

## STUDIES ON SOME MARINE ALGAE FROM SOUTHERN JAPAN, II

Takesi TANAKA

日本南海産海藻類の研究 其二

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The authoritative investigation has not yet been done about the marine algal flora of Tokara Islands and Amami Islands. After the writer's going over twice to every Islands of the Tokara since February 1952, together with his making collecting trips over to each Island of Amami Oshima several times every year since May 1954, a somewhat systematic research has been under progress. The result of this study seems to the writer to be very interesting and contribute to some extent to the marine flora of the Southern Japan.

Among the specimens of marine algae from these Southern Japan, there are some interesting ones, of which are described in the following pages.

5) *Bornetella clavellina* spec. nov. Plate I, A. and Fig. 1.

Frons caespitosa vel solitaria, claviculata vel cylindracea, 1~1.5 cm. alta, ca. 0.2 cm. crassa, levissime incrassata; axis ad basin plus minus rugosus, e 20~28 ramulis primariis in unicum corona compositum; cellulis corticus 150~240 $\mu$  diametro; a superficie visis 5~6 angulatis, gametangia spherica vel subspherica, 250~280 $\mu$  in diam.; spora numerosa, ellipsoidea, ca. 52~58 $\times$ 70~78 $\mu$  magna, colore albo-virido.

Japanese name. *Hoso-mizutama*.

Hab. Takarazima, Tokara Islands; Koniya, Amami Islands.

Frond solitary or caespitose, claviculate or cylindrical, slightly curved, 1~1.5 cm. high, about 0.2 cm. thick, provided with a very short simple stipe ending in a disc shaped, slightly encrusted with chalk; central axis rugose toward base, bearing whorls of 20~28 primary branches; primary branches forming toward distal end up to 1~2 laterally attached; spherical or subspherical gametangia, 250~280 $\mu$  diam., and terminally inserted secondary branches jointed together to form monostromatic surface cells of pentagonal or hexagonal units; surface cells ca. 150~240 $\mu$  in diam.; gametangia producing about 16~20 spores; spores ellipsoidal, about 52~58 $\times$ 70~78 $\mu$  in diam., colour light green or somewhat greenish white.

The present species seems to possess some resemblance to *Bornetella nitida* MUN, et CHALMES, but it differs from the latter by the outer appearance. The outer appearance of this species is characteristic on account of the small size and peculiar claviculate shape and somewhat slightly curved in the middle portion of the frond.

The gametangia of *B. clavellina* TANAKA are borne single or groups of two on the upper portions of the branches of the first order, and contain about 16~20 spores. They are spherical or subspherical, about 250~280 $\mu$  in diameter. *Bornetella nitida* MUN, et CHALMES may be distinguished on the basis of the number of spores formed in the gametangia.

The plant was found growing rather scattered on small blocks, coral or stones lying in shallow pools together with *B. ovalis* YAMADA. Fertile specimens were collected in the month of July.

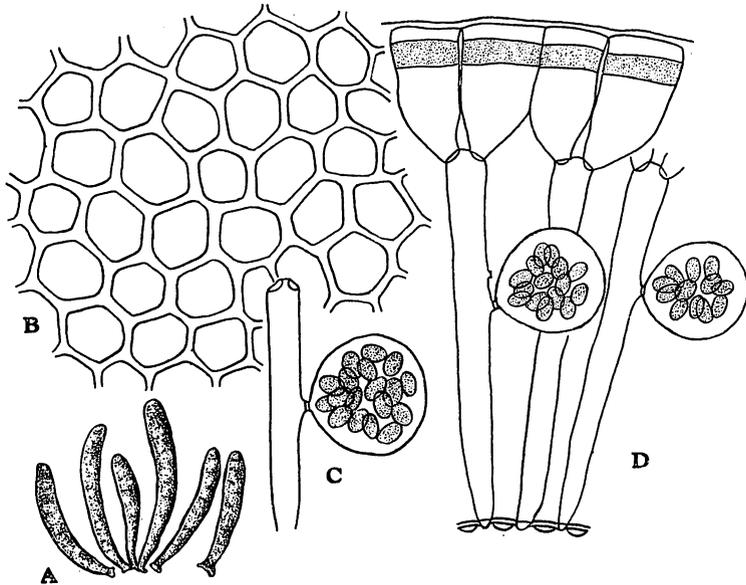


Fig. 1. *Bornetella clavellina* TANAKA.

