The Genus Antithamnion (Ceramiaceae) in Sourthern Japan and Adjacent Waters I

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The Genus *Antithamnion* (Ceramiaceae) in Southern Japan and Adjacent Waters-I.

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Abstract

For some years, the present writer has been studying the marine red algae from southern Japan. Among the specimens of marine red algae collected by the writer since 1967 from these southern Japanese islands, eight species of *Antithamnion* are described in this paper. Of these eight species, seven species are newly known in southern Japan and its adjacent waters; they are *A. breviramosus* DAWSON, *A. breviramosus* var. *simplex* DAWSON, *A. hubbsii* DAWSON, *A. lherminieri* (CROUAN & CROUAN) NASR, *A. mcnabii* DAWSON, *A. percurrens* DAWSON, *A. sublittorale* SETCHELL & GARDNER. The other one is a new species named *A. subcorticatum.*

Introduction

About 45 species of *Antithamnion* have been reported from the Pacific coasts (Dawson, 1962: 10–14) and 11 species of them were reported from Japan and its adjacent waters. They are as follows: *A. gracilentum* J. AG. (Yendo, 1914: 278–279), *A. corallina* (RUPR.) KJELLM. (Tokida, 1932: 23; Yamada and Tanaka, 1944: 73), *A. sparsum* TOKIDA (1932a: 105–108), *A. corticatum* TOKIDA (1932a: 108–112), *A. nipponicum* YAMADA & INAGAKI (1935: 38–40), *A. simamuranum* NAGAI (1941: 207–208), *A. miharai* TOKIDA (1942: 90–92), *A. basisporum* TOKIDA & INABA (1950: 118–121), *A. cristirhizophorum* TOKIDA & INABA (1950: 121–122), *A. defectum* KYLIN (Inagaki, 1950: 24–25), *A. gardneri* G. DE TONI (Umezaki, 1969: 6–9).

Three species of *Antithamnion*, i.e. *A. plumula* (ELLIS) THUR., *A. applicitum* YENDO (non J. AGARDH) and *A. terminale* INAGAKI were once reported respectively from Japanese waters. But later all of these species were transferred into another genus. *A. plumula* interpreted by Okamura (1922: 157) was transferred into *Plathythamnion yezoense* INAGAKI (1950: 25) on the ground that there was no species in Japan that coincide with *A. plumula* (ELLIS) THUR. as shown in the figures and descriptions by Hauck and Rosenvinge and that the closer affinity between *P. yezoense* and *A. plumula* that is interpreted by Okamura. *Antithamnion applicitum* YENDO (non J. AGARDH) (1917: 206–207) was treated as synonymous with *Antithamnion nipponicum* YAMADA & INAGAKI without any clear distinctions pointed out between these two species (Okamura, 1936: 706). And, also, *Antithamnion terminale* INAGAKI (1950: 22–23) was treated as synonymous with *Acrothamnion preissii* (SONDER) WOLLASTON (Segawa, 1956: 102, as *Acrothamnion pulchellum* J. AGARDH). In this species the fact that the gland cells are situated on the terminal cells of lateral branches is distinct enough to regard the *A. terminale* as synonymous with *Acrothamnion preissii.*

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Furthermore, recently Wollaston (1968: 287–289) described, in comparison with the southern Australian and the northern Japanese species of *Antithamnion gracilentum*, that it is doubtful whether Japanese species coincide with Australian species because of the differences of branching of pinnules between these two specimens.

All of those above described Japanese species of *Antithamnion* are reported from northern part of Japan and its adjacent waters, while no notice was taken on the species of *Antithamnion* collected from the southern Japanese and its adjacent waters.

Almost all of the collections were made by dredging and SCUBA* diving. Most of these specimens are small enough to allow them to play the part as epiphytes on larger algae or on calcareous red algae. Therefore, all these specimens are kept in glycerine microslide mounts and stored at the Harbarium of Department of Botany, Faculty of Fisheries, Kagoshima University.

Antithamnion breviramosus DAWSON

Fig. I A–D

Contributions toward a marine flora of the southern California (1949) pp. 14–15, figs. 28, 57; Notes on Pacific Coast Marine Algae VI (1954) p. 342; Notes on eastern Pacific insular marine algae (1957a) p. 7; Marine algae from the 1958 cruise of the Stella Polaris in the Gulf of California (1959a) p. 28; New records of marine algae from Mexico and Central America (1960) p. 50; Marine Algae of El Salvador (1961) p. 417; Marine Red Algae of Pacific Mexico (1962) p. 14, pl. 15, fig. 1.

Thallus small, greenish-yellow in glycerine jelly mount, consisting of a branched prostrate axis and erect axis; prostrate axis about 3–5 mm. in extent, attached by simple, uniseriate rhizoids from the basal cell of primary determinate branches; rhizoids about 12 μ in diameter, thickly walled; erect axis 2–3 mm. high; primary axis producing primary determinate branches in whorls of three from the upper distal end of the axial cells; axial cells to 57 μ in diameter and 3.5–4 times as long as broad; determinate branches commonly having 2–4 forkings, alternately branched, directed upward and adaxially curved, to 330 μ or 7–14 cells long, 9–15 μ in diameter at the base, the cells mostly 2–5 times as long as broad, the branch tips usually blunt or at least not sharply pointed, the basal most cells much shorter; gland cells frequent on determinate branchlets, resting on only single cell, having almost 1/2–3/5 long as this cell, 9 by 18 μ, ovate-oblong; tetrasporangia on adaxial side of the first or the second basalmost cell of determinate branches, cruciately divided, ovate-oblong or rarely spherical, 36–45 by 42–48 μ in diameter; sexual reproductions unknown.

