



Title	Notes on the Marine Bryozoa from Hokkaido : I. Crisiidae (Cyclostomata) (With 10 Text-figures and 3 Plates)
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Notes on the Marine Bryozoa from Hokkaido

I. Crisiidae (Cyclostomata)

By

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(With 10 Text-figures and 3 Plates)

Recent five years the junior author has been making collections of marine bryozoans on his visits to Akkeshi, Muroran and Mori, Hokkaido, and in the summer of 1971 the senior author had a chance to study the bryozoan fauna along the southeastern coast of Hokkaido.

Mr. Kiyoshi Ito in Otaru was so kind as to give the authors his shore collection materials of bryozoans for the present study. The authors were also very fortunate in receiving invaluable bryozoan collection by Dr. Minoru Imajima made in 1955 at Shirikishinai.

It seems, therefore, rather enough to study the bryozoan fauna along the coasts of Hokkaido, and actually the authors have distinguished over 100 species in the present materials. The present paper deals only with Crisiidae (Cyclostomata) and the reports on other families will appear successively.

It is the authors' greatest pleasure to express here their hearty thanks to Dr. M. Imajima of National Science Museum, Tokyo and Mr. K. Ito as well as to Prof. Mayumi Yamada of Hokkaido University for their kind helps in all ways.

Crisia denticulata (Lamarck, 1816)

(Text-fig. 1, Pl. 1, figs. 1-4)

Crisia denticulata Busk, 1875: p. 4, pl. IV, figs. 1-4; Hincks, 1880: p. 422, pl. LVI, fig. 7; Harmer, 1891: p. 129, pl. XII, figs. 1-3; Marcus, 1940: p. 47, fig. 24; Kluge, 1962: p. 156, text-fig. 77.

Zoarium slender, bushy, with elongate branches sometimes diverging at an angle larger than 45°. Primary zooid single. Branches composed of one or two slender internodes usually with eight to 14 zooids opening on short peristome. Fertile internode consisting of over 14 zooids, the third of the fifth forming an

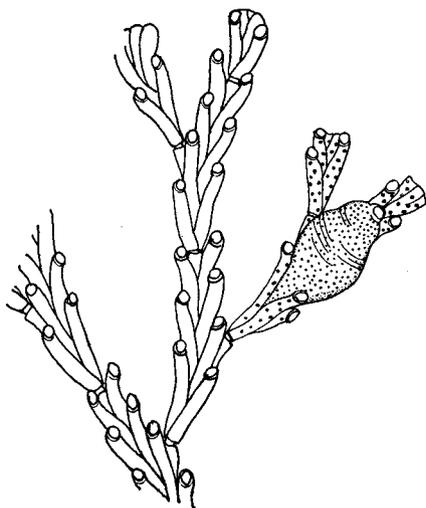


Fig. 1.

Fig. 1. *Crisia denticulata* (Lamarek), sterile and fertile internodes with a pouch-like gonozooid. $\times 20$

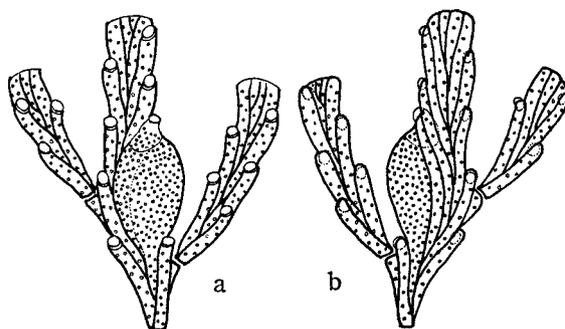


Fig. 2.

Fig. 2. *Crisia eburneo-denticulata* Smitt. a. fertile internode in frontal view. b. the same from the basal side. $\times 20$

elongated pouch-like gonozooid with a small conical protuberance on which an oeciopore opens apically. A pair of supporting roots, each consisting of serial tubular kenozooids, rising from the basal wall of the lowermost zooid of each internode.

Numerous complete colonies were collected at Akkeshi, Muroran and Mori by the authors, Shirikishinai and Toyoura by Imajima, Hakodate and Otaru by Ito.

The present specimens well agree with this northern form, and are well distinguishable from others by elongated internode and sac-like gonozooid of which the proximal half is clearly tapered. The materials differ from var. *borgi* Kluge (1962) in the oeciopore opening on the conical process, and also from var. *arctica* Kluge (1962) by the constant lower position of gonozooid in the fertile internode.

