February, 1954 No. 2

PUBLICATIONS
FROM
THE AKKESHI MARINE BIOLOGICAL STATION

Species of the Genus *Eudendrium* from Japan.

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(With 15 text figures)

Beginning with the report of Inaba (1890) the species of hydroid genus *Eudendrium* from Japan were studied by Stechow (1909, 1913) and Jäderholm (1919). In 1923 Stechow enumerated the following five species of the genus *Eudendrium* in his list of hydroid-fauna in the Japanese waters:

Eudendrium capillare Alder
Eudendrium vaginatum Allman
Eudendrium armstrongi Stechow
Eudendrium rameum (Pallas)
Eudendrium racemosum (Gmelin)

Since that time, the species of *Eudendrium* were treated three times; the first time by Fraser (1935) who described his new species *E. biseriale* from the specimens in Sagami Bay, the other times by Leloup (1938) and by the present writer (1950), in both cases *E. capillare* was reported.

Recently the writer has had the opportunity to examine examples of *Eudendrium* collected from several localities in Japan, and found among them 15 different species of this genus, including 6 new species.

The following is the list of the species treated in the present report:

1) *Eudendrium annulatum* Norman
2) *Eudendrium boreale* n. sp.
3) *Eudendrium insigne* Hincks
4) *Eudendrium racemosum* (Gmelin)
5) *Eudendrium magnificum* n. sp.
6) *Eudendrium rameum* (Pallas)
7) *Eudendrium imperiale* n. sp.
8) *Eudendrium ramosum* (Linné)
9) *Eudendrium japonicum* n. sp.
10) *Eudendrium lineale* n. sp.
11) *Eudendrium laxum* Allman
12) *Eudendrium sagaminum* n. sp.
13) *Eudendrium biseriale* Fraser
14) *Eudendrium capillare* Alder
15) *Eudendrium tenellum* Allman

Of five species listed by Stechow (1923), *E. armstrongi* Stechow and

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1) Contributions from the Akkeshi Marine Biological Station, No. 64.

Publ. Akkeshi Mar. Biol. Stat., No. 2. 1954.

E. vaginatum Allman did not be treated in this report, for the materials of these two species did not come to the writer's hand.

Before going further, the writer wishes to acknowledge his indebtedness to Dr. Hirotaro Hattori of the Biological Laboratory, Imperial Palace, Tokyo, in allowing to place many specimens of that Laboratory at the writer's disposal. Thanks are due to Prof. Tohru Uchida, who gave most valuable suggestions and kind encouragement during this study.

1) *Eudendrium annulatum* Norman

(Fig. 1)

Eudendrium annulatum: Hincks, 1868, p. 83, pl. 15, fig. 1; Allman, 1871–72, p. 338.

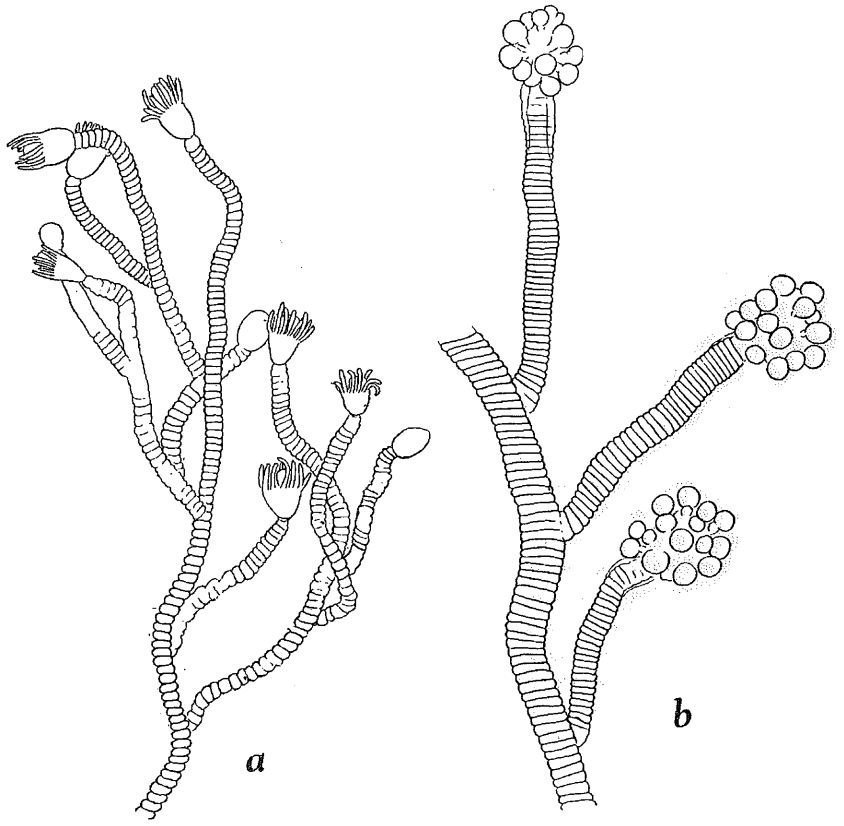

Fig. 1. *Eudendrium annulatum* Norman.
a. Portion of colony showing irregular branching.
b. Male gonophores.

Trophosome. Colony strongly fascicled, attaining about 8 cm in height. Stem large, stout, strongly fascicled, attaining about 7 mm in

breadth in its basal portion, much and irregularly branched. Large branches may also be fascicled; small branches give rise to the pedicels for the hydranths. Branches becoming more slender upwards, with a hydranth at the distal end. Hydranths rather small, with 15–16 tentacles. Perisarc on stem, branches and pedicels, very distinctly annulated throughout with rather narrow regular annulations.

Gonosome. Only the male gonophores were collected. Male gonophores monothalamic, spherical, with a short stalk, about 20 in number, scattered on the fully aborted hydranths, which are devoid of hypostome and tentacles.

Remarks. This species is new to Japanese waters. In Japan it was collected only in Hokkaido, in low tide mark. The localities are: Muroran, Oshoro, Akkeshi, all in Hokkaido.

Distribution. Widely distributed in the North Atlantic ocean, Antarctic ocean, Indonesia, and Japan.

2) *Eudendrium boreale* n. sp.

