Report of the Biological Survey of Mutsu Bay.
9. Marine Algae of Mutsu Bay and Adjacent Waters. II.*

By

Yukio Yamada.

(Botanical Institute, Imp. University, Tokyo.)

After the appearance of the first part of this report, I made collection two times in Mutsu Bay and its adjacent waters, in May and August, 1927. All the species enumerated in the following list have been studied from the materials which I collected myself and most of them are not included in the first part of the report.

Of 51 species listed in the present paper which contains 7 Chlorophyceæ, 18 Phaeophyceæ and 26 Rhodophyceæ, 37 are found inside Mutsu Bay, so that the number of all the species in this Bay which has been referred to amounts to 86 in all. As plants newly added to our marine flora, 12 species are mentioned, of which 6 are new not only to our flora, but also to the science, namely *Gobia saxicola*, *Elachista taeniaeformis*, *Elachista tenuis*, *Halothrix ambigua*, *Dictyota spathulata* and *Dasya sessilis*.

To our great regret, some species are left for future study, because of the lack of fruits and other reasons, but we hope to be able to give information about them some other day.

I wish to express my sincerest thanks to Dr. K. Okamura for his valuable suggestions and criticisms throughout the course of this study and my cordial thanks are also due to Prof. Hayata and Prof. Tahara and also to the members of the Marine Biological Station at Asamushi who helped me with much kindness during the course of the present study.

---

*A contribution from the Marine Biological Station, Asamushi, Aomori-Ken.

CHLOROPHYCEAE.

CODIACEAE.

1) **Codium adhaerens** AGARDH.

Sp. Alg. I. p. 457; HARVEY, Phyc. Brit. pl. 35, A; OKAMURA, Icon. of Jap. Alg. III. p. 140, pl. 134, fig. 1–3; Id., Nippon Sorui Mei-i (2nd edition) p. 261.

Nom. Jap. Hai-miru.

Loc. *Ōma.*

Distr. Riu-kiu, Ogasawara-jima, Hyuga to Rikuzen on the Pacific side.

CLADOPHORACEAE.

2) **Cladophora albida** KÜTZING. Fig. 1.

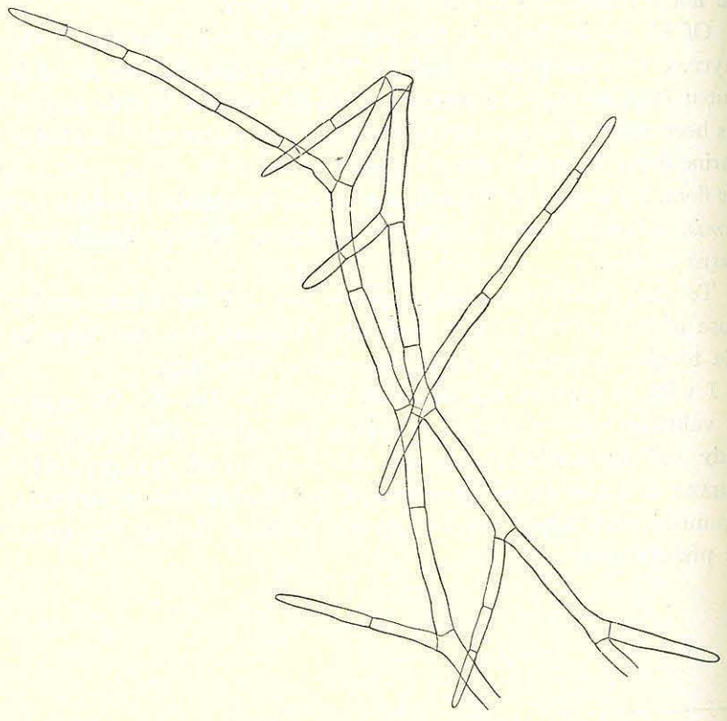


Fig. 1. *Cladophora albida* KÜTZ. ca. × 60.

Phyc. Germ. p. 240; Id., Tab. Phyc. IV, t. 15; HARVEY, Phyc. Brit. pl. 275; DE TONI, Syll. Alg. I, p. 325.

Nom. Jap. Wata-shiogusa.

Loc. Natsudomarizaki.

Fronds about 10 cm high, attached to the frond of *Laurencia*, forming a dense entangled mass; filaments very slender even at the base, scarcely exceeding 60 μ in diameter, silky, yellowish green, slightly shining, dichotomously branched; cells cylindrical, 6–8–10 times as long as diameter, very slightly constricted at joints with cell-membrane rather thick; ramuli secund or alternate, patent, with terminal cells somewhat acute; chromatophores not abundant.

In referring our plant to the present species, I have not been able to see any authentic specimen, but consulting with the descriptions of KÜTZING, HARVEY, DE TONI etc. I am strongly convinced of doing so, though there are some differences. The cells of our plant are somewhat longer than those in HARVEY's figure (Phyc. Brit. l. c.), but I cannot take it as a character by which our plant is separated from the present species. This is the first time that the present species has been reported as growing within our boundaries, but it seems to be widely distributed on our coast.

3) **Cladophora densa** HARVEY Fig. 2.

Char. of New Alg. etc, p. 333, (Proceed. of Amer. Acad. Vol. IV, 1859); OKAMURA, Nippon Sorui Mei-i (2nd edition), p. 241.

Loc. Gomi-jima, Ōma.

Distr. Hakodate.

As HARVEY's original description of this species is too short and imperfect, I will give a full description with a figure.

Fronds about 8 cm high, densely caespitose, attached by means of slender creeping ramified rhizoids to the rock in the littoral zone, not profusely branched; filaments erect, rigid, di-trichotomously ramified with the basal cell attenuated below and not annulated; cells of the main filaments very long, cylindrical, about 190 μ in diameter becoming more slender and shorter upwards; cells of the upper branchlets about 100 μ thick, 5–15 times as long as diameter, obtuse at the apex, sometimes swollen with irregular outline, scarcely constricted at joints, with thick cell-wall and striated especially in the lower cells. Colour of

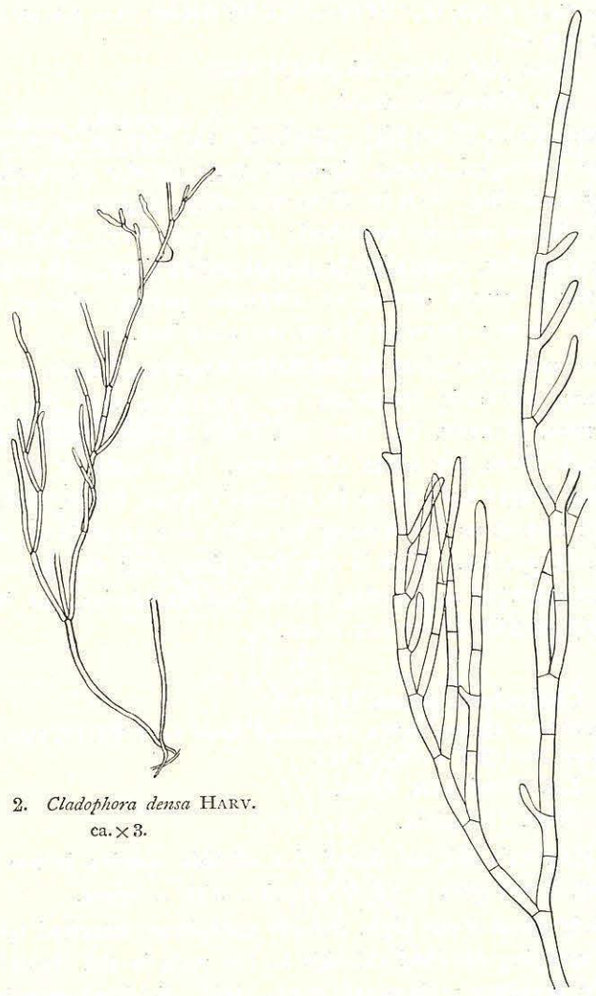


Fig. 2. *Cladophora densa* HARV. ca.×3.

Fig. 3. *Cladophora glaucescens* HARV. ca.×50.

the frond is deep green when fresh, but it turns somewhat yellowish in drying.

In referring our plant to this species, I have examined some specimens collected by YENDO at Hakodate, type-locality, which were identified by him after the comparison with the original specimen of

HARVEY. Our plant agrees so exactly, not only with the original description but also with YENDO's specimens, that we can scarcely doubt that it is identical with this species.

4) **Cladophora glaucescens** HARVEY. Fig. 3.

Phyc. Brit. pl. 196; DE TONI, Syll. Alg. I, p. 320; COLLINS, Green Alg. North Amer. (Tufts Coll. Stud. Vol. 2, Scient. Ser. 1909) p. 336; YENDO, Note on Alg. new to Jap. V (Bot. Mag. Tokyo, Vol. 30, 1916) p. 248; SETCHELL & GARDNER, Mar. Alg. North Amer. II (Univ. Cal. Pub. Bot. Vol. 8) p. 219.

Loc. Asamushi, Ōshima.

Distr. Echigo, Uzen, Mutsu, Rishiri, Yangeshiri, Hakodate, Oshoro, Hitachi.

Fronds caespitose, with basal portions firmly coalesced to a thick tuft-like stem, glaucous, about 15 cm long; filaments much branched, dichotomous or alternate or often secund in the upper portion, ending in long erect and obtuse ramuli; segments 60–70 μ thick and very long, 5–8 times as long as diameter, constricted very slightly at the joints, with thick wall near the base of the frond, with ramuli 35–40 μ thick; chromatophores not very dense.

The occurrence of the present species within our boundary was confirmed by YENDO after having examined HARVEY's Herbarium. COLLINS describes in his l. c. "ending in long erect *acute*. . . .ramuli". In our plant, however, every terminal segment has an obtuse top and in this point it differs a little from *Cl. glaucescens* determined by COLLINS and SETCHELL-GARDNER. But in other characteristics, e. g. dimension of segments, mode of ramification, colour of fronds, chromatophore etc. our plant agrees very well with the description of the present species. This species seems to be very common in Mutsu Bay and other localities.

5) **Cladophora Stimpsonii** HARVEY. Fig. 4.

Char. of new Alg. etc. (Proc. of Amer. Acad. Vol. IV, 1859) p. 333; OKAMURA, Nippon Sorui Mei-i (2nd edition) p. 239; SETCHELL and GARDNER, Mar. Alg. of North Amer. II. (Univ. Cal. Pub. Bot. Vol. 8) p. 219.

Loc. Asamushi.

Distr. Hakodate, Muroran, Shiriya.

