MARINE ALGAE OF NORTHERN TAIWAN
(Cyanophyta, Chlorophyta, Phaeophyta)

by

YOUNG-MENG CHIANG

Since Heydrich's paper "Beitraege zur Kenntniss der Algen flora von Ost-Asian besonders der Insel Formosa, Molukken und Liu-Kiu-Inseln", published in 1894, there have been several studies made on the marine algal flora of Taiwan by Japanese algologists, such as Dr. Okamura (7, 8, 10), Dr. Yamada (19, 20, 25) Dr. Tanaka and Dr. Horikawa(6). In recent years the Chinese botanists, Prof. Y. F. Shen and Dr. K. C. Fan have continued this study. But so far as the writer is aware no complete report has been made of the marine algae of Northern Taiwan. Only some fragmentary notes occur in the papers of the above mentioned writers, with the exception of Fan's paper on "The Genera *Gelidium* and *Pterocladia* of Taiwan" which was based on the materials collected from this district.

The present investigation is based on the writer's own collections from Northern Taiwan extending from April 1957 to 1960, and the numbers following the names of places are his collection numbers.

This study includes 50 species, 1 form, and 3 varieties, of which 2 species belong to the Cyanophyta, 31 belong to the Chlorophyta and 21 to the Phaeophyta. The two species of the Cyanophyta, seven species of the Chlorophyta and two species and one form of the Phaeophyta are new additions to the folra of Taiwan.

All specimens referred to in this paper are deposited in the Algae Herbarium of the National Taiwan University.

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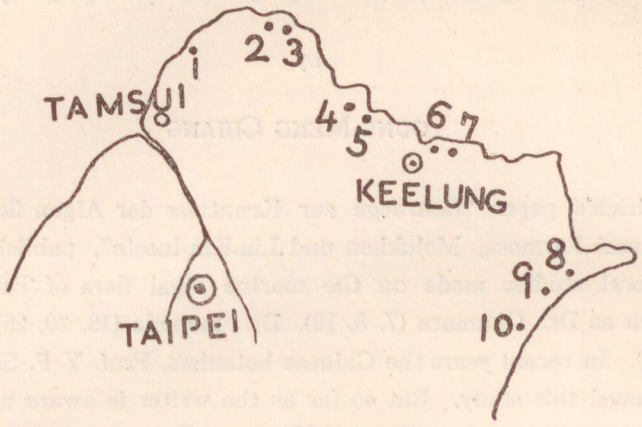
COLLECTION LOCALITIES

1. Hsiao Keelung 小基隆　2. Laomei 老梅　3. Shihmen 石門　4. Yeliu 野柳

5. Kou Shen Ts'un 國聖村 6. Pachihmen 八尺門 7. Patoutsu 八斗子 8. Shihchen 石城
9. Tali 大里 10. Kueishan 龜山



Map of Northern Taiwan

1. Hsiao Keelung

Hsiao Keelung is situated on the north side of Tamsui (淡水) and is about 16 kilometers from there. It takes about 40 minutes to walk from the Hsiao Keelung bus station towards the north, to reach the coast. This is a sandy shore with many large or small pebbles covering the sand. The flora is poor, and is only present in winter and early spring. The pebbles are covered by *Enteromorpha* and *Ulva*. From May to October, many specimens of *Galaxaura* and *Amphiroa* are cast ashore.

2. Laomei

Laomei is on the north-east of Hsiao Keelung, and is about 9 kilometers from there. This is a beautiful shore with very large flat rocks extending about 500 meters long in the middle littoral belt. The rocks having been worked upon by the waters have many deep grooves and tide-pools here and there, in which many *Enteromorpha*, *Porphyra* and *Corallina* grow in autumn and winter. But the rocks are almost naked during summer.

3. Shihmen

Shihmen is a rocky shore, within 2 kilometers east of Laomei. Collections were made at two stations. The southern station, in front of the bus station, is a stony shore. The water is very clear here. In winter and ealy spring all the stones are densely covered by *Ulva* and *Enteromorpha;* however *Porphyra* and *Gelidium* are not common plants here. The northern station, about 500 meters off the former, is a rocky shore. Here is a lagoon just beyond and sheltered by an artificial rock breakwater. This lagoon does not much exceed three meters in depth at high tide and its floor is covered by pebbles. In summer, *Colpomenia sinuosa* is a dominant plant on the bottom of the lagoom. On the lower portion of the bank of the lagoon, some surf is present and the rocks are covered by *Porphyra* in winter.

4. Yeliu

Yeliu is situated to the west of Keelung and is about 18 kilometers from there. At the east side, there is a lagoon sheltered by an artificial rock breakwater and a river flowing into it. This lagoon is not more than 2 meters in depth at low tide and is covered by a mud bottom. The water here is mucky and plants are extremely scant. Outside of the breakwater, a considerable surge occurs, as well as a small amount of surf. Plants are also very scant here, except for some *Porphyra* growing on the extruded rocks in winter. On the west side, about 50 meters off the former, is a rocky shore. The flora is very rich in *Ulva*, *Porphyra* and *Bostrychia*.

5. Kou Shen Ts'un

Kou Shen Ts'un is about 1.5 kilometers off Yeliu. This is a sandy shore with a few solitary rocks standing here and there. In winter these rocks are thickly covered by *Enteromorpha compressa* and *Enteromorpha clathrata*. In summer the whole shore is naked, except for some dried *Sargassum* laying here and there.

6. Pachihmen

Pachihmen is on the north of Keelung. This is a very complex rocky shore. It is composed of a large number of small or medium rocks, a flat, extensive bed and a few mountain-like large rocks. The small rocks make their appearance above the sea-level only at low tide, while the latter are always exposed more than one meter above the water even at high tide. Among the rocks there are a number of shallow pools. On the large rocks there are also some shallow pools. In autumn the whole shore, except for the upper parts of the mountain-like rocks, are colored with bright green. The plants almost exclusively belong to *Ulva* and *Enteromorpha*. In winter some spots of green color are mixed with red and brown colors, especially those at the middle and upper portions of the mountain-like rocks. From September to April, the dominant members of the formation of the whole shore still belong to the *Porphyra*, *Ilea*, *Ulva*, *Enteromorpa* and *Chaetomorpha*. During late spring these algae gradually degenerate from the upper portion of the mountain-like rocks. Then the lower and middle parts of the rocks are occupied by *Gigartina intermedia* and *Corallina*, *Sargassum* and *Dictyota* are the chief components of the formation in the lower littoral belt. *Gelidium* seems to be the dominant plants in the infralittoral belt.

7. Patoutsu

Patoutsu is located to the north-east of Keelung. The west is a stony shore. These are completely submerged at high tide and become dry at low tide. No growth of larger algae was observed here, although some clumps of *Corallina* occured. The east side is a sandy shore with a very broad flat rock that is completely submerged during high tide. A river flows into the sea from here. The water here is mucky. The plants are very scant here, except for a few clumps of *Corallina* and *Enteromorpha* extending from late autumn to early spring.

8. Shihchen

This is a rocky shore. The components of the formation very much resemble those which are found at Tali and Kueishan which will be mentioned afterwards.

9. Tali

Tali is situated to the south-east of Keelung and can be reached in about an hour and a half by the slow train bound for Suao (蘇澳) This is also a very complex shore. It may be clearly divided into three portions. The northern side, extending for about 150 meters, is a stony place where no growth of algae has been observed, except for *Sargassum* in summer. In the median portion there are many very large rocks which are exposed more than one meter above the sea-level, the plants here are scant, only *Ceramium* and *Centroceras* are the dominant plants in September and October, *Chnoospora* is also rich in early spring. The southern side forms a flat extensive bed that extends about one kilometer or more, and makes its appearance during low tide. Along the outer edge there are a number of shallow pools. In the middle littoral zone *Ulva* and *Enteromorpha* grow here and there from October to March. In the pools, in the lower littoral zone, are various kinds of algae, but none of them appear abundantly. On the exposed rocks, *Porphyra* and *Bangia* are dominant from October to December.

10. Kueishan

Kueishan is located to the south of Tali. This is also a rocky shore composed of many large rocks which are exposed more than one meter above the sea-level at high tide. There is a lagoon sheltered by an artificial breakwater. Distribution of marine algae in this part is very similar to the median portion of Tali.

SYSTEMATIC LIST

CYANOPHYTA

Oscillatoriaceae

Lyngbya Ag.