(Fig. 2)

Trophosome. Colonies growing in small clusters from a creeping stolon, may attain a height of 10 cm. Main stem erect, simple, mostly not fascicled but at times slightly fascicled at the base, irregularly branched. Stem and branches are not in one plane. Perisarc regularly and distinctly annulated throughout, the annulations rather close together and very distinct throughout; the perisarc envelops the lower part of the hydranth, forming a cup-like portion that may be composed of a loose corrugated membraneus sheath. Hydranth with about 20 tentacles. There is a horizontal groove in the surface of the body of the hydranth.

Gonosome. Male gonophores two-chambered, in a whorl, on the base of the hydranth that is not aborted. Female gonophores oval, in dense clusters around the body of hydranth which are usually not aborted. It seems that as the female gonophores advance to maturity tentacles of the hydranth disappear and gonophores become to scatter on the hydranths or some distance down the pedicels.

Remarks. This new species resembles *E. vaginatum* Allman in the presence of a cup-like sheath on the hydranth. This is, however, rather large species, attaining 10 cm, while the latter more small reaching 4 cm. Moreover, the annulations on stem and branches are very close and distinct in this species, but not so compact in *E. vaginatum*. The species

is one of the commonest species in Hokkaido, collected in Oshoro, Muroran and Akkeshi in low tide mark, attached on rocks and stones.

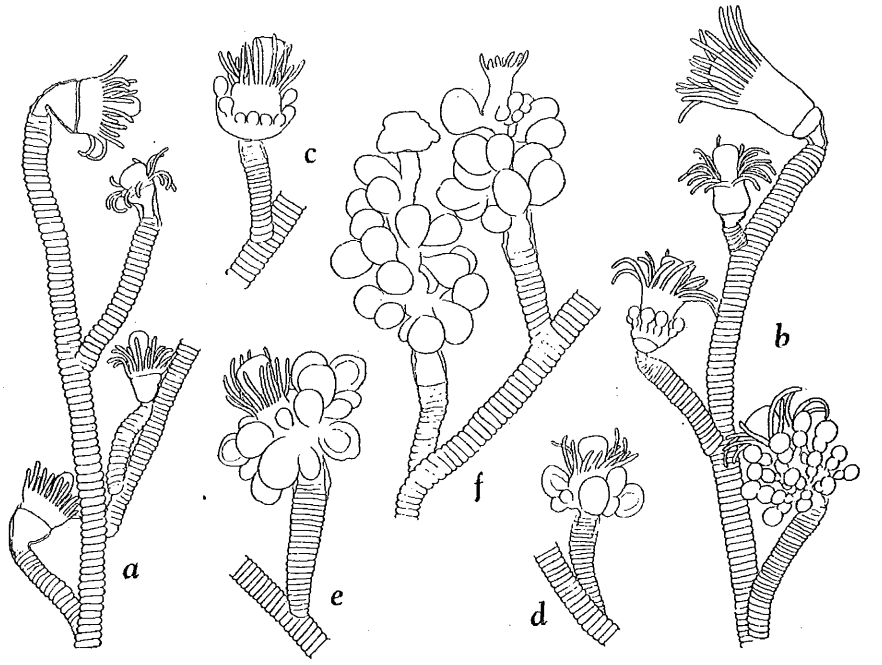

Fig. 2. *Eudendrium boreale* n. sp.
a. Portion of branch. b. Branch with male gonophores.
c-f. Female gonophores, showing different stages.

3) *Eudendrium insigne* Hincks

(Fig. 3)

Eudendrium insigne: Hincks, 1868, p. 86, pl. 14, fig. 3; Allman, 1871-72, p. 337, pl. 14, figs. 4-6; Fraser, 1937, p. 41, pl. 7, fig. 29.

Trophosome. Colony small, reaching a height of 3 cm. Stem simple, not fascicled, with a small number of branches. Branches rather sinuous, usually about the same size as the main stem. Hydranth with 20–25 tentacles, without a typical furrow on its body, but in some specimens an indistinct groove is present. Perisarc of stem and branches more or less annulated throughout, but often the annulations are incomplete, so as to be a wrinkled appearance. Hydranth pedicels usually annulated throughout.

Gonosome. Only the female gonophores were collected. Female gonophores globular, on short stalk, forming a whorl of 3 to 6 at the base of the tentacles of unreduced hydranth.

Remarks. This widely distributed species has not been reported from Japan and this is the first record of the species from Japan. Our Japanese specimens are somewhat different from those of Europe and America in the feature of the perisarc and the lack of or weak development of the furrow on the hydranth body. They are, however, so

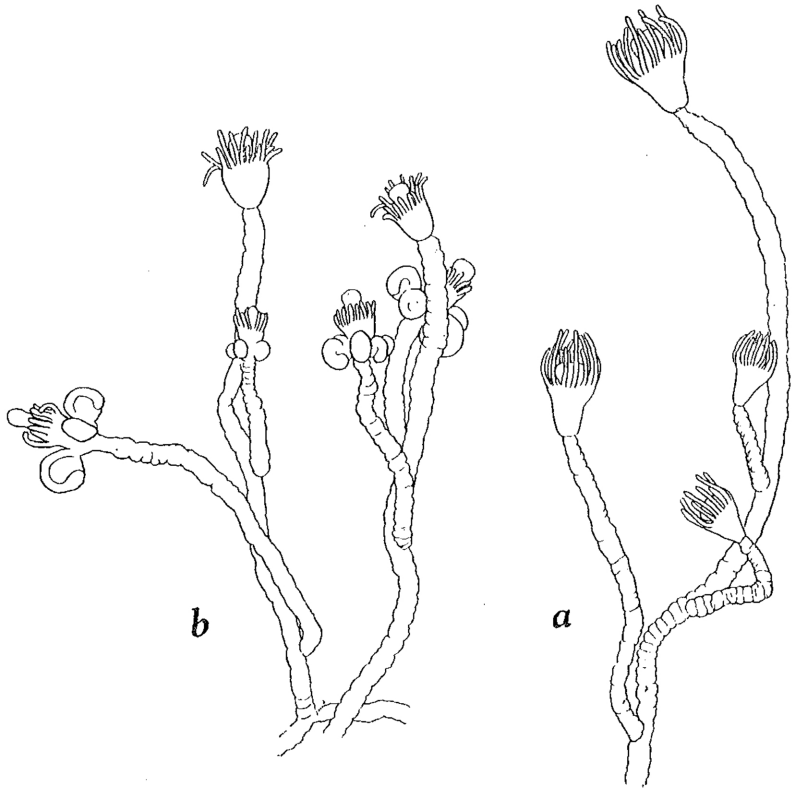

Fig. 3. *Eudendrium insigne* Hincks.
a. Portion of colony. b. Portion of branch with female gonophores.

closely related to those of Europe and America in the general form of the colony, that the writer identifies them with the species.

