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[Note]

Notes on Marine Algae from Jeju Island — II

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Two species of brown algae, *Dictyota friabilis* Setchell and *Punctaria projecta* Yamada, are found in the coast around Jeju Island. *D. friabilis* occurs on geniculate coralline algal beds in the lower tidal zone, which is characterized in the decumbent, entangled habit, subdichotomously bifurcate in several times, and somewhat prominent apical portion. *P. projecta* is epiphytic on other algae, which is characterized in simple, lanceolate to fusiform, coarsely undulate and cortical cells slightly projecting outward.

Key Words: *Dictyota friabilis, Punctaria projecta*

INTRODUCTION

Seven species of *Dictyota*, *D. cervicornis* Kützing from Bijindo (Kang 1966), *D. dichotoma* (Hudson) Lamouroux, *D. divaricata* Lamouroux, *D. indica* Sonder ex Kützing, *D. latifolia* Kützing, *D. linearis* (C. Agardh) Greville and *D. maxima* Zanardini were reported in Korea (Lee and Kang 2002). However, the latter two species, *D. indica* and *D. latifolia*, were conspecific with *D. cervicornis* and *D. dichotoma*, respectively (Hörnig *et al.* 1992, Hörnig and Schnetter 1988).

Two species of *Punctaria*, *P. latifolia* Greville and *P. plantaginea* (Roth) Greville have been known to occur in Korea. Since *P. latifolia* was reported from Pusan by Yamamoto and Kawamoto (1942) for the first time, it has been one of the common seaweed of Korea (see Lee and Kang 2002). *P. plantaginea* has been reported only from Ochung Island of Korea (Kang 1966).

The morphological descriptions of two species, *Dictyota friabilis* and *Punctaria projecta* are provided with special reference to the plants from Jeju Island and Chuja Islands, respectively.

DESCRIPTION

***Dictyota friabilis* Setchell 1926: 91, pls. 13, 20.**
(Figs 1-13)

Type: UC. Herbarium, University of California (No. 261252)

Type locality: Reef at Arue Point, Tahiti.

Korean name: 기는그물바탕말 (nom. nov.)

Thalli are decumbent, membranous, more or less friable, with short stolons and stupose base, and dark greenish brown (Fig. 1). Stolons are membranous, slender ribbon-shaped, contorted, entangled, branched, composed of a monostromatic medulla and a monostromatic cortex, 60-80 μm thick, 250-400 μm broad, and 2-3 mm long (Fig. 4). Blades are ribbon-shaped with entire margin, 3-5 times bifurcated subdichotomously, contorted and decumbent, entangled, attaching together with masses of rhizoid arising on the various portion of blades, composed of a single cell layered medulla and a single cell layered cortex, ca. 3 cm long, 3-10 mm broad and 90-120 μm thick (Figs 2, 9). Apical cells of branch are somewhat prominent, biconvex lenticular, 30-50 μm long and 15-25 μm broad (Fig. 7). Phaeophycean hairs occur on both surfaces of blade (Figs 10, 13). Medullary cells are rectangular in surface view, elongated longitudinally, arranged in longitudinal rows, containing a lump of brown granules, 85-215 μm long, 50-80 μm broad, and 50-100 μm thick (Figs 10, 12). The lumps of brown granules are seen in transverse rows in surface view. Cortical cells are usually rectangular, somewhat elongated longitudinally, arranged in longitudinal rows, strongly constricted at middle portion, 15-35 μm long, 8-20 μm broad, and 15-25 μm thick (Figs 6, 10, 12).