Japanese name: Hina hutatsugasane (nom. nov.)

Habitat: Epiphytic, dredged from 20 m. deep at Oodomari, southern Kyushyu (June 1966; *no. 19695*).

Geographical distribution: Pacific Baja Calif., Gulf of Calif.

The plant, upon which the above descriptions are based, was found as an epiphyte.

* Self Containing Underwater Breathing Apparatus

Single small fragment of this species was collected and the observation proved that it brings forth the well matured tetrasporangia. The vegetative external features and sizes are in

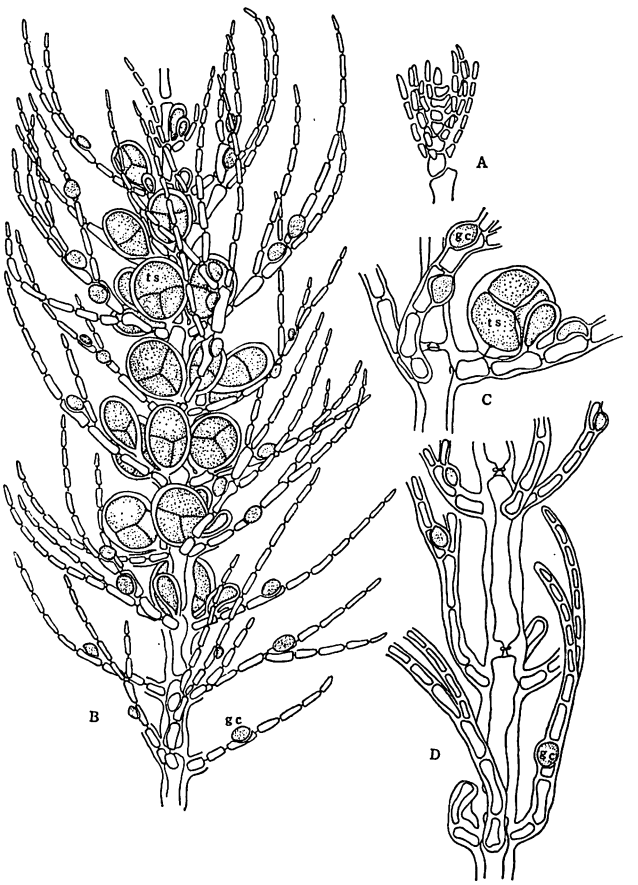

Fig. 1. *Antithamnion breviramosus* DAWSON. A, apical part of indeterminate branch. ×264. B, middle part of indeterminate axis provided with tetrasporangia on determinate lateral branches. ×180. C, two tetrasporangia on determinate lateral branch. ×264. D, lower part of indeterminate branch. One of three determinate lateral branches is transformed into rhizoid. ×180. gc: gland cell, ts: tetrasporangium.

agreement with Dawson's descriptions. According to Dawson's note, the Pacific Mexican specimens were sterile; however, in this Japanese plant, the present author found out a tetrasporangia producing plant. The tetrasporangia are formed adaxially on the first or the second basal most cell of lateral determinate branches and they aggregate around the erect axis as if they were surrounding the axis.

Superficially, the features of this tiny and delicate plant bearing primary determinate branches in whorls of three in each axial cell show a close affinity to *Antithamnion elegans* BERTHOLD as given by Børgesen (1930: 56–60) and Feldmann-Mazoyer (1940: 267–271). However, these two species are apparently different on the following grounds: i. e. in *A.*

breviramosus, the erect branches always bear the primary determinate branches in whorls of three and the tetrasporangia are always formed solitary on the adaxial side of the first or the second basal cell of the determinate lateral branches in the southern Japanese specimens; and on the contrary, in *A. elegans*, the erect branches bear the primary determinate lateral branches in whorls of three or four and one to three tetrasporangia are formed adaxially on the first to the third basal cells of determinate lateral branches. Furthermore, the cells of determinate lateral branches in *A. breviramosus* are longer than that of *A. elegans*. But the sizes of plants, cells and tetrasporangia between these two species remind us of the possibility that these two species are to be closely related.

Antithamnion breviramosus var. *simplex* DAWSON

Fig. 2 A–B

An Annotated list of marine algae from Eniwetok Atoll (1957) p. 117 fig. 24 c,d.

Thallus minute, consisting of a branched prostrate axis and erect axis; erect axis about 1 mm. long or less long; primary indeterminate axis producing primary determinate lateral branches in whorls of three from the upper distal end of the axial cells; axial cells to 24 μ in diameter and 2–8 times as long as broad; determinate branches usually simply having 1–2 forkings, alternately branched, directed upwards and adaxially curved, to 9 μ in diameter at the base, of cells mostly 2 times as long as broad, the branch tips blunt or at least not acute; gland cells frequent on determinate branchlets, resting on only single cell, having almost 4/5 length as this cell, 6–9 by 9–12 μ, ovate-oblong; reproductions unknown.