Plants loosely tufted, of delicate texture, often very long, attaining about 35 cm, di-trichotomously ramified; branches alternate or some-

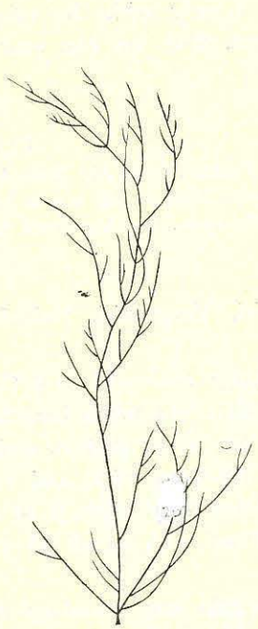


Fig. 4. *Cladophora Stimpsoni* HARV. ca.×$\frac{4}{3}$.

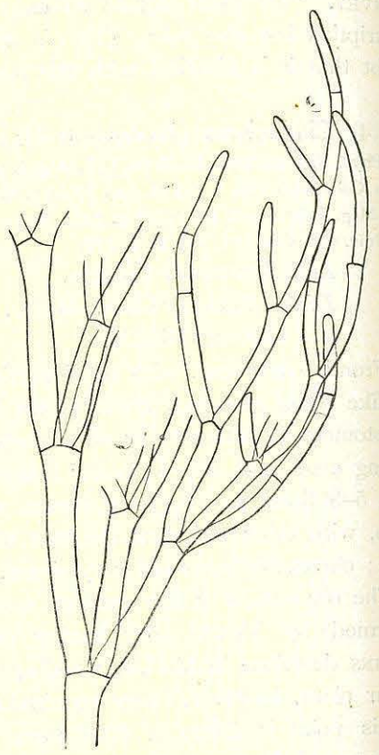


Fig. 5. *Cladophora utriculosa* KÜTZ. ca.×45.

times opposite, in the upper portion often secund, with patent axils, and with the articulations 5–8 times as long as diameter; cells of the lower portion very long, about 160 μ in diameter but becoming more short and slender upwards, very slightly constricted at joints; terminal cells somewhat acute, but some are obtuse, about 40 μ thick. Colour light green. Cell-membrane thick near the base of the frond, striated.

I have compared the plant with a specimen collected at Hakodate and distributed from the Herbarium of the U. S. North Pacific Exploring Expedition under Commanders RINGGOLD and RODGERS, and it agrees very well with HARVEY's species. In addition it should be stated that Asamushi is situated very near to the type-locality.

6) **Cladophora utriculosa** KÜTZING. Fig. 5.

Phyc. Germ. p. 269; Id., Tab. Phyc. III. t. 94; YENDO, Note on Alg. new to Jap. II. (Bot. Mag. Tokyo Vol. 28, 1914) p. 265; OKAMURA, Nippon Sorui Mei-i (2nd edition) p. 238.

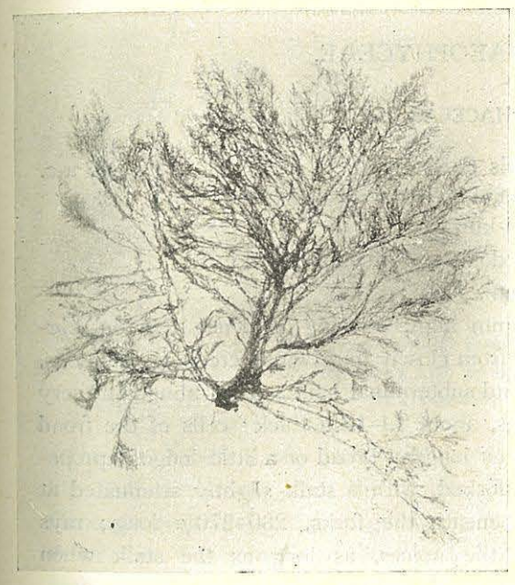
Loc. Nonai, Natsudomarizaki.

Distr. Wakasa, Tajima, Echigo, Shima, Samé.

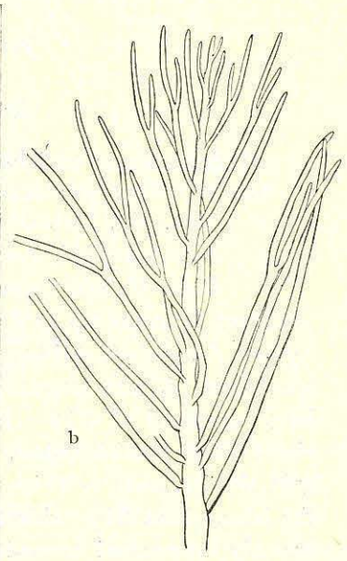
This species of *Cladophora* is more or less easily distinguishable from many other species of this genus found on our coast, because of its densely fasciculated branchlets. The specimens from Nonai are much more robust than the others which were found in Natsudomarizaki. Both have been found on the stem of *Coccophora Langsdorfii*. The accompanying figure shows the mode of ramification.

BRYOPSIDACEAE.

7) **Bryopsis hypnoides** LAMOUROUX. Fig. 6, a, b.



a



b

Fig. 6. *Bryopsis hypnoides* LAMX.
a....ca.×$\frac{6}{7}$. b....ca.×45.

"Mem. p. 135, t. I, fig. 2, a–b"; HARVEY, Phyc. Brit. pl. 119; DE TONI, Syll. Alg. I, p. 434; VICKER, Phyc. Barbad. pl. 53; COLLINS, Green Alg. North Amer. (Tuft Coll. Stud. Vol. 2, No. 3, Scient. Ser. 1909) p. 403; YENDO, Note on Alg. new to Jap. III (Bot. Mag. Tokyo, Vol. 29, 1915) p. 103.

Loc. Nonai, Ōma.

Distr. Oshoro.

Fronds caespitose, 7 cm high, irregularly and pinnately branched with branches again irregularly and not dichotomously ramified, having branchlets issued from every side of the rachis; ultimate ramuli slightly constricted at the base and often branched. Colour light green. The texture of the plant is very soft and the frond adheres very closely to paper in drying.

Our plant agrees very well with VICKER's illustrations given in her "Phyc. Barbad.". The present species appears to prefer rather protected places, being found on stones and shells on the upper sublittoral zone.

PHAEOPHYCEAE.

SPHACELARIACEAE.

8) **Sphacelaria variabilis** SAUVAGEAU. Fig. 7, a-c.

Rech. sur Sphac. p. 160: OKAMURA, Nippon Sorui Mei-i (2nd edition) p. 148.

Nom. Jap. Matazaki-kurogashira.

Loc. Asamushi, Asadokoro, Natsudomarizaki.

Distr. Hyūga, Sagami, Noto.

Erect filaments up to 3 mm high, forming a dense tuft on *Coccophora Langsdorfii*, arising from closely intertwined creeping filaments, less branched, with lateral and subterminal hairs; hairs abundant, very long, composed of 4–12 cells, about 14–18 μ thick; cells of the frond about 30–40 μ thick below, as long as broad or a little longer; propagula slender, once or twice forked, with a stalk slightly attenuated at the base, about 24 μ thick beneath the forks, 230–270 μ long; rays scarcely attenuated toward the apices, as long as the stalk when matured; sporangia and gametangia unknown.

The above description is based upon the plant from Natsudomarizaki, but, that from Asamushi is somewhat different from the former. The latter grows on the frond of *Sargassum Thumbergii* and about

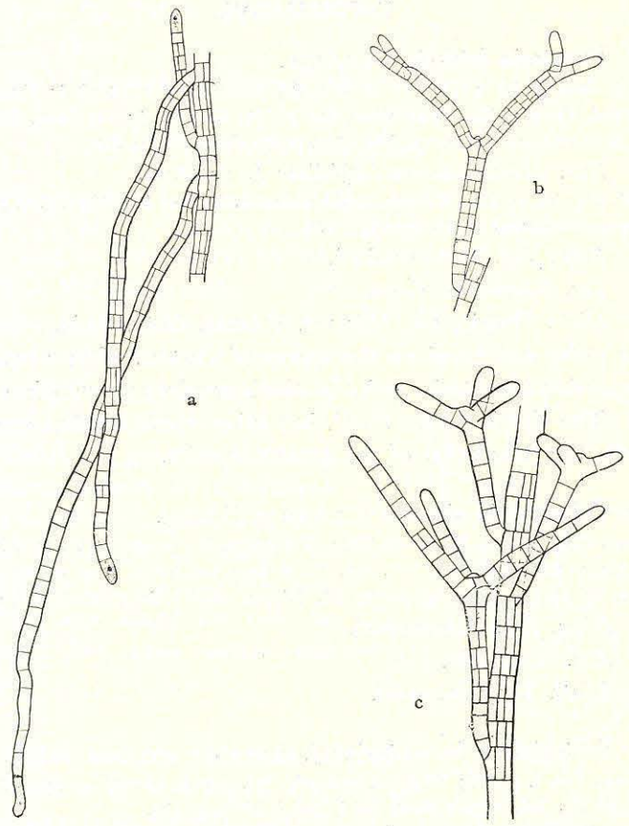


Fig. 7. *Sphacelaria variabilis* SAUV.
Specimen from Asamushi.
a....ca.×60. b....ca.×90. c....ca.×90.

10 mm high, alternately much branched, sometimes with long rhizoid-like filaments arising from the middle or lower portion of the main filaments or branches; propagula very variable in shape, usually with three rays, but sometimes those with forked or twice forked rays are seen.

According to SAUVAGEAU, *S. variabilis* is said to have no hair, while ours have it as described above. Except for the presence of hairs our plants agree well with the character of *S. variabilis*.

ENCOELIACEAE.

9) **Punctaria latifolia** GREVILLE.

"Alg. Brit. p. 52"; THURET et BORNET, Etud. Phyc. p. 13, pl. 5; KJELLMAN, in ENGLER and PRANTL, Nat. Pflanzenfam. Alg. p. 199, fig. 140, A; DE TONI, Syll. Alg. I, p. 474; SETCHELL and GARDNER, Mar. Alg. North Amer. III, p. 519.

Syn. Homoeostroma latifolium J. AGARDH.

Anal. Alg. III, p. 11; *Homoeost. latif.* OKAMURA, Icon. of Jap. Alg. IV, p. 8, pl. 153; Id., Nippon Sorui Mei-i (2nd edition), p. 150.

Nom. Jap. Haba-modoki.

Loc. Asamushi, Ōma.

Distr. Hirado, Ise, Mikawa, Kazusa, Noto, Sado.