Tetrasporangia are born on both surfaces of blade

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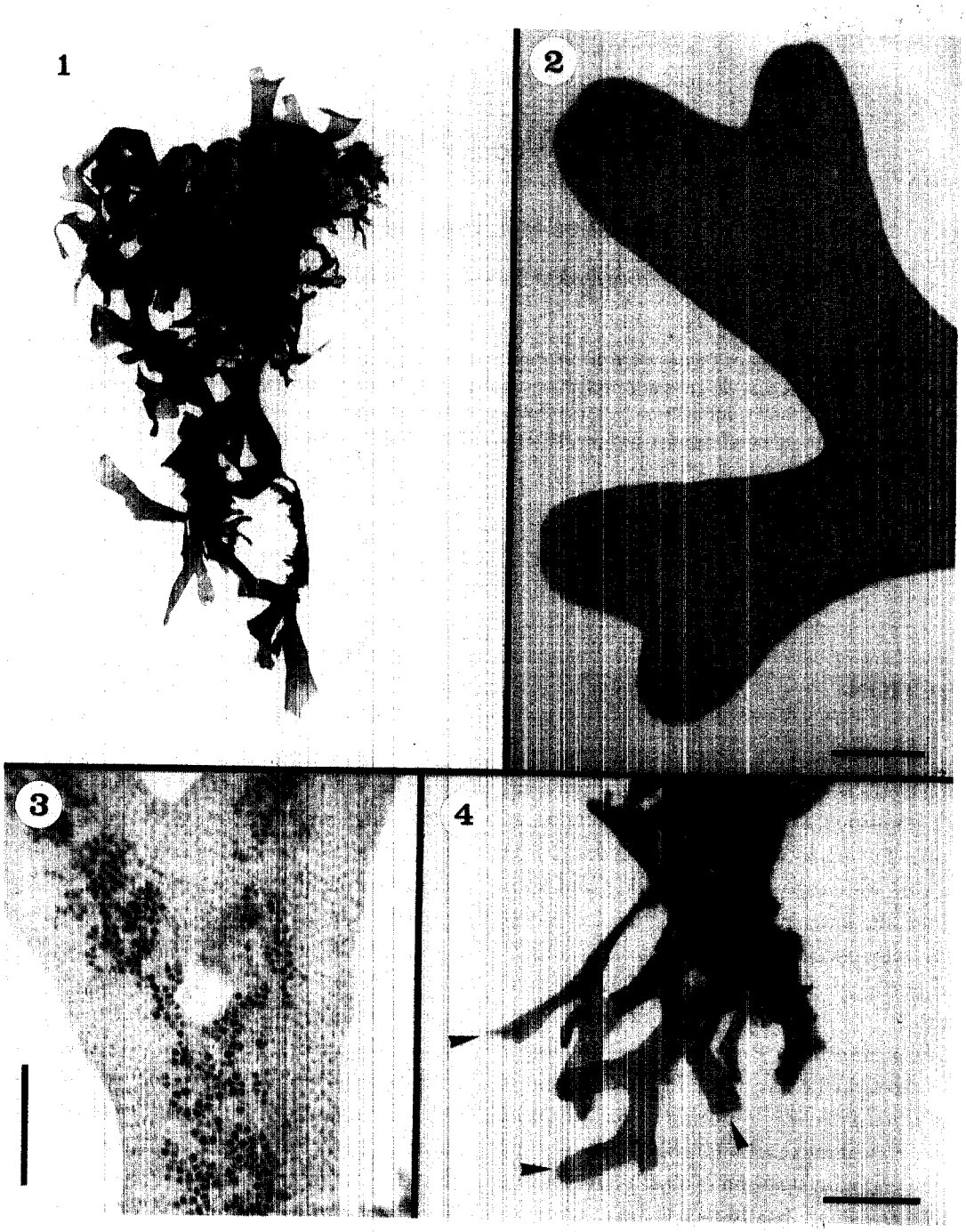