Key to the species.

1. Trichomes about 14μ in diameter; color blackish-green.....*L. confervoides*
1. Trichomes about 31μ in diameter; color bright blue-green.....*L. majuscula*

1. **Lyngbya majuscula** Gomont, 151, pl. 3, figs. 3–4, 1893; Dawson, Mar. Plants of Nha Trang 380, fig. 3d, 1954.

Fig. 1 A

Some specimens of this alga were sent to Dr. Dawson and have been identified by him as this species.

Trichomes about 31μ in diameter; with very thin sheath; about 4 cm. or more long.

Growing in entangled mats on the rocks in the middle littoral belt.

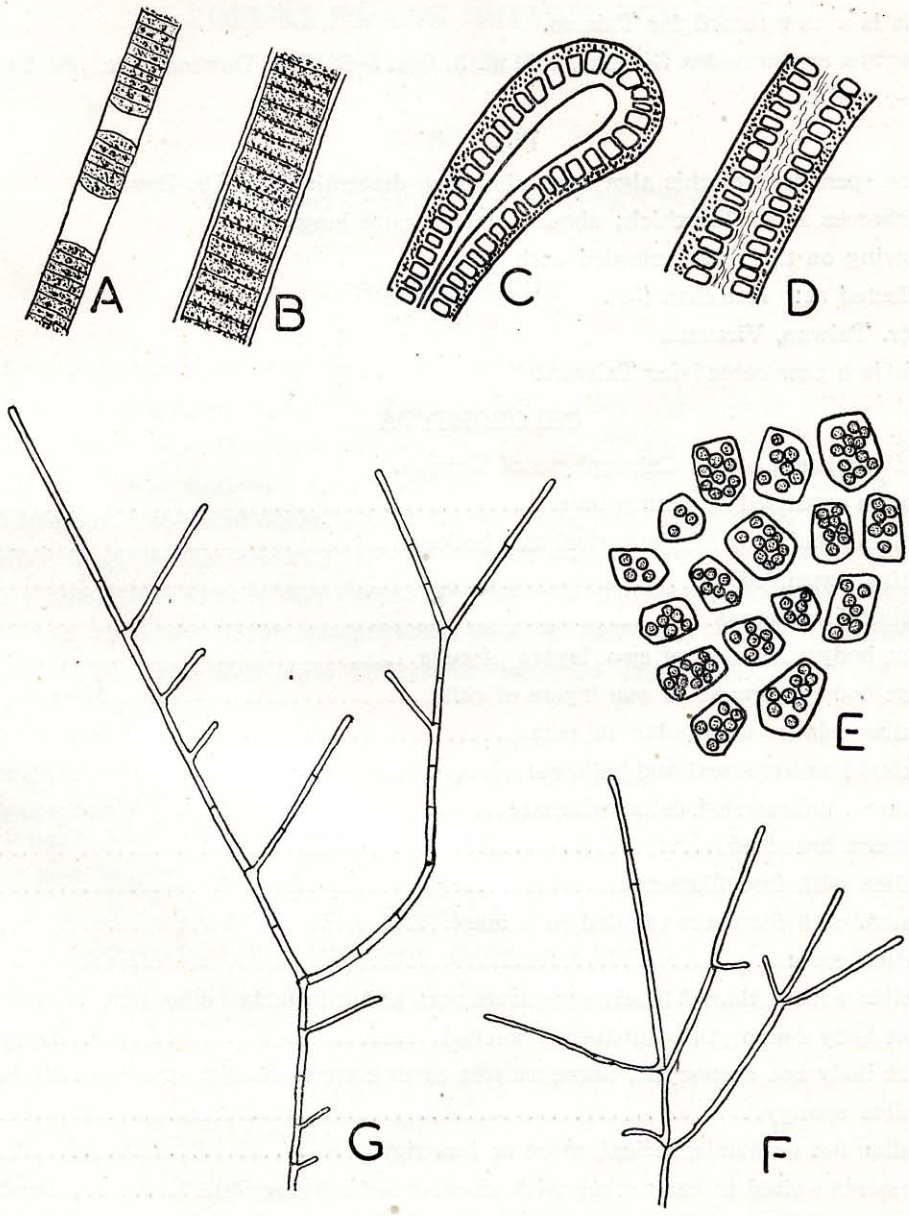


Fig. 1 A. *Lyngbya majuscular* Gomont: Portion of a discontinous filament, 31μ in diameter, ×180; B. *L. confervoides* Gomont: Portion of a filament, 14μ in diameter, ×760; C-E. *Enteromorpha Linza* (L.) Ag.: C. A cross-section of a frond showing the cavity, ×170; D. A cross-section of the median portion showing united, ×170; E. Gametangia, ×720; F. *Cladophoropsis Zollingeri* (Kütz.) Börg.: A small portion of a plant, ×5; G. *C. sundanensis* Renib.: A portion of a plant, ×10.

Collected at: Patoutsu (392), (416).

Distr. Taiwan, Vietnam.

This is a new record for Taiwan.

2. **Lyngbya confervoides** Gomont, 156, pl. 3, figs. 5–6, 1893; Dawson, l. c. 380, figs. 3 b–c, 1954.

Fig. 1 B

Some specimens of this alga have also been determined by Dr. Dawson.

Trichomes about 14μ thick; about 2 cm. or more long.

Growing on the rocks mingled with mud.

Gollected at: Kueishan (38).

Distr. Taiwan, Vietnam.

This is a new record for Taiwan..

CHLOROPHYTA

Key to the Genera of the Chlorophyta of Taiwan.

1. Thallus expanded or filamentous..... 2.
1. Thallus tubular or hemispherical and hollow..... 4.
2. Thallus expanded..... 3.
2. Thallus filamentous..... 5.
3. Plant body composed of two layers of cells.....*Ulva*
3. Plant body composed of one layers of cells.....*Monostroma*
4. Thallus tubular or tubular in part.....*Enteromorpha*
4. Thallus hemispherical and hollow.....*Dictyosphaeria*
5. Filament unbranched, cells uniseriate.....*Chaetomorpha*
5. Filament branched..... 6.
6. Thallus with free filaments..... 7.
6. Thallus with filaments tangled in a mass..... 9.
7. Thallus erect..... 8.
7. Thallus with a rhizoid-bearing prostrate part and a branched erect part..*Caulerpa*
8. Plant body coenocytic, pinnately branched.....*Bryopsis*
8. Plant body not coenocytic, branches free or uniting to form a reticulum..*Struvea*
9. Thallus spongy.....10.
9. Thallus flat or hemispherical, more or less rigid.....11.
10. Filaments united to each other with circular disks (tenacula).....*Boodlea*
10. Filaments form a surface layer of swollen utricles.....*Codium*
11. Thallus mat-shape; cells very long.....*Cladophoropsis*
11. Thallus in a irregular mass; cells very large.....*Valoniopsis*

Ulvaceae

Monostroma (Thur.) Wittr.

1. **Monostroma nitidum** Wittr., Monogr. Monost. 41, t. 2, fig. 7, 1866; Yamada, in

Bot. Mag. Tokyo 39:78, 1925; Y. F. Shen and K. C. Fan, in Taiwania 1:321, 1950.

In early spring the plants grow abundantly on the exposed rocks. These plants were young in January, reaching good development in March.

Collected at: Pachihmen (164), Laomei (189), Patoutsu (632), Yeliu (646).

Distr. Japan, Ryukyu, Taiwan, China Sea, Polynesia.

Ulva (L.) J. Ag.

Key to the species.

1. Thallus usually deeply lobed to the base, growing in a circular mass like the petals of a poppy flower.....*U. conglobata*
1. Thallus growing in a flat expanded plane..... 2.
2. Basal parts of the thallus very thick.....*U. pertusa*
2. Basal parts of the thallus not very thick..... 3.
3. Thallus with many pores of different sizes, original margins dentate..*U. reticulata*
3. Thallus not as above..... 4.
4. Plant body deeply and irregularly lobed to form narrow ribbons.....*U. fasciata*
4. Plant body never lobed to the base.....*U. lactuca*

1. **Ulva conglobata** Kjellm., Mar. Chlor. Jap. 10, pl. 2, figs. 1–3, pl. 3, figs. 9–14, 1897; Okamura, Icon. Jap. Alg. 4:58, pl. 165, figs. 1–10, 1918; Yamada, 1. c. 39:79, 1925; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

This species is very common along the coasts of northern Taiwan. It grows widely on the rocks in the littoral belt.