Our plant was found on the leaves of *Zostera*, often accompanied by *Scytosiphon lomentarius* and *Halothorix ambigua* growing in sheltered places. The size is rather small, but other characteristics agree very well with the description of the present species.

10) **Colpomenia sinuosa** DERBES et SOLIER.

"Mem. Phys. Alg. p. 11, fig. 18–20"; KJELLMAN, in ENGLER et PLANTL, Nat. Pflanzenfam. Alg. p. 203; DE TONI, Syll. Agl. III, p. 489; OKAMURA, Icon. of Jap. Alg. I, p. 86, pl. 19, fig. 11–12, pl. 20, fig. 10–12; Id., Nippon Sorui Mei-i (2nd edition), p. 151.

Nom. Jap. Fukuro-nori.

Loc. Asamushi.

Distr. Very common.

11) **Scytosiphon lomentarius** J. AGARDH.

Sp. Alg. Vol. I, p. 126; DE TONI, Syll. Alg. III, p. 485; OKAMURA, Icon. of Jap. Alg. I, p. 144, pl. 30; Id., Nippon Sorui Mei-i (2nd edition), p. 152.

Nom. Jap. Kayamo-nori.

Loc. Very common in Mutsu Bay, Ōma.

Distr. On both coasts from Taiwan to Shumushu-Island.

DESMARESTIACEAE.

12) **Desmarestia viridis** LAMOUROUX.

OKAMURA, The first part of this report p. 5, No. 17.

Loc. Asamushi.

13) **Desmarestia tabacoides** OKAMURA.

Icon. of Jap. Alg. I, p. 187, pl. 38, pl. 39, fig. 9–13; Id., Nippon Sorui Mei-i (2nd edition), p. 155.

Nom. Jap. Tabako-gusa.

Loc. Ōma.

Distr. Nagasaki, Sagami, Bōshū, Iwaki.

DICTYOSIPHONACEAE.

14) **Dictyosiphon foeniculaceus** GREVILLE. Fig. 8.

"Alg. Brit. p. 56, t. 8;" HARVEY, Phyc. Brit. pl. 326; SETCHELL and GARDNER, Mar. Alg. North Amer. III (Univ. Cal. Pub. Bot. Vol. 8), p. 589, pl. 40, fig. 47–49.

Loc. Natsudomarizaki.

In every respect our plant coincides very well with the American plant of which SETCHELL and GARDNER give the description and illustrations in detail. It grows on the frond of *Scytosiphon lomentarius* in sheltered places in sublittoral regions, and zoosporangia are found abundantly in June. This is the first time that this species has been found not only in this district but even within our boundaries.

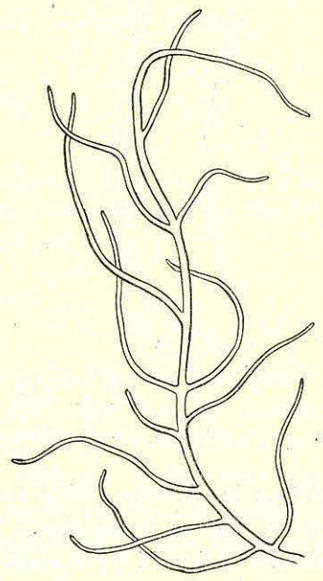


Fig. 8. *Dictyosiphon foeniculaceus* GREVILLE. ca.×3.

15) **Gobia saxicola** OKAMURA et YAMADA sp. nov. Fig. 9, a, b.

Frons caespitosa, filiformis, cylindrica, simplex, cava, praeter basin solidam, parvo disco ad saxum affixa, saepe torta, vivo elastica; tela corticalia erecta, ex 2–4 cellulis composita; cellulis terminalis pyriformis 17–24 μ longa, 11–14 μ lata; fila centralia 7–14 μ crssa, leve corolata; pili sparsi, 6–7 μ lati; zoosporangia obovoidea vel obovata vel ellipsoidea, 27–30 μ longa, 18–21 μ lata.

Loc. Gomi-Jima, Asadokoro, Ōma.

Distr. Wakasa (K. NONAKA).

Fronds caespitose, filiform, cylindrical, simple, about 15 cm high,

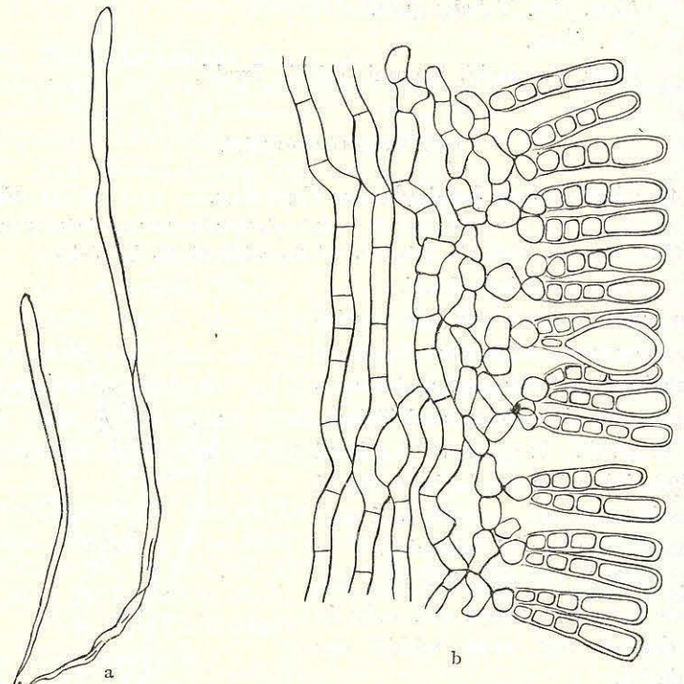


Fig. 9. *Gobia saxicola* OKAM. et YAM. sp. nov.
a. ×1. b. Longitudinal section of the fertile frond. ca.×280.

0.3 cm in diameter, often twisted, elastic, attached to the rocks or stones with a small disc. The basal portion of the frond is very slender and solid for a short distance, soon becoming gradually thicker and hollow upwards tapering to a blunt apex. Cortical filaments straight, perpendicular to the main axis, composed of 2–4 cells with terminal cells pyriform which measure 17–24 μ in length, 11–14 μ in diameter; hairs few in number, 6–7 μ thick; central filaments loose, slightly coloured, freely anastomosing, 7–14 μ in diameter; zoosporangia obovate or elliptical, 27–30 μ long, 18–21 μ broad.

The new species has some resemblances to *Gobia simplex* SET. et GARD. in its general aspects, but there are many differences which separate it satisfactorily from the latter species. Our plant is often twisted and always grows on rocks or stones, not being attached to other algae as *Gobia simplex* which is found also in this country, and it does not closely adhere to paper in drying as the latter species. In anatomical structure, it differs from that of the related plant in the measurement of every part as stated above and moreover in having the central filaments slightly coloured.

Though there are so many differences in the present plant, yet we cannot put it in a genus other than *Gobia*, as the structure of the frond and mode of propagation is quite the same as this genus.

Our plant was collected in all cases in the "Splitz" zone or in upper littoral zone, sometimes together with *Gloiopeltis furcata*.

ELACHISTACEAE.

16) **Elachista fucicola** ARESCHOUG.

in "Linnea, Vol. 16, p. 235, pl. 8, fig. 6, 7"; OKAMURA, Icon. of Jap. Alg. IV, p. 49, pl. 163, fig. 1–12; SETCHELL and GARDNER, Mar. Alg. North Amer. III (Univ. Cal. Pub. Bot. Vol. 8), p. 503, pl. 38, fig. 33–55.

Nom. Jap. Nami-makura.

Loc. Ōma.

Distr. Iwaki, Rikuzen.

The specimens which I referred to the present species have gametangia only (in June), and paraphyses are very few in number, not being so markedly curved as those illustrated by SETCHELL and GARDNER in the American plant. The thickness of the erect free filaments varies 60–70 μ. The plants were collected in rock-pool growing on the fronds of *Sargassum micracanthum* and *Turbinaria fusiformis*.

17) **Elachista taeniaeformis** YAMADA sp. nov. Fig. 10, a-d.

Thallus parvos laxos lubricos pulvinos format; pars basalis non conspicua; filamenta erecta ad basin abrupte, ad apicem versus conspicue et longe attenuata, sub medio latissima; cellulae filamenti erecti cylindricae brevissimae, ad basin in longitudine partem quartam diametri aequantes, sursum sensim elongatae sed longitudione numquam diametron exedunt praeter partem superiorem, ad septa leve constrictae,

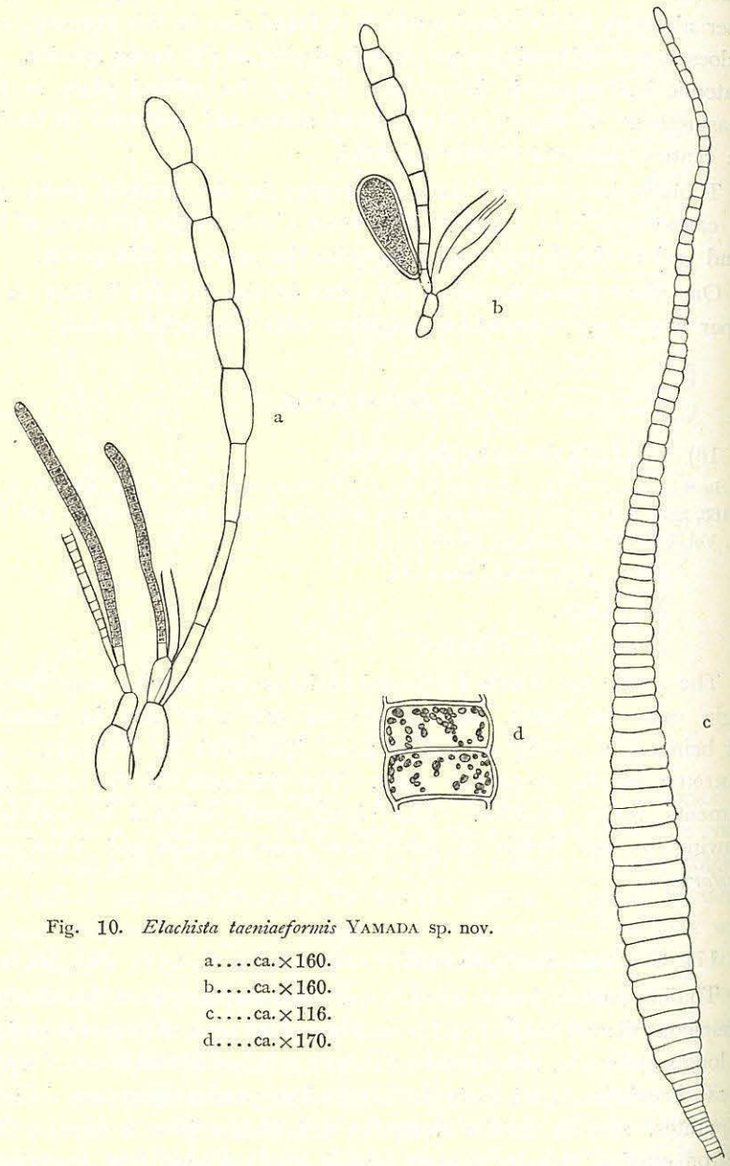


Fig. 10. *Elachista taeniaeformis* YAMADA sp. nov.
a....ca.×160.
b....ca.×160.
c....ca.×116.
d....ca.×170.

chromatophoris discoidiis, reticulate dispositis; zoosporangia clavata vel elliptica; gametangia cylindrica tenuia, 10-30 gametes generant; paraphyses clavatae, non curvatae, ad septa constrictae; pili sparsi, 10–14 μ cassi.