A. Habits of the plant. x. 1.2 B. Surface view of the frond. x 75.

C. Primary branch bearing a sporangium. x 75.

D. Primary branches bearing sporangia. x 75.

6) *Ulva amamiensis* spec. nov.

Plate I, B. II and Fig. 2.

Fronde membranacea, nonnunquam perforata, breve stipitata, virido-smaragdina, lineari-vel ovato-lanceolata, non raro in 2~5 lobatas laciniata, marginibus undulatis, fere 100~170 $\mu$  crassa, 20~60 cm., raro usque 115 cm. longa 10~35 cm., raro usque 50 cm. lata; cellulis vegetativis a facie visis 4~6 angulato-rotundis, in sectione thalli transversa oblongis; parte gelatinosa subintercellularis maxime tenuibus; fila radicalia fibrosa, inter 2-strata cellulas producta.

Japanese name. *Usyuku-aosa*.

Hab. Usyuku, Amami Islands.

Frond linear-lanceolate to ovate-lanceolate, often laciniata into two to five lobes, very undulate on the margins, membranaceous, often perforate, cuneate stipe, margins smooth having no microscopic teeth, mostly 20 to 60 cm. long and 10 to 35 cm. wide (the largest specimen 50 $\times$ 115 cm.); membrane distromatic, 100~170 $\mu$  thick as to the base, two layers of cells very closely attached to one another, and covered with thin outer walls; cells in surface view 4~6 angled with round corners, 27~40 $\mu$  diam., in cross section vertically oblong, 32~78 $\mu$ ; chromatophore in most of the cells not filling the interior; colour of the frond dark-green or green.

Among the genus *Ulva*, the vegetation of the species is very characteristic and observed with interest. The present species abundantly grows on rocky bottom in a depth of about 2~7 fathoms. It is linear-lanceolate to ovate-lanceolate, and in the latter case often laciniate into two to five lobes. The frond is erect and flaccid, and rather membranaceous. The present specimens of *Ulva* from Amami Islands, which are perforate abundantly in the frond, showing some of the openings larger and the outer smaller in size. These specimens are rather somewhat similar to *U. pertusa* KJELLM. in general appearance.

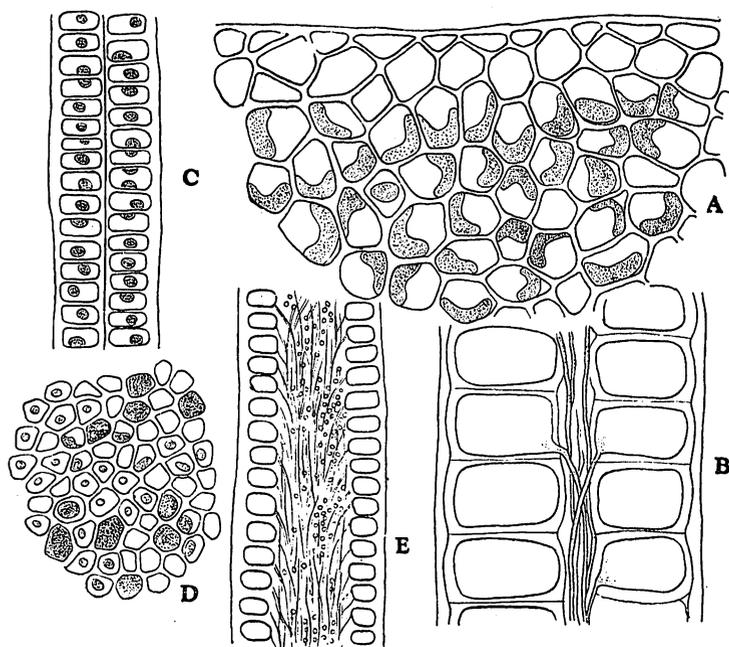


Fig. 2. *Ulva amamiensis* TANAKA.