Collected at: Shihmen (8), (116), Laomei (115), Yeliu, (482), (645), Tali (496), Patoutsu (519), Shicheng (663).

Distr. Japan, Taiwan.

2. **Ulva lactuca** (L.) Le Jol., Alg. Mar. Cherb. 38; Okamura, Mar. Alg. Kotosho 96, 1931; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Some specimens of this alga were sent to Dr. Yamada and have been determined by him as this species.

The specimens at hand are very variable in shape being oval, elliptical etc., without stem, 6–9 cm. high, about 120μ thick.

Collected at: Laomei (358).

Distr. Japan, Taiwan.

3. **Ulva reticulata** Forsk., Fl. Alg. Arab. 187, 1775; Okamura, Icon. Jap. Alg. 2:182, pl. 100, figs. 1–6, 1912; Yamada, 1. c. 78, 1925; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Plate 1 A

In comparison with the figures of the present species given by Okamura in his Icones cited above, the frond of our specimens are more entire than the former.

They grow in deep pools entangling themselves among other algae e. g. *Hypnea, Ulva* etc., in the middle littoral belt.

Collected at: Pachihmen (386).

Distr. Japan, Taiwan, China Sea, Malay Archipelago, Indian Ocean, Red Sea.

4. **Ulva fasciata** Delile, Fl. Egypt. 155, pl. 58, fig. 5, 1813; Yamada, in Sci. Pap. Inst. Alg. Res. Hokkaido Imp. Univ. 1:27, 1935, Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Our specimens are 15–25 cm. in height. Dr. Yamada also reported this species from O-luan-pi and Tali and noted that his specimens from Tali are exceedingly large, some of them attaining 145 cm. in height.

Collected at: Tali (71), Laomei (121).

Distr. Japan, Taiwan, Malay Archipelago, West Indies, Australia.

5. **Ulva pertusa** Kjellm., Mar. Chlor. Jap. 4, pl. 1, figs. 1–5, pl. 3, figs. 1–8, 1897; Okamura, 1. c. 4:79, pl. 169, fig. 8, pl. 170, 1921; Yamada, in Bot. Mag. Tokyo 39:79, 1925; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Plate 1 B

The frond is about 4–8 cm. high or more, lower portion very thick (about 355μ thick), and becoming thinner above (about 228μ in thickness). Sometimes with very thin segments on the margins. The surface just above the holdfast is radiately wrinkled. Frond is very variable in shape being oval, sublanceolate or suborbicular etc., usually more or less lobed or deeply divided to the base and sometimes folded, twisted or roughly wrinkled, undulated and entire or wavy on the margin; surface entire or rarely perforated by a few small pores.

Collected at: Tali (162).

Distr. Japan, Taiwan, Malay Archipelago.

Enteromorpha Link

Key to the species.

1. Thallus flat except at the lower portion, which is tubular.....*E. Linza*
1. Thallus tubular and hollow..... 2.
2. Arrangement of the cells for the most parts regular..... 3.
2. Arrangement of the cells is irregular..... 5.
3. Cells disposed in regular lines only on young portion.....*E. prolifera*
3. Cells disposed in regular lines throughout the whole frond..... 4.
4. Branchlets composed of one row of cells.....*E. crinita*
4. Branchlets composed of more than one row of cells.....*E. clathrata*
5. Thallus much tufted, much branched.....*E. compressa*
5. Thallus usually solitary, rarely branched.....*E. intestinalis*

1. **Enteromorpha compressa** (L.) Grev., Alg. Brit. 180, t. 18, 1830; Okamura, Mar. Alg. Kotosho 96, 1931; Yamada, in Bot. Mag. Tokyo 39:79, 1925; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Collected at: Laomei (9), Shihmen (125), Tali (428), Pachihmen (448), Patoutsu (449).

Distr. Very widely distributed throughout the world.

2. **Enteromorpha clathrata** (Roth.) Grev., Alg. Brit. 181, 1850; Okamura, 1. c. 96, 1931, Nippon Kaiso-si 19, 1936; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

The specimens at hand are 2–8 cm. high, slender, abundantly branched and their branchlets are never arranged in a row of cells. These characteristics are in close agreement with the description of the species given by Okamura.

Collected at: Kou Shen Ts'un (18).

Distr. Japan, Taiwan, Vietnam, Medit. Sea, Australia.

3. **Enteromorpha prolifera** (Fl. Dan.) J. Ag., Till Alg. Syst. 5:129, t. 4, figs. 103–104, 1882; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Collected at: Tali (429).

Distr. Japan, Taiwan, China Sea, Malay Archipelago, Medit. Sea, West Indies.

4. **Enteromorpha crinita** (Roth.) K. Ag., in Lund Univ. Arsk. 19:144, 1882; Okamura, 1. c. 17, figs. 7–8, 1936; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Our specimens are not abundantly branched; but in habit, in arrangement of the cells, and in the shape of the cells they are in close agreement with the description of this species given by Okamura.

Collected at: Tali (430).

Distr. Very widely distributed.

5. **Enteromorpha intestinalis** (L.) Link. in Nees Hor. Phys. Berol. 5, 1820; Yamada, Mar. Chlor. Ryuku 35, 1934; Y. F. Shen and K. C. Fan, 1. c. 321, 1950.

Collected at: Laomei (123), Pachihmen (133), Patoutsu (153), Tali (431).

Distr. Japan, Taiwan, Ryukyu, Indian Ocean, Medit. Sea, Europe.

6. **Enteromorpha Linza** (L.) Ag., Till. Alg. Syst. 11, p. 134, t. 4, figs. 110–112, 1883; Okamura, Icon. Jap. Alg. 3:163, pl. 138, figs. 1–10, 1915.

Fig. 1 C–E; Plate 1 C–D

The frond arises from a small conical disc; flat, linearlanceolate, 3–9.5 cm. high, gradually tapering to the base into a cylindrical tube; stem very short from which arises a few branches, the branch may grow into the same shape as the main axis; margin entire or slightly lobed here and there, beautifully crisped or plaited. Structure consists of two layers of minute oblong cells 23.8 μ long, 10.2 μ broad, these two layers adhere together in the middle of the plant, but towards each margin there is an air space between the layers.

In our specimens two kinds of fronds have been observed. One kind is crisped, the other is entirely flat, and it seems as if these are two diffeerent forms. But for want of authentic specimens with which to compare ours. It seems best to consider them as the same species until further study can be made.

The specimens at hand were found growing on the rocks, during November to January in the upper littoral belt.

Collected at: Laomei (460), Patoutsu (521).

Distr. Very widely distributed throughout the world.

This is a new record for Taiwan.

Valoniaceae

Dictyosphaeria Decaisne

1. **Dictyosphaeria cavernosa** (Forsk.) Börg., in Dansk Bot. Arkiv. 8:2, 1932; Yamada, in Sci. Pap. Inst. Alg. Res., 4:31, 1944; Y. F. Shen and K. C. Fan, in Taiwania 1:322, 1950.

Dictyosphaeria favulosa Dec., Class. Alg. Calcif. 32, 1842; Okamura, Icon. Jap. Alg. 1:205, Pl. 40. figs. 13–24, 1908, Mar. Alg. Kotosho 100, 1931; Yamada, l. c. 39: 81, 1925.

Plate 1 E-F

This plant is like that illustrated by Okamura. The specimens are mostly under 3 cm. in diameter. They are compressed-spherical and are empty but some specimens are split open at the top, and in some of the split ones they are cup-shaped with very irregular margins.

The plants grow in shallow pools during April to July.

Collected at: Tali (339), Patoutsu (393).

Distr. Widely distributed.

Boodleaceae

Boodlea Murr. et De Toni

Key to the species.

1. Diameter of the main axis about 125 μ ..... *B. composita*
1. Diameter of the main axis about 220–300 μ ..... *B. paradoxa*

1. **Boodlea composita** Brand; in Beihef. z. Bot. Zentralbl. 18:187, t. 6, figs. 28–35, 1905; Yendo, in Bot. Mag. Tokyo 30:47, 1916; Yamada, l. c. 39:84, 1925; Okamura, Nippon Kaiso-si 38, 1936; Y. F. Shen and K. C. Fan, l. c. 322, 1950.