Distribution. Widely distributed in the North Pacific and Atlantic ocean, Mediterranean, Antarctic, Indonesia, and Japan.

4) *Eudendrium racemosum* (Gmelin)

(Fig. 4)

Eudendrium racemosum: Allman, 1871–72, p. 341; Stechow, 1913, p. 63: Stechow, 1923, p. 4.

Trophosome. Colony large, attaining about 11 cm in height. Stem very greatly fascicled, especially in the basal portion, irregularly branched.

Stem and branches form rather plane appearance but hydranth pedicels are toward all directions. Main stem, branches and second branches all fascicled. Perisarc on main stem and on large branches wrincked in some places and smooth in other, often reaching the appearance of annulations. Small branches and hydranth pedicels mostly annulated on the base. Hydranth with 18–20 tentacles.

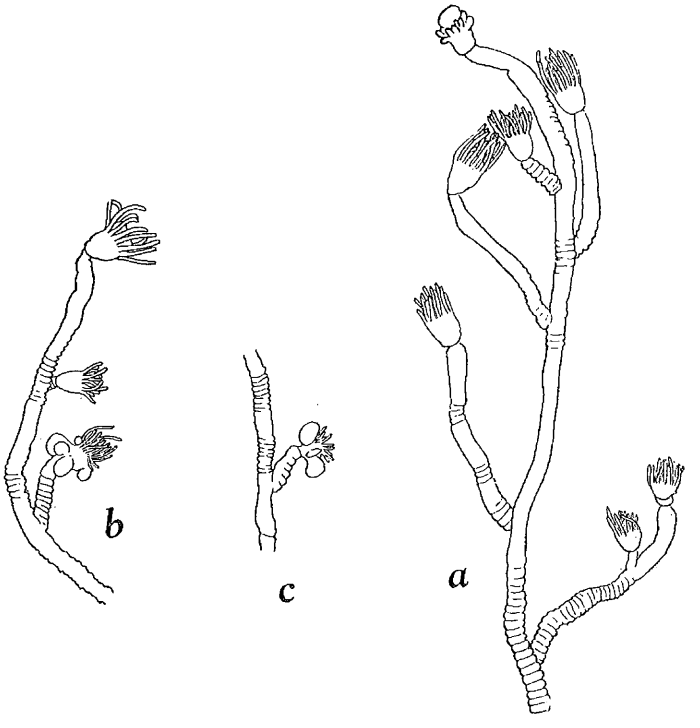

Fig. 4. *Eudendrium racemosum* (Gmelin).
a. Portion of colony. b, c. Female gonophores.

Gonosome. Only the female gonophores were collected. Female gonophores oval, attached on the body of somewhat reduced hydranth, in a whorl of 3–5 in number.

Remarks. This species resembles at a glance *E. rameum*, but differs from it in the mode of ramification and in the perisarc of stem and branches. *E. rameum* has more smooth perisarc than this. In 1913 Stechow reported the species from Sagami Bay basing on the specimens with male gonophores, which were described by him as four-chambered ones. The specimens here examined were collected in Hayama, Sagami Bay.

Distribution. Mediterranean, and Japan.

5) *Eudendrium magnificum* n. sp.

(Fig. 5)

Trophosome. Colony large, attaining about 10 cm in height. Main stem fascicled, rather thick in basal portion, irregularly branchd. Branches also fascicled on the basal part. Branches and hydranth pedicels mostly smooth but with a few annulations or wrinkles at the base or at some other parts.

Gonosome. Only male gonophores were collected. Male gonophores one- or two-chambered, with a short stalk, radially arranged on fully aborted hydranth in 15–20 in number.

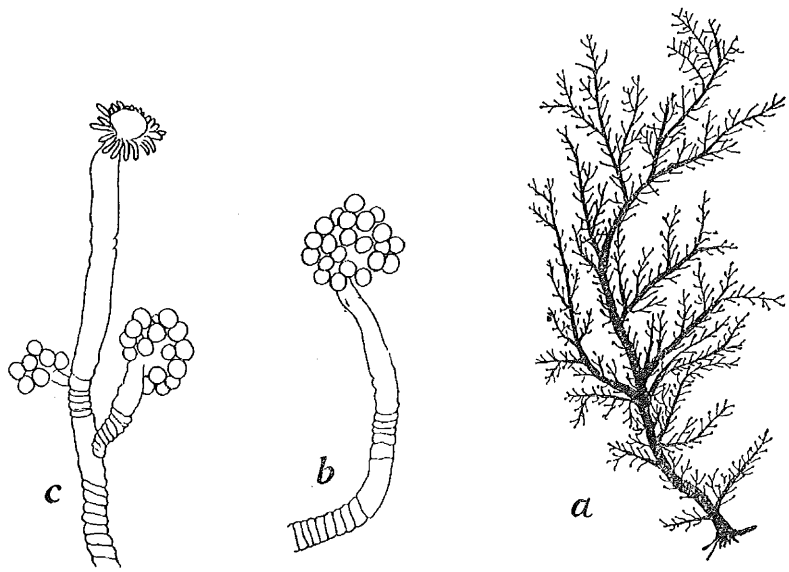

Fig. 5. *Eudendrium magnificum* n. sp.
a. Colony. b, c. Male gonophores.

Remarks. This new species was identified on one specimen collected in Hayama, Sagami Bay. This species resembles *E. racemosum* in general appearance but the male gonophores are one- or two-chambered, not developed over three-chambers.