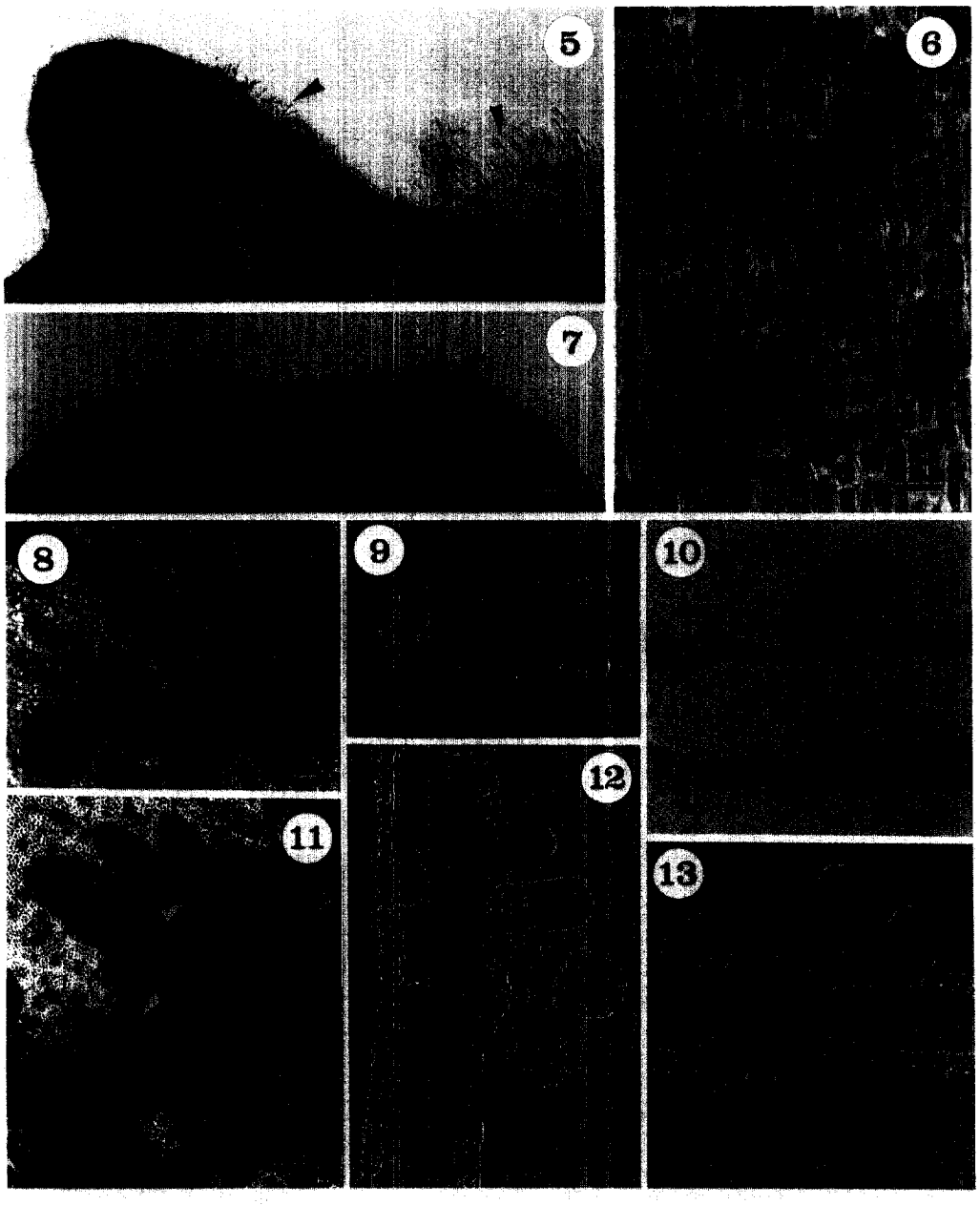
Figs 1-4. *Dictyota friabilis* Setchell.

Fig. 1. Habit. Scale unit: 1 mm. **Fig. 2.** Apical portion of blade. Scale bar: 2 mm. **Fig. 3.** Surface view of tetrasporangial sori. Scale bar: 1 mm. **Fig. 4.** Stolons (arrow heads). Scale bar: 2 mm.

except for the younger or older parts and generally grouped, cruciately divided, globose, 80-120 μm in diam. (Fig. 3). Tetraspores usually appear *in situ* germination before the cruciate division (Figs 8, 10-13).

Collections examined: LYP-1676 (Marado, 7 V 2001, ⊕, LYP-1677 (Hamduck, 22 VIII 2002, ⊕, coll. B. Kim).