The plants grow on the rocks in hemispherical spongy mats. Only two small masses of this species were collected. They show clearly the characteristics of the species. Which coincide fairly well with the detailed description given by Okamura.

Collected at: Patoutsu (370).

Distr. Japan, Taiwan, China Sea, Indian Ocean, Africa, Australia.

2. **Boodlea paradoxa** Rbd. ex Okamura, Nippon Kaiso-si 39, 1936; Y. F. Shen and K. C. Fan, l. c. 322, 1950.

Diameter of main axis measures about 220–300 μ, at the upper end it is about 60–70 μ in diameter and the length is 2 to 3 times the breadth, or sometimes the same as the diameter.

Collected at: Tali (341), Patoutsu (680).

Distr. Taiwan, Malay Archipelago.

Cladophoropsis Börg.

Key to the species.

1. Thallus bright blue-green, filaments about 150–300 μ thick .....*C. Zollingeri*
1. Thallus olive-green, filaments about 77–108 μ thick .....*C. sundanensis*

1. **Cladophoropsis Zollingeri** (Kütz.) Börg., Cont. Connais. Gen. Siphonocladus 288, 1905; Yamada, in Sci. Pap. Inst. Alg. Res. 3:11, 1944; Y. F. Shen and K. C. Fan, l. c. 323, 1950.

Aegaglopila Zollingeri Kütz., Spec. Alg. 415, 1849.

Cladophoropsis fasciculata Okam. (non Börg.) Icon. Jap. Alg. 4:75, pl. 169, figs. 1–7, 1921; Yamada, in Bot. Mag. Tokyo 39:85, 1925.

Fig. 1 F

The plants form a vaguely expanded mass, 1–1.5 cm. high and the filaments have a diameter of 150–304 μ.

Collected at: Laomei (94).

Distr. Japan, Ryukyu, Taiwan, Malay Archipelago.

2. **Cladophoropsis sundanensis** Renib., Einige neue Chlorophyc. Ind. Ozean 147, 1905; Yamada, in l. c. 11, 1944; Dawson, Costa Rican Alg. 7, 1957.

Fig. 1 G

Some specimens of this alga were sent to Dr. Dawson and have been kindly identified by him as this species.

The plants were found cast ashore.

Collected at: Shihmen (418).

Distr. Ryukyu, Taiwan, Malay Archipelago, Polynesia.

This is a new record for Taiwan.

Anadyomenaceae

Valoniopsis Börgs.

1. **Valoniopsis pachynema** (Mart.) Börg., Mar. Alg. Arb. Sea etc. 10, 1934; Y. F. Shen and K. C. Fan, l. c. 323, 1950.

Valonia confervoides Harvey, Alg. Ceylon Exsic. 73; Okamura, Icon, Jap. Alg. 2:59, pl 65, figs. 7–10, 1907; Yamada, in Bot. Mag. Tokyo 39:80, 1925.

The plant forms a rigid, densely tufted low mat on the exposed rocks in the middle and lower littoral belt almost the whole year around.

Collected at: Shihmen (56), Tali (72), Laomei (92), Pachihmen (104).

Distr. Japan, Taiwan, Malay Archipelago, Indian Ocean, West Indies, Australia.

Siphonocladiaceae

Struvea Sonder

1. **Struvea delicatula** Kütz., Tab. Phyc. 16:1, t. 2, 1866; Yamada, l. c. 39:82, 1925; Okamura, Mar. Alg. Kotosho 97, 1931; Y. F. Shen and K. C. Fan. l. c. 323, 1950.

Plants are 1.5–2 cm. high, the stipe is simple, about 0.9 cm. long, upper cells 380–494 μ thick. The leaf is nearly round, or ovate in outline, about 7–8 mm. in diameter. The root is composed of fiberous processes. Growing in shallow pools near the upper littoral belt.

Collected at: Tali (198).

Distr. Widely distributed throughout the world.

Cladophoraceae

Chaetomorpha Kütz.

Key to the species.

1. Filaments attached ..... 2.
1. Filaments mostly unattached ..... 4.
2. Thallus erect, tufted.....*C. basiretrorsa*
2. Thallus twisted on other materials, entangled ..... 3.
3. Filaments 300–750 μ in diameter .....*C. spiralis*
3. Filaments 80–120 μ in diameter.....*C. brachygona*
4. Filaments 150–300 μ in diameter .....*C. Linum*
4. Filaments 340–450 μ in diameter .....*C. crassa.*

1. **Chaetomorpha Linum** (Müll.) Kütz., Phyc. Germ. 204, 1845; Yamada, l. c. 39:88, 1925, Mar. Chlorophy. Ryukyu 42, 1934; Y. F. Shen and K. C. Fan, l. c. 324, 1950.

Fig. 2 A

The filament is about 150 μ thick in diameter, the length of the cell is always shorter or as long as diameter, but rarely longer.

Collected at: Patoutsu (371).

Distr. Very widely distributed.

2. **Chaetomorpha crassa** (Ag.) Kütz., l. c. 204, 1845; Yamada, l. c. 39:88, 1925; Okamura, Mar. Alg. Kotosho 97, 1931; Y. F. Shen and K. C. Fan, l. c. 324, 1950.

Fig. 2 B

The filaments are 340–450 μ in diameter, 1–2 times as long as broad, but sometimes shorter. They grow abundantly in a free floating state in the pools near the lower littoral belt during April and May. The filaments are entangled with each other in a spiral manner.

Collected at: Patoutsu (20).

Distr. Japan, Taiwan, China Sea, Medit. sea, Europe, Australia.

3. **Chaetomorpha brachygona** Harv., Ner. Bor. Amer. 3:87, t. 47, 1858; Yamada, l. c. 39:88, 1925; Y. F. Shen and K. C. Fan, l. c. 324, 1950.

Fig. 2 C

The filaments are 80–120 μ thick, 1 to 2 times as long as their diameter, walls very thick.