Japanese name: Hosoba hina hutatsugasane (nom. nov.)

Habitat: Growing as epiphyte on the frond of the outer margins of *Plocamium telfairiae* HARVEY at the depth of about 10 m. in the lagoon of north end of Yoron Island (Aug. 1967, *no. 19696*).

Geographical distribution: Parry Island, Eniwetok Atoll.

Some small fragments of this species were collected and examined. This tiny plant is remarkably similar to that described on the specimens from Eniwetok Atoll (Dawson, 19 57: 117). Since it may be that the Japanese specimens at hand is quite young, the present author could not be said to have observed a well developed prostrate axis as shown by Dawson. However, the simple forkings of lateral branches and the size of plant are the features clear enough to allow us to regard the present southern Japanese species as *A. breviramosus* var. *simplex*.

Antithamnion hubbsii DAWSON

Fig. 3

Marine Red Algae of Pacific Mexico (1962) pp. 16–17, Pl. 5 Fig. 2, Pl. 6 Fig. 3.

Plants small, epiphytic, creeping on the larger algae; the primary axis attached frequently by a multicellular uniseriate rhizoid; rhizoids solitary, formed from the basal cell

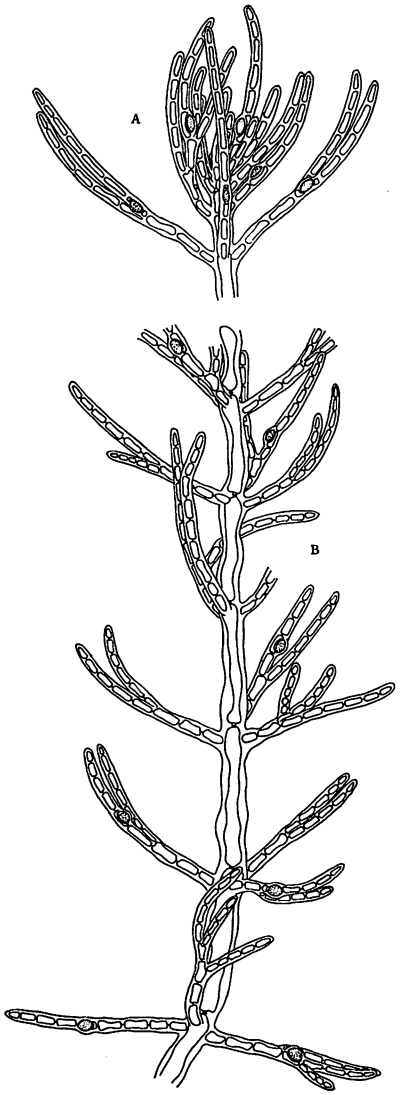

Fig. 2. *Antithamnion breviramosus* var. *simplex* DAWSON. A, apical part of indeterminate branch. ×240. B, middle part of indeterminate axis. ×240.

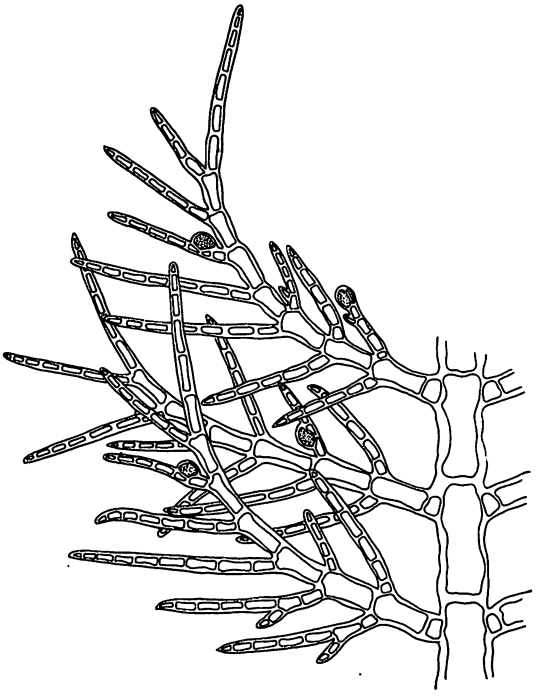

Fig. 3. *Antithamnion hubbsii* DAWSON. Mid-part of sterile plant. ×170. gc: gland cell.

of determinate lateral branch, about 24 μ in diameter, terminating in an irregular multicellular lobed disc; primary indeterminate axis 39–60 μ in diameter, the cells 3.5–4.6 times as long as broad, provided near the upper distal end of each cell with a pair of spreading or somewhat ascending determinate lateral branches; some of the determinate branches transformed later into indeterminate branches; primary determinate lateral branches 400–450 μ or 12–14 cells long, 24–30 μ in diameter near the base, arising from a subspherical

or quadrate basal cell, provided with opposite pinnate secondary determinate lateral branches in their lower part; the secondary determinate lateral branches simple or with a abaxial tertiary determinate branches mostly in the lower secondary determinate lateral branches; all branches attenuate, branch tips mostly acute and sharpened, of cells 3.3–5 time as long as broad; gland cells frequent, mostly on the secondary branches of the determinate lateral branchlets, resting on two cells, ovate-oblong, about 15 by 28 μ, pale green or yellowish; reproductions unknown.

