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Some Marine Algae Recently Discovered in Japan and New to Science

By

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Among the specimens of marine algae from Osyoro Bay collected by me since 1930, there are some interesting ones, of which the first three have not been previously reported from Japanese waters and the other three seem to be new species. They all belong to the small red algae.

Here I wish to express my best thanks to Prof. Y. YAMADA for his kindly guidance during the course of the present study.

***Erythrocladia subintegra* ROSENVINGE**

Mar. Alg. of Denm. part I (1909), p. 73; BOERGESEN, Mar. Alg. of Dan. West Ind. vol. II (1915), p. 7; Kaisô Kenkyûsyô Hôkoku, No. II. p. 9, figs. 1, 2.

Japanese Name. *Iso-hanabi*.

Hab. Osyoro Bay, Shiribeshi Prov., any time except summer, epiphytic on *Cladophora* sp., *Chondria crassicaulis* HARVEY etc. Prof. YAMADA has also collected this alga at Enoshima, Sagami Prov.

The thallus is microscopic, roundish or elliptical in a surface view, 140–280 μ in diam., horizontally expansive, forming a small suborbicular and monostromatic disc. It has a continuous margin, showing a marginal growth and not a free end. From the centre of the thallus, the cells divide dichotomously toward the outside; they are variable in shape, but generally linear-oblong or forked in the marginal portion of the thallus and oblong in the middle portion. Two cells born newly by the bifurcation of one cell are unequal in dimensions to each other. The cells are 3–10 μ broad, 5–20 μ long, in our specimens very variable in dimension. The monosporangia are 5–6 μ sometimes 10 μ in diam., in a surface-view mostly roundish or elliptical in shape and produced in all portions of the thallus. The colour is purplish red.

According to ROSENVINGE's description, the thallus of the genus *Erythrocladia* consists of mutually separated filaments which are only partly confluent in the older stage. Such an aspect seems to be observed com-

monly in *Erythrocladia irregularis* ROSENVINGE, but in our plant such is not commonly the case. ROSENVINGE has not seen its younger stage. BOERGESEN, on the contrary, has observed that this plant had a completely continuous margin in the younger stage and did not grow with free ends, as ROSENVINGE had described. He has consequently entertained a considerable doubt for ROSENVINGE's description. Our specimens answer very well to BOERGESEN's description. This alga looks like *Erythropeltis* described imperfectly by FR. SCHMITZ, but the distinction between two genera *Erythrocladia* and *Erythropeltis* is not yet clear. I have referred our specimens to the present species with as considerable a degree of doubt as BOERGESEN.

A new addition to the algal flora of Japan.

Porphyropsis coccinea (J. AGARDH) ROSENVINGE

Mar. Alg. of Denm. part I (1909), p. 69, figs. 9, 10; Kaisô Kenkyûsyô Hôkoku, No. II. p. 13, fig. 6.

Syn. *Porphyra coccinea* J. AGARDH in KUCKUCK's Bemerk. zur Meeresalg. von Helg. (1897), p. 390, figs. 13, 14.

Japanese Name. *Hinanori*.

Hab. Tsukotan, Shiribeshi Prov. in spring, epiphytic on *Sargassum*, *Gelidium* growing on stones below the low tide mark, very rare.

The frond is generally irregularly elliptical with a remarkably undulated margin, monostromatic, about 7 mm high, about 28μ thick. The cells in the basal portion of the frond are arranged in two or more layers and form the filamentous rhizines. The cells are rounded or oval in shape, and $4.5-10\mu$ in diam. The spore-mother cells are crescent-shaped. The monospores are roundish or oval, and born in every portion of the frond. The frond is purplish red in colour.

This alga resembles some younger specimens of *Porphyra*, but it differs from the latter by its thinner frond and its smaller cells. I have collected only a few individuals, but they are provided with monospores, and answer very well to KUCKUCK's and ROSENVINGE's descriptions and also coincide with the specimens from France kept in the herbarium of Prof. YAMADA.

A new addition to the algal flora of Japan.

Trailliella intricata BATTERS

Text-fig. 1.