Nom. Jap. Hiru-namimakura.

Loc. Ōma.

Thallus forming a small, rather loose tuft, 3 mm high, somewhat lubricous; the basal portion not conspicuous; erect, free, filaments abruptly attenuated at the base, long and strongly tapering to the apex, with the broadest portion beneath the middle part, 55–85 μ at the broadest part, 7–16 μ near the apex about 17 μ broad at the very base; cells of erect free filaments discoidal, about $\frac{1}{4}$ times as long as diameter in most parts, becoming a little longer upwards, but the length does not exeed the diameter except a few apical cells, slightly constricted at joints; chromatophores discoid, arranged parietally like a net; zoosporangia elongato-obovate, or elliptical, about 100 μ long and 30 μ broad; gametangia cylindrical, thin, 70–100 μ long, about 4–5 μ in diameter, producing 10–30 gamets; paraphyses clavate, not curved, constricted at joints; hairs 10–14 μ thick, few in number.

By the character of having short-celled, erect, free filaments abruptly attenuating towards the base, the present species shows a close affinity to *Elachista flaccida* ARESCH., from which, however, it differs in the slenderness of the upper part of the erect free filaments which is very peculiar to our plant and by which both species are very readily known from one another.

Our plant is found in the cryptostomata and on other portions of *Sargassum Horneri*, growing in a pool in the littoral zone.

18) **Elachista tenuis** YAMADA sp. nov. Fig. 11.

Thallus parvos leve lubricos pulvinos format; pars basalis ex filamentis leve ramosis cellulis minoribus lubricaris ellipsoides composita; filamenta erecta ad basin apicemque vix attenuata, 12–17 μ crassa per totam longitudinem; cellulae filamentorum erectorum cylindraceae, ad septa haud constrictae, 1.5–2-plo diametro longioribus, chromatophoris granularibus fasciarium corporem in centrale cavo cellularum formantibus; gametangia cylindrica, vel leve clavata; paraphyses paucae, ex cellulis ad septa leve constrictis, membrana crassa compositae; zoo-

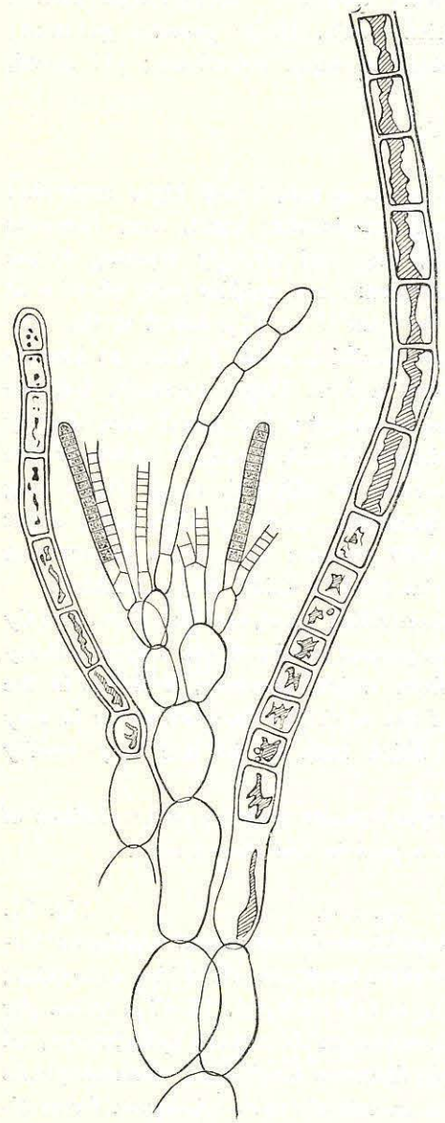


Fig. 11. *Elachista tenuis* YAMADA sp. nov. ca. × 390.

sporangium ignotum.

Nom. Jap. Hosonamimakura.

Loc. Ōshima.

Thallus forming small tufts in the cryptostomata of *Sargassum confusum*, about 0.5 cm high, somewhat lubricous; the basal portion composed of a small dense and lubricous mass of slightly branched filaments whose cells are usually ellipsoid; erect free filaments not constricted at joints even when old, scarcely attenuated at the both ends, 12–17 μ broad throughout the whole length with cylindrical cells, which are 1.5–2 times as long as diameter; chromatophores granular, gathering to a band-like mass in the centre of the cell; gametangia cylindrical or somewhat clavate, matured ones about 95 μ long, about 7 μ broad, being divided into 8–20 or more loculi; paraphyses few in number, clavate, the lower portion composed of long thick-walled cells, gradually shorter and swollen above measuring about 7–8 μ in the upper portion, slightly constricted at joints, somewhat

curved; zoosporangia unknown.

The present species is distinguished by its slender, erect free filaments. They do not exceed 17 μ in diameter, usually measuring 14–16 μ, and neither attenuated to both ends nor constricted at joints. The band-like coalescing of chromatophores also helps us in separating the present species from the allied ones.

19) **Halothrix ambigua** YAMADA sp. nov. Fig. 12.

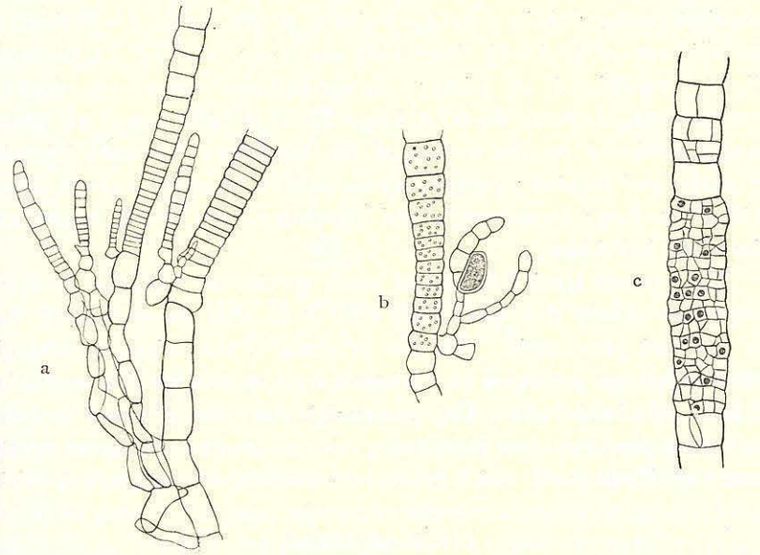


Fig. 12. *Halothrix ambigua* YAMADA sp. nov.
a....ca. × 60. b....ca. × 80. c....ca. × 80.

Thallus magnos pulvinos ad hospitem format; pulvini lubrici magni, rubro-flavescentes, 10–14 mm longi; pars basalis crassa, ex filamentis leve dichotomis, laxe aggregatis constructa; cellulae filamentorum elongatae hyaline, constrictae ad septa, membrana tenui, chromatophoris irregulariter discoideis; filamenta erecta, sensim versus utrosque fines attenuata; cellulae filamentorum erectorum $\frac{1}{3}-1\frac{1}{2}$-plo diametro longioribus leve constrictae ad septa; zoosporangia obovata; gametangia ad superficiem filamentorum erectorum numero et forma irregulare distri-

buta ; paraphyses moniliformes clavatae curvatae ; zoosporangia et gametangia ad eodem thallum generata.

Loc. Asamushi, Ōshima, Ōma.

Thallus forming large tufts on other algae, becoming larger and larger by confluenting to each other, 10–14 mm high, rather lubricous, light reddish-yellow ; the basal portion very thick, composed of sparingly dichotomous and loosely attached filaments ; cells of the filaments elongated, colourless, constricted at joints, thin-walled ; the erect free filaments gradually attenuated to both ends, 70–100 μ thick at the broadest portion ; their cells $\frac{1}{3}-\frac{1}{2}$ times at the base, $1-\frac{3}{4}$ times at the thickest part, $1-1\frac{1}{2}$ times near the apex, as long as diameter, slightly constricted at joints ; chromatophores irregularly discoid ; zoosporangia obovate, 65–90 μ long, 27–37 μ broad ; sori of gametangia produced on the surface of the erect free filaments, irregular in shape and number ; paraphyses moniliform, clavate, curved, about 240–380 μ long ; zoosporangia and gametangia are found in one and the same individual.

The present species resembles some species of *Elachista* in every respect so closely that one would refer it to that genus except that he can find gametangia. But the presence of the unique gametangia necessitates my putting it in *Halothrix* as a distinct species, separating it from *H. lumbricalis*. The gametangia are mostly found in every portion of the erect free filaments. All our plants were found on the leaves of *Phyllospadix* which grows in the sublittoral zone or rock pools.

CHORDARIACEAE.

20) **Peterospongium rugosum** (Okamura) Setchell et Gardner.

Phyc. Cont. VIII, p. 12 (Univ. Cal. Pub. Bot. Vol. 13); Id., Mar. Alg. North Amer. III, p. 509, pl. 39, fig. 42–43.

Syn. Cylindrocarpus rugosa Okamura.

Alg. Jap, Exsc. No. 88; Id., Icon. Jap. Alg. I, p. 20, pl. 5, fig. 1–6; Id., Nippon Sorui Mei-i (2nd edition), p. 159.

Nom. Jap, Shiwa-no-kawa.

Loc. Ōshima, Ōma.

Distr. Very common from Shima to Hakodate.

Our plants are small and irregular in shape, the largest one measuring about 4 cm in length ; though the fronds are small, yet in some specimens zoosporangia are met with.

DICTYOTACEAE.