Japanese name: Nise hutatsugasane (nom. nov.)

Habitat: Epiphytic on larger algae or Polychaete-tube, at depth of about 10–30 m. in Yoron Island (Aug. 1967, *no. 19697*). Additional materials were collected from Oodomari (Nov. 1967), Mage Island (June 1963) etc.

Geographical distribution: Melpomene Cove, Isla Guadaloupe, Baja Calif.

This southern Japanese species resemble to *A. hubbsii* DAWSON and *A. nipponicum* YAMADA & INAGAKI. But closer examinations between these two species show that it is quite doubtful whether these two species are apparently different. Dawson (1962: 10) described, in the Key to the north Pacific species of *Antithamnion*, that in *A. nipponicum* "the secondary determinate branchlets predominately pectinate or secund" and in *A. hubbsii* "the secondary determinate branchlets predominately pinnate or forked". Dawson's Key on these two plants is quite doubtful and it is supposed that the determinate lateral branches of *A. nipponicum* probably produce the pectinate or secund secondary determinate branchlets only for a short time and as they grow the determinate lateral branches become pinnate provided with simple or oppositely branched branchlets. Therefore, the principal vegetative structures of these two species are quite similar. Furthermore, the external features of these species fundamentally agree in some degree in comparison with Yamada and Inagaki's figures (1935: Fig. 1–3) and Dawson's figures (1962: Pl. 6 fig. 3, Pl. 5 fig. 2). Our southern Japanese species of *Antithamnion* show the intermediate features between *A. nipponicum* and *A. hubbsii* on the following grounds:

(1) Indeterminate branches with somewhat ascending determinate branches.

(2) Branch tips tend to be more attenuated and to have longer cells.

(3) The secondary determinate branches simple or with a few adaxial branchlets.

Of these three, the former two characteristics are common to *A. hubbsii* and the last is common to *A. nipponicum*. Additional characteristics are compared in **Table I.**

The sterility of our southern Japanese specimens and Dawson's Mexican specimens prevented the present author from comparing the reproductive organs. Furthermore, present southern Japanese specimens are much variable and unstable in the external features. Therefore, before any possible discussion is to be done on the present southern Japanese specimens, large amount of them must be compared. But in this paper the southern Japanese plants are described as *A. hubbsii* DAWSON on the grounds of its being similar to *A. hubbsii* rather than to *A. nipponicum*.

Table I. Comparison of vegetative characteristics between *A. nipponicum*, *A. hubbsii* and the present southern Japanese plants.

	*A. nipponicum**	present materials	*A. hubbsii***
Rhizoid (in diam.)	60-70 μ	24 μ	30-40 μ
Primary axis (in diam.)	75-90 μ	30-60 μ	50-60 μ
of cells	250-350 μ long	3.5-4.6 diam. long	4-5 diam. long
Indeterminate branch	10-14 cells long	12-14 cells long	13-14 cells long
		400-450 μ long	1 mm. long
		24-30 μ in diam.	30 μ in diam.
	4-8 pairs of pinnules	2-5 pairs of pinnules	3-5 pairs of pinnules

* after Yamada and Inagaki (1935: 38-40, Fig. 1-3)

** after Dawson (1962: 17, Pl. 6 fig. 3)

Antithamnion lherminieri ((CROUAN & CROUAN) NASR

Fig. 4 A-C

"Some new and little known algae from the Red Sea" (1941) p. 66, fig. 9-10; Dawson, "Some marine algae of the southern Marshall Islands" (1956), p. 53, fig. 51; Palmyra Atoll (1959), p. 46; Marine Red Algae of Pacific Mexico (1962), p. 18, Pl. 5, fig. 5.

Thalli small, epiphytic on calcareous algae or on Polychaete-tube, attached by long, pluricellular, uniseriate rhizoids with discoid tips; creeping axis about 42 μ in diameter and of cells about 135 μ long, producing erect branches and dwarfish branches oppositely; erect branches about 2 mm. high, bearing a branchlets alternately from nearly every cell, of cells about 15 μ in diameter and about 1.8 times as long as broad, the branch tips blunt or at least not conspicuously acute, ascending; branchlets usually simple and rarely with one or two additional branchlets; rhizoids solitary, 27-30 μ in diameter, lobed digitately, usually formed on the basal cells of the dwarfish branches that are of the more ventral of each opposite pair of branches; gland cells resting on two or rarely on three cells on the branchlets, ovate-oblong, 18 μ long and 12 μ broad; tetrasporangia placed near the base on the adaxial side of the lateral branchlets, sessile, cruciately divided, subcylindrical with broadly rounded apex and base, 102 μ long and about 48 μ broad, kept within a thick gelatinous envelop; sexual reproductions unknown.