Some new Brit. Mar. Alg. (Journ. of Bot. vol. 34, 1896), p. 10;

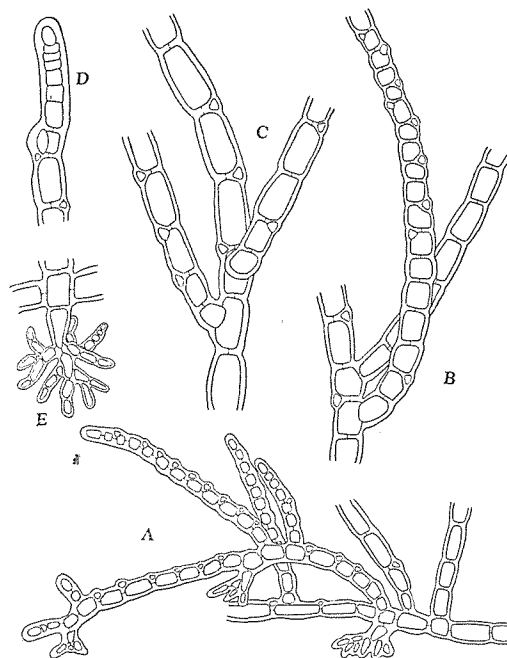


Fig. 1. *Trailliella intricata* BATTERS

- A. A basal creeping part of the frond with hapteres and erect filaments. $\times 90$.
 B, C. Portions of erect filaments, bearing gland cells. $\times 100$.
 D. An apical portion of an erect filament. $\times 100$.
 E. A hapter. $\times 150$.

DE TONI, Syll. Alg. vol. IV (1903), p. 1269; KYLIN, Mar. Red. Alg. in Vicin. of Friday Harbor, Wash. (1925), p. 44; ROSENVINGE, Mar. Alg. of Denm. part III (1923-1924), p. 305, fig. 213.

Japanese name. *Tama-no-ito*.

Hab. Kabuto-iwa, Tsukotan, Tsurukake-iwa on Oshoro-Shiwoya coasts, Shiribeshi Prov. in Feb. to Oct., found on rocky walls and rocks or on *Symphycloadia*, *Ptilota*, *Heterosiphonia* and *Gelidium*. The present alga was collected also in Amakusa, Higo Prov. by Mr. T. TANAKA.

The frond is monosiphonous, about 5-8mm high, filamentous and branches irregularly, forming dense tufts. The frond is divided into the creeping filaments and the erect filaments, but there is no sharp distinction between them. The creeping filaments are procumbent and fix to the substratum by means of pluricellular hapteres. The hapteres are composed of a conical, downward tapering cells and several branched rhizoids. The

erect filaments, arising from the creeping ones, branch in an irregular manner. At their origin the hapters at the apices of the erect filaments resemble the end of the normal branches. The former have tapering cells or irregularly elongated cells in their younger stages, while the latter have terminal cells which are elliptical or lens-shaped. The gland cells are situated mostly on the upper side of the creeping filaments, but they are arranged on one or both sides in the erect filaments. There are often filaments which bear no gland cells. ROSENVINGE noticed the tetrasporangia, but I have observed neither tetrasporangia nor sexual organs in my material.

In referring our plant to this species, I have examined some specimens from Sweden. My specimens agree very well with them, though there are no tetraspores and sexual organs.

A new addition to the algal flora of Japan.

Colaçonema simplex sp. nov.

Text-fig. 2.

Frons minutissima, roseopurpurea, filamentosa, cellulis uniserialibus, irregulariter ramosa, repens anatomosans et tunc reticulum inordinatum inter cellulas corticales algae matricis efficiens. Cellulae varie formatae, fere oblongae, simplices vel furcatae, diam. $3-10\mu$, diam. $2-15$ -plo longiores. Monosporangia saepe simplicia, latere vel termine in cellulis filamentorum ornata, subglobosa, diam. $6-10\mu$.

Japanese Name. *Beni-mayudama*.

Hab. Shiwoya, Shiribeshi Prov., found on *Asparagopsis hamifera* (HARLOT) OKAMURA.

Fronde microscopic, purplish red, filamentous, consisting of single row of cells, irregularly branched, creeping on the host plant, forming an irregular network between the cortical cells of the host. Cells variable in shape, generally oblong, simple, furcate or irregular, $3-10\mu$ in diam., $2-15$ times as long as broad. Monosporangia simple, lateral or terminal on the cells of the filaments, subglobular, $6-10\mu$ in diam.