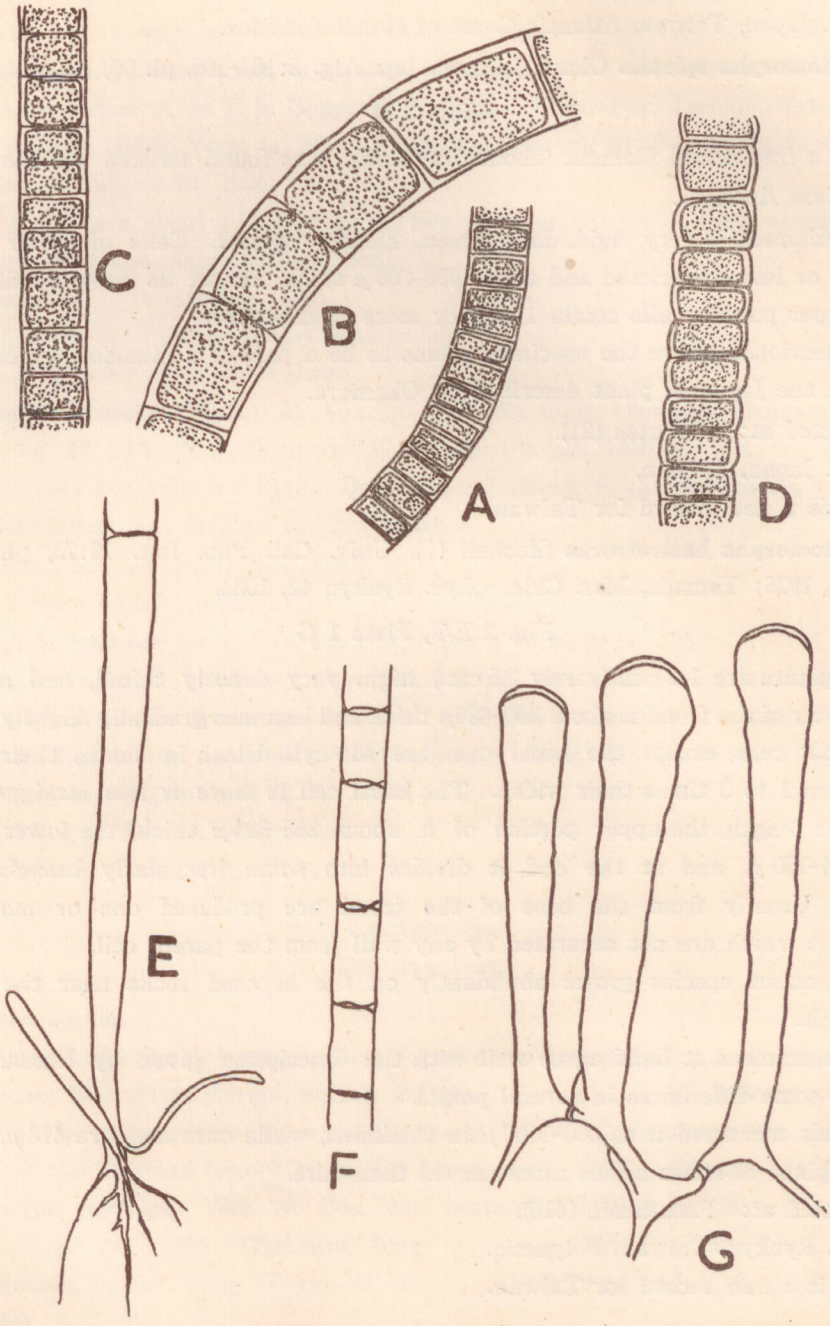


Fig. 2. A. ***Chaetomorpha Linum*** (Müll.) Kütz.: Portion of a filament, ×44; B. ***C. crassa*** (Ag.) Kütz.: Portion of a filament, ×44; C. ***C. brachygona*** Harv.: Portion of a filament, ×85; D. ***C.*** spiralis. Okam., ×9; E–F. ***C. basiretrorsa*** Stechell (?). ×60: E. Basal portion of a plant showing two elongations issued from the basal cell; F. Middle portion of the same plant; G. ***Codium adhaerans*** (Cabr.) C. Ag.: Three utricles. ×100.

Collected at: Laomei (124), Patoutsu (522).

Distr. Japan, Taiwan, Atlantic Coast of North America.

4. **Chaetomorpha spiralis** Okam. in Icon. Jap. Alg. 2:162–165, pl. 95, 1912.

Fig. 2 D

Only a fragmental filament (about 4 cm. long) was found twisted on the branch of *Gelidium Amansii*.

The filament is very rigid, dark green, closely twisted. Cells of lower portion are more or less constricted and about 650–700 μ thick, almost as long as diameter; in the upper portion cells attain 1 mm. or more in diameter.

As mentioned above the specimen seems to be a part of a filament, which agrees well with the Japanese plant described by Okamura.

Collected at: Patoutsu (21).

Distr. Japan, Taiwan,

This is a new record for Taiwan.

5. **Chaetomorpha basiretrorsa** Stechell (?), Univ. Cal. Pub. Bot. 12:73, pl. 8, figs. 4–6, 1926; Yamada, Mar. Chlorophyc. Ryukyu 42, 1934.

Fig. 2 E-F, Plate 1 G

The plants are 1–2 cm. (rarely 2.5 cm.) high, very densely tufted, and straight; the diameter of the frond is about 340–420μ thick and becomes gradually slightly thinner downwards; cells, except the basal one, are sub-cylindrical in shape, their length varies from 1 to 3 times their width. The basal cell is more or less straight, about 4–5 mm. in length, the upper portion of it about 266–324 μ thick, the lower portion about 114–150 μ, and at the end it divides into some irregularly branched thin rhizoids. Usually from the base of the frond are produced one or more thin elongations which are not separated by any wall from the parent cell.

The present species grows abundantly on the exposed rocks near the middle littoral belt.

The specimens at hand agree well with the description given by Yamada. Yet there are some differences in several points.

Yamada measured it as 500–1000 μ in thickness, while ours measure 418 μ. Moreover the plant of Nawa seems more curved than ours.

Collected at: Pachihmen (415).

Distr. Ryukyu, Taiwan, Polynesia.

This is a new record for Taiwan.

Bryopsidaceae

Bryopsis Lam.

Key to the species.

1. Thallus simple, rarely branched, main axis unbranched below.....*B. muscosa*

1. Thallus branched ..... 2.
2. Thallus over 3 cm. high, branchlets mostly divided again.....*B. plumosa*
2. Thallus about 1.5 cm. high, branchlets simple.....*B. indica*

1. **Bryopsis indica** A. et E. S. Gepp., in Transac. Linn. Soc. London, 7:169, pl. 22, figs. 10–11, 1908; Yamada, Mar. Chlorophy. Ryukyu 61, fig. 30, 1934; Okamura, Nippon Kaiso-si 91, 1936.

The plants are about 1.5 cm. high. They grow on the rocks, shells or other plants in the pool near the middle littoral belt.

Collected at: Pachihmen (394).

Distr. Ryukyu, Taiwan, Malay Archipelago.

This is a new record for Taiwan.

2 **Bryopsis plumosa** (Huds.) C. Ag., Sp. Alg. 448, 1821; Okamura, Nippon Kaiso-si 91, fig. 47, 1936; Y. F. Shen and K. C. Fan, l. c. 325, 1950.

The plants are 3–9.5 cm. high. Branches are pinnately divided twice, the upper branchelets sometimes may be divided again.

Collected at: Patoutsu (154), (523).

Distr. Very widely distributed.

3. **Bryopsis muscosa** Lam., ex Okamura, Nippon Kaiso-si 90, 1936.

The specimens at hand are characterized by the presence of a straight stem which is naked on the lower portion and produces somewhat irregularly arranged simple branches on the upper part. Branches are about 47–107 μ thick, 1–2 mm. long.

Collected at: Pachihmen (472).

Distr. Japan, Taiwan, Medit. Sea.

This is a new record for Taiwan.

Caulerpaceae

Caulerpa Lam.

Key to the species.

1. Ultimate branchlets clavate, with a round or compressed tip ..... 2.
1. Ultimate branchlets peltate, with a flat tip.....*C. peltata* var. *typica*
2. End of the ultimate branchlet mostly round.....*C. racemosa* var. *laete-virens*
2. End of the ultimate branchlet mostly compressed.... *C. racemosa* var. *Chemitzia*

1. **Caulerpa racemosa** Web. v. Bos. var. **laete-virens** Web. v. Bos., Monogr. des Caulerpa 366, 1898; Okamura, Icon. Jap. Alg. 3:67–69, 119, figs. 2–5, 1913; Yamada, in Bot. Mag. Tokyo 39:91, 1925; Y. F. Shen and K. C. Fan, l. c. 325, 1950.

Collected at: Tali (73), Laomei (362), Patoutsu (372).

Distr. Very widely distributed throughout the world.

2. **Caulerpa racemosa** Web. v. Bos. var. **Chemnitzia** Web. v. Bos., l. c. 370, 1898; Yamada, l. c. 91, 1929; Y. F. Shen and K. C. Fan, l. c. 325, 1950.

Crulerpa racemosa Web. v. Bos. var. *occidentalis* (J. Ag.) Börg; Ecol. and Syst. account of the Caul. 379, 1907; Okamura, Icon. Jap. Alg. 6:59, pl. 280, fig. 6, 1932, Nippon Kaiso-si 102, fig. 51, 2, 1936.

Caulerpa Chemnitzia Svedel., Ecol. and Syst. Stud. Ceyl. Sp. Caul. 129.

The specimens at hand are in close agreement with the present variety in the arrangement of their branchlets and in shape of the branchlets which are expanded into trumpet-shape ends.

Collected at: Patoutsu (326), Tali (409), Shihmen (531).

Distr. Widely distributed in most warm seas.

3. **Caulerpa peltata** (Lam.) Web. v. Bos. var. **typica** Web. v. Bos., l. c. 375, 1898; Okamura, l. c. 6:60, pl. 280, 1932, l. c. 103, fig. 52, 1936; Y. F. Shen and K. C. Fan, l. c. 325, 1950.

Collected at: Tali (74), (408).

Distr. Widely distributed in most warm seas.

Codiaceae

Codium Stackh.

1. **Codium adhaerens** (Cabr.) C. Ag., Spec. Alg. 1:457, 1882; Okamura, Icon. Jap. Alg. 3:140, pl. 134, figs. 1–3, 1915, Nippon Kaiso-si 120, fig. 61, 1936; Yamada, Mar. Chlorophy. Ryukyu 76, fig. 45, 1934.

Agardhia adhaerens Cabrera, in Phys. Sällsk. Arsber.

Fig. 2 G

The plants are young, the diameter of the utricles are 45–123μ thick but in some larger ones it attains 169 μ; the diameter of medullary filaments are about 23 μ.