***Crisia eburneo-denticulata* (Smitt, 1865)**

(Text-fig. 2, Pl. 1, figs. 5, 6)

Crisia eburneo-denticulata Busk, 1875: p. 5, pl. VI; Kluge, 1962: p. 154, text-fig. 75.

Zoarium slender, bushy, with elongated branches composed of one or two delicate internodes. Ordinary internode consisting of over 10 zooids while fertile internode sometimes with more zooids. Gonozooid elongate oval or elliptical, the proximal end pointed. Oeciopore small, circular, opening at narrowed distal end.

Numerous delicate colonies were collected at Akkeshi, Erimo, Muroran and

Mori by the authors, Shirikishinai and Hakodate by Imajima and Otaru by Ito.

Crisia eburnea (Linnaeus, 1758)

(Text-fig. 3, Pl. 1, figs. 7, 8)

Crisia eburnea, Harmer, 1891: p. 131, 154, pl. XII, fig. 6; Borg, 1930: p. 40, Text-figs. 14, 15; Kluge, 1962: p. 153, text-fig. 73.

Zoarium short and small, forming robust bushy tuft attached to algal roots. Branches rather strong and consisting of one or two short, stout internodes which are composed of about 10 zooids arranged alternately in two rows. Zooids tubular, robust with an orifice opening on a moderate peristome. Fertile internode broad, consisting of over 14 zooids, sometimes sending out two or three branches. Gonozooid characteristic in its moderately inflated sac-like form with a circular oocciopore opening on the top of short tubular process.

A number of specimens were obtained at Akkeshi, Erimo and Muroran by the authors and Shirikishinai and Hakodate by Imajima.

The materials at hand agree with the descriptions and figures of Harmer (1891) and Kluge (1962), and when the gonozooid is much inflated they approach to *Crisia aculeata* Hassall described by Harmer 1891 but differ clearly from the latter species in the complete lack of the whip-like process of ordinary zooid and in the pointed end of the orifice.

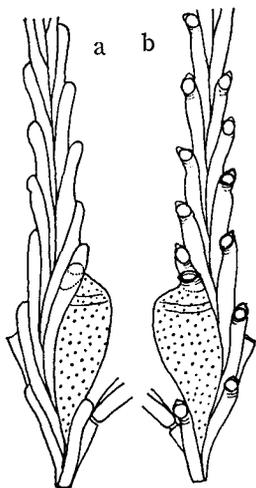


Fig. 3.

Fig. 3. *Crisia eburnea* (Linnaeus). a. fertile internode in basal view. b. the same in frontal view. $\times 20$

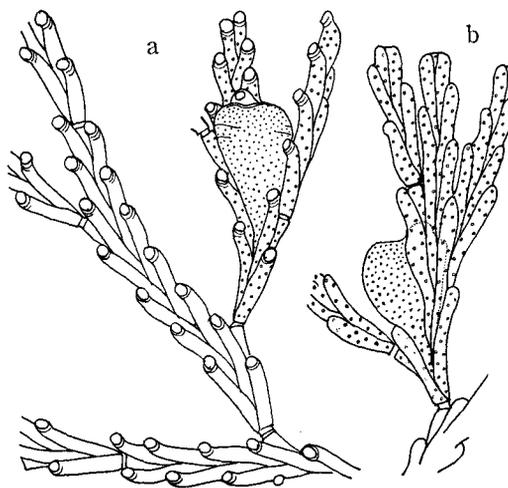


Fig. 4.

Fig. 4. *Crisia aculeata* Hassall. a. sterile and fertile internodes with inflated gonozooid in frontal view. b. fertile internode from the basal side. $\times 20$

***Crisia aculeata* Hassall, 1941**

(Text-fig. 4, Pl. 1, figs. 9, 10)

Crisia aculeata Harmer, 1891: p. 132, pl. XII, fig. 4; Marcus, 1940: p. 43, text-fig. 22; Kluge, 1962: p. 152, text-fig. 72.

Zoarium rather robust, bushy with somewhat stout branches composed of one or two internodes. Sterile internode consisting of six to 12 zooids, while fertile one of over 12 zooids. Gonozooid peculiar in its much inflated distal half and in its oeciopore opening on a conical process. Ordinary zooids with no spinous process.

