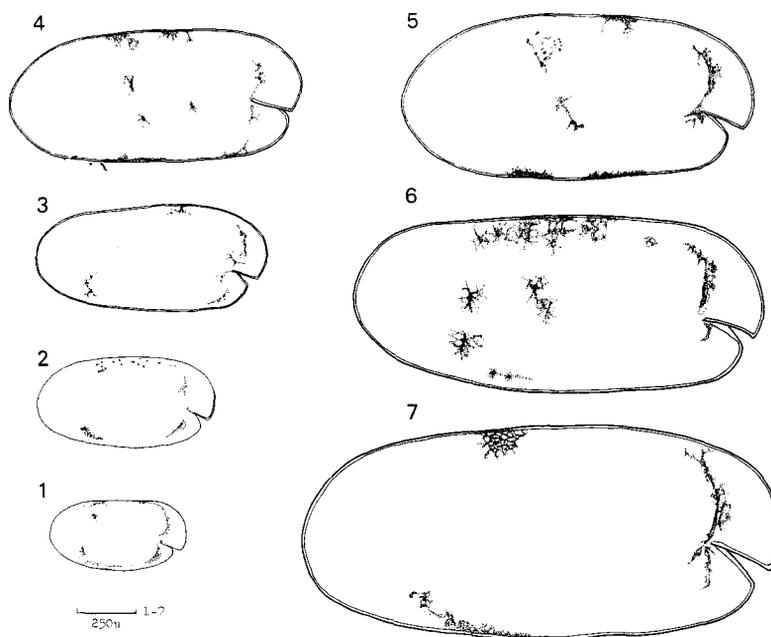


Fig. 8. *Bathyleberis yamadai* n. sp. 1-3. first to third larval stages; 4. fourth larval stage (♀); 5. fourth larval stage (♂); 6. fifth larval stage (♀); 7. fifth larval stage (♂).

*Fifth limb* (Fig. 10-3). Exopodite bristle short; ventral to distal margin of comb with about 13 bristles and marginal hairs; dorsodistal margin of comb with long stiff hairs. *Sixth limb* (Fig. 10-4) triangular in lateral view; ventral to posterior margin with hairs, without bristles; posterior part tapering distally. *Seventh limb* (Fig. 10-5) forming a very small bud-like process. *Furca* (Fig. 10-5): lamellae with total five claws and a hairy process on proximal margin. *Eyes* (Fig. 9-4).

Median eye oval, with dark brown pigments. Each lateral eye with about 12 ommatidia.

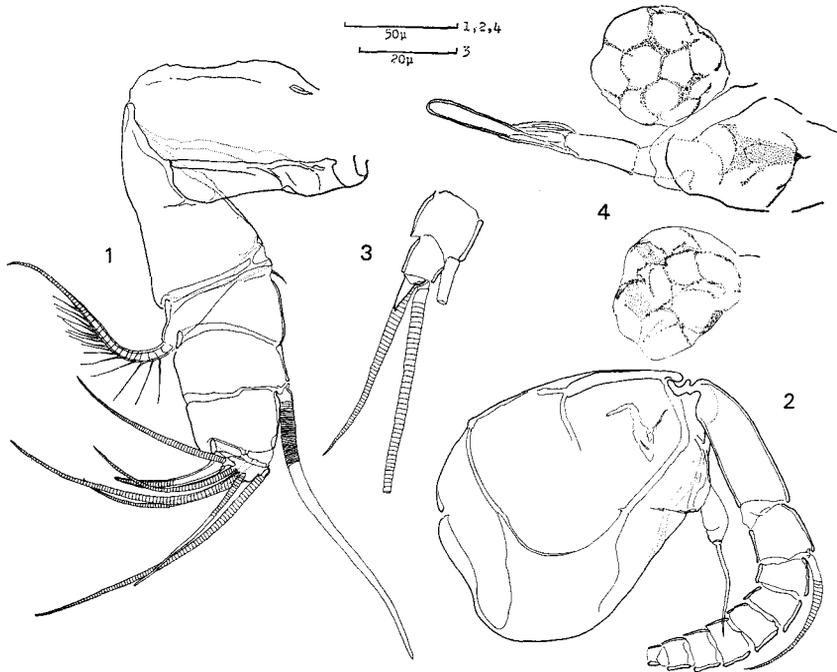


Fig. 9. *Bathyleberis yamadai* n. sp. First larval stage (A-5 instar). 1. first antenna; 2. second antenna; 3. distal part of exopodite of second antenna; 4. rod-shaped organ, median eye, and lateral eyes.

