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A List of the Marine Algae from the Atoll of Ant

By

YUKIO YAMADA

With Plates VI-VII.

The atoll of Ant is situated some 20 miles southwest from the Island of Ponape, East Caroline Islands, Micronesia. In the winter of 1939 the writer spent a few days on this interesting atoll for collecting marine algae. The following list comprises completely the algae collected on that occasion, and includes 42 species in all, among which *Dictyosphaeria mutica*, *Rhipilia micronesica*, *Wrangelia anastomosans*, *Dasya adhaerens*, *Centroceras minutum*, *C. apiculatum* and *Crocania minutissima* are described as new species.

The writer wishes to express his sincere thanks to all gentlemen who helped him during his journey, especially to Messrs. G. MORIYAMA and S. YOSHIIKE who took him to Ant with them.

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CHLOROPHYCEAE

Valoniaceae

1) *Dictyosphaeria bokotensis* YAMADA

Stud. Meeresalg. Formosa, I (Bot. Mag. Tokyo, vol. 39, 1925) p. 81; Id., Mar. Chlorophyc. Ryukyu (Journ. Fac. Sci. Hokkaido Imp. Univ., Ser. V, vol. 3, no. 2) p. 38.

Japanese name: *Toge-kikkōgusa*.

The specimens from Ant grow much larger than the ones from Ryukyu and Formosa, attaining about 7 cm in height. The size of cells are also more irregular in Ant specimens than the others; therefore it is often difficult to distinguish the present species from *D. cavernosa* (FORSK.) BÖRG. without examining the presence or absence of spines projecting into the cell cavities.

2) *Dictyosphaeria cavernosa* (FORSKAL) BÖRGESSEN

Rev. FORSK. Alg. (Dansk Bot. Arkiv, vol. 8, 1932) p. 2—*D. favulosa*

DCAISNE, Class. alg. calcif. p. 32; HARVEY, Ner. Bor. Amer. part 3 (1857), p. 50, pl. 44, B; WEBER VAN BOSSE, Note Dictyosphaeria (Nouva Notar., Ser. 16, 1905), p. 143; Id. Liste alg. Siboga, vol 1 (1913), p. 63; OKAMURA, Icon. Japan. alg., vol. 1 (1908), p. 205, pl. 40, figs. 13-24; YAMADA, l. c. p. 39.

Japanese name: *Kikkōgusa*.

3) **Dictyosphaeria mutica** YAMADA spec. nov.

Frons solida, pulvinata?, crasse discoidea vel irregularis, ca. 1.5 cm in diam., 5-6 mm crassa, rhizoideis ad substratum affixa. Segmenta polygono-rotunda, diam. 1 mm vix attingentia, spinis in cavitibus cellularum e parietibus proiectentibus nullis.

Japanese name:

Frond solid, pulvinate?, thickly discoid or somewhat irregular in outline, about 1.5 cm in diameter, 5-6 mm thick, attaching to the substratum by means of rhizoids issuing from the under surface of the frond. Segments polygono-rotund, scarcely exceeding 1 mm in diameter. Cellulose spine projecting into the cell cavities is not present.

So far as the writer is aware there have been described four species of *Dictyosphaeria* from the southern seas: *D. Versluysi* WEBER VAN BOSSE, *D. Van Bossae* BÖRG., *D. Setchellii* BÖRG. and *D. australis* SETCH. in all of which the spines of cellulose projecting into the cell cavity from the cell wall are detected. In our specimens from Ant, however, no such process is to be found. In this point *D. australis* SETCH. ought to be considered, because this species, according to the description, shows the spinous processes very rarely and sparingly.

The present species was found on the stones etc. in the littoral belt facing to the out side ocean and direct surfs.

Boodleaceae

4) **Boodlea siamensis** REINBOLD

in Flora Koh Chang (Bot. Tid., 1900), p. 107; Id., in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913), p. 68; BÖRGESSEN, Mar. alg. Dan. West-Ind. vol. 1 (1913), p. 49; Id., Some Ind. green and brown alg (1930), p. 153; YAMADA, l. c., p. 40.

Japanese name: *Yuru-aomogusa*.

5) **Microdictyon** OKAMURAI SETCHELL

Notes on Microdictyon (1925), p. 102; Id., Notes on Microdictyon II

(1926), p. 149; Id., Genus Microdictyon (1929), p. 553; YAMADA, l. c. p. 40; YAMADA and TANAKA, Mar. alg. Yonakuni (1938), p. 55.—*M. pseudohapteron* (non A. & E. GEPP) OKAMURA, l. c. vol. 2 (1910), p. 105, pl. 80, figs. 8-12.

Japanese name: *Tanomogusa*.

SETCHELL distinguished *M. Okamurai* from *M. pseudohapteron* GEPP chiefly by its thicker segments, slighter tapering and shortness of the ultimate segments etc. But it seems to me that this distinction becomes often rather inconspicuous; e.g. the writer met with many specimens, whose primary segments do not reach 400 μ in diameter while most of the ultimate ones exceed 150 μ in thickness. According to SETCHELL's description the diameter of the primary and ultimate segments of both species are as follows:

	diam. of prim. segm.	diam. of ult. segm.
<i>M. Okamurai</i>	500-500 (commonly 410-450)	180-200
<i>M. pseudohapteron</i>	200-300	125-150

And also in many specimens the writer found the ultimate segments of different shape in one and the same individual, e.g. those tapering distinctly from the base to the blunt apex, *pseudohapteron*-type, and those tapering slightly, up to the same or slightly less diameter at the apex, *Okamurai*-type. However, having not found the thinner ultimate ones less than 150 μ which, according to SETCHELL, is characteristic in *M. pseudohapteron* the writer referred his specimens to *M. Okamurai* SETCH.