Syn.: *Callithamnion lherminieri* CROUAN & CROUAN, in Maze & Schrum 1870-77, p. 144; *Antithamnion antillanum*, Børgesen 1915-20, p. 226, fig. 213-216.

Japanese name: Nise kinuitogusa (nom. nov.)

Habitat: Growing as an epiphyte on the calcareous red algae and on the Polychaete-tube in the tide pool. Yonakuni (col. Tanaka, Oct. 1959, no. 19698); Amami Island (col. Ushio, May 1969, *no. 19699*).

Geographical distribution: Guadeloupe, West Indies; Pacific Baja Calif., Gulf of Calif., Marshall Island.

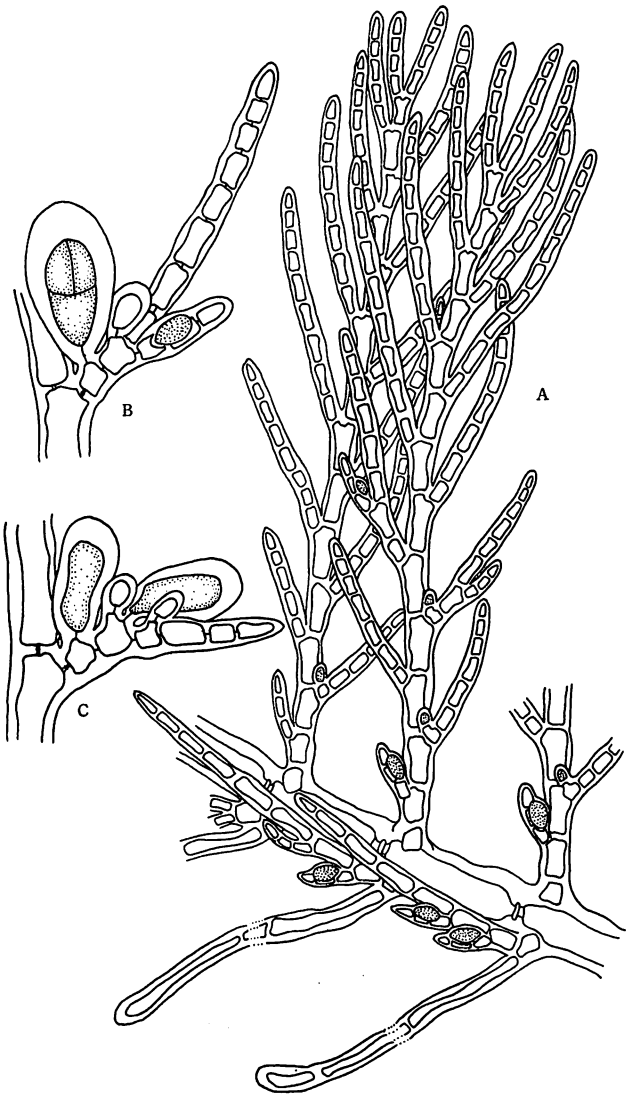

Fig. 4. *Antithamnion lherminieri* (CROUNA & CROUAN) NASR. A, habit of plant. ×250. B-C, determinate lateral branches provided with tetrasporangia. ×315.

This tiny species of *Antithamnion* coincide quite well with the descriptions and figures on the plants from Pacific Mexico given by Dawson (1962: 18). But as to the gland cells they differ slightly. Dawson described (1959: 46) an occurrence of gland cells that are borne on a single cell, but in our southern Japanese materials they are usually resting on two and rarely on three cells.

This species is distinct from other species of *Antithamnion* in the arrangement of branches and branchlets.

The specimens from Yonakuni and Amami Island were growing on Polychaete-tube and calcareous algae forming a hairy, purplish clumps in the tide pool near the low tide level of the intertidal zone on the coral reef.

Antithamnion mcnabii DAWSON

Fig. 5 A-B

Marine algae from the 1958 cruise of the Stella Polaris in the Gulf of California (1959 a) p. 28, fig. 7; Marine Red Algae of Pacific Mexico (1962) p. 18, Pl. 5 fig. 4.

Thalli minute, growing on a small sand grains forming soft, densely aggregate, interwoven clumps, abundantly branched, provided with interwoven, branched, monosiphonous axis; main axis about 42–66 μ in diameter and about 120–165 μ long below, gradually reduced toward the tops; main axis producing determinate branches in whorls of three from the upper distal end of the axial cells; determinate lateral branches about 159 μ long, provided with two to three or sometimes four forkings in a digitate manner, directed upward and adaxially curved, the cells successively reduced in size to 12–15 μ or less long and to 6–7 μ at the ends, branch tips blunt or subacute, the cells mostly 2–6 times as long as broad, the basalmost cell much shorter; rhizoids arising from the basal cell of a determinate lateral branch, simple, uniseriate, multicellular, about 18 μ in diameter, numerous; gland cells absent; tetrasporangia on the adaxial side of basal cell of determinate lateral branches, sessile, cruciately divided, oblong when young and nearly ovate-oblong when mature, 75 by 48 μ, surrounded by determinate lateral branches; sexual reproductions unknown.

Japanese name: Fushikure futatsugasane (nom. nov.)

Habitat: Growing on small sand grains in Mage Island (col. Tanaka, June 1963, *no. 196910*).