The plants at hand agree quite well with the description and figures of *Dictyota friabilis* Setchell (1926: 91, pl. 13, Figs 4-7; pl. 20, Fig. 1) in decumbent habit, frequent attachment by masses of rhizoid, a somewhat prominent apical cell, a form of tetrasporangial sori, and the friable texture (Fig. 5). The plants at hand occur on geniculate coralline algal beds in the lower tidal zone and have stolons at the base of thallus (Fig. 4). Although Setchell

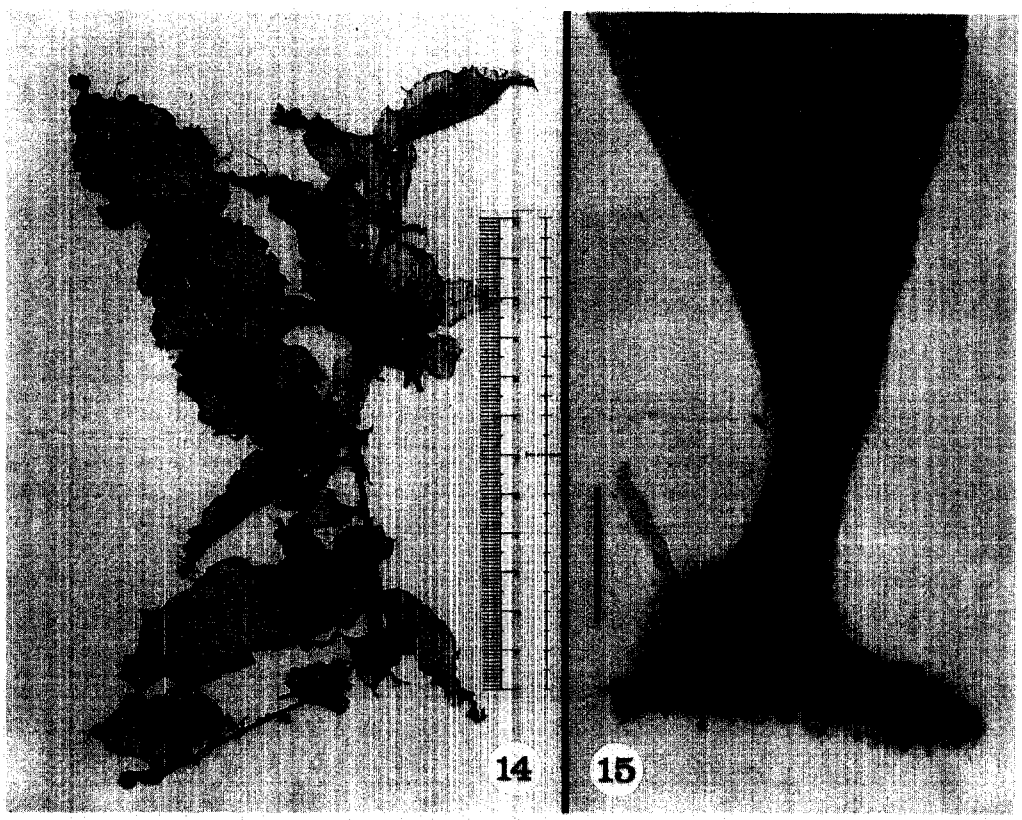


Figs 5-13. *Dictyota friabilis* Setchell.

Fig. 5. Tufts of rhizoid on terminal blade (arrow heads). Scale bar: 400 μm. **Fig. 6.** Cortical cells of blade in surface view. Scale bar: 50 μm. **Fig. 7.** Apical cells of blade (arrows). Scale bar: 100 μm. **Fig. 8.** Surface view of tetrasporangia with cruciate division (arrow heads). Scale bar: 100 μm. **Fig. 9.** Cross section of blade margin. Scale bar: 50 μm. **Fig. 10.** Cross section of blade bearing tetrasporangium (arrow head) and phaeophycean hairs (h). Scale bar: 50 μm. **Fig. 11.** Showing *in situ* germination of spore (arrow heads). Scale bar: 400 μm. **Fig. 12.** Longitudinal section of blade. Scale bar: 50 μm. **Fig. 13.** Cross section of blade showing *in situ* germination of spore (arrow head). Scale bar: 50 μm.

(1926) made no mention of basal system of the plant from Tahiti, the plants from Jeju Island have masses of rhizoid and several stolons at the base of blade. It is also quite remarkable that there are conspicuous belt-like thickenings running around the cortical cell parallel to the blade surface in our plant. However, those of the type material do not have such a belt-like constriction and are seemed to the form of cortical cells in longitudinal section because of longer size of the cortical cell (cf. Setchell 1926, pl. 13, fig. 7). The tetrasporangia of our plant frequently make *in situ* germination before their reduction division (Figs 11-13).