The plants adhere tightly on the coral rocks during June and July.

Collected at: Tali (698).

Distr. Very widely distributed throughout the world.

This is new record for Taiwan.

PHAEOPHYTA

Key to the Genera of the Phaeophyta of Taiwan.

1. Thallus branched; filament with cells uniseriate ..... *Ectocarpus*
1. Thallus not as above ..... 2.
2. Thallus expanded, cylindrical or subcylindrical ..... 3.
2. Thallus a reticulum or hemispherical and hollow ..... 14.
3. Thallus expanded ..... 4.
3. Thallus cylindrical or subcylindrical ..... 11.
4. Thallus with a narrow unbranched blade ..... 5.
4. Thallus flabellate or much branched blade ..... 6.
5. Plant body composed of a medullary filamentous layer and a cortical cellular layer ..... *Endarachne*

5. Plant body altogether composed of cells.....*Ilea*
6. Thallus with midrib.....*Nourocarpus*
6. Thallus without midrib..... 7.
7. Thallus flabellate..... 8.
7. Thallus dichotomously or pinnately branched.....10.
8. Two cortical cells correspond to each medullary cell.....*Zonaria*
8. One cortical cell corresponds to each medullary cell..... 9.
9. Thallus with inrolled margins.....*Padina*
9. Thallus without inrolled margins.....*Homoeostrichus*
10. Medullary and cortical layers consist of one layer of cells.....*Dictyota*
10. Medullary layer partially consists of more than two layers of cells.....*Dilophus*
11. Thallus composed of a medullary filamentous layer and a cortical cellular layer and is dichotomously branched.....*Ishige*
11. Thallus altogether composed of cells.....12.
12. Thallus subcylindrical, dichotomously branched.....*Chnoospora*
12. Thallus clearly differentiated into stem, branches and leaf-like portions.....13.
13. With clear, free vesicles; leaf flat.....*Sargassum*
13. Vesicles, if have, not distinct; leaf peltate.....*Turbinaria*
14. Thallus a reticulum.....*Hydroclathrus*
14. Thallus hemispherical and hollow.....*Colpomenia*

Ectocarpaceae

Ectocarpus Lyng.

1. **Ectocarpus Mitchellae** Harv., Ner. Bor. Amer. 1:142, pl. 12, 1851; Yamada, in Bot. Mag. Tokyo 39:239, 1925; Okamura, Nippon Kaiso-si 138, fig. 68; Y. F. Shen and K. C. Fan, l. c. 326, 1950.

The plants are densely branched, 3.5–6.2 cm. high. Branches and branchlets become gradually slender upwards and end in an acute point. Diameter of the axis is 17–34 μ thick, 1 to 3 times as long as broad. Plurilocular sporangia are 51–380 μ long, 20 to 45 μ wide, sessile with blunt apex, cylindrical, always secund on the upper branches.

Collected at: Patoutsu (156).

Distr. Japan, Taiwan, Vietnam, Indian Ocean, both Coasts of North America.

Dictyotaceae

Dictyota Lamour.

1. **Dictyota divaricata** Lamour., Dict. 14, 1809; Yamada, l.c. 39:253, 1925; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

During summer the plants grow abundantly and form intricated mats on the rocks in the pools in the lower littoral belt and in the deeper part of the sea.

Collected at: Tali (75), Shihmen (420), Patoutsu (82), Pachihmen (710).

Distr. Japan, Taiwan, China Sea, Red Sea, Europe, West Indies.

Dilophus J. Ag.

Key to the species.

1. Thallus large, erect, dichotomously branched.....*D. marginatus*
1. Thallus small, creeping, irregularly branched .....*D. radicans*
1. **Dilophus radicans** Okam, in Bot. Mag. Tokyo 30:7, figs. 1–2, 1915, Icon. Jap. Alg. 6:44, pl. 275, figs. 1–8, 1931; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

This small alga grows on the rocks with other algae in the pools in the lower littoral belt.

Collected at: Tali (76).

Distr. Japan, Taiwan, Polynesia.

2. **Dilophus marginatus** Okam., Icon. Jap. Alg. 3:33, pl. 108, fig. 9, pl. 109, 1915, Nippon Kaiso-si 167, 1936; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

Plate 1 H

In every characteristic, our specimens agree well with the original description of of this species, except in height and habit of the frond. Our specimens are apparently smaller (8–12 cm.) than Okamura's plant. Our specimens usually produced dichotomous proliferations from the middle portion of the frond, these often develop into new branches on both surfaces and margins.

Collected at: Pachihmen (30).

Distr. Japan, Taiwan.

Zonaria (Draparn) J. Ag.

Key to the species.

1. Thallus fan-shaped, margins entire.....*Z. Diesingiana*
1. Thallus palm-shaped, margins more or less lobed .....*Z. coriacea*
1. **Zonaria Diesingiana** J. Ag., Sp. Alg. 1:109, 1848; Yamada, in Bot. Mag. Tokyo 39:249, 1925; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

Plate 1 I

The plants before us are 3–5 cm. high. The fronds are expanded in a fan-shape, usually very much torn and lobed in longitudinal directions, apical margin entire. From the summit of the frond it often produces small fan-shaped proliferations. Sporangia were found. The plants were washed ashore.

Collected at: Kueishan (86), Patoutsu (400), Tali (410).

Distr. Japan, Taiwan.

2. **Zonaria coriacea** Yamada, in l.c. 249, 1925; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

The plants grow abundantly and beautifully on rocks on the edge of the pool in the lower littoral belt.

Collected at: Tali (77).

Distr. Taiwan.

Homoeostrichus J. Ag.

1. **Homoeostrichus multifidus** (Harv.) J. Ag., and Anal. Alg. Cont. 1:15, 1894; Yamada, l.c. 250, fig. 4, 1925; Okamura, Nippon Kaiso-si 180, 1936; Y. F. Shen and K. C. Fan, l.c. 327, 1950.

The specimens are 6–10 cm. high and deeply split almost to the base into many narrow segments. They were found washed ashore.

Collected at: Tali (413).

Distr. Japan, Taiwan.

Padina Adans.

Key to the species.

1. Plant body composed of 6–8 layers of cells at the base ..... *P. crassa*
1. Plant body composed of 2 layers of cells throughout ..... *P. minor*

1. **Padina crassa** Yamada, Not. Some Jap. Alg. 11, 56, pl. XVII, fig. 2, 1931; Okamura, Icon. Jap. Alg. 6:87, pl. 294, figs. 5–11, 1932.

Plate 1 J–K

Only two dry specimens were found. One of them is 4 cm. high, while another one is 7 cm. The basal portion of the fronds are composed of 6–8 layers of cells, and of 2–4 layers toward the margin; 190–225μ thick at the base.

The small one more nearly resembles the figure of the type specimen in shape, but the larger one has 4 branches, one of these is divided again to give rise to a similar one, each segment has a short (about 1 cm.) slender but thick stem which is thickly covered with brown hairs. The fronds are fan-shape, membranous, translucent, with tetrasporangial sori. The plants were washed ashore.

Collected at: Shihmen (45).

Distr. Japan, Taiwan, China Sea.

This is a new record for Taiwan.

2. **Padina minor** Yamada, in l.c. 251, fig. 5, 1925; Okamura, l.c. 103. 1931; Yamada, Mar Alg. Ryukyusho, Formosa 185, 1950; Y. F. Shen and K. C. Fan, l.c. 328, 1950.

Collected at: Patoutsu (417), Tali (78).

Distr. Japan, Taiwan.

Neurocarpus Web. et Mohr.

1. **Neurocarpus undulata** Holm. f. **plana** Okam., ex Nippon Kaiso-si, 173, 1936.

Only one specimen at hand. In comparison with the description and figure of *N. undulata* given by Okamura in his Icones, the margin of our specimen is more greatly lobed than the former. So I refer the specimen to this forma.

Collected at: Patoutsu (652).

Distr. Japan, Taiwan.

This is a new record for Taiwan.

Punctariaceae

Colpomenia Derb. et Sol.

1. **Colpomenia sinuosa** (Roth) Derbs et Solier, Men. Phys. Alg. 11, t. 22, figs. 18–28, 1856; Yamada, in Bot. Mag. Tokyo 39:241, 1925; Y. F. Shen and K. C. Fan, l.c. 328, 1950.

The plants are hollow and subglobular, but in some larger ones their surfaces are split into a few segments. In texture the walls of No. 79 and No. 373 are thicker than those of No. 334.