This species was found both on the outer and inner sides of the atoll. On the outer side it grows in crevices of the coral reef in the littoral belt facing the heavy surfs of the ocean, while in the lagoons it was collected on the bottom of the depth of about 1 m.

Cladophoraceae

6) *Cladophora socialis* KÜTZING

Spec. alg. (1849), p. 416; Id., Tab. Phyc. vol. 4 (1854), p. 15, tab. 71, I; REINBOLD, in WEBER VAN BOSSE's Liste alg. Siboga, vol. 1 (1913), p. 82; BÖRGESSEN, Mar. alg. Easter Isl. (1924), p. 249; SETCHELL, Tahitian alg. (1926), p. 74.

Japanese name:

Caulerpaceae

7) *Caulerpa verticillata* J. AGARDH

Nya alg. Mexico (1847), p. 6; Till alg. syst., I, p. 6; WEBER VAN BOSSE,

Monogr. Caul. (1888), p. 267, pl. 20, figs. 7-10; SVEDELIUS, Ceylon spec. Caul. (1906), p. 108; REINKE, Ueber Caul. (1900), p. 7; BÖRGESSEN, Ecol. and syst. account Caul. Dan. West-Ind. (1907), p. 355; Id., Mar. alg. Dan. West-Ind. vol. 1 (1913), p. 121; YAMADA, Mar. Chlorophyc. Ryukyu (1934), p. 62.

Japanese name: *Utiwa-zuta*.

Of this species a few specimens were found among the rich material of the next species.

8) *Caulerpa acuta* (YAMADA) YAMADA comb. nov.

Syn. *C. verticillata* J. Ag. f. *acuta* YAMADA, Marine Chlorophyc. Ryukyu (1934), p. 63.—*C. filicoides* YAMADA, Notes Japan. alg. VII (1936), p. 135, pl. 30, fig. 2.

The discovery of *C. acuta* YAMADA in Ant is the third record of the present species. The other locality is the Ryukyu Archipelago. This time a rich material was found on the bottom about 2 m deep in the lagoon.

9) *Caulerpa brachypus* HARVEY

Char. new alg. Japan (1859), p. 332; WEBER VAN BOSSE, l. c. p. 280, pl. 22, fig. 2; YENDO, on *C. anceps* HARV. (Bot. Mag. Tokyo, vol. 17, 1903), p. 153; YAMADA, Mar. Chlorophyc. Ryukyu (1934), p. 65.—*C. anceps* HARVEY, List of Friendly Islands alg. no. 67; OKAMURA, Icon. Japan. alg. vol. 3 (1914), p. 94, pl. 125, figs. 1-8.

Japanese name: *Hera-iwazuta*.

As it is well known the assimilator of the present species is exceedingly variable in shape and size as in the other species of this genus. In the South Sea Islands the writer collected this species in Ant as well as in Kusai and Palao. The Palao specimens resemble very much the typical form showing a great resemblance to the Japanese plant, while the Ant specimens are all much more delicate having very long narrow assimilators. In a specimen they are about 5-11 cm long, and 2-3 mm wide. On the other hand in the Palao specimens the assimilators are very wide reaching about 11 mm. The proliferations are abundant and the serrations on the margin of the assimilators are usually present, but not constant. If we had, therefore, only these two forms before us we would keep them as two distinct species, but the Kusai specimens show just the intermediate form. Therefore the writer referred this very delicate Ant specimens to *C. brachypus* HARV.

10) *Caulerpa taxifolia* AGARDH

Spec. alg. (1823), p. 435; HARVEY, Phyc. austr. vol. 3 (1863), pl. 178; WEBER VAN BOSSE, l. c., p. 292; REINKE, l. c. p. 15; SVEDELIUS, l. c., p. 112; BÖRGESSEN, Ecol. and syst. account Caul. (1907), p. 563; Id., Some Ind. green and brown alg., II (1932), p. 58; OKAMURA, Icon. Japan. alg. vol. 3 (1913), p. 38, pl. 110, figs. 4-5; YAMADA, l. c. p. 67.

Japanese name: *Itii-zuta*.

11) *Caulerpa antoensis* YAMADA

New Caul. and Halimeda Micronisia (1944) p. 27, pl. I, fig. 1.

Japanese name: *Anto-zuta*.

12) *Caulerpa serrulata* J. AGARDH var. *typica* BÖRGESSEN

Rev. FORSKAAL's alg. (Dansk Bot. Arkiv, Bd. 8, Nr. 2, 1932), p. 5—*C. Freycinetii* AGARDH, Spec. alg. (1823), p. 446; WEBER VAN BOSSE, l. c. p. 312, pl. 25, figs. 5-6 and 8-9; REINKE, l. c. p. 25, fig. 38; OKAMURA, l. c. vol. 3 (1913), p. 18, pl. 105, figs. 1-3.