*Second larval stage* (A-4 instar; sex undetermined)

*Carapace* (Fig. 8-2) about 0.78 mm in length, about 0.39 mm in height. *First antenna* (Fig. 11-1). One dorsal bristle added to second and fourth segments; sensory bristle of fifth segment with six terminal filaments and one short proximal filament; b-, c-, f-, and g-bristles with filaments; d-bristle about one-half the length of e-bristle. *Second antenna* (Fig. 11-2,3) similar to adult female; endopodite weakly three-segmented; end segment of exopodite with a triangular basal spine and three bristles of different lengths. *Rod-shaped organ* (Fig. 11-7) similar to adult.

*Mandible* (Fig. 11-4). Basale endite with four terminal bristles and one bristle on middle of ventral margin. Exopodite not observed. Endopodite: ventral margin with three bristles, two of which of an equal length furnished with stiff long hairs along dorsal margin; dorsal margin of second segment with three long stout bristles and three bristles of different lengths; ventrodorsal edge with

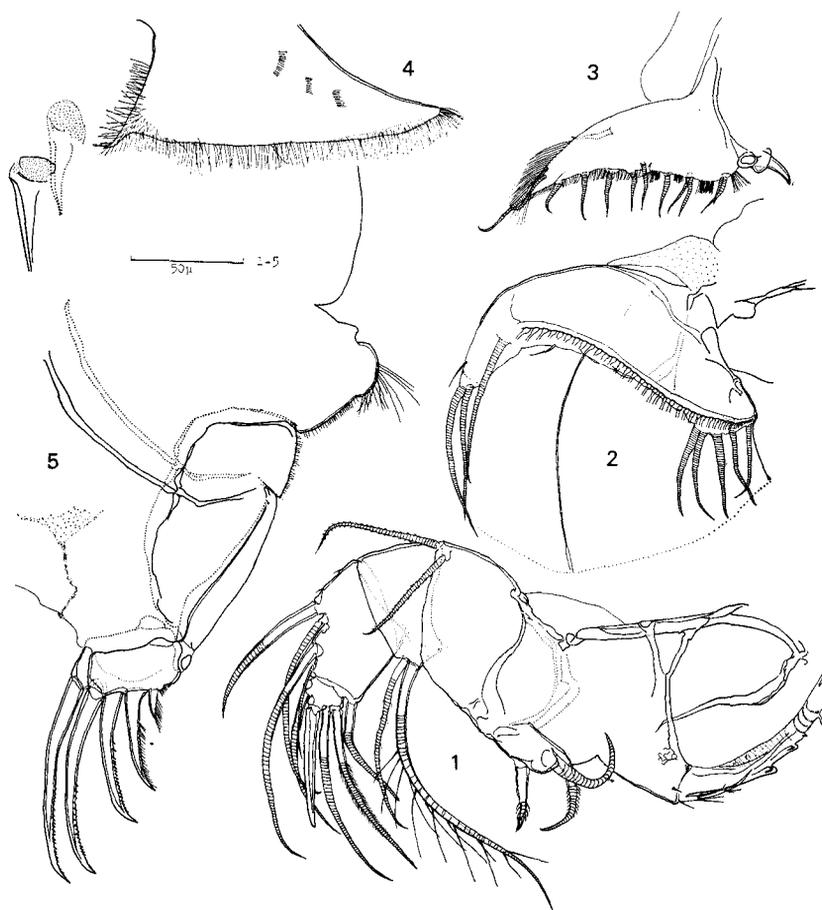


Fig. 10. *Bathyleberis yamadai* n. sp. First larval stage (A-5 instar). 1. mandible; 2. maxilla; 3. fifth limb; 4. sixth limb; 5. seventh limb and furca.

three bristles; end segment with a strong dorsal claw and four bristles on distal margin. *Maxilla* (Fig. 11-5) similar to adult female; endites with five long and one short bristles. *Fifth limb* (Fig. 11-6) similar to adult; ventral margin of comb with about 22 bristles; some bristles arising from lateral surface. *Sixth limb* (Fig. 12-1). Anterior margin hirsute, with one distinct suture and one short bristle; ventral to posterior margin with long hairs; posteroventral corner terminating in a bifurcate tip. *Seventh limb* (Fig. 12-2) forming a thumb-like process. *Furca* (Fig. 12-3). Lamellae with four and five claws respectively.