A. Surface view of the marginal portion. x 350. B. Longitudinal section of the basal part. x 350. C. Longitudinal section of the upper portion. x 150. D. Surface view of the lower part. x 100. E. Longitudinal section of the basal part. x 100.

It is characterized by the flaccid frond and internal prolongation of the clearly slender rhizoidal filaments. As to the anatomical characters of the frond, the present species agrees very well with *Letterstedtia japonica* HOLMES, with the exception of the shape of chromatophore in the cells. The cells are not completely filled with chromatophore.

7) *Neomeris van Bossae* HOWE

Plate I, C. and Fig. 3.

Phyc. studies. IV (1909) p. 80, pl. 1, figs, pl. 5, figs. 17~18; WEBER VAN BOSSE, Liste des Alg. du Siboga, vol. 1 (1913) p. 88; YAMADA, The Phyto-geographical Relation between the Chlorophyceae of Mariannes, Carolines and Marshall Islands (1926) p. 965.

Japanese name. *Konahada-fudenoho*.

Hab. Growing on rocks in the littoral belt. Takarazima, Tokara Islands.

In our adjacent waters the present species was collected at Micronesian Islands and Taito, Formosa by Prof. Y. YAMADA as already noted them in his short papers. In our specimens, the plants almost solitary but rarely gregarious. They are clavate, subcylindrical or sometimes fusiform and attain 1~3 cm. high, 2~3.5 mm broad, often curved near the middle or toward rounded-obtuse or subacute apex. The primary branches attains about 900 $\mu$  and about 30 times as long as their median diameter.

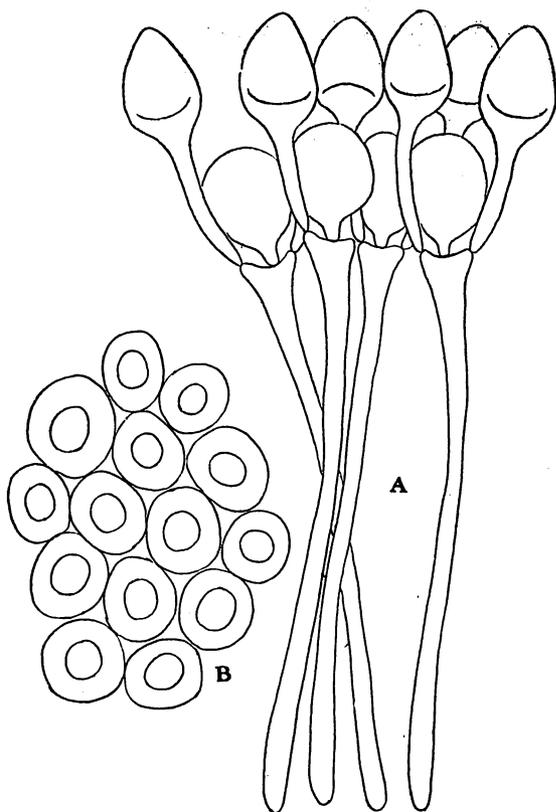


Fig. 3. *Neomeris van Bossae* HOWE.  
A. Primary branches bearing sporangia. x70.  
B. Surface view of the frond. x70.

It was after examining only a few algal specimens collected by Mr. Y. UZIKE at Satoura, Shikoku in 1941, that the Japanese name of "*Nise-usikenori*", one species among Protofloridae, was determined into *Goniotrichum Humphreyi* COLLINS in 1944 by the writer (l.c.). In this case, the determination was performed after making a comparative reference to the specimens of PHYC. BOR. AMER., no. 421, kept in the Herbarium of Hokkaido University. But underdeveloped condition of these algae prevented the writer from clarifying whether the frond was tube-like-hollow or not.