21) **Dictyota spathulata** Yamada sp. nov. Fig. 13.

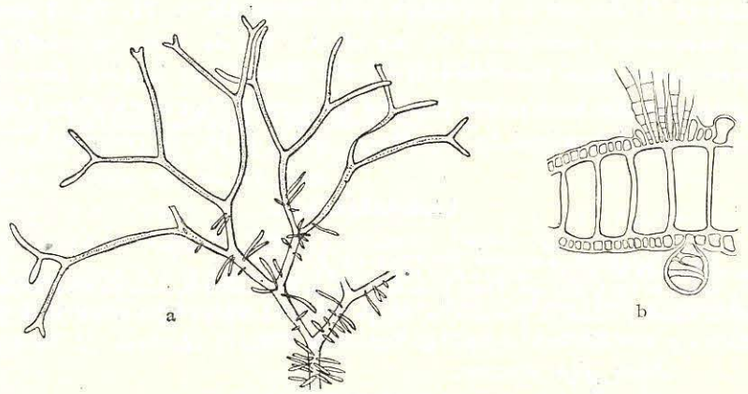


Fig. 13. *Dictyota spathulata* Yamada sp. nov.
a....ca.×1. b....ca.×100.

Fronds 10 cm alta multo dichotoma laxe implicata angulis patentibus ex una tela cellularum medullarum magnarum et serie singula cellularum minorum periphericarum per totam frondem composita ; segmentia margine integra angusta, 0.4–1.5 mm lata, ca 150 μ crassa imprimis sursum elongata, segmenta extrema latiuscula lineari-spathulata ad apicem obtusa ; tetrasporangia ad utrasque superficies praeter mediam discontinualiter generata ; color fusco-flavescens.

Nom. Jap. Hera-amijigusa.

Loc. Natsudomarizaki.

Fronds 10 cm high, forming a loose mass, repeatedly dichotomous, with patent rounded axils, about 150 μ thick, composed of a single layer of large medullary cells sorrounded by a single cortical layer of small cells throughout the whole body ; segments narrow, about 0.4–1.5 mm broad, with entire margin, elongated towards the extremity, with ultimate segments somewhat broadened, linear-spathulate and obtuse at the apex. Sori of tetrasporangia scattered on both surfaces along the median line of segments and tetraspores very often germinate

on the mother frond. Colour dark brown, becoming black in drying, especially in older parts.

The present plant appears to be closely related to *D. linearis* Ag., but in general it is more coarse and robust than the latter. It is found on stones in the littoral or upper sublittoral zone. The illustrations of *D. linearis* in Kützing's Tab. Phyc. IX. t. 21, fig. 2 seems to have some resemblance to our plant. But in ours, segments are more patent than those shown in his illustrations judging from his figure, and also more patent than the specimen of that species from Corsican Island determined by Börgesen, which is in my possession.

LAMINARIACEAE.

22) **Agarum Turneri** Postels et Ruprecht.

Illust. p. 12, t. 22; De Toni, Syll. Alg. III, p. 334; Miyabe, Laminariac. (Hokkaido Suisan Chōsa Hōkoku, in Japanese) p. 59, pl. 27; Okamura, Nippon Sorui Mei-i (2nd edition), p. 129; Id., Icon. of Jap. Alg. V, p. 90, pl. 225.

Nom. Jap. Aname.

Koc. Ōma.

Distr. Kurile Islands, Hokkaido, Chosen.

23) **Costaria Turneri** Greville.

Syn. in Alg. Brit. pl. 29; De Toni, Syll. Alg. III, p. 361; Miyabe, l. c., p. 50, pl. 20; Okamura, Nippon Sorui Mei-i (2nd edition), p. 176; Id., Icon. of Jap. Alg. Vol. V, p. 99, pl. 226; Setchell and Gardner, Mar. Alg. North Amer. III, p. 610, pl. 56, b, pl. 79.

Nom. Jap. Zarame.

Loc. Ōma.

Distr. From Rikuchu to the Kurile Islands, Chosen.

FUCACEAE.

24) **Turbinaria fusiformis** Yendo.

Okamura, The first part of this report, p. 7, No. 30.

Loc. Ōshima.

25) **Sargassum enerve** Agardh.

Sp. Alg. p. 17; De Toni, Syll. Alg. III, p. 25; Yendo, Fucac. of Jap. p. 96, pl. 13, fig. 1–6; Id. in Okamura Nippon Sorui Mei-i (2nd edition) p. 202; Okamura, Icon. of Jap. Alg. V, p. 29, pl. 209.

Nom. Jap. Hondawara.

Loc. Ōma.

Distr. From Kyusyu to Rikuzen on the Pacific coast, and to Echigo in the Japan Sea.

RHODOPHYCEAE.

HELMINTHOCLADIACEAE.

26) **Helminthocladia Yendoana** Narita.

Enum. Spec. Nemal. et Helminth. Jap. (Bot. Mag. Tokyo, Vol. 32, 1918) p. 191, pl. 4. fig. 2–3; De Toni, Syll. Alg. VI, p. 83.

Loc. Ōma.

Distr. Sagami, Shimōsa, Hitachi, Iwaki, Mutsu.

Our plant is just the same as Narita's species. But, of this species Dr. Okamura has much doubt whether it is nothing but a dwarfed form of *H. australis* Harv. influenced by the cold current.

CHAETANGIACEAE.

27) **Scinaia joponica** Setchell.

Scin. Assembl. (Univ. Cal. Pub. Bot. Vol. 6.) p. 98, 124, pl. 11, fig. 16–18; Okamura, Nippon Sorui Mei-i (2nd edition), p. 16; De Toni, Syll. Alg. VI, p. 99.

Syn. Scinaia furcellata Okamura (non Bivona).

Icon. of Jap. Alg. I, p. 10, pl. 2, fig. 19, pl. 3, fig. 16–20.

Nom. Jap. Fusa-nori.

Loc. Ōma.

Distr. From Tosa to Hitachi, Nagasaki, Idzumo.

The present locality appears to be the nothern limit of distribution of this species.

GIGARTINACEAE.

28) **Gigartina unalaskensis** Ruprecht.

In litt. Herb. Acad. Petropol; Yendo, Note on Alg. new to Jap. IV (Bot. Mag. Tokyo, Vol. 30, 1916), p. 54, fig. 2; De Toni, Syll. Alg. VI, p. 177.

Syn. Gigartina pacifica Kjellman.

Beringshafv. Algflor. p. 31, Tab. 1, fig. 21–22; Okamura, Icon. of Jap. Alg. I, p. 34, fig. 1–8; Id., Nippon Sorui Mei-i (2nd edition), p. 31.

Nom. Jap. Ibo-nori.

Loc. Benten-jima.

Distr. Kurile Islands, Hidaka, Hakodate, Otaru.

In referring the present alga to this species I have followed YENDO's opinion who made some comparative studies of many original and authentic specimens in several herbaria in Europe. My specimens are rather small in size though they have many matured cystocarps on the margin as well as on the surfaces of the frond. They form a dense, dark, brownish-purple mat which covers a wide area of rock in the shallow littoral pool.

RHODYMENIACEAE.

29) **Lomentaria hakodatensis** YENDO.

OKAMURA, The first part of this report, p. 12, No. 57.

Loc. Gomi-jima.

Fronds epiphytic on other algae with intricated and stoloniferous roots, with cylindrical stem and branches strictly monopodial, elongated, filiform ; upper branches short, articulated with internodes 3–6 mm long, branchlets regularly opposite or verticillate, constricted at the base, lancoid or catenato-articulate, with awl-shaped apex. Sori of tetrasporangia immersed in the lower thickened part of the branches. Cystocarps urn-shaped, sessile.

30) **Champia parvula** J. AGARDH.

Epicr. p. 303; DE TONI, Syll. Alg. IV, p. 558: OKAMURA, Icon. of Jap. Alg. II, p. 89, pl. 126; Id., Nippon Sorui Mei-i (2nd edition), p. 49.

Nom. Jap. Watsunagi-sō.

Loc. Asamushi, Natsudomarizaki, Benten-jima.

Distr. Very common on the both coasts of the main Island, Tosa in Shikoku. Tetraspores-August.

Our plants are found sometimes on rocks, sometimes on other algae, forming a dense tuft. They are somewhat slender in comparison with the southern forms within our boundary, e. g. those illustrated by OKAMURA in his Icones l. c.

31) **Chylocladia lubrica** YENDO. Fig. 14, a, b.

Novae Alg. Jap. Decas I-III (Bot. Mag. Tokyo, Vol. 34, 1920) p. 6.

Nom. Jap. Ito-taoyagisō.

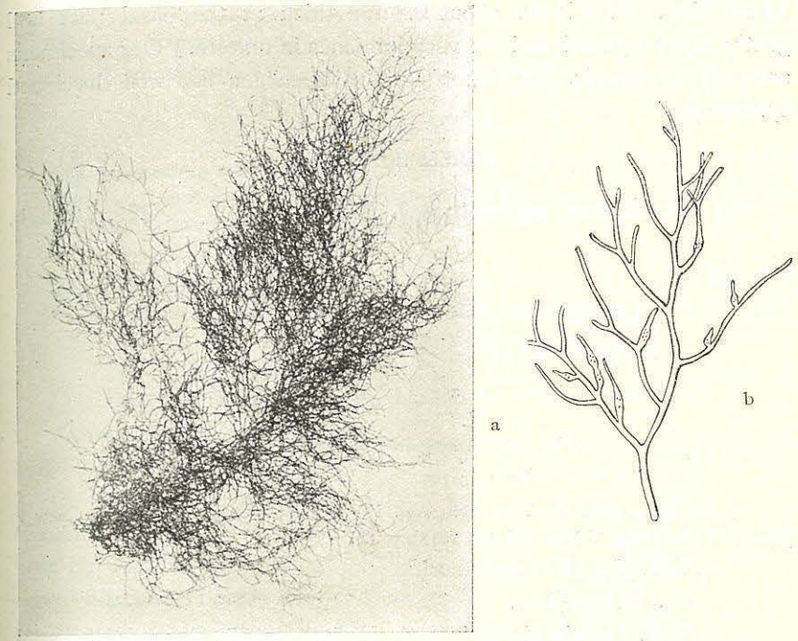


Fig. 14. *Chylocladia lubrica* YENDO.

a. . . . ca. $\times \frac{1}{2}$. b. . . . ca. $\times 1.5$.

Loc. Benten-jima, Natsudomarizaki.

Distr. Ōma, Horozuki.