*Third larval stage* (A-3 instar; sex undetermined)

*Carapace* (Fig. 8-3) about 1.00 mm in length, about 0.50 mm in height. *First*



Fig. 11. *Bathyleberis yamadai* n. sp. Second larval stage (A-4 instar). 1. first antenna; 2. endopodite of second antenna; 3. exopodite of second antenna; 4. mandible; 5. maxilla; 6. fifth limb; 7. rod-shaped organ.

*antenna* (Fig. 13-1). One dorsal bristle added to third segment; fourth segment with a ventrodistal bristle; d-bristle about two-thirds the length of e-bristle. *Second antenna* similar to adult female. *Mandible* (Fig. 13-2,3). Dorsal margin of

basale with one backward-pointing midbristle and two subterminal bristles. Exopodite small with two short bristles on distal margin. Endopodite: dorsal margin of first segment with in total seven bristles, of which three are stout; end segment with a dorsal claw and five bristles. *Maxilla* (Fig. 13-4) similar to adult female. *Fifth limb* (Fig. 13-5): ventral margin of comb with about 30 bristles; several bristles arising from lateral surface. *Sixth limb* (Fig. 14-1) similar to adult, with two long posterior and five ventral and two anterior bristles; anterior margin with two distinct sutures. *Seventh limb* (Fig. 14-2) bare, elongate. *Furca* (Fig. 14-3). Each lamella with six claws; proximal claw bristle-like.

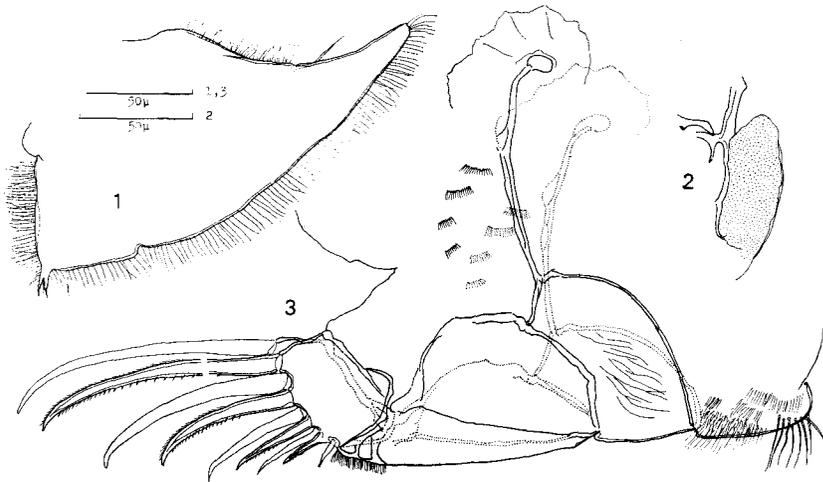


Fig. 12. *Bathyleberis yamadai* n. sp. Second larval stage (A-4 instar). 1. sixth limb; 2. seventh limb; 3. furca.

*Fourth larval stage (A-2 instar)*

*Female. Carapace* (Fig. 8-4) about 1.25 mm in length, about 0.54 mm in height. *First antenna* (Fig. 15-2). Third segment with four dorsal bristles; one ventrodistal bristle added to fourth segment; d-bristle somewhat shorter than e-bristle. Endopodite of *second antenna* (Fig. 16-1) similar to adult female. *Mandible* (Fig. 16-2). Dorsal margin of second endopodite segment with stout a-, b-, c-, and d-bristles, and with 1 short proximal bristle, 1 short and 1 long medial bristles between b- and c-bristles, 2 short medial bristles near base of c-bristle, 1 long bristle between c- and d-bristles, and 1 long medial bristle distal to base of d-bristle. *Maxilla*, *fifth limb*, and *sixth limb* (Fig. 16-3) similar to adult female. *Seventh limb* (Fig. 16-4). Each limb with ten bristles, six proximal, four distal; each bristle somewhat tapering distally, with one or two bells. *Furca*. Each lamella with eight or nine claws.