Afterward the similar plant was discovered from Yamakawa Harbour in Kagoshima Prefecture. These algae grow thick every year in winter season at the upper littoral zone upon the stone reef; in other words, at a place a little higher than the growing zone of *Bangia* or *Enteromorpha*. Then these algae from Yamakawa grow large enough, the fronds become tube-like-hollow and, as SCHMITZ already pointed out, the similarity of these algae with *Bangiopsis subsimplex* (MONT.) SCHMITZ is ascertained by this character. The tube-like hollowness of the frond is a distinct character which, the writer supposes, differs *Bangiopsis* from *Goniotrichum*.

The number of branches is one whorl usually 30~35. Hairs are monomorphous. The colour of the frond is blueish white, especially at the apex of the frond. The sporangia are strongly calcified but mutually free. Their shape is oval or subglobose. The spores are about 140~180 $\mu$  long and 100~140 $\mu$  broad.

8) *Bangiopsis subsimplex* (MONTAGNE) SCHMITZ Fig. 4. in ENGLER und PRANTL, Naturl. Pflanzenfam., (1897) 1. Teil, 2. Abt., p. 314.

Syn. *Compsopogon subsimplex* (MONTAGNE, in Annales Science, Nat. Bot., III Ser., t. 14 (1850) p. 299.

Syn. *Goniotrichum Humphreyi* (non COLLINS) TANAKA, Japanese species of *Protofloridae* (1944) p. 82, Text-figs. 4~5; The systematic study of Japanese *Protofloridae* (1952) p. 8, fig. 4.

Japanese name.

*Nise-usikenori*.

Hab. Satoura, Awa Prov.; Yamakawa, Satuma Prov. Growing on stone reef in the littoral zone.

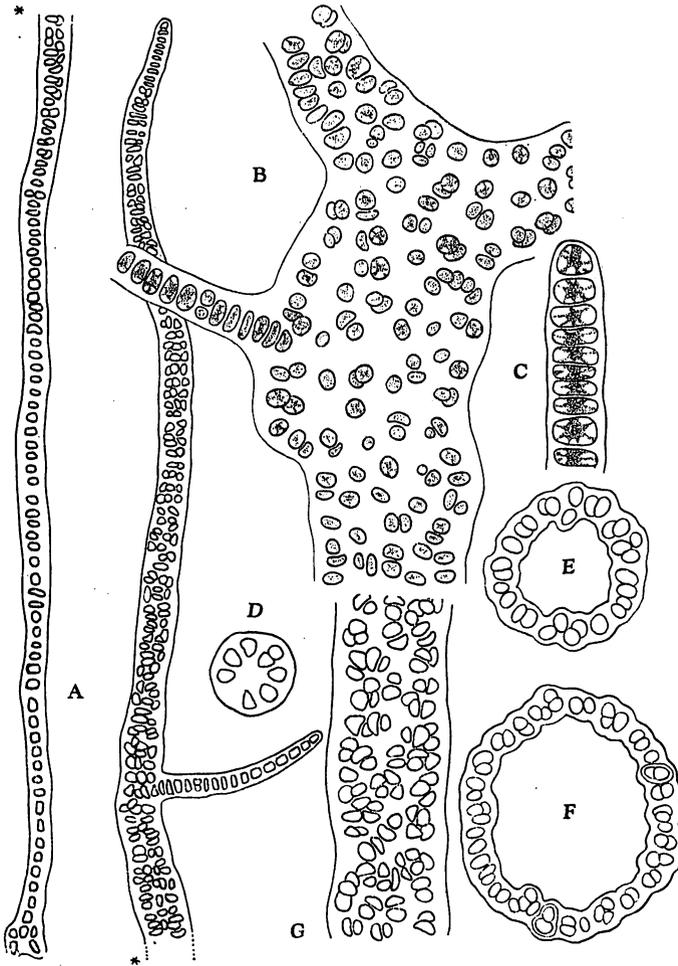


Fig. 4. *Bangiopsis subsimplex* (MONT.) SCHMITZ.