6) *Eudendrium rameum* (Pallas)

(Fig. 6)

Eudendrium rameum: Hincks, 1868, p. 80; Allman, 1871–72, p. 334; Torrey, 1902, p. 33; Stechow, 1909, p. 27; Jäderholm, 1919, p. 4; Stechow, 1923, p. 4; Fraser, 1937, p. 42, pl. 7, fig. 31.

Trophosome. Colony large, attaining about 11 cm in height. Main stem fascicled, rather thick at the basal portion. Stem irregularly branched, not forming a plane appearance. Branches more slender than those of *E. racemosum*. Periderm of branches, second branches and pedicels mostly smooth, with some indistinct annulations at the base. Hydranth with about 20 tentacles.

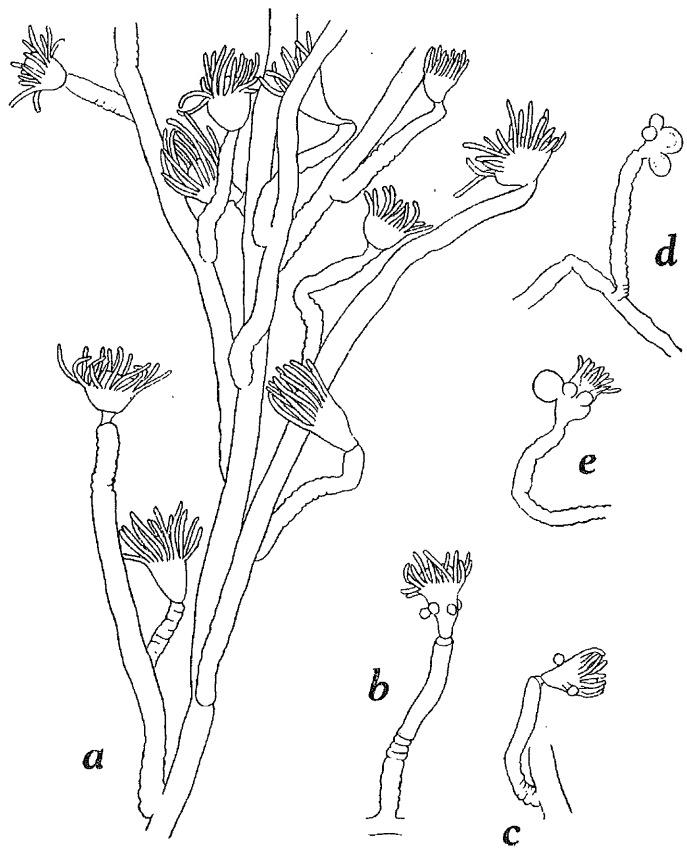

Fig. 6. *Eudendrium rameum* (Pallas).
a. Portion of colony. b, c. Male gonophores. d, e. Female gonophores.

Gonosome. Male gonophores two- or three-chambered, often one-chambered in immature ones, arranged in a whorl under the tentacles of unreduced hydranth. Female gonophores arranged in a whorl on the body of hydranth which is slightly aborted though with hypostome and tentacles. In some specimens the hydranth is more aborted and is devoid of tentacles.

Remarks. This cosmopolitan species is common in the middle

Japanese waters. Stechow reported this from Sagami Bay and later Jäderholm from Kyushu. We have some specimens collected from Misaki, Hayama, Shimoda, all in Sagami Bay.

Distribution. Widely distributed in the Pacific and Atlantic, and Arctic ocean.

7) *Eudendrium imperiale* n. sp.

(Fig. 7)

Trophosome. Colony very large, attaining about 16 cm in height. Main stem fascicled, rather thick in its basal portion, irregularly branched. Stem and branches somewhat sinuous, not so straight as in *E. ramosum*. Branches not so slender, mostly in one plane. Hydranths pedicels be rather apart each other, forming the appearance of a withered tree. Perisarc of branches mostly smooth but with some wrinkles in some places, branchlets and pedicels generally with 5–8 annulations at the base. Hydranth with about 20 tentacles.

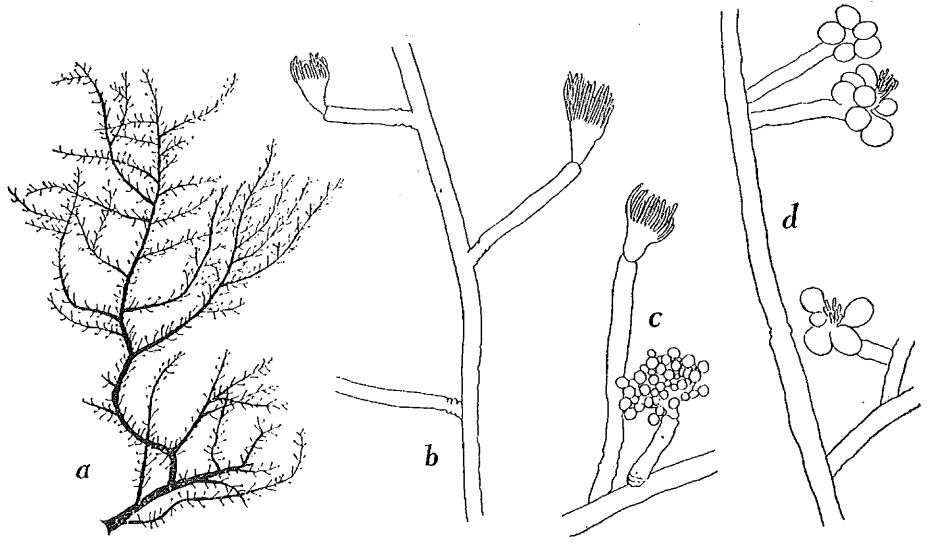

Fig. 7. *Eudendrium imperiale* n. sp.
a. Colony. b. Portion of branch.
c. Male gonophores. d. Female gonophores.

Gonosome. Male gonophores two-chambered, arranged in about 20–30 in number, on fully aborted hydranth which is devoid of tentacles and hypostome. Female gonophores oval, arranged in a verticil of 5–8 in number, on aborted hydranth, which has several small tentacles or

in some cases is devoid of tentacles.

Remarks. This new species resembles *E. ramosum* in general appearance but differs from the latter in the mode of ramification of the colony. The materials were collected all from Sagami Bay, near Hayama.