Geographical distribution: El Solitario rock, Bahia Aqua Verde, Baja California der Sur, Mexico.

The plants (*no. 196910*) from Mage Island, growing on small sand grains, seem to belong to this species. It agrees with Dawson's Pacific Mexican species, *A. mcnabii*, in having:

(1) The form of dense aggregation of axis matted together with rhizoids.
(2) The absence of gland cells.
(3) The short-segmented and digitately branched determinate lateral branches.
(4) Provided with the determinate lateral branches in whorls of three from the upper distal end of the respective principal axial cells.
(5) Growing on small sand grains.

But it differs in having much stouter branching. In southern Japanese specimens the principal axis measures 42–60 μ in diameter and branchlets are 150 μ long, however, on the contrary, in Pacific Mexican specimens the axis measures 25 μ in diameter and branchlets are 100 μ long.

All of the primary determinate branches incurve conspicuously as if they were surrounding the principal axis. In most cases, the principal axial cells bear three primary branches

Fig. 5. A-B, *Antithamnion mcnabbii* DAWSON. C-D, *Antithamnion sublittorale* SETCHELL & GARDNER. A, indeterminate axis provided with tetrasporangia and determinate lateral branches in whorls of three. ×164. B, part of indeterminate lateral branches in whorls of three. ×246. C, apical part of indeterminate branch. ×246. D, middle part of indeterminate axis provided with opposite, distichous determinate lateral branches. ×164.

on the upper distal end of each axial cells, however where the indeterminate branch is formed from one of these three primary branches, additional fourth primary lateral branch is formed on the same axial cell. Thus, the branches become tetrastichous.

Antithamnion percurrens DAWSON

Fig. 6 A–C

An Annotated List of Marine Algae from Eniwetok Atoll (1957) p. 116–117, Fig. 24 a, b.

Thalli minute, densely tufted, the principal main axis prostrate and are fastened to the substratum by means of short lateral branches modified to attachment; primary main axis about 18 μ in diameter, of cells about 3 times as long as broad, frequently branched, with opposite primary determinate branches from the upper distal end of each axial cells; one member of paired primary determinate branches transferred into rhizoids and others are transferred into erect lateral branches; erect lateral branches to 6 mm. high, provided with paired, opposite secondary determinate branches from the upper distal end of the axial cells of erect lateral branches; secondary determinate branches 9–12 μ in diameter at the base, 6 to 8 cells long, the basal cells subspherical, the others about 1–1.2 times as long as

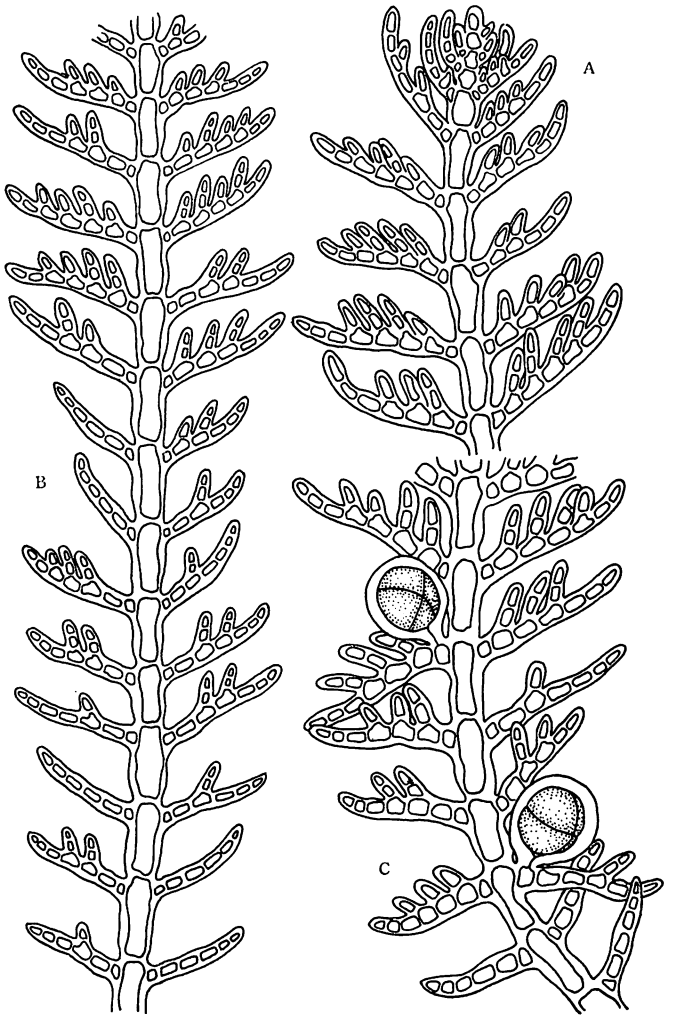

Fig. 6. *Antithamnion percurrens* DAWSON. A, apical part of indeterminate lateral branch. ×307. B, middle part of indeterminate lateral branch. ×205. C, lower part of indeterminate lateral branch provided with tetrasporangia. ×307.

broad, pectinate or secund, adaxially with two to three simple ultimate branches; ultimate branches 1–3 cells long; gland cells absent; tetrasporangia on the adaxial side of basal cell of the secondary determinate branches, nearly spherical, 48 by 36 μ, sessile, cruciately divided, thickly walled with gelatinous envelop, tetrasporangia bearing secondary determinate branches much disarranged; sexual reproductions unknown.