Japanese name: *Yore-zuta*.

13) *Caulerpa Urvilleana* MONTAGNE

Voyage au pole sud (1845), p. 21; WEBER VAN BOSSE, l. c., p. 318; REINKE, l. c. p. 27.

Japanese name: *Hosoba-yorezuta* (nov.).

As it was already pointed out by M. WEBER VAN BOSSE and REINKE this species is very similar to *C. serrulata* J. AG., especially f. *typica* of the present species often hardly can be distinguished from the form of *C. serrulata* J. AG. The Ant specimens are to be referred to f. *vitiensis*.

14) *Caulerpa cupressoides* AGARDH

Spec. alg. (1822), p. 441; WEBER VAN BOSSE, l. c., p. 21; REINKE, l. c. p. 27; BÖRGESSEN, Mar. alg. Dan. West-Ind. vol. 1 (1913), p. 135; OKAMURA, l. c., vol. 4 (1937), p. 16, pl. 155, figs. 1-3 and 5-8, p. 94, pl. 200, figs. 2-3; YAMADA, l. c., p. 70.

var. *Turneri* WEBER VAN BOSSE, l. c., p. 330, pl. 27, fig. 4.

Japanese name: *Byakusin-zuta*.

A few specimens were collected in the lagoon.

15) *Caulerpa racemosa* J. AGARDH

Till alg. syst. p. 72; WEBER VAN BOSSE, l. c., p. 357; REINKE, l. c., p. 36.

var. **clavifera** WEBER VAN BOSSE, l. c., p. 361; BÖRGESSEN, Mar. alg. Dan. West-Ind. vol. 1 (1915), p. 147; OKAMURA, l. c., vol. 3 (1913), p. 66, pl. 119, fig. 1.

Japanese name: *Sennari-zuta*.

var. **Chemnitzia** WEBER VAN BOSSE, l. c., p. 370.

Japanese name: *Rappa-zuta*.

This variety was found on the bottom of about 2-3 m deep places in the lagoon.

16) **Caulerpa peltata** LAMOUROUX

"Journ. de Bot. vol. 2 (1809), pl. 3, fig. 2"; WEBER VAN BOSSE, l. c., p. 373, pl. 31, figs. 9-11, pl. 32, fig. 9; J. AGARDH, Till alg. syst. p. 37; REINKE, l. c., p. 39; SVEDELIUS, l. c., p. 131; BÖRGESSEN, Mar. alg. Canary Isl. vol. 1 (1925), p. 112.

Japanese name: *Takatuki-zuta*.

17) **Caulerpa Matsueana** YAMADA

New Caulerpas and Halimedes Micromesia (1944), p. 28, pl. II.

Japanese name: *Matue-zuta*.

Codiaceae

18) **Udotea argentea** ZANARDINI

Plant. mari rubro collect. enumer. (1858), p. 82, pl. 10, fig. 1; J. AGARDH, Till alg. syst., V, p. 76; A. & E. S. GEPP, Codiace. Siboga Exped. (1911), p. 125, pl. 2, figs. 21-22c, pl. 3, fig. 22d, pl. 7, figs. 57-60; YAMADA, Mar. Chlorophyc. Ryukyu (1934), p. 75.

Japanese name: *Ō-hagoromo*.

There is only one small fragmentary specimen, but there seems to be no doubt about that it belongs to the same species as the Ryūkyū specimen quoted above.

19) **Tydemania expeditionis** WEBER VAN BOSSE

"Ann. Jard. Bot. Buitenzorg, 2^e Ser., vol. 2 (1901), p. 139: Id., Liste alg. Siboga, vol. 1 (1913), p. 116, pl. 5, fig. 4; A. & E. S. GEPP, l. c., p. 66.—*Rudicularia penicillata* HEYDRICH, Rudicularia, ein neues Genus der Valoniaceen (Flora, Bd. 92, 1903), p. 97.

Japanese name: *Suzukakemo*.

20) **Rhipilia micronesica** YAMADA spec. nov.

Pl. VI, figs. 1-2.

Planta flavo-viridis, 3-9 cm alta, mollis, stipitata vel vix stipitata;

stipitibus erectis vel decumbentibus, simplicibus vel divis, 1-2.5 cm longis, ca. 4 mm crassis. Frons rotunde vel cuneatim flabellata, 13 cm × 7 cm—7 cm × 6 cm—7 cm × 4.5 cm—5 cm × 6.5 cm, raro peltata, tenuissima non zonata, margine fimbriata vel lacerata. Frondis filamenta 20-32 μ crassa, laxa intricata, ramis pseudolateralibus, 100-200 μ longis.

Japanese name:

Plants yellowish green, 3-9 cm high, soft, stipitate or nearly sessile; stipe erect or decumbent, simple or divided, 1-2.5 cm long, about 4 mm thick, expanding above into the frond. Frond 13 cm × 7 cm—7 cm × 6 cm—7 cm × 4.5 cm—5 cm × 6.5 cm, rotundately or cuneately flabellate, rarely peltate, very thin, not zonate, at margin fimbriate or lacerate. Frond filaments 20-32 μ in diameter, laxly interwoven; pseudo-lateral branches usually long, about 100-200 μ long, but shorter ones also met with.