8) *Eudendrium ramosum* (Linné)

(Fig. 8)

Eudendrium ramosum: Hincks, 1868, p. 82, pl. 13; Allman, 1871–72, p. 332, pl. 13; Torrey, 1902, p. 34; Fraser, 1937, p. 42, pl. 7, fig. 32.

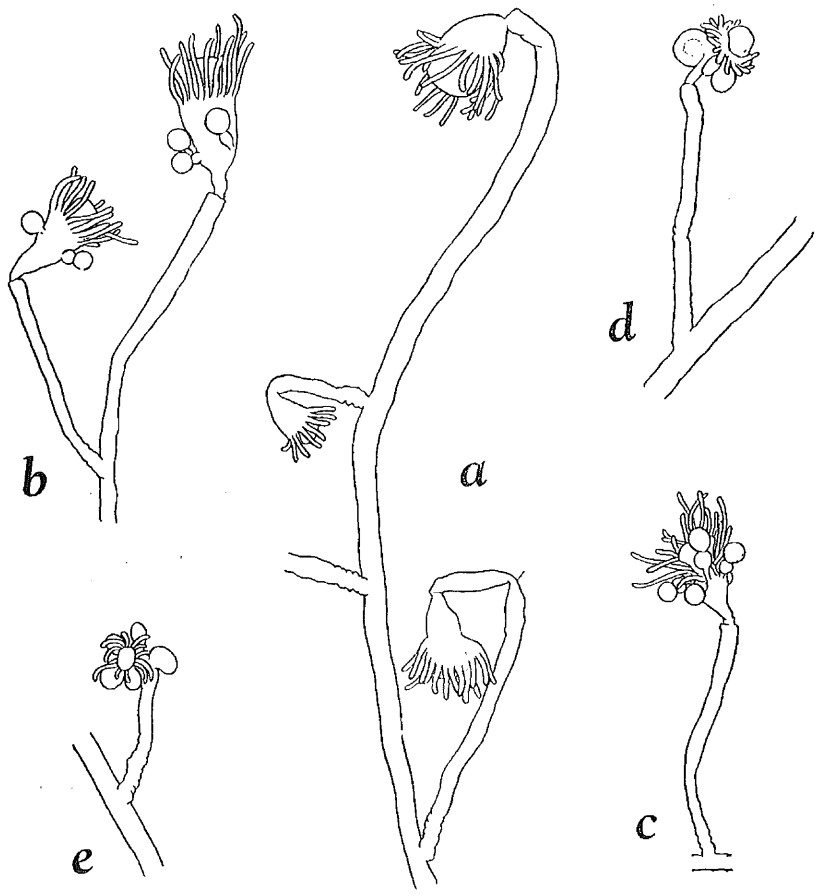

Fig. 8. *Eudendrium ramosum* (Linné).
a. Portion of branch. b, c. Male gonophores.
d, e. Female gonophores.

Trophosome. Colony attaining about 10 cm in height. Stem rather straight, not sinuous and branches directing upwards, so branches appear

to be in parallel. Stem simple but sometimes slightly fascicled in the base. Stem much and irregularly branched. Perisarc of stem, branches and pedicels mostly smooth, with some indistinct annulations at their base. Hydranth with 18–20 tentacles.

Gonosome. Male gonophores two-chambered, arranged in a whorl of 5–8 in number, on the body of hydranth which is generally not-aborted and with tentacles but in some cases is fully reduced and without tentacles. Female gonophores oval, arranged in a whorl of 3–5 in number under the tentacles of the slightly reduced hydranth which has small tentacles.

Remarks. This is new to Japanese waters. The features of the trophosome and gonosome mostly agree with those of European *E. ramosum*. The specimens examined were collected at Misaki, Hayama, in Sagami Bay.

Distribution. Pacific and Atlantic coasts of North America, British Isles, and Japan.

9) *Eudendrium japonicum* n. sp.

(Fig. 9)

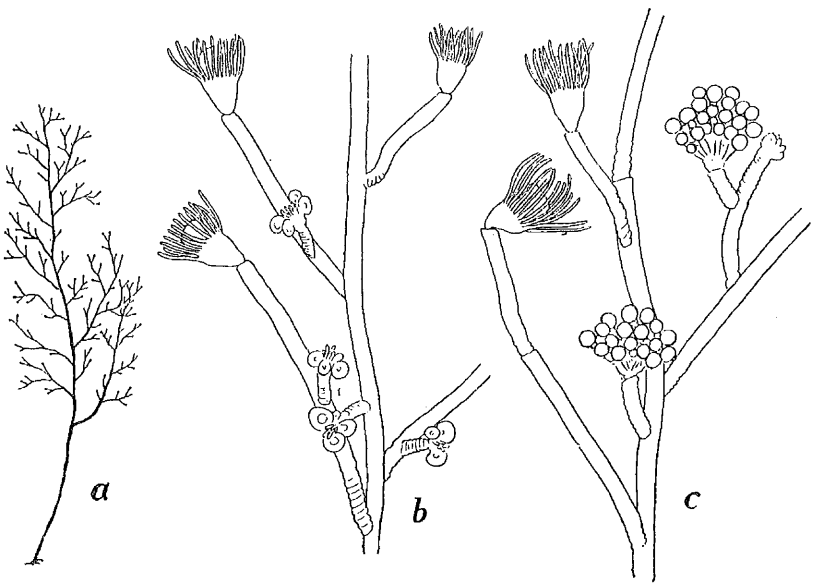

Fig. 9. *Eudendrium japonicum* n. sp.
a, Colony. b. Female gonophores. c. Male gonophores.

Trophosome. Colony attaining about 9 cm in height. Main stem simple, not-fascicled, but slightly widened in the lower portion. Stem

irregularly branched; stem, branches and hydranth pedicels generally smooth, but with 3–4 indistinct annulations or wrinkles on the base. Hydranth with about 15–18 tentacles.

Gonosome. Male gonophores three-chambered, radially arranged on the body of fully aborted hydranth, which is devoid of hypostome and tentacles. Female gonophores globular, radially arranged in a whorl on the lower part of reduced hydranth which has 6–8 small tentacles.

Remarks. This new species resembles *E. ramosum* but differs from the latter in the mode of ramification of the colony. The specimens were collected near Hayama, Sagami Bay.