Our plant resembles *C. Bonnemaisioniae* BATTERS, but the former has usually the singular monosporangia instead of the aggregated ones of the latter. The present alga differs from *C. ? reticulatum* BATTERS in the following points. The filaments of *C. ? reticulatum* BATTERS form a more or less regular network among the cortical cells of the host plant. As the lateral branches often run very close to the primary filaments, it looks

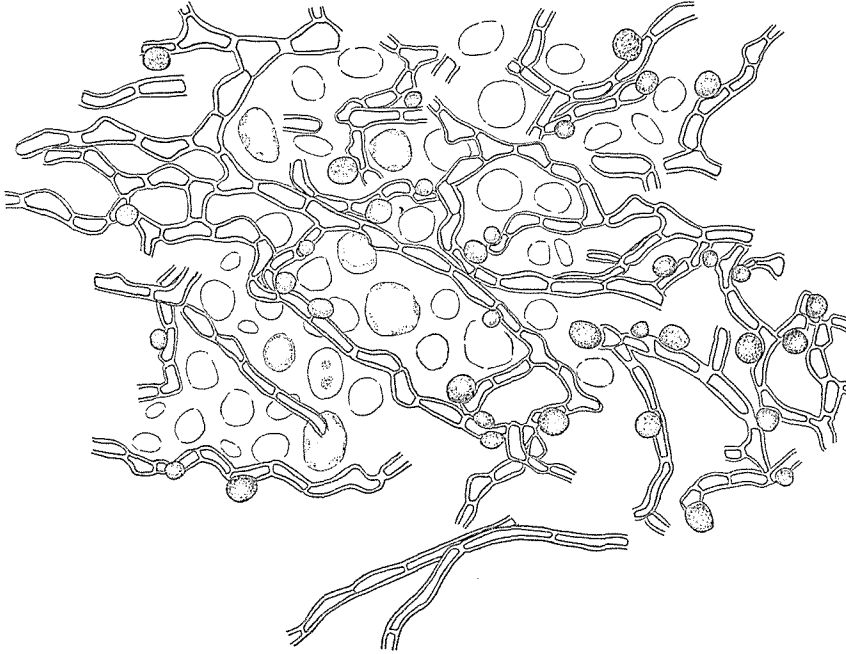


Fig. 2. *Colaenema simplex* sp. nov.

Filaments with monosporangia, creeping among the cortical cells of *Asparagopsis hamifera* (HALIOT) OKAMURA. $\times 450$.

as if the frond consists of double series of cells. The filaments consist of brevous cells which are almost as long as broad. But we are unable to find such habits in our plant as mentioned above.

Branchioglossum nanum sp. nov.

Text-fig. 3.

Frons rhizoideis filamentosis, in lapidibus aut frondibus algae matricis epiphytica, erecta, 4–8 mm alta, plana, delicato-membranacea, dichotomo-alternatim ramosa. Segmenta lineari-lanceolata, 0.3–0.5 mm lata, marginibus levibus, apicibus aliquantum acutis, in partibus marginalibus monostromatica, centrale polystromatica, nervo centrali singulo ornata, nervis transversalibus destituta. Cystocarpia majora, hemisphaerica, per segmenta superiora sparsa. Tetrasporangia rotundata, in singula serie vel in binis seriebus utrimque ad nervos centrales ornata, crusiatiim divisa.

Japanese Name. *Hime-murasaki*.