The plants grow abundantly on the rocks and stones in the pool in the lower littoral belt.

Collected at: Tali (79), Shihmen (334), Patoutsu (373).

Distr. Very widely distributed throughout the world.

Endarachne J. Ag.

1. **Endarachne Binghamiae** J. Ag., Anal. Alg. Cont. 3:27, 1896; Y. F. Shen and K. C. Fan, l.c. 328, 1950.

Phyllitis Fascia (non Kütz.) Okam., Illust. Mar. Alg. Jap. 1:27, pl. 10, 1900.

The specimens at hand are 4–16.5 cm. high, 0.5–1.9 cm. broad, thin and kelp-like in shape.

Collected at: Patoutsu (168).

Distr. Japan, Taiwan, China Sea, Pacific Coast of North America.

Ilea Fries.

1. **Ilea Fascia** (Müll.) Fries, Flora Scanica 1835: Yamada, l.c. 242, 1955; Okamura, Nippon Kaiso-si 234, 1936; Y. F. Shen and K. C. Fan, l.c. 329, 1950.

Phyllitis Fascia Kütz., Phyc. Gener. 342, t. 24, 1843.

The specimens before us are sterile and are 13 cm. high, by 0.5–2 cm. broad.

Collected at: Shihmen (1), Patoutsu (169), Tali (318).

Distr. Japan, Taiwan, Malay Archipelago, Atlantic Ocean.

Hydroclathrus Bory

1. **Hydroclathrus clathratus** (Bory) Howe., Alg. Britton and Millspaugh, Bahama Flora, 590, 1920; Okamura, l.c. 232, 1936; Y. F. Shen and K. C. Fan, l.c. 329, 1950.

Hydroclathrus cancellatus Bory, Dict. Class. 8:419, 1826; Okamura, Icon. Jap. Alg. 1:18, pl. 4, fig. 11, pl. 5, figs. 7–13, 1907; Yamada, l.c. 241, 1925; Okamura, Mar. Alg. Kotosho 102, 1931.

The specimens were found washed ashore.

Collected at: Patoutsu (374), (653) Shihmen (335).

Distr. Very widely distributed throughout the world.

Ishigeaceae

Ishige Yendo

1. **Ishige Okamurai** Yendo, Fucac. Jap. 154, 1907; Yamada, in Bot. Mag. Tokyo 39:248, Okamura, Nippon Kaiso-si 238, fig. 30, 1936; Y. F. Shen and K. C. Fan, l.c. 329, 1950.

The specimens are sterile 3 to 3.5 cm. high. During May and June it grows abundantly on the exposed rocks in the middle littoral belt.

Collected at: Tali (30), Kueishan (40), Patoutsu (550), Shihchen (678).

Distr. Japan, Taiwan, China Sea.

Chnoosporaceae

Chnoospora J. Ag.

1. **Chnoospora implexa** (Hering) J. Ag., Sp. Alg. 1:172, 1848; Yamada, l.c. 39:243, 1925; Okamura, Mar. Alg. Kotosho 103, 1931; Y. F. Shen and K. C. Fan, l.c. 329, 1950; Dawson, in Pacif. Science 8:404, figs. a-b, 1954.

Chnoospora obtusangula (Harv.) Sond. Alg. trop. Austr., 45; Okamura, Icon. Jap. Alg. 4:52–55, pl. 164, figs. 1–9, 1918.

Dictyota obtusangula Harv., Char. new alg. 329, no. 14, 1859.

The plants are 25–14.5 cm. high, growing on the exposed rocks in the middle littoral belt.

Collected at: Shihcheng (666), Tali (209).

Distr. Japan, Taiwan, China Sea, Malay Archipelago, Red Sea, Australia.

Fucaceae

Turbinaria Lamour

Key to the species.

1. Margin of the blade roughly serrate.....*T. ornata*
1. Margin of the blade serrulate or entire.....*T. filamentosa*

1. **Turbinaria ornata** J. Ag., Sp. Alg. 1:266, 1848; Yamada, l.c. 39:244, 1925; Okamura, l.c. 104, 1931; Y. F. Shen and K. C. Fan, l.c. 329; Yamada, Mar. Alg. Ryukyusho. Formosa, 189, 1950,

The specimens were found cast ashore, none of them had a basal portion but only the leafy portion remained.

Collected at; Laomei (93).

Distr. Very widely distributed throughout the world.

2. **Turbinaria filamentosa** Yamada, in Bot. Mag. Tokyo 39:243, fig. 1, 1925; Y. F. Shen and K. C. Fan, 1. c. 391, 1950.

Only two specimens wore found washed ashore. They grow up to 8 cm. high and in the habit of leaf and filamentous receptacle agree very well the original description and figure of this species.

Collected at; Laomei (414)

Distr. Taiwan.

Sargassum C. Ag.

Key to the species.

1. Blade oval, margins serrate or dentate; vesicles small round or oval..... 2.
1. Blade linear, margins entire; vesicle linear, cylindrical.....*S. Horneri*
2. Blade crispate; vesicle round, very small (1–3 mm. in diameter), smooth ....*S. crispifolium*
2. Blade flat; vesicle oval (4–5 mm. in diameter), often bearing wings or teeth .....*S. Sandei*

1. **Sargassum Horneri** (Turn.) C. Ag., Coyn. 38, 1820; Okamura, Icon. Japan Alg. 5:3–5, pl. 202, 1923; Yamada, in Bot. Mag. Tokyo 39:244, 1925; Y. F. Shen and K. C. Fan, l.c. 329, 1950.

Fucs Horneri Turn. Hist. Fuc. 1–34, t. 17.

Spongocarpus Horneri Kg. Tab. Phyc. 10, t. 89.

Sargassum Fengeri J. Ag. Sp. Sarg. Austr. p. 58.

Fig. 3 A-C

Two very large plants (about 1 m. high) were found cast ashore.

Some of the branches of this alga were sent to Dr. Dawson and have been identified by him as this species.

Collected at: Shihmen (658).

Distr. Japan, Taiwan.

2. **Sargassum crispifolium** Yamada, in Jour. Fac. Sci. Hokkaido Imp. Univ. 1 (2):72, pl. 20, 1931; Okamura, Nippon Kaiso-si 356, fig. 173, 1936.

Sargassum Grevillei (non J. Ag.) Yendo, in Tokyo Bot, Mag. 31:195, 1917.

Fig. 3 D-F

Only one of the specimens collected had a root. It was small and round, but it dropped off after the specimen had been dried. Leaves are very small not over 2 cm. long, 0.8 cm. broad, usually strongly curled, and the margins are rarely entire but usually have fine or rough teeth; petioles are very short. Vesicles are round, very small, mostly less than 3 mm. but rarely 5 mm. in diameter, with comparatively long, linear or broad petioles which may reach 4 mm. in length, smooth. Receptacles are one to four times forked, cylindrical and verruciform.

In comparison with the original description and figure our specimens are somewhat different from the Yamada's plants in respect to the sizes of the leaves and vesicles. Moreover, some of our specimens have leaves which are not sharply dentate on the margins, but are either entire or undulate with distant teeth. Some of vesicles have broad petioles.