10) *Eudendrium lineale* n. sp.

(Fig. 10)

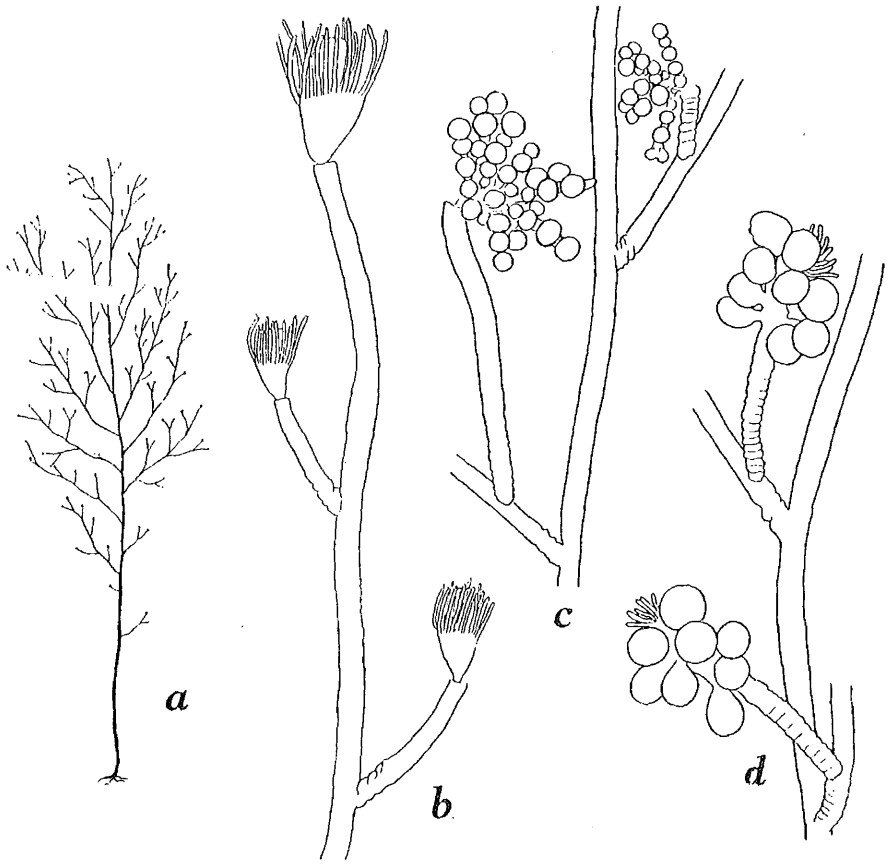

Fig. 10. *Eudendrium lineale* n. sp.
a. Colony. b. Portion of branch.
c. Male gonophores. d. Female gonophores.

Trophosome. Colony attaining about 11 cm in height. Main stem simple, not fascicled, irregularly branched. Stem and branches mostly smooth, but with 2 or 3 annulations on the base. Hydranth with about 20 tentacles.

Gonosome. Male gonophores three- or four-chambered, radially arranged in numbers on the body of fully aborted hydranth, which is devoid of tentacles. Female gonophores arranged in 10–13 in number, forming a whorl in immature ones and irregularly scattered on a long extended hydranth which has a number of small tentacles.

Remarks. In general appearance this new species resembles *E. ramosum* but differs in the features of male gonophores. About the male gonophores this resembles *E. racemosum*, but the species does not show so great fasciclation as the latter species. The specimens were collected at Matsugasaki, Fukui Prefecture, in the Sea of Japan.

11) *Eudendrium laxum* Allman

(Fig. 11)

Eudendrium laxum: Allman, 1877, p. 7, pl. 3.

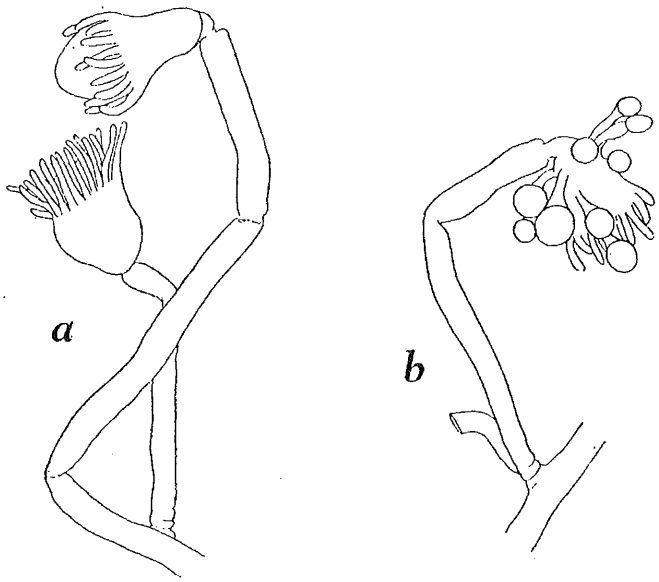

Fig. 11. *Eudendrium laxum* Allman.
a. Portion of branch. b. Male gonophores.

Trophosome. Colony attaining a height of about 4 cm. Main stem simple, not fascicled, but slightly thick at the distal end of the stem,

irregularly branched. Perisarc of main stem and branches mostly smooth, but with some wrinkles in some cases and one or two annulations present at the base of the branch.

Gonosome. Only the male gonophores are collected. Male gonophores two-chambered, radially arranged in a whorl, under the tentacles of slightly reduced hydranth, which has a hypostome and tentacles.

Remarks. This material is identified with *E. laxum* which was originally described by Allman in 1877 from off Sand Key. The trophosome and gonosome of this material both agree with the Allman's description. Only one colony was collected at Okinose in Sagami Bay in about 70-90 m depth.

12) *Eudendrium sagaminum* n. sp.