The present species seems to be related to *R. orientalis* GEPP, but can be distinguished in its thinner frond filaments. In *R. orientalis* GEPP the diameter of its frond filaments reaches 30-50 μ , but in the present species it is 20-32 μ as mentioned above. In addition to it in the micronesian species the tenacula have almost always only two processes, those with three or more processes being not found.

21) **Halimeda Opuntia** LAMOUROUX

Sur classif. Polyp. coral. (1812), p. 186; BARTON, Genus Halimeda (1901), p. 18, figs. 19-27; OKAMURA, Icon. Japan. alg. vol. 3 (1915), p. 207, pl. 148; YAMADA, Mar. Chlorophyc. Ryukyu (1934), p. 80.

f. *triloba* BARTON, l. c., p. 20, pl. 2, fig. 20.

f. *typica* BARTON, l. c., p. 20, pl. 2, fig. 21.

Japanese name: *Sabotengusa*.

22) **Halimeda gracilis** HARVEY

Ceylon alg., no. 72; BARTON, l. c., p. 22, pl. 3, figs. 28-32.

Japanese name: *Yasegata-sabotengusa*.

Comparing two specimens from Ant with the figures of BARTON they agree with fig. 28, but they are somewhat larger in general size. The joints are usually more rounded than those figured by BARTON.

23) **Halimeda incrassata** LAMOUROUX

l. c. p. 186; BARTON, l. c. p. 25, figs. 39-51; BÖRGENSEN, Mar. alg. Dan. West-Ind. (1913), p. 109; OKAMURA, l. c. vol. 3 (1915), p. 213, pl. 149, figs. 9-10, pl. 150; YAMADA, Mar. Chlorophyc. Ryukyu (1934), p. 81.

- f. *monilis* BARTON, l. c. p. 27, pl. 4, fig. 40.
 f. *distorta* YAMADA, New Caul. and Halimeda Micronesia (1944),
 p. 28, pl. IV.
 Japanese name: *Soriha-sabotengusa*.

24) **Halimeda micronesica** YAMADA

New Caul. and Halimeda Micronesia (1944) p. 29, pl. V.
 Japanese name: *Koba-no-sabotengusa*.

PHAEOPHYCEAE

Sphacelariaceae

25) **Sphacelaria Novae-Hollandiae** SONDER?

Nova alg. gen. et spec. etc. (1845), p. 50; SAUVAGEAU, Remarq. Sphacel. (1901), p. 137, figs. 33-34a; BÖRGESSEN, Mar. alg. Mauritius, II (1941), p. 45.

Japanese name: *Nanyō-kurogasira* (nov.).

On a frond of *Halimeda* a specimen most probably referable to the present species was found. The propagula are few in number, and are still young, therefore the determination is not without doubt.

Dictyotaceae

26) **Dictyota Bartayresiana** LAMOUROUX

"Dictyotae no. 17"; J. AGARDH, Spec. alg. vol. 1 (1848), p. 94; Id. Anal. alg. cont. I (1894), p. 66; HARVEY, Ner. bor. Amer. (1852), p. 110, tab. 8, fig. C; VICKERS, Phyc. Barb. (1908), pls. 12-13; WEBER VAN BOSSE, Liste alg. Siboga, vol. 1 (1913), p. 182; BÖRGESSEN, Mar. alg. Dan. West-Ind. (1914), p. 209; Id., Cont. South Ind. mar. alg. flora, I (1937), p. 27.

Japanese name: *Ōmata-amizi*.

There is a good number of specimens, but they are all sterile.

27) **Padina minor** YAMADA

Stud. Meeresalg. Formosa, II (Böt. Mag. Tokyo, vol. 39, 1925), p. 251, fig. 5; Id., Notes Japan. alg., II (1931), p. 68; OKAMURA, l. c. vol. 6 (1931), p. 56, pl. 279, figs. 6-9?

Japanese name: *Usuyuki-utiwa*.

There is only one specimen. But in other Islands of Micronesia the writer met several times with this species.

As already stated by the writer *P. minor* is related very closely to

P. Commersonii BORY, so much that one may take it as a variety of BORY's species. But according to many authors *P. Commersonii* shows three layers of cells in the older parts of the frond, while in *P. minor* it is never the case.

OKAMURA illustrated *P. minor* in his *Icones* (l. c.). According to him his specimens show the presence of indusium covering sorus of the sporangia. The writer reexamined many specimens from the same locality as the type but could not find any indusium.

28) *Zonaria variegata* (LAMOUROUX) MERTENS

in "MARTIUS, *Icon. plant. cryptog.*, p. 6, tab. II, fig. 11"; VICKERS, *Phyc. Barbad.* part 2, pl. 6b; BÖRGESEN, *Mar. alg. Dan. West-Ind.* (1914), p. 197; Id., *Mar. alg. Easter Isl.* (1924), p. 266; Id., *Mar. alg. Canary Island*, vol. II (1926), p. 91; Id., *Some Ind. green and brown alg.* (1930), p. 169; WEBER VAN BOSSE, *Liste alg. Siboga*, vol. 1 (1913), p. 175.

Japanese name: *Maruba-simaōgi* (nov.).