Fig. 13. *Bathyleberis yamadai* n. sp. Third larval stage (A-3 instar). 1. first antenna; 2. mandible; 3. ditto, exopodite; 4. maxilla; 5. fifth limb.

*Male. Carapace* (Fig. 8-5) about 1.42 mm in length, about 0.64 mm in height. *First antenna* (Fig. 15-1). Dorsal margin of third segment with five bristles; f-bristle furnished with more filaments than in female. *Second antenna* (Fig. 16-5). Endopodite larger than in female, three-segmented; second segment with a small bristle; third segment tapered, with a long bristle on proximal surface. *Mandible* (Fig. 16-6) similar to A-2 female; proximal bristle on dorsal margin of second endopodite segment longer than in female. *Maxilla, fifth limb,*

and *sixth limb* (Fig. 16-7) similar to adult female. *Seventh limb* (Fig. 16-8). Each limb with 12 bristles, 6 proximal, 6 distal; each bristle somewhat tapering distally, with two or three bells. *Furca*. Each lamella with seven or eight claws.

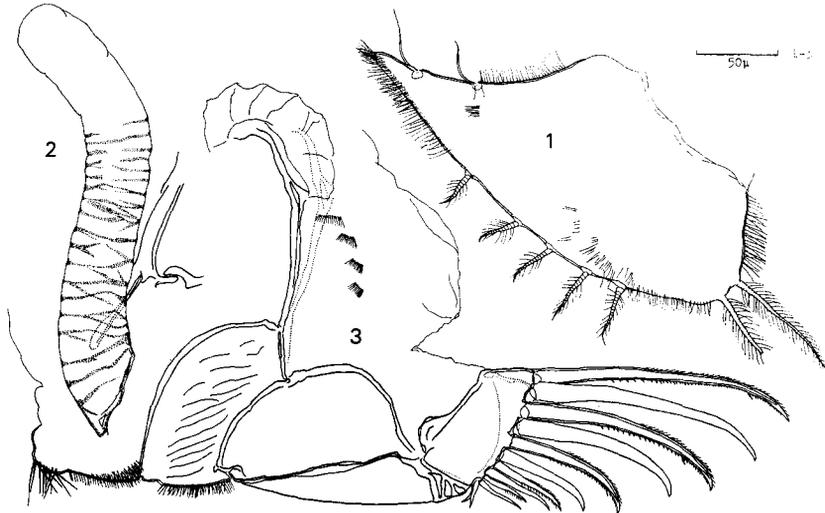


Fig. 14. *Bathyleberis yamadai* n. sp. Third larval stage (A-3 instar). 1. sixth limb; 2. seventh limb; 3. furca.

*Fifth larval stage* (A-1 instar)

*Female*. *Carapace* (Fig. 8-6) about 1.78 mm in length, about 0.80 mm in height. *First antenna* and *second antenna* (Fig. 17-1) similar to adult female. *Mandible* (Fig. 17-2). Second endopodite segment as shown in figure. *Maxilla*, *fifth limb*, *sixth limb* (Fig. 17-3), and *seventh limb* similar to adult female. *Furca*. Each lamella with nine or ten claws. *Genitalia* and *brush-like organ* (Fig. 17-4): brush-like organ composed of four or five short bristles.

*Male*. *Carapace* (Fig. 8-7) about 2.06 mm in length, about 0.96 mm in height. *First antenna* (Fig. 17-5): f-bristle furnished with much more filaments than in female. *Second antenna* (Fig. 17-6). Endopodite elongate, three-segmented; second segment with two short bristles; end segment tapering distally, terminating in a sharp point. *Mandible* (Fig. 17-7): two proximal bristles present on dorsal margin of second endopodite segment. *Maxilla*, *fifth limb*, *sixth limb* (Fig. 17-8), and *seventh limb* similar to adult female. *Furca*. Each lamella with about nine claws. *Copulatory limb* (Fig. 17-9) present, with one bristle in each side.

*Specimens examined*. A-5 instars (9-IX-'77); A-4 instars (26-VIII-'75, 9-IX-'77); A-3 instars (9-IX-'77); A-2 instars (18-IX-'74, 9-V-'75, 27-V-'75); A-1 instars (9-V-'75, 27-V-'75) Oshoro, Sh. Hiruta leg.