- A. branched plant. x 190. B. Part of the ramified filament. x 325.  
 C. Apex of a filament composed of a single row of cells. x 420.  
 D. ... E. Transverse sections of the filaments. x 325. G. Thick part of a filament. x 325.

Both, *Bangiopsis subsimplex* (non SCHMITZ) BOERGESSEN from Danish West Indies reported by Dr. BOERGESSEN, and, *Goniotrichum Humphreyi* COLLINS from Jamaica determined by COLLINS, are not hollow but solid of their tube-contents; and this fact enables us to distinguish them from *Bangiopsis subsimplex* SCHMITZ.

Therefore, we may safely venture to presume that we had better assort this Japanese species among *Protofloridae* into the genus of *Bangiopsis* than assort it into the genus of *Goniotrichum*.

## 和文摘要

## 田中 剛：日本南海産海藻類の研究 其二

トカラ列島及び奄美大島近海の海藻類については、未だ本格的な総合的調査は行われていない。研究者は1952年2月以降トカラ列島の各島に2回、1954年5月以降毎年奄美大島各島に数次の採集を行い、調査を行つている。これらの採集品中には学術上興味あるものも可成り見受けられ、目下研究中である。

以下種名の明かにせられたこれ等本邦の南海産の種類を断片的に報告したいと思う。

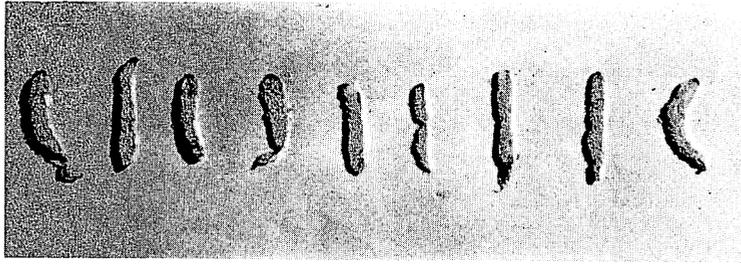
5) ホソミヅタマ (新称) 本植物はナガミヅタマに稍類似の種と思われるが、藻体の外形及び子嚢の性状に稍差異があり新種と推定される。トカラ列島、宝島及び奄美大島古仁屋等に産し、ミヅタマと混生し、浅所又は潮溜り等に生育する。成実期は6~7月頃。

6) ウシュクアオサ (新称) 奄美大島本島の東南海岸の深所(2~7尋)岩上に生育し、体は長大なるアオサの一種で、伊豆産のオーアオサと生態が似ていると思われる。藻体は長大、膜質にて柔かく、生時はワカメの如き触感があり、色調及び内部構造はヤブレグサと近似の性状を有している。生時体の基部附近の細胞は表面観にて特有の様状が認められる。

7) コナハダフデノホ (新称) 本植物は熱帯又は亜熱帯性の絲藻類の一種で、既にミクロネシア群島からは山田、時田、神田諸博士によつて報告されている。尙台湾、台東に於いても山田教授及び筆者によつて本植物が1934年に採集された。今回本邦内、トカラ列島、宝島に生育しているので茲に報告した。成実期は5~6月頃。

8) ニセウシケノリ。原始紅藻類の1種、邦産ニセウシケノリは1941年四国徳島。里浦産の僅小の標本によつて *Goniotrichum Humphreyi* COLLINS と査定(1944)したものである。この査定には北大、理学部所蔵の PHYC. BOR. AMER., No. 421 の標本を比較検討して決定した。其の後鹿児島県、山川港の石垣上、干満潮線間の上帯即ちウシケノリ又はアオノリの生育帯より一寸上位にニセウシケノリと思われる藻が毎年冬期繁茂している。この藻は SCHMITZ (1897) の言う如く、体が生長すると中空となり、*Bangiopsis* の特異の性状を呈して来る。尙 F. BOERGESSEN (1915) は西印度の海藻報告中に *Bangiopsis subsimplex* SCHMITZ を挙げ、この植物は SCHMITZ の記載とは異なり、藻体が中空ではないと述べているが、これは恐らく *Goniotrichum Humphreyi* COLLINS ではないかと推定される。従つて本邦産ニセウシケノリは *Bangiopsis* 属に所属せしめた方が妥当と思われる。