Japanese name: Kataha no hutatsugasane (nom. nov.)

Habitat: Yonakuni (col. Tanaka, Oct. 1959, *no. 196911*).

Additional materials was collected from Yoron Island (Aug. 1967, *no. 19 6912*). Growing as an epiphytes on the thallus of *Plocamium telfairiae* HARVEY associated with *Acrothamnion butleriae* (COLLINS) KYLIN at a depth of about 10 m. in the lagoon of the north end of Yoron Island.

Geographical distribution: Parry Island, Eniwetok Atoll.

Some small fragments of this species were collected. This minute and delicate species coincide quite well with Dawson's Marshallese descriptions and figures (Dawson, 1957: 116–117. fig. 24 a, b).

Dawson (1962: 10–11) described 15 species of *Antithamnion* that are provided with pectinate or secund determinate branches, among those 15 species *A. percurrens* resemble in some degree with *A. pteroton* (SCHOUSB.) BORN. (De Toni, 1903: 1399; Kylin, 1956: 374, fig. 298–D) and with *A. defectum* KYLIN (Smith, 1944: 308, pl. 78 figs. 1–2; Inagaki, 1950: 24–25, fig. 3; Halos, M. Th., 1968: 161–162, fig. 6, pl. 7). But closer examination of the present species at hand shows that the present southern Japanese plant is rather small in size, having percurrent erect axis, large and sessile tetrasporangia that are always formed solitary on the basal most cell of the secondary determinate branch, without gland cell, etc. On the contrary, in *A. pteroton* its axis are not so conspicuously percurrent as seen in *A. percurrens* and is producing straight primary lateral branches, and in *A. defectum* it produces gland cells and pedicellate tetrasporangia.

On these grounds, the present species is apparently distinguishable from those latter two species.

Antithamnion subcorticatum spec. nov.

Fig. 7 A–D

Plants to 2.5 cm. tall, consisting of prostrate indeterminate axis and erect indeterminate branches; prostrate indeterminate axis moniliform or undulate consisting of spherical or subspherical cells, of cells to 24 μ long and to 12 μ broad, producing rhizoids; rhizoids uniseriate, multicellular, about 18 μ in diameter and of cells about 2.5 times as long as broad; erect indeterminate branches about 54 μ in diameter and of cells about 6 diameters long in lower portion, 15–24 μ in diameter and of cells about 2 diameters long in middle portion, gradually tapering toward apex, distichous, with alternate secondary indeterminate branching at intervals of two or rarely three cells of erect indeterminate branches; determinate lateral branches consisting of 1–12 cells long, 9 μ in diameter at the base, the lowermost cells not spherical, the others 2–5 times as long as broad, slightly incurved,

regularly pinnate oppositely from each axial cells except for the last 2–4 cells from the top, the branch tips essentially blunt or at least conspicuously acute; basal cell of a determinate lateral branches in lower part meristematic, branched progressively, branches become incurved as if they were surrounding the axis, more or less appressed, slender, and forming a loose, lax nodal envelopment, branches 9–12 μ in diameter, of cells 4–20 times as long as broad; gland cells absent; tetrasporangia formed on the adaxial side of basalmost cell of determinate lateral branches, solitary, sessile, spherical, 33–39 μ in diameter, thickly walled, cruciately divided; sexual reproductions unknown.

Japanese name: Nankai beni hanemo (nom. nov.)