Fig. 15. *Bathyleberis yamadai* n. sp. Fourth larval stage (A-2 instar). Male. 1. first antenna. Female. 2. first antenna.

### Discussion

The present new species, as described above, has five different larval stages. The knowledge on the number of larval stages of other species within the subfamily *Cylindroleberidinae* is absent, except that Poulsen (1965) calculated the size of all the developmental stages of *Parasterope meulleri* based upon the size of some juveniles and obtained the result that it has five larval stages.

The differentiation process of the sixth and seventh limbs in the present new species almost accords with that indicated in the key to early mydocopid instars (Kornicker, 1969). In the first larval stage, the sixth limb has no bristles. In

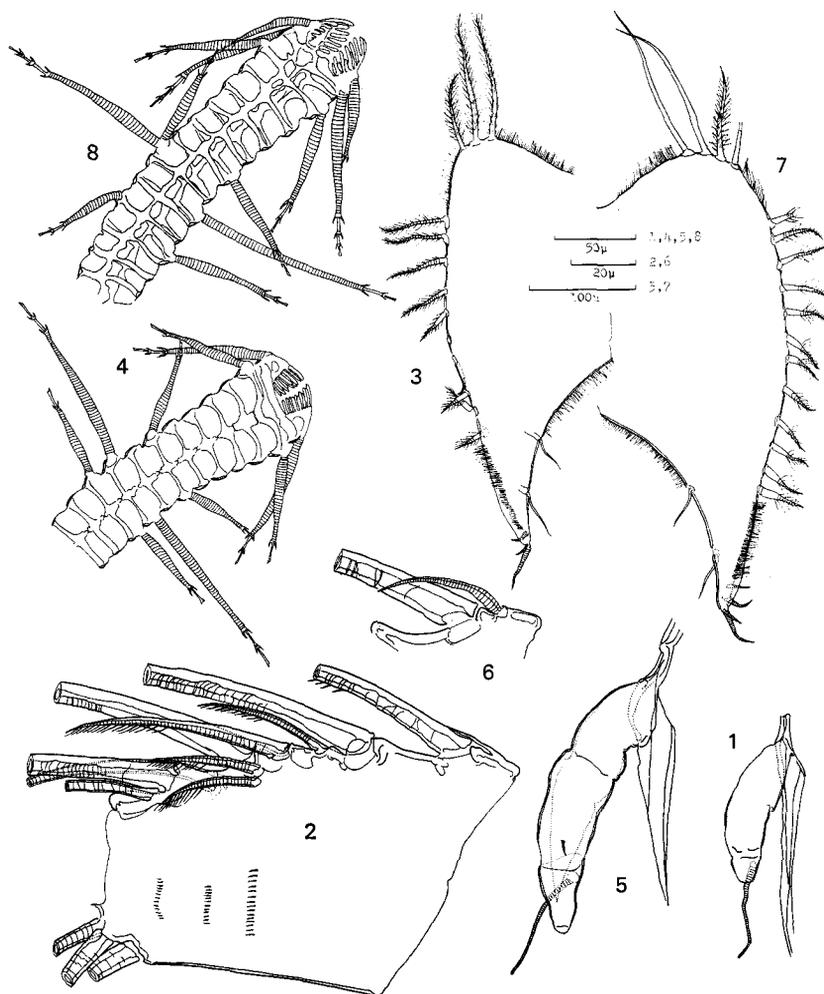


Fig. 16. *Bathyleberis yamadai* n. sp. Fourth larval stage (A-2 instar). Female. 1. endopodite of second antenna; 2. second endopodite of mandible; 3. sixth limb; 4. seventh limb. Male. 5. endopodite of second antenna; 6. dorsoproximal edge of second mandibular endopodite; 7. sixth limb; 8. seventh limb.

the present new species, the seventh limb is recognized as a very small process even in the first larval stage. In this connection, the limbs of *Sarsiella japonica* and *S. misakiensis* (family Sarsiellidae) are also detected in the first larval stage (Hiruta, 1977, 1978). In the second stage, the sixth limb is provided with one bristle on the anterior margin, and the seventh limb is clearly recognized as a bare thumb-