There are only three sterile specimens collected by the diver in the lagoon. They accord very well with the descriptions and figures given in the literature cited above, especially with those of BÖRGESEN except that the Ant specimens have a thicker frond than the other. The thickness of the frond attains about 270 μ in Ant specimens while BÖRGESEN measured it as 150–200 μ in his Easter Island specimen.

The specimens at hand resemble very much the type specimen of *Gymnosorus corallis* OKAM. in the outer appearance as well as in the anatomical structure. However OKAMURA's figure 4 shows the indusium, therefore this is most probably not *Gymnosorus*, but *Zonaria*.

Fucaceae

29) *Turbinaria ornata* J. AGARDH

Spec. alg. vol. 1 (1848), p. 266; BARTON, *Syst. and struct. account Turbinaria* (1891), p. 219.—*Fucus turbinatus* β . *ornatus* TURNER, *Fuci*, vol. 1 (1808), p. 50, tab. 24, figs. c–h.

Japanese name: *Rappamoku*.

RHODOPHYCEAE

Hypneaceae

30) *Hypnea Esperii* BORY

Voy. Coquille (1828), p. 157; KÜTZING, *Tab. phyc.* vol. 18 (1868), pl.

26, figs. a-c; GRUNOW, Alg. Novara (1868), pl. 75; BÖRGESSEN, Mar. alg. Easter Isl. (1924), p. 306, fig. 48; TANAKA, Hypnea from Japan (Sci. Pap. Inst. Alg. Reser. vol. 2, no. 2, 1941), p. 243.

Japanese name: *Hime-ibaranori*.

A few specimens were found growing among other algae preserved in alcohol. They bear tetrasporangia.

Gracilariaceae

31) *Gelidiopsis intricata* (AGARDH) VICKERS

Liste alg. mar. Barbad. (1905), p. 61; WEBER VAN BOSSE, Alg. iles Kei (1925), p. 140; Id., Liste alg. Siboga, vol. 4 (1928), p. 425; FELDMANN, Remarq. Gelidium, Gelidiopsis et Echinocaulon (1931), p. 7; YAMADA and TANAKA, Mar. alg. Yonakuni (1938), p. 74.—*Sphaerococcus intricatus* C. AGARDH, Spec. alg. (1823), p. 333.—*Acrocarpus intricatus* KÜTZING, Tab. phyc. vol. 18 (1868), p. 12, pl. 35, figs. d-f.

Japanese name: *Moture-tengusamodoki*.

Ceramiaceae

32) *Crouania minutissima* YAMADA spec. nov.

Frons minutissima, 5 mm vix attingens, parte basilari repens, postea ascendens, rhizoideis longis ex partibus basilaribus egredientibus adfixa, irregulariter alternatim ramosa, non corticata, cellulis filamentorum centralium cylindraceis, in partibus repentibus ca. 64μ crassis, 3-4-plo diam. longioribus sursum gradatim tenuioribus ac brevioribus; ramulis verticillatis, numero 4, repete trichotomis, apice obtusis; tetrasporangiis sphaericis, ca. 60μ in diam.

Japanese name: *Hime-yotunosade* (nov.).

Frond very minute, scarcely reaching 5 mm in length, creeping on the substratum with the basal portion, upper portion ascendens; basal portion sending long rhizoids by means of which the frond attaches to the substratum, irregularly alternately branched, not corticated, covered with branchlets; cells of the central filaments cylindrical, about 64μ thick, about 3-4 times as long as broad in the creeping portion, gradually becoming thinner and shorter upwards; branchlets verticillate, 4 in number in every whorl, repeatedly trichotomously ramified, obtuse at apices; tetrasporangia spherical, about 60μ in diameter.

The present species of *Crouania* is very peculiar in the small size of its frond. This species seems to be distributed widely in the eastern parts

of the Pacific, because the writer has seen the same thing as this in the Ryūkyū archipelago and Formosa.

33) *Wrangelia anastomosans* YAMADA spec. nov.

Pl. VII, fig. 2.

Frons erecta, laxe intricata, ter quaterve pinnatim ramosa; ramis cylindraceis vel leviter compressis, diam. vix 1 mm attingentibus, distiche alternato-pinnulatis, pinnulis superioribus penicillatis. Frons tote corticata, ad nodis ramulis monosiphoniis verticilliter ornata; ramulis verticillatis repetite dichotomis, ad apicem attenuatis, cellulis basilaribus $40-50\mu$ crassis, 2-3-plo diam. longioribus, superioribus longioribus, 7-8-plo diam. longioribus, ad dissepimentis leviter constrictis, apice obtusis. Tetrasporangia breviter ovata, $80-86\mu$ lata, $86-96\mu$ longa, pedicellata, involucrata, ad basim filamentum verticillatum producta. Cystocarpia ad apicem ramulorum brevium producta, paranematis densis protecta.

Japanese name: *Moture-rangeria* (nov.).