Fronds somewhat erect, thinly membranaceous, lubricous, filiform, irregularly and decompoundly much branched with spreading branches intricated to each other by adhesion and shortened upwards, not constricted at the insertion ; ultimate branchlets sub-opposite, recurved, constricted at the base, somewhat obtuse at the apex. Cystocarps urn-shaped, sessile at the branchlet ; tetrasporangia in ultimate branches, forming linear sori in 1–3 parallel longitudinal rows with the spores arranged in an interrupted series ; soriferous parts slightly ventricose and fusiform.

This species has been found in many cases on other algae e. g. *Laurencia*, *Coccophora* etc. which grow in shallow pools or shaded places. It forms a very dense and entangled mass, being about 10–

16 cm high. Fronds are about 0.8 mm thick at the basal part and gently taper upward and are very lubricous in texture. Our specimens are only tetrasporic, but YENDO's original specimen has well developed cystocarps.

DELESSERIACEAE.

32) **Nitophyllum monanthos** J. AGARDH. Fig. 15, a, b.

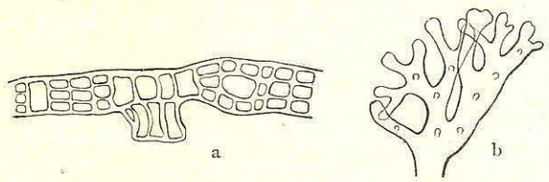


Fig. 15. *Nitophyllum monanthos* J. AG.
a....ca.×80. b....ca.×1.5.

Sp. Alg. II, p. 655; DE TONI, Syll. Alg. IV, p. 637; YENDO, Note on Alg. new to Jap. VIII (Bot. Mag. Tokyo, Vol. 32, 1918), p. 69.

Nom. Jap. Hai-usubanori.
Loc. Benten-jima.
Distr. Islands Koshiki, Gotō, Hyōgo, Bōshū, Shimofuro, Tappi, many places in Hokkaido.

After having made a comparative study with authentic specimens, YENDO referred a species of *Nitophyllum* having the creeping habit to *N. monanthos* J. AG. The present plant very well agrees with YENDO's specimens, and creeps on the frond of *Gelidium*, attaching itself to it by means of many minute rhizoidal processes emitted from the under-surface. In almost all details, our plant agrees pretty well with that of YENDO, but the number of cell-layers is almost always three in ours, while YENDO describes it as having five in his case. Unfortunately, our specimens have no reproductive organ.

BONNEMAISONIACEAE.

33) **Asparagopsis hamifera** (HARIOT) OKAMURA.
Icon. of Jap. Alg. IV, p. 131, pl. 183, fig. 10–11, pl. 184, fig. 10–16.
Syn. Bonnemaisonia hamifera HARIOT.
Alg. de Yokosuka, p. 223; OKAMURA, Nippon Sorui Mei-i (2nd edition), p. 62; DE TONI, Syll. Alg. IV, p. 768.

Nom. Jap. Kagi-nori.
Loc. Ōma.
Distr. From Awa (Shikoku) to Hakodate.

RHODOMELACEAE.

34) **Laurencia obtusa** LAMOUROUX.
OKAMURA, The first part of this report, p. 13. No. 60.
Loc. Futago-jima, Ōshima, Benten-jima.

35) **Polysiphonia hakodatensis** YENDO. Fig. 16.
Novae Alg. Jap. Decas I–III (Bot. Mag. Tokyo, Vol. 34, 1920), p. 7; DE TONI, Syll. Alg. VI, p. 401.
Loc. Asadokoro.
Distr. Nemuro, Muroran, Hakodate, Otaru, Mutsu.

Fronds epiphytic, soft and delicate, ecorticated, 8–10-siphonous; primary filaments creeping on the host by root-fibres, emitting erect filaments; erect filaments many times irregularly branched in an alternate manner with articulations as long as diameter but becoming longer upwards and sometimes twisted; lesser branches mostly secund, shortly articulated, provided with penicillate ramuli often emitting unicellular rudimental root-fibers from the vicinity of the axils of the upper branches; tetraspores immersed in twisted branchlets; cystocarps unknown.

A very fine and elegant species. Our specimens are sterile, but agree very well

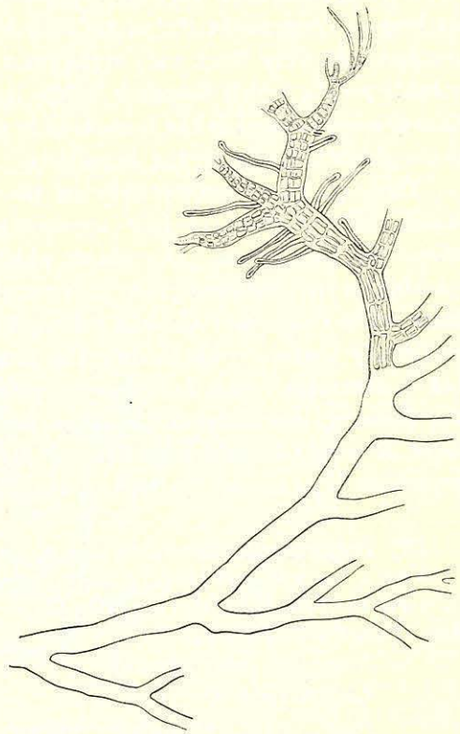


Fig. 16. *Polysiphonia hakodatensis* YENDO. ca.×25.

with the original specimen of YENDO in every respect. They are found in sheltered places growing on *Rhodomela subfusca* AG.

36) **Polysiphonia japonica** HARVEY.

Narrative of the Exped. of an Amer. Squadron to the Chinese Seas and Jap. vol. II, p. 331; GEPP, Chin. Mar. Alg. (Journ. of Bot., Vol. 42, 1904) p. 163, t. 460, fig. 4-6; OKAMURA, Nippon Sorui Mei-i (2nd edition), p. 75; DE TONI, Syll. Alg. VI, p. 393.

Loc. Yuno-shima, Ōshima, Natsudomarizaki.

Distr. Fusan (Chosen).

Fronds about 6 cm high, solitary or caespitose, much branched, with patent branches, forming a globose mass, dark red, gelatinous when young, becoming coarse in age; hairs present, very variable in quantity according to individuals; articulations short, about 350–500 μ long near the base of the frond, very seldom exceeding the diameter, and half as long as diameter in the upper branchlets; pericentral cells four in number with very thick wall, in the main filaments provided with some subsidary cells which disappear in the upper portion of the branches; tetraspores produced in the branchlets in spiral arrangement; cystocarps ovato-globose, sessile on the branchlets. Antheridia unknown.

This alga grows epiphytically on the fronds of other algae or on stones. The amount of hair appears to depend upon the locality where the alga grows. Our plants which were found on *Grateloupia* growing in the sheltered place in Yuga-shima are provided with many hairs while those from Ōshima collected on the exposed rock are not so densely covered with them. The articulations are generally short but in rare cases some have longer ones, about 1.5 times as long as the diameter, especially in the upper portions of branches. Furthermore, it should be added that in our plant the base of the ultimate branchlets is generally apt to be constricted.

37) **Polysiphonia urceolata** GREVILLE. Fig. 17.

"Ed. p. 309"; HARVEY Manual p. 95; Id., Phyc. Brit. pl. 167; Id., Ner. Bor. Amer. II, p. 32; DE TONI, Syll. Alg. IV, p. 875; YENDO, Notes on Alg. new to Jap. IV (Bot. Mag. Tokyo, Vol. 30, 1916), p. 60.

Nom. Jap. Shōjō-kenori.

Loc. Asamushi.

Distr. Otaru, Hakodate, Shiokubi, Hidaka, Iwai-jima (Prov. Suwo), Sagami, Noto.

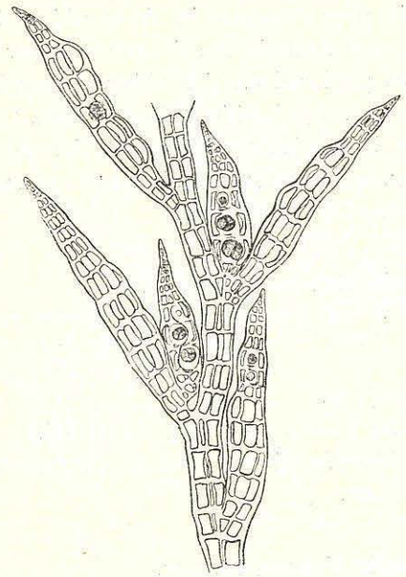


Fig. 17. *Polysiphonia urceolata* GREV. ca. ×35.

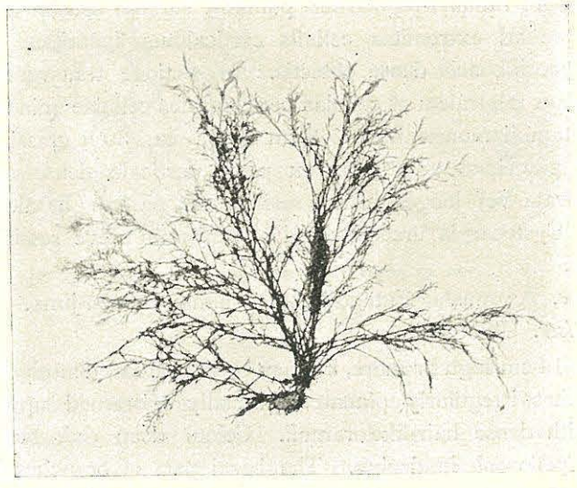


Fig. 18. *Polysiphonia violacea* GREV. ca. ×1.

This species is very common in Asamushi and in its vicinity, mostly growing on the rocks in the littoral or upper sublittoral zone. The tetraspores are produced on the ultimate branchlets or axillary ones. Cystocarps urn-shaped with a short pedicel.

I have compared our plants with many European ones identified by FOSLIE, COTTON, and BÖRGESEN, and do not find any essential difference between ours and the European's.

38) **Polysiphonia violacea** GREVILLE. Fig. 18.

in HARVEY's Phyc. Brit. pl. 209; FALKENBERG, Rhodomelac. p. 115, t. I, fig. 17–19; DE TONI, Syll. Alg. IV, p. 900; YENDO, Notes on Alg. new to Jap. IV (Bot. Mag. Tokyo, Vol. 30, 1916), p. 61.

Loc. Futago-jima.

Distr. So far known only from Asamushi.

Our plant has been found only once in the above locality on the rock in the littoral belt.

39) **Dasya sessilis** YAMADA sp. nov. Fig. 19, a, b, c.

Syn. Dasya punicea YENDO (non MENEGINI).