(Fig. 12)

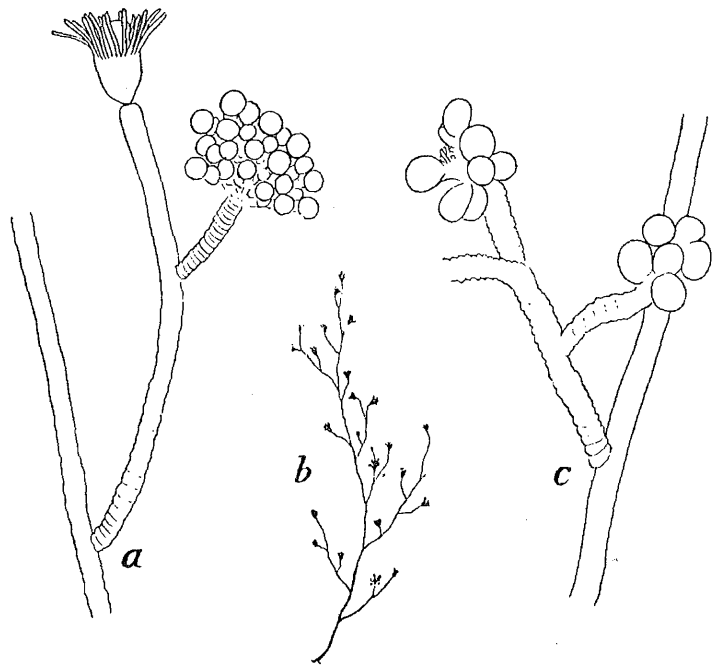

Fig. 12. *Eudendrium sagaminum* n. sp.
a. Male gonophores. b. Colony. c. Female gonophores.

Trophosome. Colony rather small, attaining a height of 2 cm. Main stem simple, not fascicled, irregularly branched. Branches not in one plane. Stem and branches with annulations or wrinkles in some parts

but these are often indistinct grading to smooth appearance. Hydranth with about 16–18 tentacles, often with a transverse groove on the lower part of the body.

Gonosome. Male gonophores two-chambered, radially arranged in numbers on fully aborted hydranth. Female gonophores oval, radially arranged in a whorl of 6–7 in number, on the body of reduced hydranth which has about 10 small tentacles in some specimens but no tentacles in other ones.

Remarks. This species resembles *E. insigne* in the general appearance and the presence of a groove on the hydranth body, but differs in the annulations of perisarc. The perisarc of *E. insigne* seldom shows the smooth appearance in its stem and branches. One male and one female specimen were collected near Hayama, Sagami Bay.

13) *Eudendrium biseriale* Fraser

Eudendrium biseriale: Fraser, 1935, p. 105, pl. 1, fig. 1.

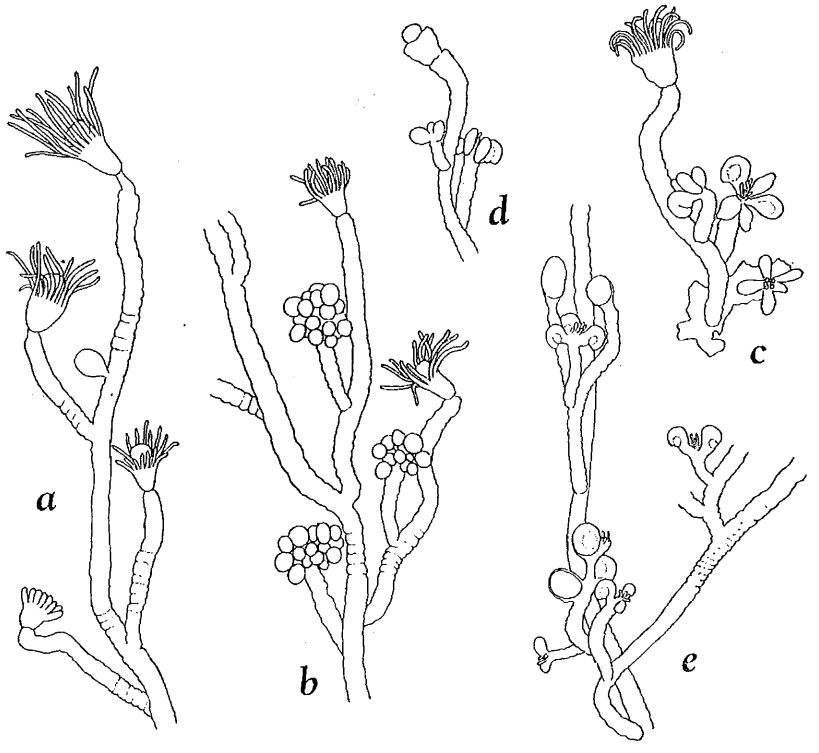

Fig. 13. *Eudendrium biseriale* Fraser.
a. Portion of branch. b. Male gonophores. c–e. Female gonophores.

Trophosome. Colony small, attaining about 2 cm in height. Stem simple, not fascicled, irregularly branched. Stem and branches rather sinuous, not so straight as in the following *E. capillare*. Perisarc of stem and branches annulated throughout or smooth in some degree or giving a wrinkled appearance in some parts. Hydranth with 16–20 tentacles.

Gonosome. Male gonophores borne on a small secondary branch or on a stem. They are one-chambered, arranged in 2 whorls or scattered on fully aborted hydranth which has no tentacles. Female gonophores borne on the secondary branch or on pedicels from hydrorhiza, 3–5 in number, arranged on a rather reduced hydranth which has 5–7 small tentacles.

Remarks. This species was described by Fraser basing on the specimens collected near Enoshima in Sagami Bay. Tne specimens here examined were collected at Hayama, also in Sagami Bay. Fraser said that the male gonophores are borne in two whorls and this is a distinct feature among the genus. The male gonophores of the specimens examined, however, do not be arranged so exactly in 2 whorls and rather scattered on the body of the aborted hydranth.

Distribution. Japan, in Sagami Bay.

14) *Eudendrium capillare* Alder

(Fig. 14)

Eudendrium sp.: Inaba, 1890, No. 35, figs. 99–102.

Eudendrium capillare: Stechow, 1909, p. 29; Stechow, 1913, p. 61. figs. 15–17; Stechow, 1923, p. 4, No. 26; Fraser, 1937, p. 40, pl. 7, fig. 28; Leloup, 1938, p. 3; Yamada, 1950, p. 5.

Trophosome. Colony small, attaining about 2 cm in height. Main stem simple, not fascicled, thread-like, and irregularly branched. Stem and branches smooth almost throughout, but with 3–4 annulations on the base of branches and hydranth pedicels. Hydranth with 20–22 tentacles.