Plate I

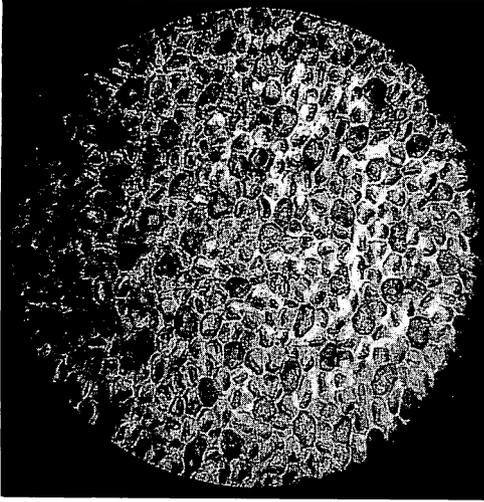


C

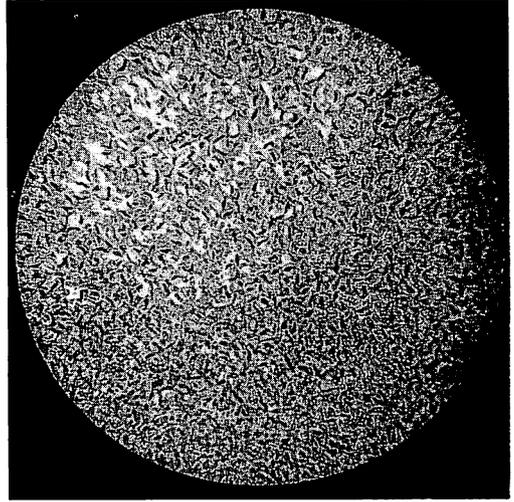


- A. *Bornetella clavellina* TANAKA x 1.5.  
B. *Ulva amamiensis* TANAKA x  $\frac{1}{3}$   
C. *Neomeris van Bossae* HOWE ca x 1.

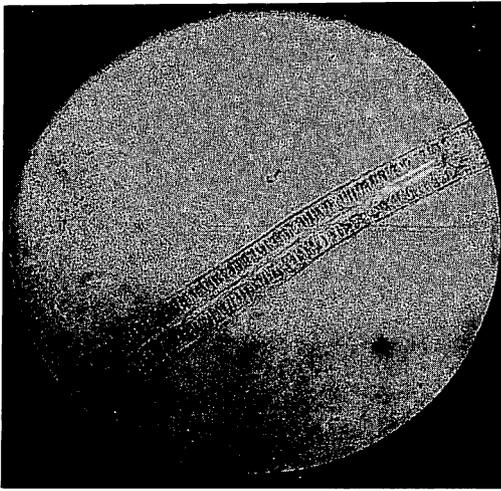
Plate II



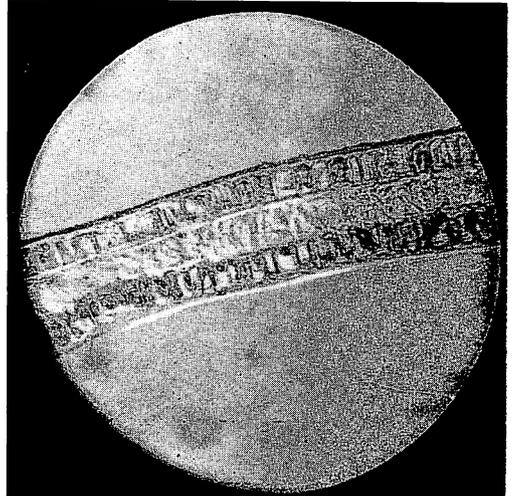
A



B



C



D

*Ulva amamiensis* TANAKA.

A. Surface view of the basal portion of the frond. B. Surface view of the marginal portion. C. Cross section of the upper portion of the frond. D. Cross section of the basal part of the frond. A—D. x 85.