Notes on Alg. new to Jap. VIII (Bot. Mag. Tokyo, Vol. 32, 1918) p. 72.

Frons 14 cm alta, ad basin ca. 1.5 mm crassa caespitosa vel solitaria, dense ramosa; ramis irregulariter pinnatis, sursum sensim abbreviatis, a basi usque ad extremitas cellulis corticalibus linearibus et sursum ramulis monosiphoneis dense obtectis. In sectione transversali frondis inter cellulam centralem et cellulas pericentrales cellulae minores observantur. Ramuli monosiphoni 2-3 cm longi, ca. 30 μ crassi ad basin, dichotomi praecipue ad basin, ex parte corticale dense exsurgenti. Stichidia ovata vel longe ovata, sessilia ad partem basalem ramuli creantur. Cystocarpia urceolata, ad apicem rami breve sessilia. Color sanguineus.

Loc. Asamushi, Futago-jima, Ōshima, Benten-jima.

Distr. Unknown.

Fronds 14 cm high or more, solitary or caespitose, densely branched, with branches irregularly pinnate, gradually shortened upwards and covered with dense hair-like ramuli. Colour deep red, but turns to somewhat yellowish in drying. The basal part of branches is mostly destituted of ramuli. The diameter of the filament is about 1,5 mm

Fig. 19. *Dasya sessilis* YAMADA sp. nov.

a....ca.$\times\frac{4}{7}$. b....ca.$\times$80. c....ca.$\times$80.

or more near the base; it is densely covered with narrow corticai cells up to their extremity. In the cross-sction there are found some small cells between the central cell and the pericentral ones. The ramuli are very dense, 2–3 mm long, dichotomous, especially near the base, about 30 μ thick below. Stichidia ovate or elongato-ovate, taper-

ing above, sessile, produced near the base of ramuli. Cystocarps urceolate, sessile, formed at the top of the short, corticated branches. Antheridia unknown.

The present plant seems to have some resemblances to *Dasya punicea* MENEG., so far as I have studied the literature and illustrations; and some specimens which YENDO referred to *D. punicea* are very likely the same as ours.

In our plant the shape of the stichidia is rather variable, sometimes being ovate, sometimes more elongated and in appearance approaching those of *D. punicea* MENEG. illustrated by ZANARDINI (Icon. Plyc. Adriat. Tab. 52). But in all the cases stichidia are sessile in our plant, while those of *D. punicea* have a short pedicel; so that we can easily distinguish one from the other.

CERAMIACEAE.

40) **Griffithsia corallina** AGARDH. (?) Fig. 20.

Syn. p. 28; HARVEY, Phyc. Brit. pl. 214: DE TONI Syll. Alg. IV, p. 1279; KYLIN, Die Entwicklungsgesch. von *Grif. coral.* AG. (Zeitschr. für Bot. 1916), p. 97–123.

Loc. Nonai.

Distr. Unknown.

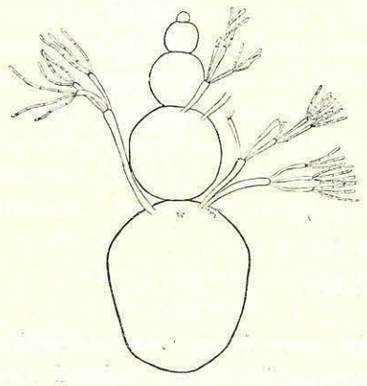


Fig. 20. *Griffithsia corallina* AG. (?) ca. × 25.

Fronds forming a dense tuft, about 5 cm high, alternato-pinnate and often irregular in ramification, lesser branches swollen for the most part becoming narrower upwards; articulations slender in main branches, about 2 mm long, slightly constricted, but in lesser branchlets they are somewhat swollen to obovoid segments, gradually diminishing in size upwards; hairs are present at the upper shoulder of cells of ramuli, and branch three or four times in 2–4-chotomous manner; tetrasporangia are borne in the inside of oblong and curved involucres

which are formed in a verticillate manner mostly on the shoulder of upper cells. Cystocarps and antheridia unknown. Mixed with hairs, there are often found some short and dwarf branches which ramify repeatedly as well as di- or trichotomously.

As it appears from the above description, there seems to be some differences between our plants and *G. corallina* AG., especially in the mode of ramification and measurement of every part of the frond, our plant being more slender than the European one. But as other charac-

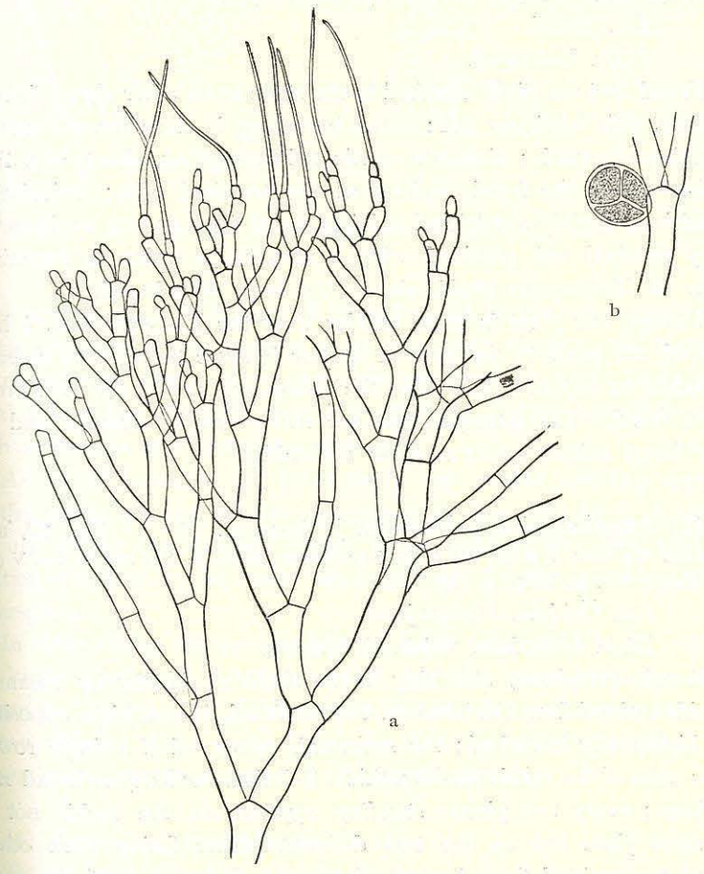


Fig. 21. *Callithamnion corymbosum* LYNGB. a....ca. × 150. b....ca. × 200.

ters all agree with those of the present species and as I do not consider the above difference to be sufficient to separate our plant from it, I have identified our plant provisionally with that species. Only one small tuft of the present plant has occurred in the collection as the first time for the study of this plant.

41) **Callithamnion corymbosum** LYNGBYE. Fig. 21, a, b.

Hydrophy. Dan. p. 125, t. 38; HARVEY, Phyc. Brit. pl. 272; THURET and BORNET, Etud. Phyc. p. 67, pl. 33–35; DE TONI, Syll. Alg. IV, p. 1331.

Loc. Nonai.

Distr. Unknown.

Frond 3–4 cm high, attached to the stone or on other algae, forming a dense, soft, lubricous tuft; much branching in dichotomous manner, corymbose upwards; filaments ecorticated throughout, about 70 μ thick at the base of the frond, 6–10 μ at the terminal cells; articulations cylindrical, slightly constricted at joints, 3–10 times as long as diameter; every terminal cell provided with a long hair, which is sometimes fallen off. Tetraspores ovoid, about 50 μ long, 40 μ broad.

Though our plant is more slender than the European one, I have referred our plant to the present species because there is no essential difference to separate ours from the Europeans except the slenderness of the frond. The tetrasporangia are rather few in number and we have found neither cystocarps nor antheridia.

42) **Acrothamnion pulchellum** J. AGARDH. (?) Fig. 22, a, b.

Anal. Alg. Cont. I, p. 23, tab. 1, fig. 6–9; YENDO, Notes on Alg. new to Jap. V (Bot. Mag. Tokyo, Vol. 30, 1916), p. 262.

Loc. Ōshima, Futago-jima.

Distr. Hakodate, Shiokubi, Oshoro.

Fronds caespitose, attaching to the shells of *Mytilus* by means of rhizoids emitted from the basal part of the frond, 15 mm high, oppositely and bipinnately branched; the main axis composed of a single row of cells; cells of the rachis 40–50 μ thick, 2–5 times as long as broad near the base; every two pinnae standing opposite on the rachis not on the same plane but on the two different planes facing each other; pinnae are emitted from beneath the apex of each cell of the rachis and from opposite sides of it, the basal cell being very small and each

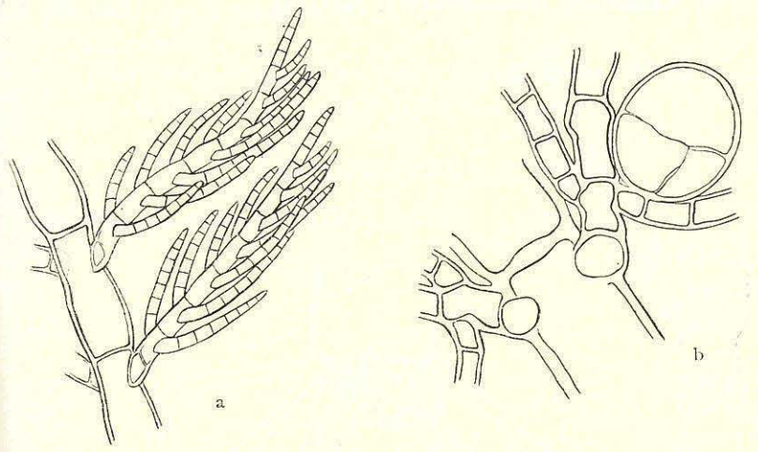


Fig. 22. *Acrothamnion pulchellum* J. AG. (?)
a....ca.×60. b....ca.×190.

pinna having about 4–8 pairs of pinnules, but in the upper portion of pinnae pinnules of the upper side are sometimes wanting; the terminal cell of pinnules acute. Tetrasporangia produced in many cases on a basal cell of the pinnules, cruciately divided. Colour beautifully red. Both antheridia and cystocarps unknown.

As stated above, in our plant every two pinnae standing opposite on the rachis are not on the same plane as described by J. AGARDH, but are on the two different planes facing each other. But this disposition might easily be made unrecognisable by the pressure of the cover-glass.

In determining the present plant I have followed YENDO, and do not know whether J. AGARDH's plant has the same arrangement of pinnae as in ours; but if his plant has in vivo an arrangement of pinnae differing from ours, I am in doubt whether my plant and YENDO's are not the same as J. AGARDH's species.