Gonosome. Male gonophores two- or three-chambered, radially arranged on the fully aborted hydranth which is destitute of tentacles and hypostome. Female gonophores 5–10 in number in one hydranth, radially arranged on the reduced hydranth which has 10–17 small tentacles. Female gonophores are often borne on the pedicel directly erected from hydrorhiza.

Remarks. The species was reported by Inaba from Uraga-canal in Sagami Bay, and recently collected from Misaki, Hayama, Sagami Bay, and from Akkeshi, Hokkaido.

Distribution. Widely distributed in the world.

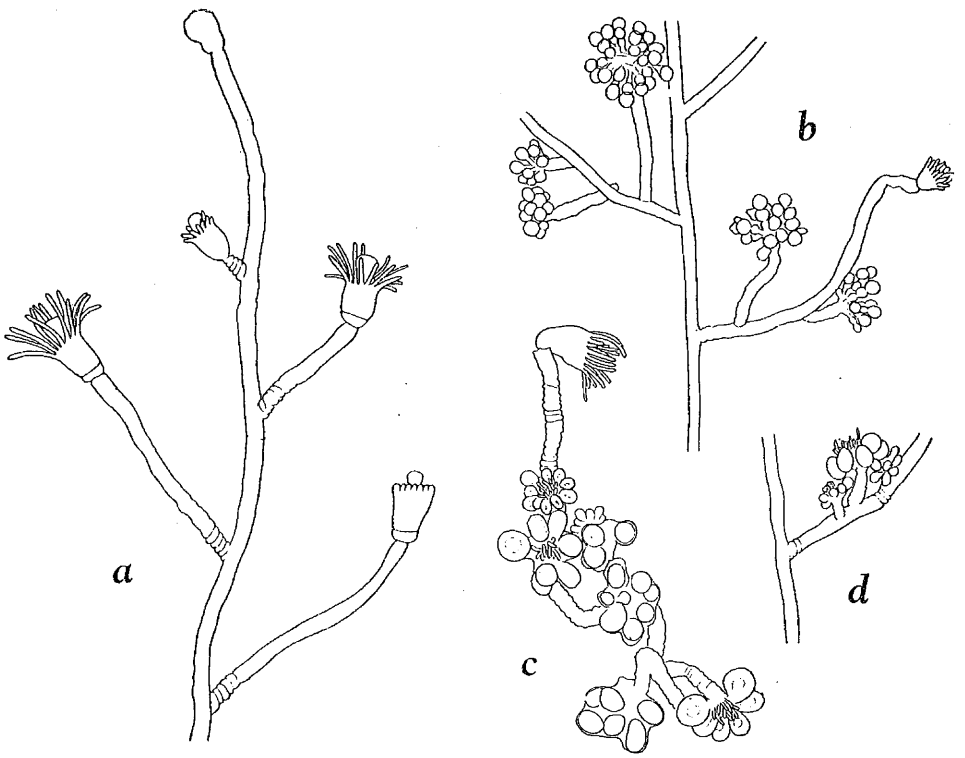

Fig. 14. *Eudendrium capillare* Alder.
a. Portion of branch. b. Male gonophores. c, d. Female gonophores.

15) *Eudendrium tenellum* Allman

(Fig. 15)

Eudendrium tenellum: Allman, 1877, p. 8, pl. 4, figs. 3–4; Fraser, 1937, p. 43, pl. 8. fig. 33.

Trophosome. Colony small and slender, attaining about 2 cm in height. Stem irregularly branched or unbranched, slender, always not fascicled. Periderm of stem and branches almost smooth, but with 2–3 annulations on the base of the branch or on irregular interval. Hydranth with 15–18 tentacles.

Gonosome. Male gonophores two-chambered, radially arranged under the tentacles of unreduced hydranth which has tentacles and hypostome. Female gonophores radially arranged under the tentacles of unreduced hydranth, forming a whorl of 3–5 in number. As the development proceeds the tentacles seem to disappear and female gonophores become to arrange on the elongated hydranth.

Remarks. This is new to Japanese waters. The specimens examined came from Hayama, Sagami Bay. It differs from *E. capillare* on the condition of atrophy of gonophores and from *E. biseriale* on the annulations on the stem and branches.

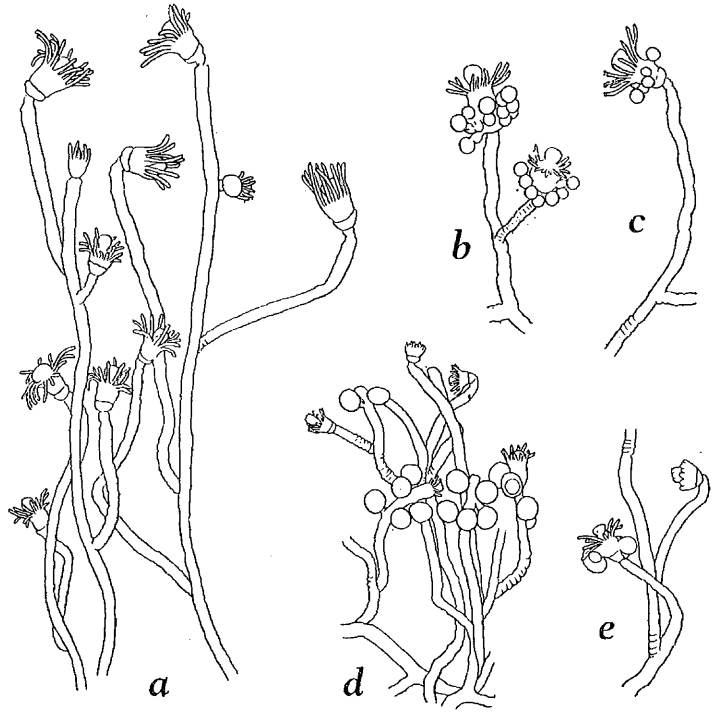

Fig. 15. *Eudendrium tenellum* Allman.
a. Portion of colony. b, c. Male gonophores. d, e. Female gonophores.

Distribution. The northern regions of the Pacific and the Atlantic, Mediterranean.

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