Several specimens were obtained at Akkeshi, Muroran and Toyoura by the authors.

The material at hand differs from the description and figure of *Crisia aculeata* by Harmer (1891) in the lack of spinous process on ordinary zooids, but the much inflated gonozooid seems to indicate the specific character. The present material may be a spineless variety of the species.

***Crisia globosa* sp. n.**

(Text-fig. 5, Pl. 2, figs. 1-3)

Zoarium small but thick, forming bushy tuft on seaweeds. Branches robust, curved internally. Sterile internode short and broad, usually consisting of six to 10 stout zooids. Fertile internode consisting of 10 to 12 strong zooids supporting a characteristic short, inflated, globose gonozooid with circular oeciopore on an elevated conical process. Primary disk with four rhizooids and a single primary zooid.

The present species resembles *Crisia conferta* Busk (1875) in general structure of branches, but differs clearly in the lower position of gonozooid in the fertile internode. It is also near to *Crisia constans* Kluge (1946) in the globose form of gonozooid but is distinguishable from the latter by the basal wall of gonozooid fused with other zooids of the fertile internode. Robust branches and fused globose gonozooid indicates the present species being new to science.

A number of fertile colonies were found in the Dr. Imajima's collection from Toyoura in October 1955, and were also collected by the authors at Akkeshi and Muroran in August 1971.

Holotype: Br-H-76, deposited in the National Science Museum. Type locality: Toyoura.

***Bicrisia abyssicola* Kluge, 1962**

(Text-fig. 6, Pl. 2, figs. 4-6)

Bicrisia abyssicola Kluge, 1962: p. 146, text-fig. 68.

Zoarium delicate, bushy with slender branches. Sterile internode consisting of three to six delicate tubular zooids with a long spine rising from a lateral process

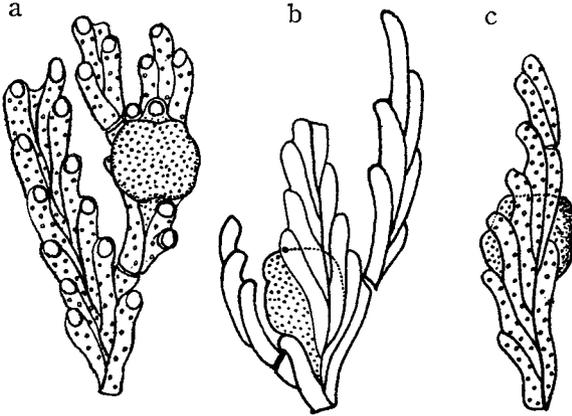


Fig. 5.

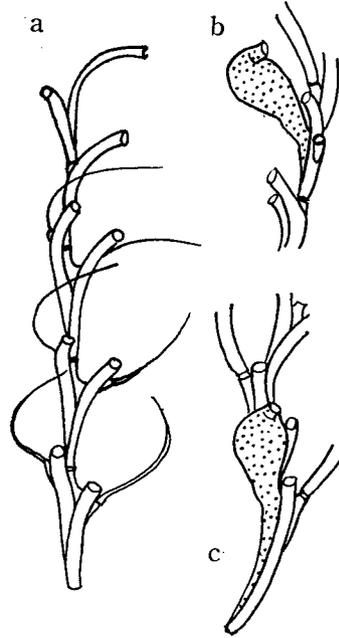


Fig. 6.

Fig. 5. *Crisia globosa* sp. n. a. fertile internode with a globose gonozooid. b, c. fertile internodes from the basal side. $\times 20$

Fig. 6. *Bicrisia abyssicola* Kluge a. sterile internode. b, c. fertile internodes with gonozooid. $\times 20$

near the distal peristome. Fertile internode carrying a pouch-like gonozooid with very long proximal extension. Ooeciopore circular, opening on a tubular process near the distal end.

Several colonies were collected at Akkeshi and Muroran by the authors, and also some samples were found in the Imajima's collection from Toyoura.

Bicrisia erecta sp. n.