Fronde erect, 5-6 cm high, standing caespitously on a small discoid base, adhering to each other or to other things, somewhat intricately, forming a small, not dense mass, 3-4 times pinnately branched; branches cylindrical or slightly compressed, scarcely attaining 1 mm in diameter, beset with pinnules distichously and alternately, upper pinnules penicillate. Frond corticated throughout, at nodes provided with verticillate monosiphonous ramuli; verticillate ramuli repeatedly dichotomous, gradually attenuated toward the apices, the basal cells $40-50\mu$ thick, 2-3 times as long as diameter, slightly constricted at dissepiments, obtuse at apices. Tetrasporangia shortly ovate, $80 \times 86\mu-86 \times 96\mu$, with one-celled pedicel, produced near the base of the verticillate filaments, often protected by short, curved involucre-like filaments issued from the stalk-cell or from its neighbouring cells. Cystocarps produced at the top of short branchlets, protected by dense paranemata, without involucre. Antheridia produced in the same place as the tetrasporangia, provided with a stalk composed of 1-3 cells.

Judging from the description *W. plumosa* HARV. seems to relate very closely to the present species. However HARVEY's description is rather short and the writer knows only it in DE TONI's Sylloge Algarum. But the specimens of *W. plumosa* HARV. were distributed by HARVEY as Austr. alg. no. 256 which the writer could see in many Herbaria in Europe and America some years ago.

The characteristics which separate the present species from *W. plumosa* HARV. specifically do not seem to be very strong ones, but the branches which adhere to each other or to other things are characteristic to our

species and beside it the monosiphonous verticillate ramuli attenuate gradually toward the apices in our species, while in *W. plumosa* HARV. they are "e basi ad apicem parum attenuata."

34) **Centroceras minutum** YAMADA spec. nov.

Frons minuta, 1 cm vix attingens, ad Laurenciam vel Janiam repens, remote irregulariterque ramosa, apice non forcipata; internodiis 130μ crassis, 3-5-plo diam, longioribus praeter in partibus superioribus frondis; cellulis corticalibus longe rectangularibus, in ordinem regularem longitudinalem sed vix transversalem dispositis; ad nodos 8 spinis 2-articulatis ornatis; tetrasporangiis circa nodos superiores productis, involucriatis, filamentis involucriorum curvatis, ex 2-4 (saepe 3) cellulis compositis.

Japanese name:

Frond minute, scarcely reaching 1 cm in length, creeping on other algae (*Laurencia* sp., *Jania* sp. etc.), sparsely branching in an irregular manner, not forcipate at apices; internodes about 130μ thick, 3-5 times as long as broad except in the upper portion of the frond; cortical cells longly quadrate, rectangular, ordinate in longitudinal rows, but hardly transversely; about 8 2-articulated spines present at every node. Tetrasporangia produced around the nodes of the upper parts of the frond, protected by involucre; involucreal filaments curved, composed of 2-4 (mostly 3) cells.

35) **Centroceras apiculatum** YAMADA spec. nov.

Frons minuta, 1 cm vix attingens, ad algam parvum repens, rhizoideis hyalinis ex nodis emittentibus affixa, irregulariter parceque ramosa, apice apiculata, non forcipata; internodiis $90-130\mu$ crassis, 1.3-2-plo diam, longioribus; cellulis corticalibus quadratis praeter ad nodis, longitudinaliter atque transversim in ordinem regularem dispositis; spinis non ornatis; tetrasporangiis prope extremitatem ramorum productis, toto immersis; cystocarpis ignotis.

Japanese name:

Frond minute, scarcely attaining 1 cm in length, creeping among other small algae, often found together with *C. minutum*, fastening themselves by means of multi-celled hair-like rhizoids issued from the nodes, sparsely irregularly branching, at apices apiculate, abruptly ending in a clearly distinguishable growing cell, not forked; internodes $90-130\mu$ thick, 1.3-2 times as long as broad; cortical cells quadrate except at nodes, arranged in longitudinal and transverse rows; spines not found at nodes. Tetrasporangia produced near the end of branches, where the frond takes the

appearance of a stichidium, completely immersed. Cystocarps and antheridia unknown.

The present species of *Centroceras* seems to be related closely to *C. bellum* SETCH. et GARDN. from the Gulf of California, but can be distinguished from this species by apiculate apices of branches. Growing among or on other algae: *Laurencia*, articulated *Corallines*, *Microdictyon*, *Dictyosphaeria* etc.

Delesseriaceae

36) **Hypoglossum minimum** YAMADA

Notes Japan. alg. VII (1936), p. 138.

Japanese name: *Hime-benihanori*.

A few specimens were found on other algae.

Dasyaceae

37) **Heterosiphonia Wurdemanni** (BAILEY) FALKENBERG

Rhodomelac. (1901), p. 639, pl. 16, fig. 11; COLLINS and HERVEY, Alg. Bermuda (1917), p. 131; BÖRGESSEN, Mar. alg. Dan. West-Ind. vol. 2 (1919), p. 324; Id., Mar. alg. Canary Isl. vol. 3 (1930), p. 137; Id., Some Ind. Rhodophyc. IV (1934), p. 29; WEBER VAN BOSSE, Liste alg. Siboga, vol. 3 (1923), p. 379.—*Dasya Wurdemanni* BAILEY in HARVEY's Ner. Bor. Amer., vol. 2 (1853), p. 64, pl. 14, c; KÜTZING, Tab. phyc. vol. 14 (1864), p. 29, pl. 81, figs. a-c; ZANARDINI, Icon. phyc. Adriat. vol. 2 (1865), p. 51, pl. 53, fig. A.

Japanese name: *Nanyō-isohagi* (nov.).