The plants at hand are gregarious and growing on geniculate coralline algal beds in the intertidal zone of



Figs 14-15. *Punctaria projecta* Yamada.
Fig. 14. Habit. Scale unit: 1 mm. **Fig. 15.** Discoid holdfast. Scale bar: 500 μm.

Jeju Island. *D. friabilis* occurs in western North Pacific and Indian Ocean (Silva *et al.* 1987; Tseng 1983; Tanaka 1990; Silva *et al.* 1996; Yoshida 1998).

***Punctaria projecta* Yamada 1968, p. 372, f. 1, 2.**

(Figs 14-22)

Type: SAP. Herb. Hokkaido Univ. (No. 029476)

Type locality: Horai-iwa, Miyazu Bay, Prov. Tango, Japan.

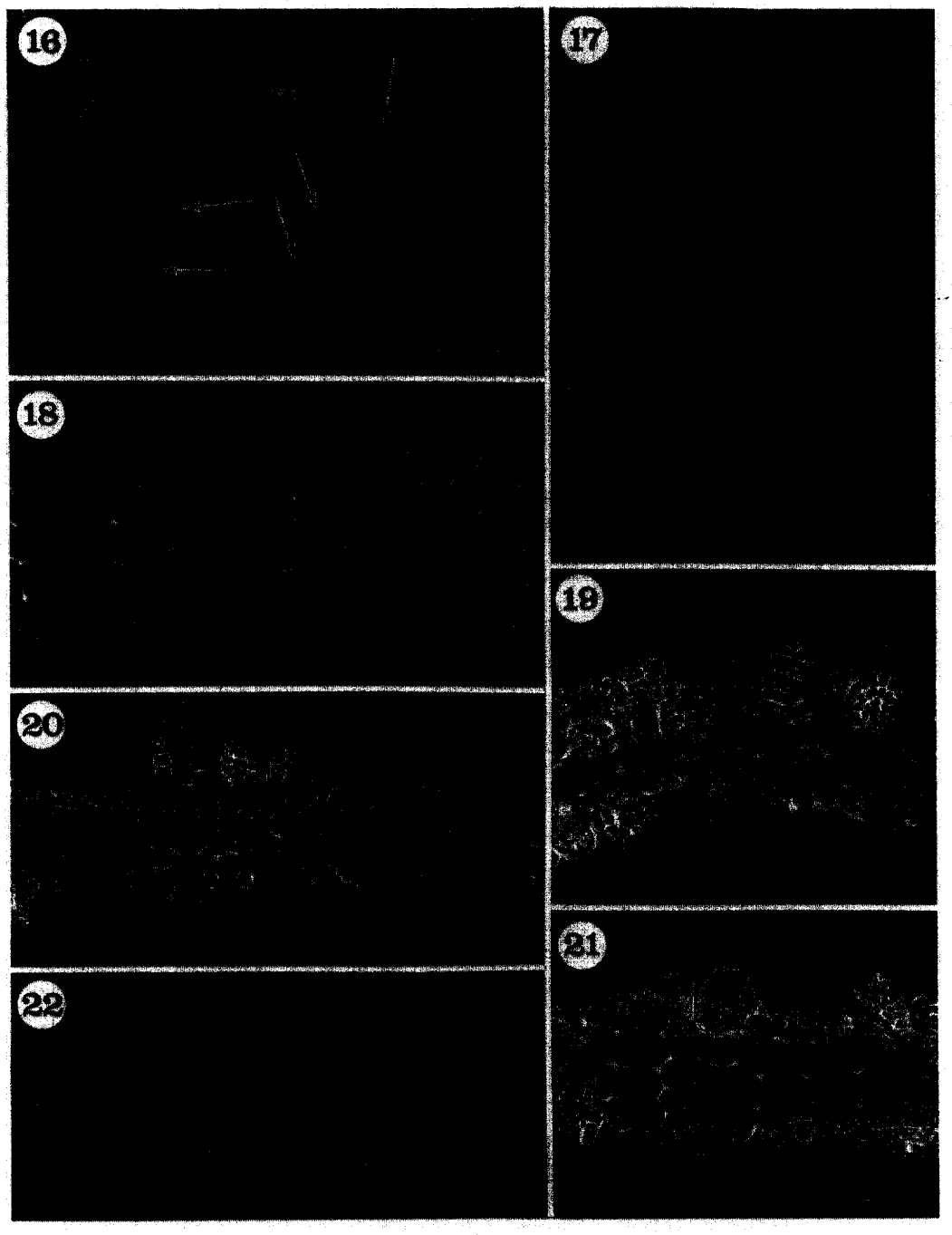
Korean name: 연붉은미역쇠 (nom. nov.)