(Text-fig. 7, Pl. 2, figs. 7-9)

Zoarium delicate, slender, forming a small bushy mass encircled with internally curved delicate branches. Each branch composed of two to four internodes, showing somewhat zigzag lines of alternately situated zooids with an elongate peristome. Some of the internodes consisting of two zooids usually give rise a single new internode, while others of three zooids giving rise two internodes laterally. A long segmented whip-like spine arised from a small lateral process near the distal end derived from a degenerated internode. Fertile internode

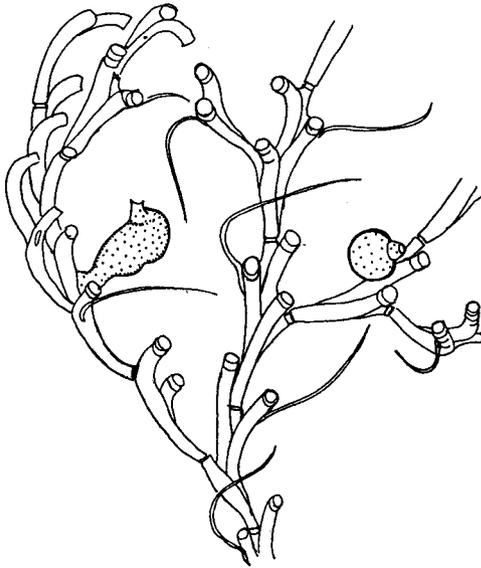


Fig. 7. *Bicrisia erecta* sp. n., a part of a colony showing the mode of branching and two gonozooids, one of which seen from above. $\times 20$

consisting of two or three zooids, and the second zooid developed into an erect bottle-like gonozooid with a circular ooeciopore supported on a short tubular process near the distal end.

The present species is close to *Bicrisia edwardsiana* (d'Orb., 1841) from the Southern Hemisphere in the general form of gonozooids, but differs from the latter in the slender tubular zooids and in having unsegmented gonozooid. It is also similar to *Bicrisia abyssicola* Kluge (1962) from the northern Atlantic, but differs in the smaller number of zooids in the fertile internode and in the erect position of gonozooid with tubular peristome.

Numerous fertile colonies were obtained by Imajima from Toyoura in October 1955, and also by the present authors at Akkeshi and Muroran.

Holotype: Br-H-77, deposited in National Science Museum. Type locality: Toyoura.

Crisiella diversa (Kluge, 1955)

(Text-fig. 8, Pl. 3, figs. 1-3)

Crisia diversa Kluge, 1955: p. 63, text-figs. 1-3.

Crisiella diversa Kluge, 1962: p. 146, text-fig. 69.

Zoarium delicate, slender and bushy. Primary disk with four rhizoids and a single primary zooid. The second internode consisting of double zooids and the third one of three ones giving rise to a pair of lateral branches. Sterile internode consisting of three long, slender zooids ordinarily giving rise to a single median or two lateral branches, while the internode consisting of five zooids shooting off three

branches. Fertile internode consisting of 10 or more zooids, one of which developing into a large tubular, club-shaped gonozooid with a small, broadly triangular oeciopore opening on a short conical process.

Numerous fertile colonies were obtained at Akkeshi, Muroran and Mori by the authors and Shirikishinai by Imajima.

The materials agree with this boreal species being abundant in the northern Atlantic. It differs from *Crisiella producta* (Smitt) by denser arrangement of zooids in sterile internode and by the club-like gonozooid only partly covered on the basal side by other zooids of the fertile internode.

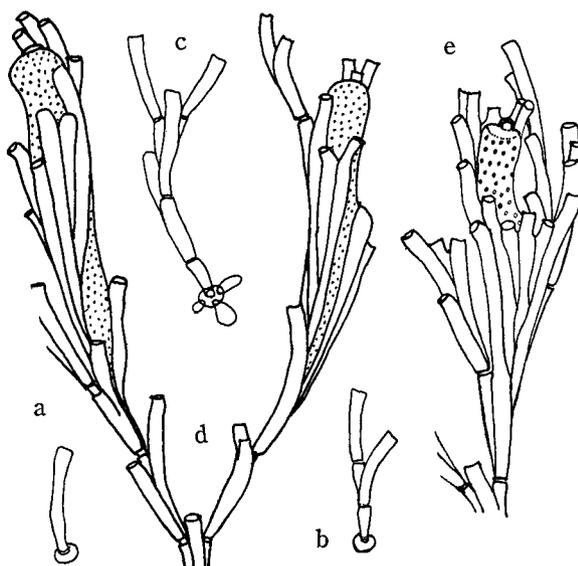


Fig. 8. *Crisiella diversa* (Kluge). a-c. young colonies rising from primary disk. d,e. three gonozooids partly covered basally by ordinary zooids. $\times 20$

Crisiella producta (Smitt, 1865)

(Text-fig. 9, Pl. 3, figs. 4-6)

Crisia producta Smitt, 1865: p. 116, 131, Pl. XVI, figs. 4-6.