Hab. Tsukotan, Shiribeshi Prov. in Feb. 1932, growing on rocks and

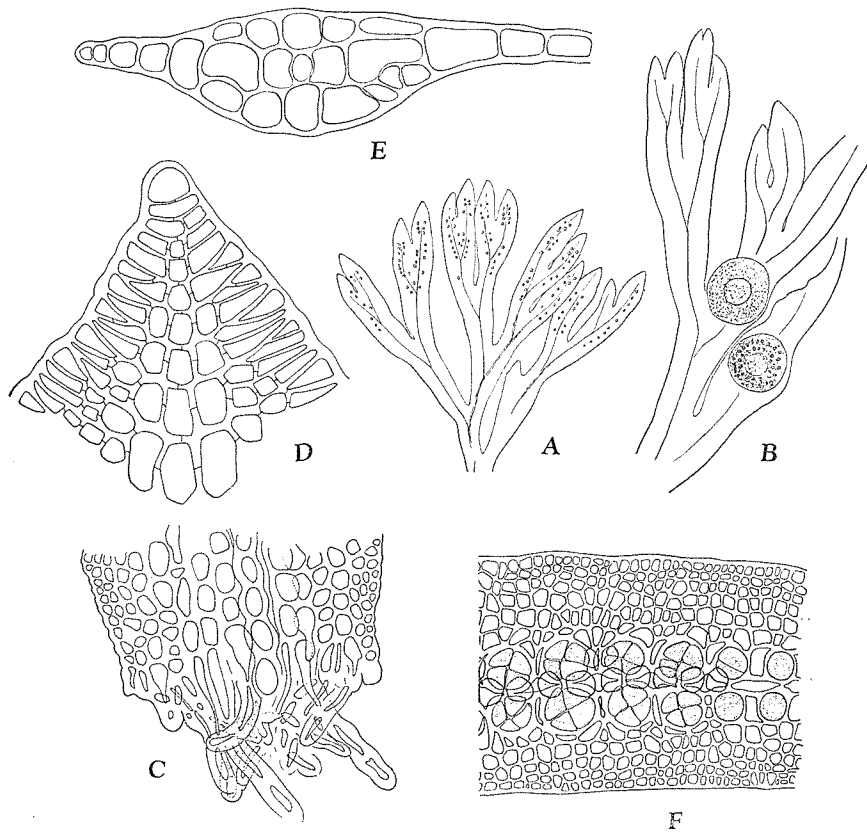


Fig. 3. *Branchioglossum nanum* sp. nov.

- A. Upper portion of a tetrasporic frond. $\times 9$.
- B. Portion of a cystocarpic frond. $\times 15$.
- C. Basal portion of a frond. $\times 130$.
- D. Apical portion of a segment in a surface view. $\times 210$.
- E. Cross section of a frond. $\times 310$.
- F. Portion of a segment bearing tetrasporangia in a surface view. $\times 260$.

stones or epiphytic on *Polysiphonia Morrowii* HARVEY, sometimes washed ashore.

Frond found on rocks and stones or epiphytic on *Polysiphonia Morrowii* HARVEY with rhizoids, erect, 4–8 mm high, delicto-membranous, dichotomo-alternately or somewhat palmately branched, monostromatic except the three-cell-layered middle portion, provided with an entire margin. Segments linear-lanceolate, generally 0.3–0.5 mm broad in the broadest portion, narrowed at the base. Apices of segments somewhat acute. Midribs evidently

present, but side nerves absent. Cortical cells irregularly polygonal. Apical cells triangular, their bases larger than their heights in a surface view. Cystocarps hemispherical, relatively larger, born in the middle or the upper portion of the segment. Tetrasporangia roundish, born on one or both sides along the midrib, forming a single longitudinal row or two, cruciately divided. Colour purplish red. Frond adhering firmly to paper when drying.

***Platythamnion yezoense* sp. nov.**

Text-fig. 4.

Frons erecta, filamentosa, 2–5 cm alta, rhizoideis filamentosis et irregulariter dichotomis adfixa. Rami primarii subdichotome ramosi, 200–210 μ crassi, e cellulis diam. 2–2.5-plo longioribus compositi, ramis quaternatis dense verticillatis, ornati. Rami laterales in partibus basalibus superiore binis seriebus ramulorum, in partibus apicalibus superiore singulis, ornati. Rami transversales quam laterales minores, pinnato-ramosi. Ramuli inferne 10 μ crassi, cellulis diam. 1.5-plo longioribus. Ramuli ultimi fere subulati. Gonimoblasti in ramis primis superioribus sessiles. Antheridia in ramis aut ramulis ornata. Tetrasporangia rotundata vel obovata, in ramulis sessilia, cruciatim divisa. Cellulae glandulosae in ramulis sessiles, rotundatae vel ellipticae, diam. 10–20 μ .

Japanese Name. *Yotsuba-gusa*.

Hab. Washed ashore on Osyoro coast and Zenibako coast etc. in Shiri-beshi Prov. about April and May.

Frond erect, filamentous, 2–5 cm high, consisting of subdichotomous main branches and 4-verticillate rami on each cell of the main branches, providing with filamentous rhizoids. Rhizoids colourless, consisting of single row of very elongated cells, irregularly dichotomous, stretching out from the bases of the main branches in general, but sometimes from rami in the basal portion of the frond. Main branches 200–210 μ in diam., consisted of single row of cells. Cells of main branches cylindrical, with somewhat thick membranes, 2–2.5 times as long as broad, but in the basal portion of the frond often as long as broad. Rami 4-verticillate, issued from the upper end of each cell of the main branches, arranged in four vertical rows, 60–70 μ thick in the basal portion. Basal cells of rami 2–2.5 times as long as broad. Among four whorled rami, the two lateral ones much larger in dimensions than the two transversal ones. Two lateral rami provided with two rows of ramuli on their upper sides near the base, but