43) **Ceramium paniculatum** OKAMURA.

The first part of this report, p. 14, No. 67.

Loc. Benten-jima.

44) **Ceramium tenuissimum** J. AGARDH. Fig. 23, a, b.

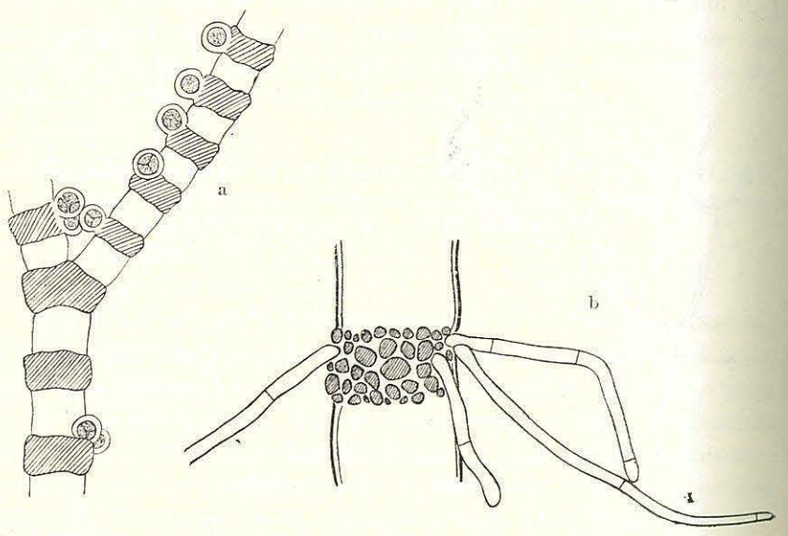


Fig. 23. *Ceramium tenuissimum* J. AG.
a....ca.×50. b....ca.×80.

Sp. Alg. II, p. 120.

Nom. Jap. Kinuito-igisu.

Loc. Natsudomarizaki.

Distr. Echigo, Fusan, Taiwan.

Frond about 6 cm high, fine, forming a loose tuft on other algae, about 85 μ thick near the base, about 30 μ in the upper ramuli, dichotomously much branched, with terminal segments slightly involuted; articulations pellucid, those of the middle portion 2-6 times as long as diameter, becoming gradually shorter above, at the nodes coated with coloured cells, no spine, sometimes with short roots emitted from nodes. Tetraspores formed at the nodes of short, lateral ramuli, very prominent, and often secundly seriated in a longitudinal row. A single frond of this plant has been found on the frond of *Sargassum Thunbergii* in a sheltered place at the locality mentioned.

45) **Ceramium clavulatum** AGARDH.

KUNTH, Syn. pl. aequin. I. p. 2; OKAMURA, Illustr. Jap. Alg. p. 47, pl. 17; Id., Nippon Sorui Mei-i (2nd edition), p. 99.

Nom. Jap. Toge-igisu.

Loc. Ōma.

Distr. From Taiwan to Prov. Iwaki on the Pacific coast; Wakasa, Sado on the Japan Sea side; Chosen.

GRATELOUPIACEAE.

46) **Prionitis patens** OKAMURA.

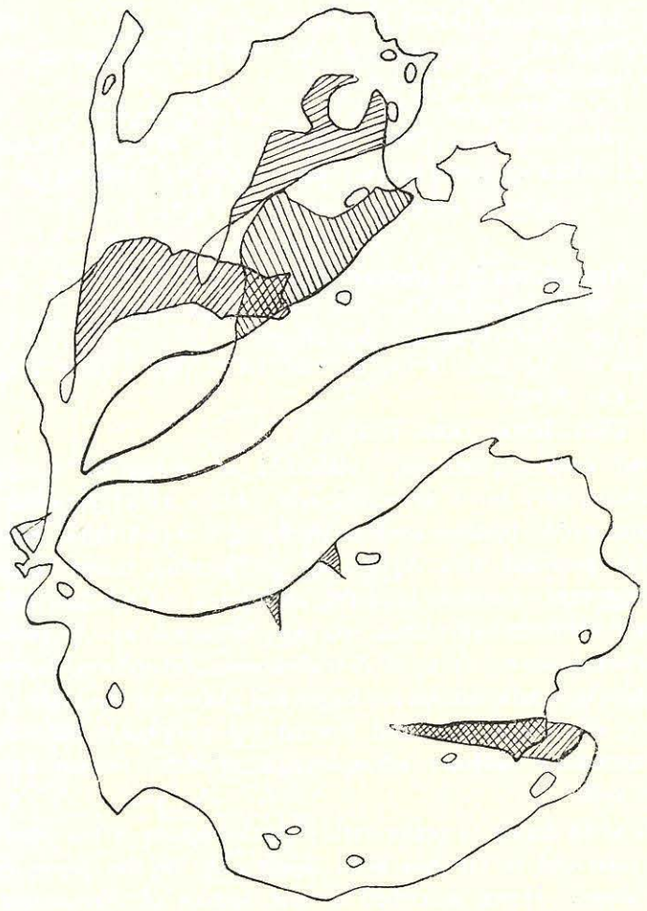


Fig. 24. *Schizymenia Dubyi* J. AG. ×1.

Contr. Knowl. mar. Alg. Jap. III. (Bot. Mag. Tokyo. Vol. 8. 1899), p. 3, pl. I, fig. 18–20; Id., Nippon Sourui Meii (2nd edition), p. 110; Id, Icon. of Jap. Alg. II, p. 73, pl. 70; De Toni, Syll. Alg. IV, p. 159.

Nom. Jap. Hira-kintoki.

Loc. Ōma.

Distr. Shima, Mikawa, Izu, Sagami, Bōshū.

NEMASTOMACEAE.

47) **Schizymenia Dubyi** J. Agardh. Fig. 24.

Sp. Alg. II. p. 171; De Toni, Syll. Alg. IV, p. 1648; Yendo, Notes on Alg. new to Jap. VI (Bot. Mag. Tokyo, Vol. 31, 1917), p. 93.

Loc. Benten-jima, Nonai.

Our plant resembles *Dilsea edulis* J. Ag. in general aspect. It grows on stones or rocks in the upper sublittoral zone or in littoral pools, and imperfectly adheres to paper in drying.

48) **Nemastoma Nakamurae** Yendo. Fig. 25, a, b.

Novae Alg. Jap. Decas I–III (Bot. Mag. Tokyo, Vol. 34, 1920), p. 7.

Syn. Nemastoma Cowdryi Howe

Chinese Mar. Alg. (Bullet. of Torr. Bot. Club., Vol. 51, 1924) p. 143, pl. I, fig. 5.

Loc. Nonai.

Distr. Inaba, Noto, Echigo.

Frond carnoso-gelatinous, cylindrical or somewhat compressed, dichotomous, very much branched, with obtuse axils; segments in the lower and middle portions equal in thickness, 2–3 mm thick, often here and there provided with decussately proliferating, minor branchlets; upper seggments slenderer becoming attenuated and subulate upwards; medullary filaments articulated, sparingly branched, loosely anastomosing; cortical layer consisting of di-trichotomous, moniliform, fasciculated filaments whose articulations are larger and globose in the lower portion, becoming minor and elongated toward the periphery, ultimate ones being sometimes filiform; tetrasporangia cruciate, formed from the ultimate cells.

This plant seems to prefer rather shaded places in the upper sublittoral zone and so far has been found only in the Japan Sea as shown above. Howe described a new species of *Nemastoma* from China naming it *N. Cowdryi*. I am not able to see his specimen,

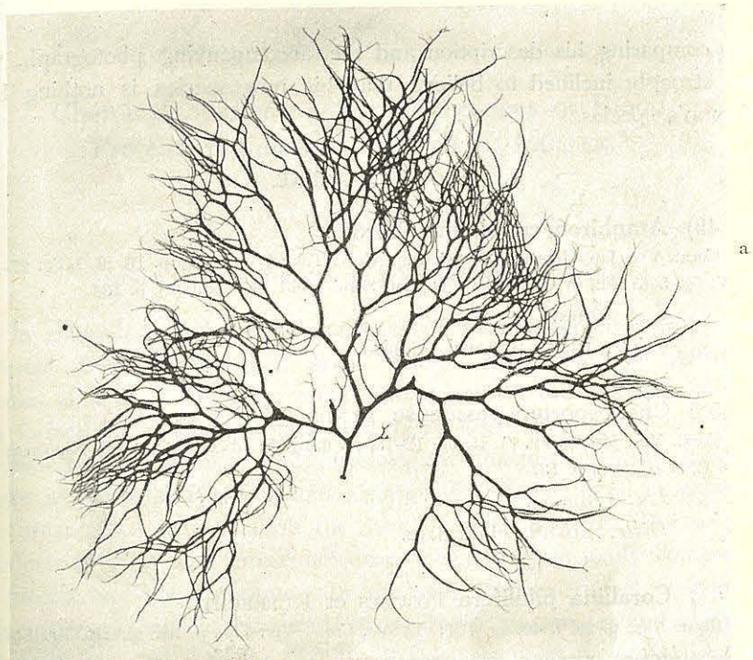


Fig. 25.
Nemastoma Nakamurae Yendo.
a . . . . ca. × 1/2.
b . . ca. × 280.

but comparing his description and the accompanying photograph, we are strongly inclined to believe that his new species is nothing but YENDO's species.

CORALLINACEAE.

49) **Amphiroa crassissima** YENDO.

Coral. Ver. Jap. (Journ. Coll. Sci. Imp. Univ. Tokyo, Vol. 16), p. 16, pl. I, fig. 27–28, pl. V, fig. 5–6; Id., in OKAMURA's Nippon Sorui Mei-i (2nd edition), p. 134.

Loc. Ōma.

Distr. Idzu, Sagami, Bōshū.

50) **Cheilosporum yessoense** YENDO.

Coral. Ver. Jap., p. 19, pl. II, fig. 12–13, pl. 6, fig. 5; Id., in OKAMURA's Nippon Sorui Mei-i (2nd edition), p. 137.

Loc. Ōma.

Distr. Bōshū, Hakodate.

51) **Corallina pilulifera** POSTELS et RUPRECHT.

Illust. Alg., p. 20, t. 40, fig. 101; YENDO, Coral. Ver. Jap., p. 30, pl. III, fig. 14–16, pl. 7, fig. 14–16.

Nom. Jap. Pirihiba.

Loc. Benten-jima, Ōma.

Distr. From Kyūshū to Hokkaido in the Pacific Ocean, Echigo in the Japan Sea.