Crisiella producta Borg, 1924: p. 3, figs. 1-9.

Zoarium small, bushy with delicate branches. Sterile internode consisting of one to five zooids with a distinct peristome. Fertile internode composed of seven or more zooids, and the first or third zooid developing into a long tubular gonozooid with curved distal end and narrowed proximal half. Oeciopore opening distally on a small indistinct process.

Several small colonies were obtained at Akkeshi and Muroran by the authors.

The species is easily distinguishable from the other species of the genus

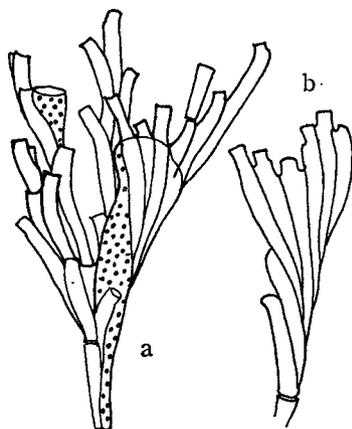


Fig. 9.

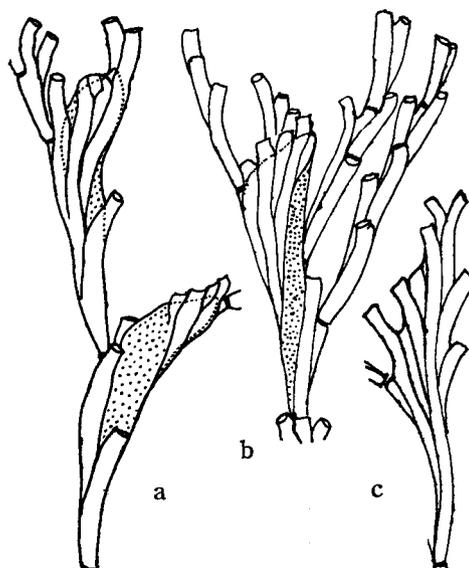


Fig. 10.

Fig. 9. *Crisiella producta* (Smitt). a. fertile internodes carrying a young and a completed gonozooids. b. another fertile internode from basal side. $\times 20$

Fig. 10. *Crisiella obliqua* sp. n. a, b. fertile internodes carrying a peculiar gonozooid respectively. c. another fertile internode showing the arrangement of zooid in basal view. $\times 20$

mainly by the gonozooid with elongated proximal end not concealed by the other tubular zooids.

Crisiella obliqua sp. n.

(Text-fig. 10, Pl. 3, figs. 7-9)

Zoarium forming somewhat dense bushy tufts. Branches rather short, with one to three internodes. Sterile internode constating of two to five zooids with a distinct peristome. Fertile internode consisting of eight to 12 zooids, one of which developing into a peculiar elongate gonozooid with oblique distal end carrying a small oeciopore which is not supported on a distinct process or tube. Gonozooid only partly concealed by other zooids.

Several fertile specimens were collected at Akkeshi and Muroran by the authors.

The present materials are quite peculiar in the elongate tubular or triangular form of gonozooid with oblique distal surface carrying a slit-like oeciopore.

Holotype: Br-H-78, deposited in National Science Museum. Type locality: Akkeshi.

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Explanation of Plates XIV-XVI