Of the present species the writer found a few specimens growing on other algae: *Hakimeda* and *Microdictyon*. They belong to var. *laxa* of BÖRGESSEN, and bear some stichidia.

38) **Dasya adhaerens** YAMADA spec. nov.

Pl. VII, fig. 1.

Frons 5-9 cm alta, erecta, teres, bis-quater vel roro ultra dichotoma, axillis rotundatis patentibus, tote corticata, cellulis pericentralibus 5; ramis saepe arcuatis, anastomosantibus, ramellis monosiphoniis articulatis obtectis; ramellis fere verticillatis, prope basim bis ternisve dichotomis, apice obtusis; cellulis basilaribus ramellum 30-40 μ . crassis, 1-2-plo diam. longioribus, gradatim attenuatis, superioribus 3-4-plo diam. longioribus, omnibus ad dissepimentum non constrictis; cystocarpiis et stichidiis ignotis.

Japanese name: *Moture-dazia* (nov.).

Frond 5-9 cm high, erect on a small disc, cylindrical, 2-4 times or rarely more times dichotomously branched with patent, round axils, thoroughly corticated, with five pericentral cells; branches often arcuate, adhering here and there to each other or to other things, clothed with monosiphonous articulated ramelli; ramelli nearly verticillate on the surface of the branches, 2-3 times dichotomous near their base, but simple upwards, obtuse at apices; cells of ramelli about $30-40\mu$ thick, 1-2 times as long as diameter near the base of ramelli, attenuating very gradually and becoming longer, 3-4 times as long as diameter upwards, not constricted at dissepiments. Any kind of reproductive organs not known.

The dichotomous branching and anastomosed branches are the important characteristics for separating the present species from the nearly allied ones, especially from *D. villosa* HARV. to which *D. adhaerens* appears to be related most closely. In *D. villosa* HARV. the branches are pinnately arranged and they do not appear to adhere to each other.

The present species was collected only once at the depth of 2-3 fathoms in the lagoon.

Rhodomelaceae

39) *Chondria simpliciuscula* WEBER VAN BOSSE

Mar. alg., Rhodophyc., Percy Sladen Trust. exped. (Trans. Linn. Soc., Bot. vol. 8, 1914), p. 125, pl. 12, figs. 9-10.

Among other small algae, *Laurencia* sp. etc. preserved in formalin-solution the writer found some specimens of *Chondria* which agree with the description and figures of *C. simpliciuscula* WEB. VAN BOS. in the main characteristics. The frond is about 400μ in the lower portion and about 280μ thick in branches, and does not branch much. Special stichidia are not formed, the tetrasporangia being produced in the upper portion of the ordinary branches. The tetrasporangia are found very sparingly but they are large, measuring about $96 \times 80\mu$.

Me. WEBER VAN BOSSE did not detect any union between her specimens and *Laurencia papillosa* on which her specimens of the present species were creeping. But in the writer's specimens he found some (not many) short hapters by means of which the frond attaches to *Laurencia*. Furthermore the peripheral cells are not so regular in shape when seen from above as the description and figure of Me. WEBER VAN BOSSE.

40) *Acanthophora muscoides* BORY

Voy. Coquille (1828), p. 156, no. 51; KÜTZING, Spec. alg. (1849), p.

859; Id., Tab. phyc. vol. 15 (1865), pl. 77, figs. a-c; OKAMURA, Icon. Japan. alg. vol. 1 (1907), p. 38, pl. 8, figs. 8-10; BÖRGESSEN, Mar. alg. Dan. West-Ind. vol. 2 (1918), p. 264.

Japanese name: *Ko-togenori*.

In the specimens branches often anastomose, so that they form a rather irregular entangling mass. The same thing can be often observed in *A. orientalis* J. Ag.

41) ***Laurencia flexilis* SETCHELL**

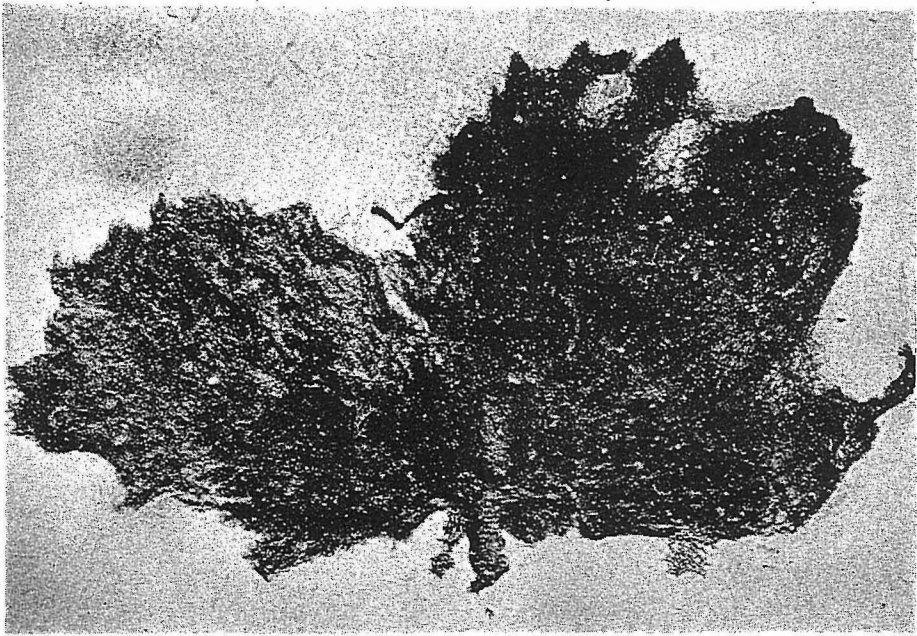
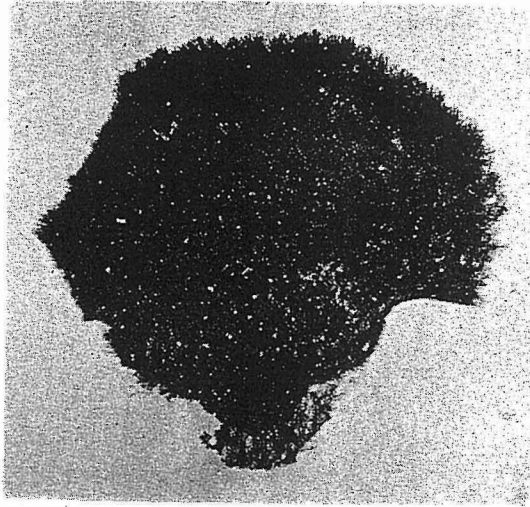
Tahitian alg. (1926), p. 101, pl. 19, figs. 1-6; YAMADA, Note *Laurencia* (1931), p. 232.