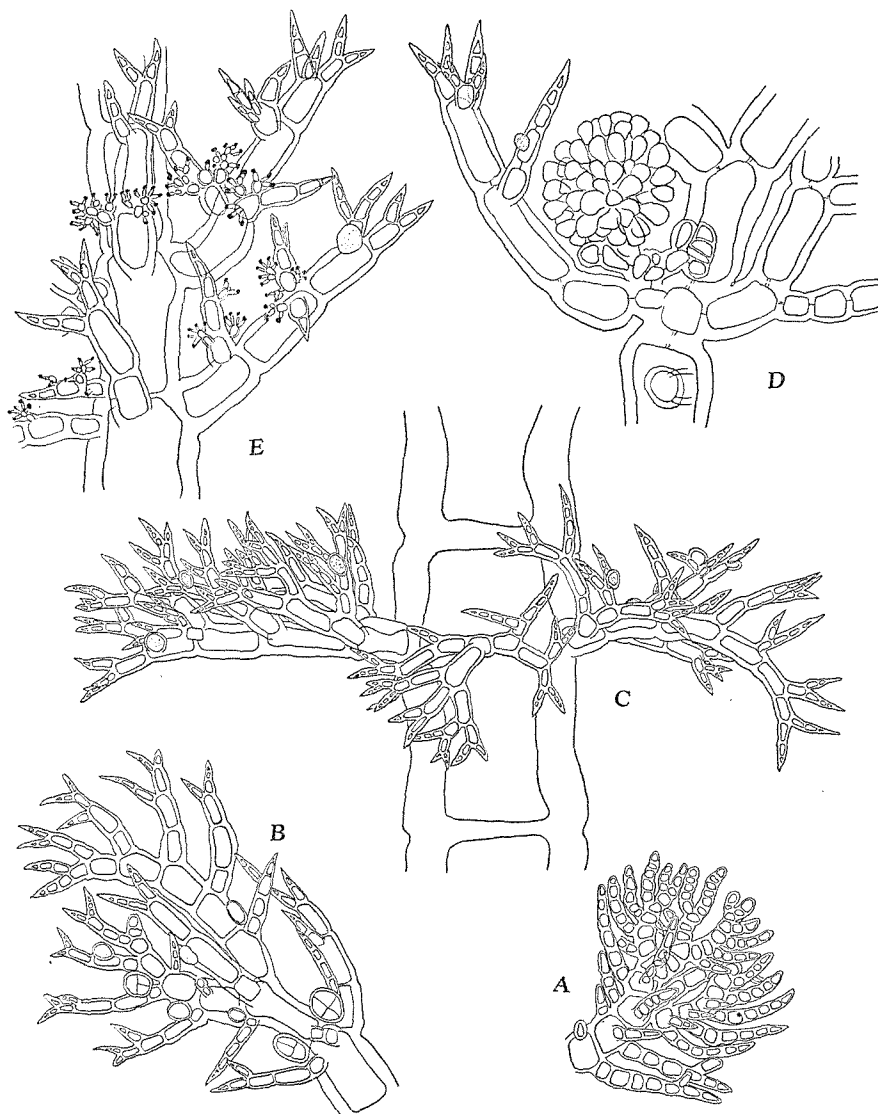


Fig. 4. *Platythamnion yczocense* sp. nov.

- A. Crowing portion of a frond. $\times 230$.
- B. Ramuli in apical portion, bearing tetrasporangia and gland cells. $\times 130$.
- C. Verticillated rami bearing gland cells, coming out of a main branch. $\times 110$.
- D. Cystocarps. $\times 230$.
- E. Antheridial ramuli. $\times 230$.

provided with only a single row of ramuli in their apical portions. Two transversal rami similar to two lateral ones, but having only a small number of ramuli. Ramuli about 10μ thick in basal portion, basal cells 1.5 times as long as broad. Ultimate ramuli subulate, but those at the growing point of the frond subulate or obtuse. Chromatophores numerous, very small, linear or globular in shape. Gonimoblast sessile, arising from the supporting cell separated from the basal cell of rami in the upper portion of the frond. Cystocarps spherical. Antheridia scattered irregularly on rami and ramuli. Tetrasporangia elliptical, sessile, born on ramuli, cruciately divided. Gland cells elliptical, $10-20\mu$ in diam., sessile on ramuli, brilliantly yellowish.

The present alga appears to be closely related to *P. villosum* KYLIN, *P. pectinatum* KYLIN, but it has no ramuli on the lower sides of the rami like the latter, and has two rows of ramuli on the upper sides of the rami. There is also a difference in shape between the two older transversal rami of the present species and those of *P. pectinatum* KYLIN. The two older transversal rami of *P. pectinatum* KYLIN shoot out the ramuli branched to several directions from one basal cell, but those of the present plant branch pinnately.