All figures $\times 18$

Plate XIV

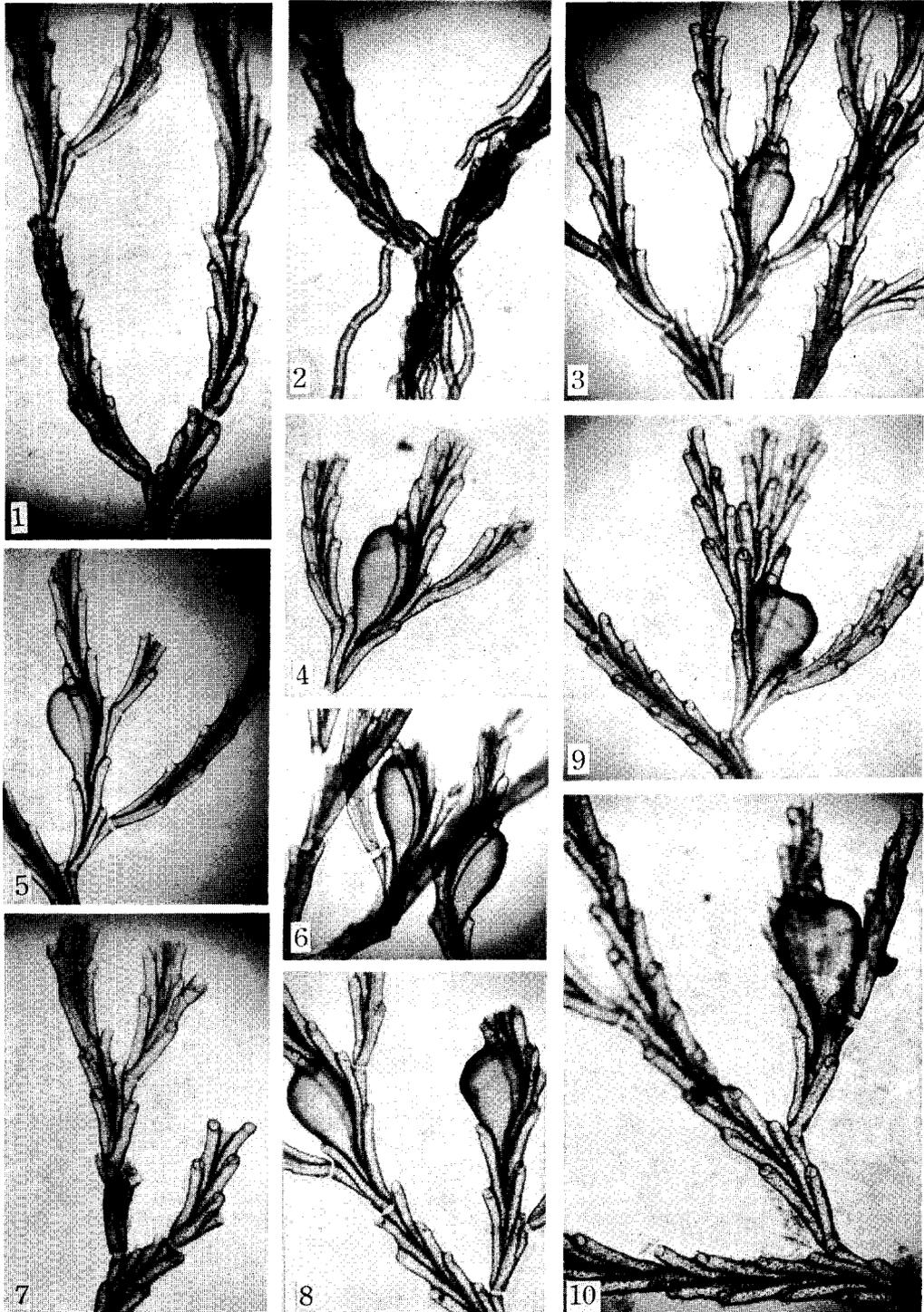
- Fig. 1-4. *Crisia denticulata* (Lamarck).
1. Internodes.
 2. Rhizoids rising in pair from the basal wall of the proximal zooids of the internode.
 3. Sac-like gonozooid in frontal view.
 4. The same seen from the basal wall.
- 5-6. *Crisia eburneo-denticulata* Smitt.
5. Slender gonozooid in frontal view.
 6. Another gonozooids in basal view.
- 7-8. *Crisia eburnea* (Linnaeus).
7. Internodes.
 8. Globose gonozooids in frontal view.
- 9-10. *Crisia aculata* Hassall.
9. Infrated gonozooid.
 10. Internodes and gonozooid.