Japanese name: *Harigane-sozo* (nov.).

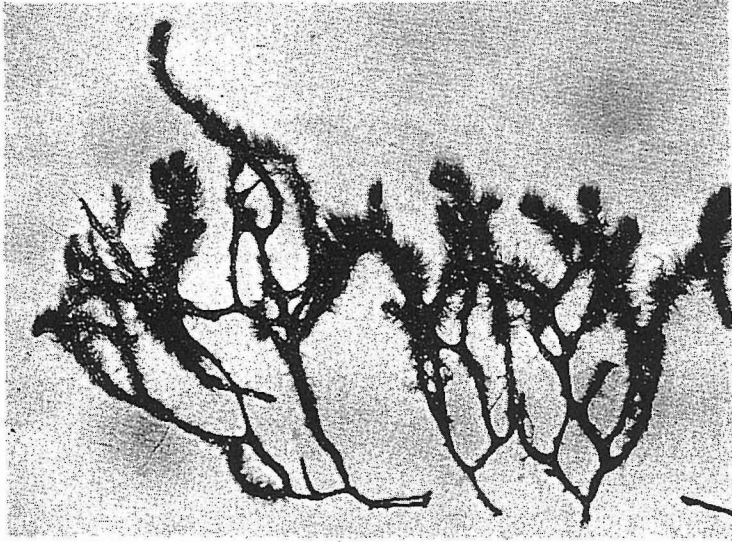
The Ant specimens are all still young, bearing neither cystocarps nor tetrasporangia. They show some resemblance to *L. venusta* YAMADA from Ryūkyū in habit, but the frond is much coarser than that of the latter species and there is no lenticular thickening in the walls of the medullary cells.

42) ***Herposiphonia* sp.**

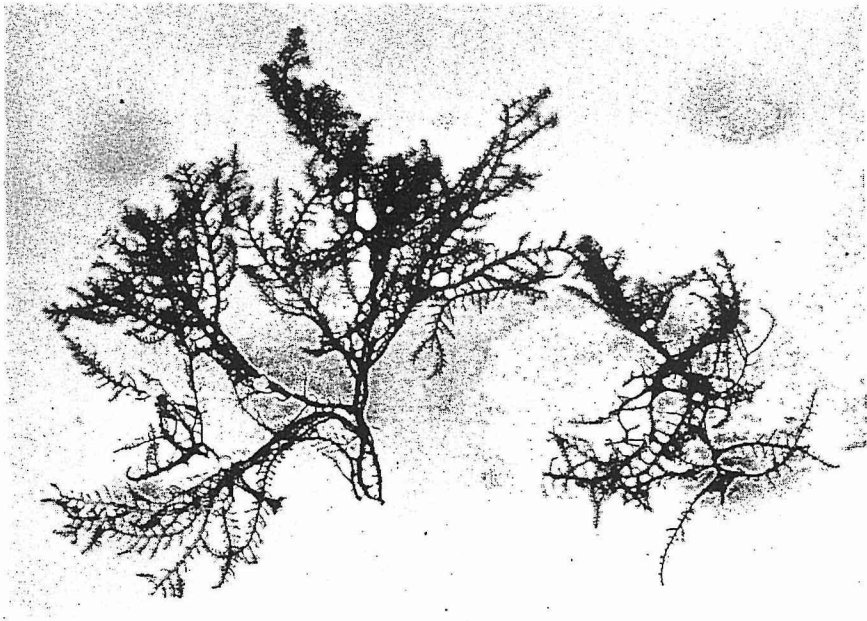
Some sterile specimens of *Herposiphonia* were found creeping on *Microdictyon*.



Rhipilia micronesica YAMADA. Slightly reduced.



1



2

1. *Dasya adhaerens* YAMADA. $\times 1$.
2. *Wrangelia anastomosans* YAMADA. $\times 1$.