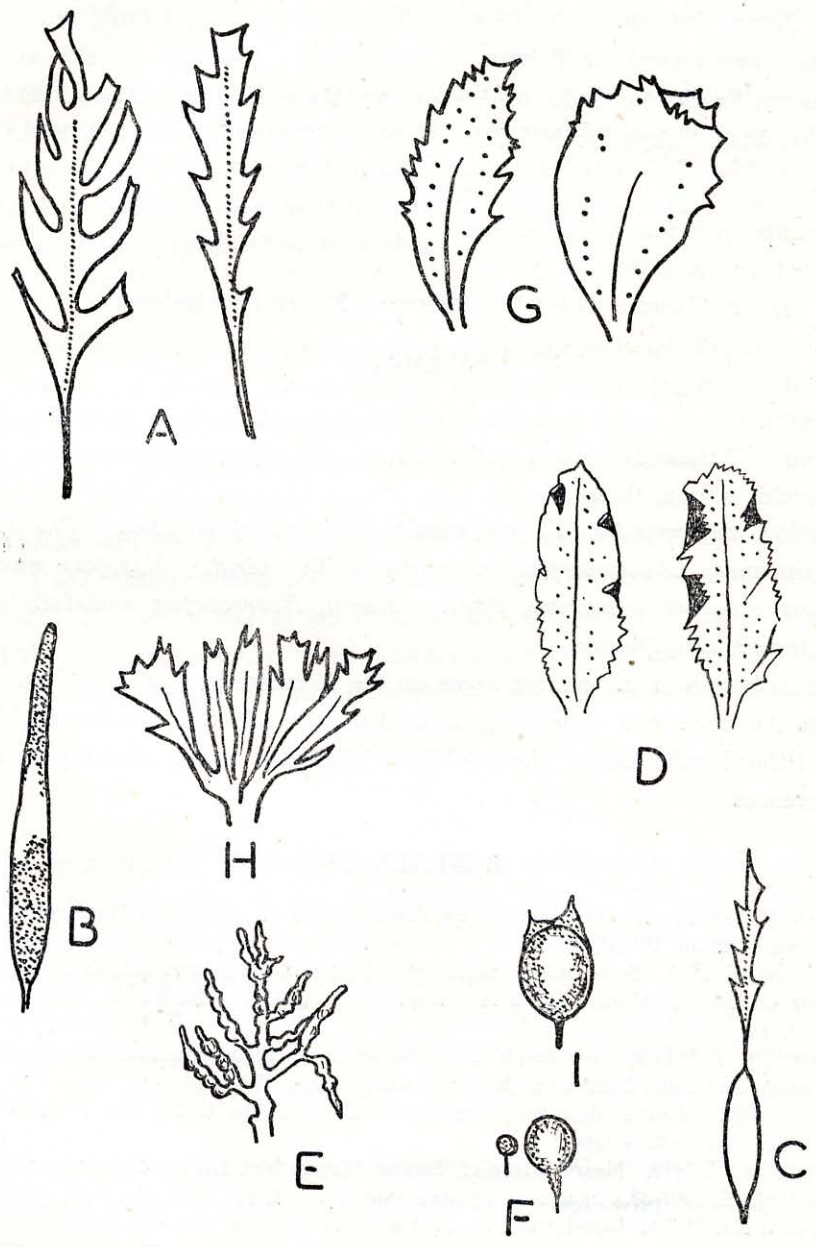


Fig. 3. A-C. *Sargassum Horneri* (Turn.) C. Ag.: A. Blades, ×3; B. Receptacle, ×1; C. Vesicle, ×2; D-F. *S. crispifolium* Yam.: D. Blades, ×3; E. Receptacle, ×6; F. Vesicle, ×2; G-I. *S. Sandei* Reinbold: G. Blades, ×3; H. Receptacle, ×6; I. Vesicle, ×2.

For want of authentic specimens with which to compare ours, it seems best to consider ours as this species until further study.

Coll ected at: Kueishan (571), Laomei (580).

Distr. Japan, Taiwan.

This is a new record for Taiwan.

3. **Sargassum Sandei** Reinbold, in Weber van Bosse 158, fig. 47. pl. 4, 1913; Yendo in Bot. Mag. Tokyo 31:196, 1917; Okamura, Nippon Kaiso-si 350, 1936.

Fig. 3 G-I

The plants were found cast ashore.

Collected at: Kueishan (572).

Distr. Japan, Taiwan, China Sea, Vietnam, Malay Archipelago.

SUMMARY

1. 50 species, 1 form and 3 varieties of marine algae are here recorded from Northern Taiwan, of these 11 species and one form are reported here for the first time from this region, these are;
Lyngbya confervoides, L. majuscula, Enteromorpha Linza, Cladophoropsis sundanensis, Chaetomorpha basiretrorsa, C. spiralis, Bryopsis muscosa, B. indica, Codium adhaerens, Padina crassa, Neurocarpus undulata f. *plana, Sargassum crispifolium.*
2. The distribution of the marine algae on the Northwestern side of Taiwan, which faces the China Sea (Loc. 1–7); and the algae on the Northeast side, which faces the Pacific Ocean (Loc. 8–10) are about the same; showing no signicant differences.

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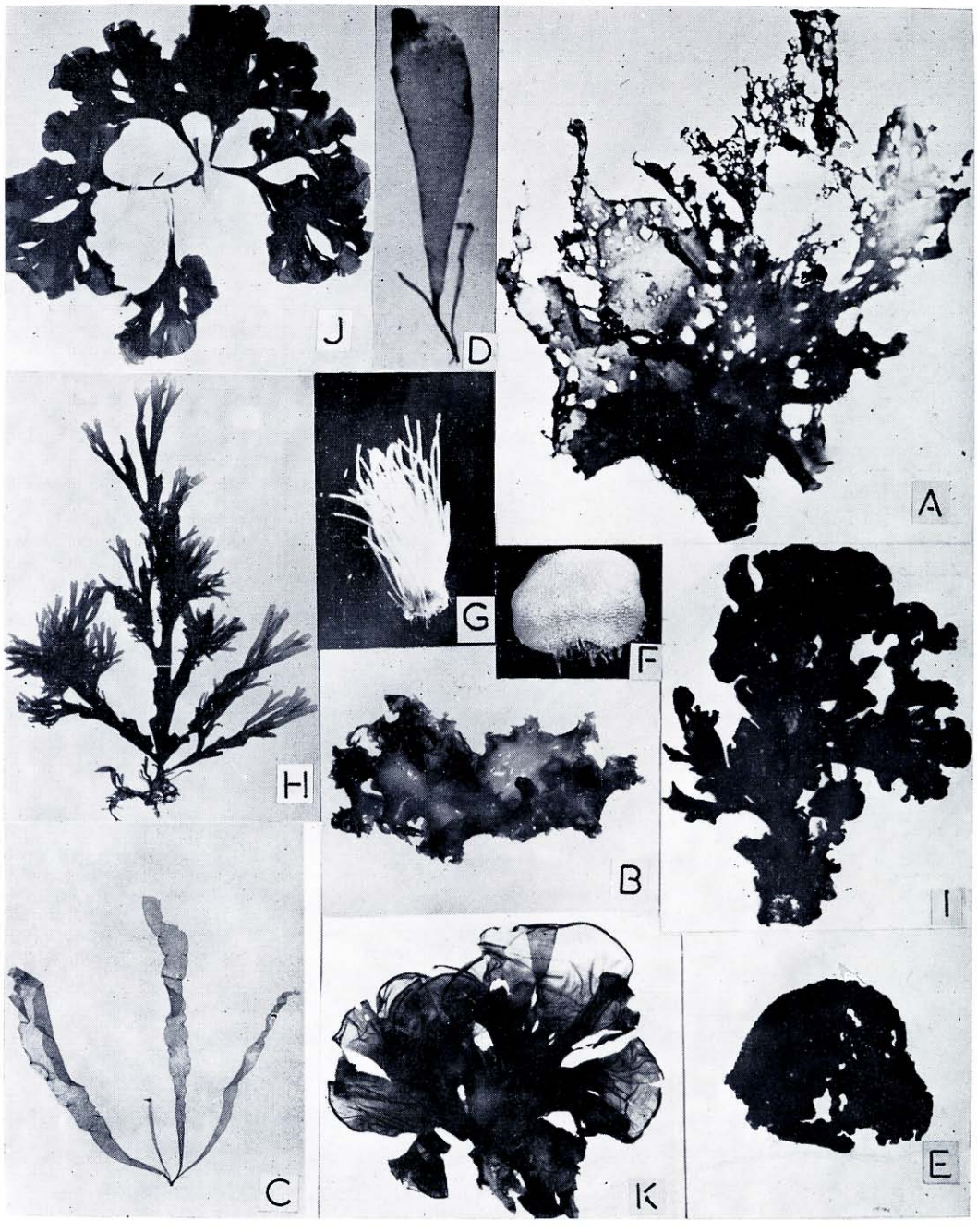

A. *Ulva reticulata* Forsk. × 0.9; B. *Ulva pertusa* Kjellm. × 0.8; C-D. *Entromorpha Linza* (L.) Ag. (C. × 0.9; D. × 1.0); E-F. *Dictyosphaeria cavernosa* (Forsk.) Börg. × 1.0; G. *Chaetomo·pha basiretrorsa* Stechell (?) × 1.0. H. *Dilophus marginatus* Okam. × 0.5; I. *Zonaria Diesingiana* J. Ag. × 0.9; J-K. *Padina crassa* Yamada (J. × 0.4; K. × 1.0).