Plate XV

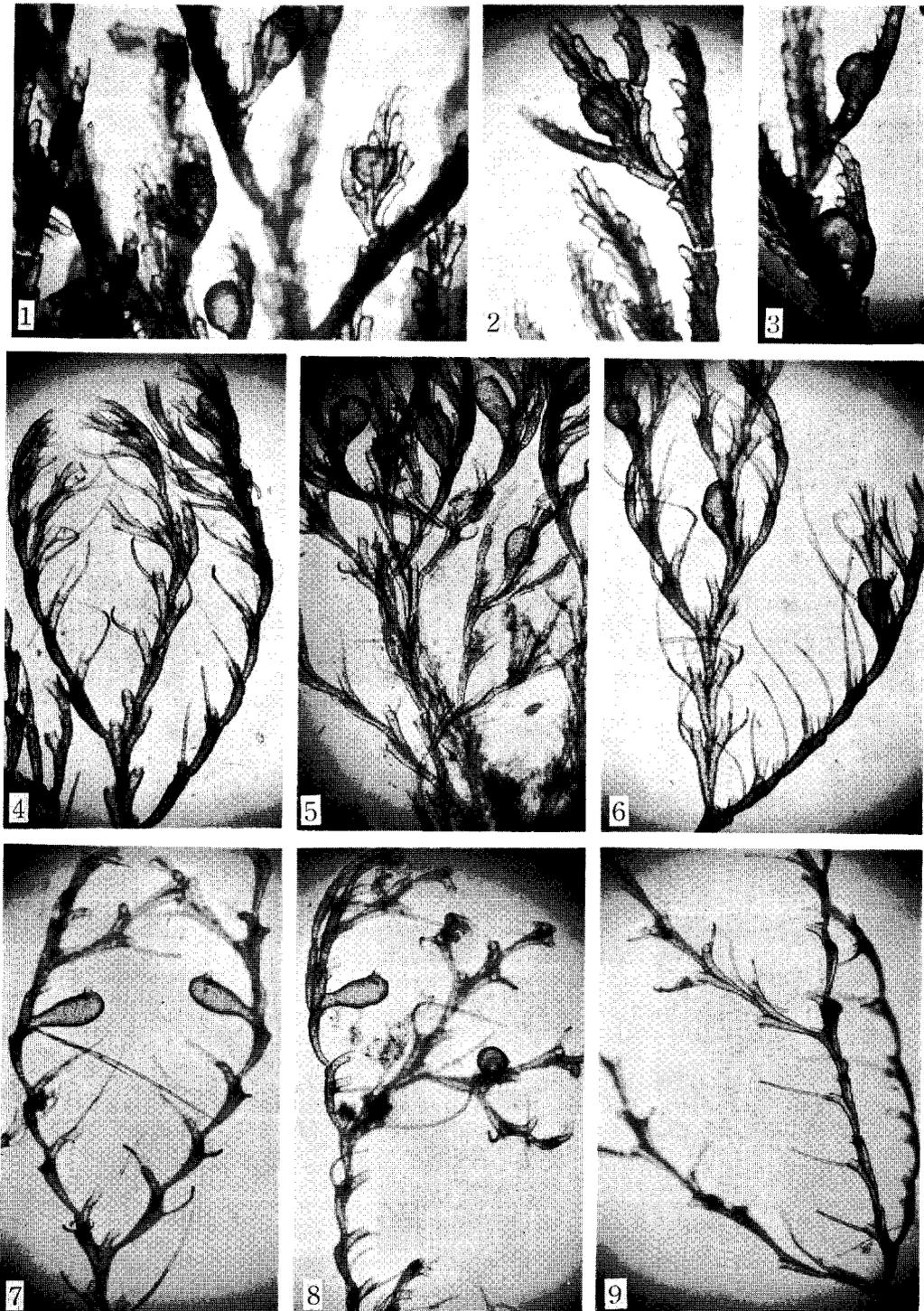
- Fig. 1-3. *Crisia globosa* sp. n.
1. Robust internodes and gonozooids.
2. Gonozooids in basal view.
3. Another gonozooids in side view.
4-6. *Bicrisia abyssicola* Kluge.
4. Internodes.
5. Fertile internodes at the distal part of the branch with many gonozooids.
6. Internodes and gonozooids in side view.
7-9. *Bicrisia erecta* sp. n.
7. Erect gonozooids.
8. Gonozooids and branching of internodes.
9. Sterile internodes.