Thalli are epiphytic, gregarious, membranous, pale brown, simple, lanceolate to fusiform, gradually expanded on a short stipe, with a discoid holdfast, coarsely undulate, 90-130 μm thick, 4-8 cm long, 1-4 cm broad (Fig. 14). Holdfasts are composed of a mass of rhizoids (Fig. 17). Stipes are short, appressed, ellipsoid in transverse section, composed of 5-6 cell-layered medulla and 2-3 cell-layered cortex, 300-500 μm thick, 0.6-1 mm broad. The cortical cells in the lower portion of stipe are transformed to rhizoids (Figs 17, 22). Blades are medulla and single cell-layered cortex, composed of 4-6 cell-layered with 88-125 μm thick. Medullary cells are oblong with round corner, 20-75 μm long, 30-50 μm broad, 20-30 μm thick. Cortical cells are globose or appressed, with a cell wall inflated outward, 20-35 μm long, 15-30 μm broad (Fig. 18). Phaeophycean hairs occur in groups on both surface of blade and 13 μm in diam. (Fig. 20).

Plurilocular and unilocular sporangia are scattered on both surface of blade. Plurilocular sporangia are produced abundantly in groups, conical to fusiform, 30-43 μm long, 15-28 μm in diam. (Fig. 19). Unilocular sporangia are born together with plurilocular sporangia, rare, solitary, spherical to ovate, 25-38 μm long, 20-38 μm in diam. (Figs 16, 21).

Collection examined: LYP-1681 (Chujado, 24 V 2001)

The plant at hand agrees quite well with *P. projecta* Yamada (1968: 372, Figs 1-2) of blade. As Yamada (1968) mentioned, the cortical cells of *P. projecta* are inflated outwardly at making a finely embossed surface, and the various shape of plurilocular sporangia are very characteristic. The holdfast of *P. projecta* is made of a mass of rhizoids, which show a disc form on the base (Figs 15, 17).



Figs 16-22. *Punctaria projecta* Yamada.

Fig. 16. Surface of blade showing unilocular sporangium (arrow head) and plurilocular sporangia (arrows). Scale bar: 30 μm. **Fig. 17.** Longitudinal section of stipe and holdfast (r: rhizoids, m: medulla). Scale bar: 100 μm. **Fig. 18.** Cross section of blade (c: cortex, m: medulla). Scale bar: 30 μm. **Fig. 19.** Plurilocular sporangia (arrow heads) in cross section of blade. Scale bar: 30 μm. **Fig. 20.** Phaeophycean hairs (h) arising on the opposite side of surface. Scale bar: 30 μm. **Fig. 21.** Unilocular sporangia (arrow head) in cross section of blade. Scale bar: 30 μm. **Fig. 22.** Cross section of stipe (c: cortex, m: medulla). Scale bar: 50 μm.

Phaeophycean hairs occur in tufts on the both surface of blade. And they appear many dots on blade surface. Occasionally, the phaeophycean hairs are born on the opposite side of blade surface, where is slightly depressed because of no medullary layer (Fig. 20). Sometimes, irregularly round to elliptical form of small perforations are observed on the blade. It seems to the authors that a small perforation may be formed at the depressed portion after falling off the hairs.

P. projecta has been reported from the coast of Japan

(Yamada 1968; Yoshida 1998). The plants at hand are epiphytic on *Sargassum fulvellum* and *Scytosiphon lomentaria* in the lower tidal zone in Chuja Islands. Most plants examined have plurilocular sporangia abundantly and unilocular sporangia rarely. Plants bearing either plurilocular sporangia or unilocular sporangia exclusively were not observed.

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