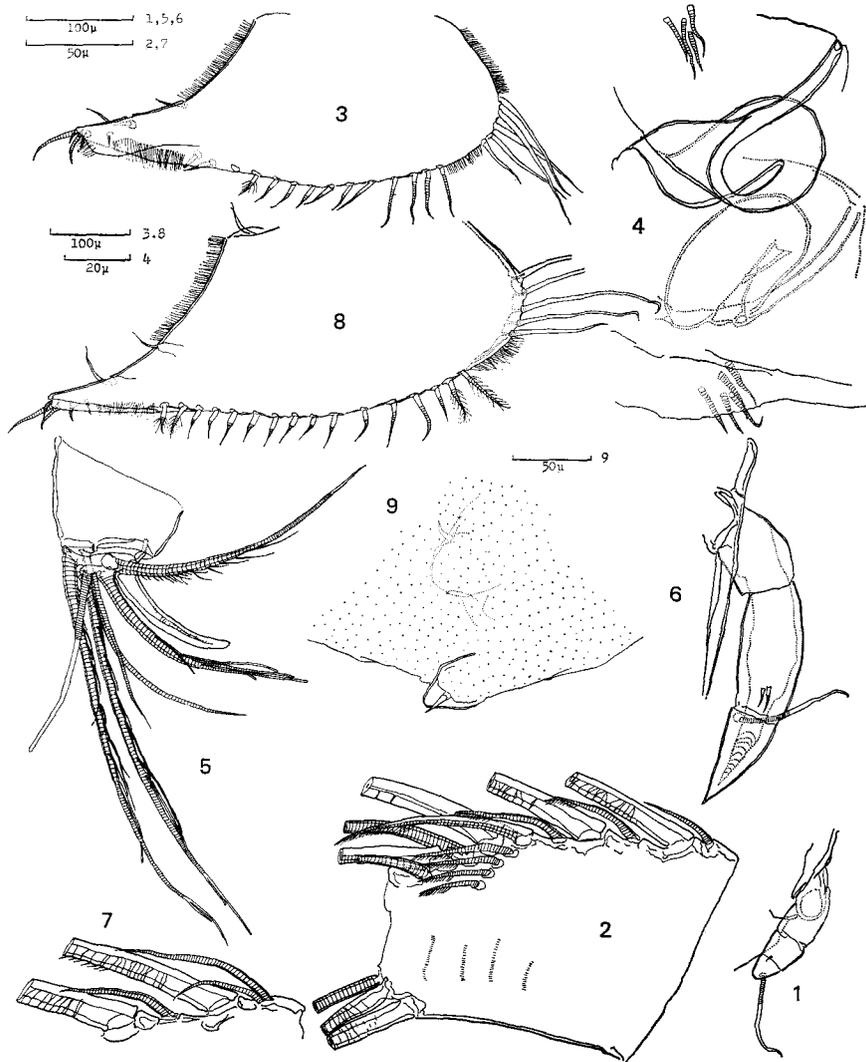


Fig. 17. *Bathyleberis yamadai* n. sp. Fifth larval stage (A-I instar). Female. 1. endopodite of second antenna; 2. second endopodite segment of mandible; 3. sixth limb; 4. genitalia and brush-like organ. Male. 5. distal part of first antenna; 6. endopodite of second antenna; 7. dorsoproximal edge of second mandibular segment; 8. sixth limb; 9. copulatory limb.

like process. In the third stage, the sixth limb has more than one bristle and is similar to adult, and the seventh limb is elongate and without bristles. The seventh limb is provided with bristles in the last three developmental stages.

Other appendages, such as the first antenna, second antenna, mandible, maxilla, and fifth limb, are similar to those of adult in total appearance through all the successive stages.

On the other hand, the sex is easily determinable in A-2 and A-1 instars by the structure of the endopodite of the second antenna. In addition, the difference in size between male and female of these stages, as described above, is fairly large. The male A-1 instar, whose shell shape is almost the same as in adult female, is somewhat smaller than adult female. Therefore, it is difficult to distinguish between them only by the shell size. In the study of life cycle, breeding season, seasonal distribution of larvae and adults, etc., it is necessary to pay attention to this point in the present new species and also probably some of the other members within the subfamily Cyllindroleberidinae.

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