Plate XVI

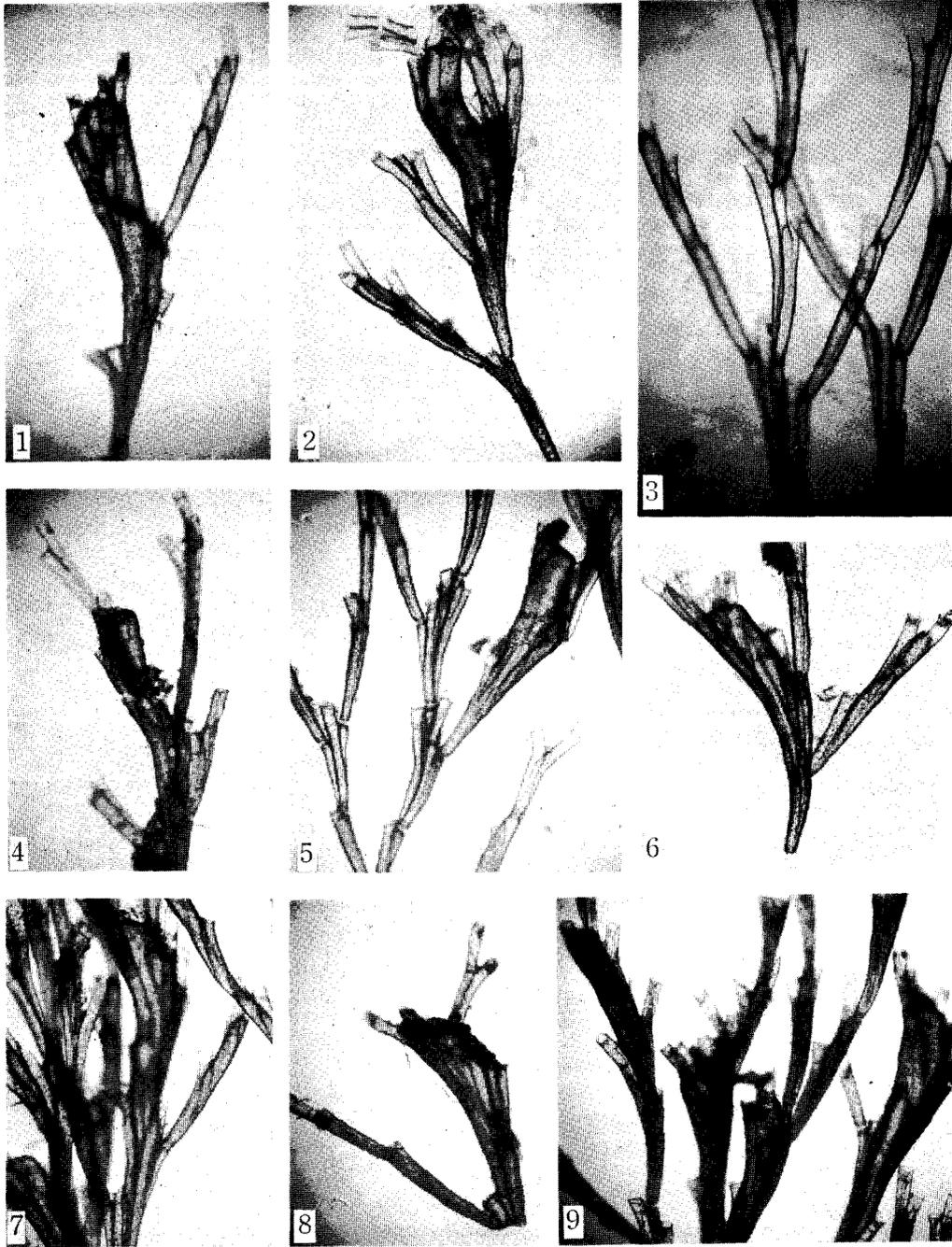
- Fig. 1-3. *Crisiella diversa* (Kluge).
1. Elongated gonozooid in basal view.
2. Another gonozooid with gonopore.
3. Branches.
4-6. *Crisiella producta* (Smitt).
4. Branches with a gonozooid.
5. Another branches carrying a gonozooid.
6. Fertile internode.
7-9. *Crisiella obliqua* sp. n.
7. Branches and a peculiar gonozooid.
8. Another gonozooid.
9. Fertile part of the colony showing gonozooids.
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S. Mawatari and S.F. Mawatari: Bryozoa from Hokkaido, I



S. Mawatari and S.F. Mawatari: Bryozoa from Hokkaido, I



S. Mawatari and S.F. Mawatari: Bryozoa from Hokkaido, I