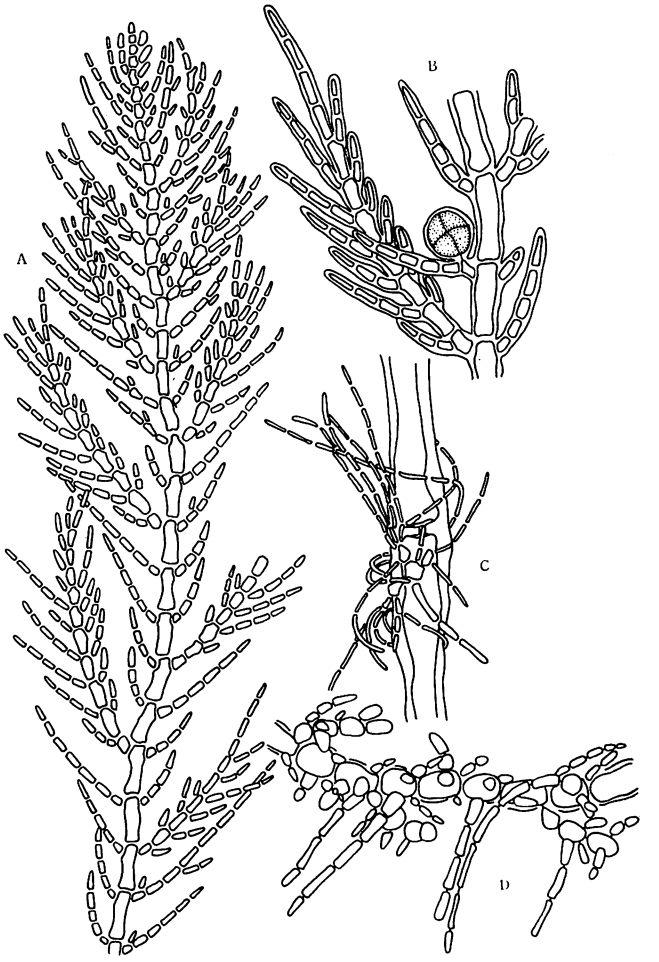

Fig. 7. *Antithamnion subcorticatum* spec. nov. A, upper part of indeterminate branch provided with opposite lateral branches. ×141. B, middle part of indeterminate branch provided with tetrasporangium. ×222. C, lower part of indeterminate branch of which node is corticated. ×141. D, prostrate part of indeterminate branch consisting of short spherical or quadrate cells. ×141.

Habitat: Growing on the thallus of larger algae, such as *Plocamium telfairiae* HARVEY, in the lagoon of north end of Yoron Island at the depth of about 10 m. (Aug. 1967, *no. 196913*).

Up to now four species of *Antithamnion*, of which the primary axis are partly corticated, has been described. They are *Antithamnion microptilum* (GRUN.) DE TONI, *A. cladodermum* (ZANARD.) HAUCK, *A. corticatum* TOKIDA and *A. pseudocorticatum* DAWSON. Of these four species the present southern Japanese species resemble superficially with the latter three species. But closer examination of this species shows that the present southern Japanese species is amply distinct from the other known corticated species of *Antithamnion*. *A. subcorticatum*, the present southern Japanese species, differs from any other known corticated species in having:

(1) Slender main axis and prostrate lower axis consisting of spherical or oblong cells.

(2) Spherical, sessile tetrasporangia formed on the adaxial side of basalmost cell of determinate lateral branch. Single tetrasporangium is formed per single lateral branch.

Additional characteristics are described in **Table II** in comparison with other related species.

Table II. Comparison of diagnostic characteristics in the corticated species of *Antithamnion*.

	A. subcorticatum	*A. cladodermum**	*A. corticatum* **	*A. pseudocorticatum****
Height of plants	2.5 cm.	2-3 cm.	3 cm.	0.1-0.5 cm.
Main axis in diam.	54 μ	250-300 μ	300-375 μ	100-120 μ
of cells	6 times long	2-3 times long		200-300 μ long
Cells of lateral	9 μ in diam.	15-20 μ in diam.		20-30 μ in diam.
branch	2-5 times long	2-5 times long		2-3 times long
Tetrasporangia	33-39 μ in diam. spherical sessile	25 by 40 μ ovate sessile	42(46.5) μ in diam. spherical sessile or pedicellate	

* after Feldmann-Mazoyer (1940: 249-251) and De Toni (1903: 1402-1403)

** after Tokida (1932: 108-112)

*** after Dawson (1962: 20-21)

Some fragments of these large but delicate species have been collected from Yoron Island. Within the specimens of southern Japanese species of *Antithamnion*, the present species is the largest one and it attains a height of about 2.5 cm. forming a filamentous clumps on the outer margins of the thallus of *Plocamium telfairiae* HARVEY. Superficially the present plant show a compactly entangled features at the lower part of the filaments.

Antithamnion sublittorale SETCHELL & GARDNER

Fig. 5 C–D

"A preliminary report on the algae" (1937) p. 86, pl. 6 fig. 15; Dawson, The marine algae of the Gulf of California (1944) p. 313; Marine Red Algae of Pacific Mexico (1962)

pp. 22–23, pl. 7 fig. 2.

Thallus minute, provided with a sparingly branched creeping axis and frequent, semi-erect indeterminate axis, 6 mm. in extent; primary axis about 33–39 μ in diameter, of cells 3 times as long as broad, provided with paired, opposite, distichous determinate branches, attached frequently by simple, uniseriate, multicellular rhizoids; rhizoids 18 μ in diameter, thickly walled, formed on the basalmost cell of determinate lateral branches; determinate lateral branches mostly up to 200 μ long, of cells 24 μ in diameter and about two times as long as broad, somewhat attenuate, usually incurved, branch tips blunt or at least not so conspicuously acute, simple or 1–3 times forked alternately beginning with the third cell from base in most cases, basal most cells usually quadrate; gland cells ovate-oblong, frequently scattered, 12–15 by about 21 μ, resting on two or rarely single cells; reproductions unknown.

Japanese name: Higene hutatsgasane (nom. nov.)

Habitat: Growing on the fragment of the dead stone-coral at a depth of about 30 m. at Tatsugo, Amami Island (Sept. 1967, *no. 196914*).

Geographical distribution: Baja Calif., Gulf of California.

Single small fragment of this plant was collected. In the external features, this minute southern Japanese plant is in agreement with *Antithamnion sublittorale* which was described by Dawson (1962: 22–23) on the basis of materials from Baja California.

But this southern Japanese material at hand differs slightly from that of Dawson's descriptions in having:

(1) The main axis are more slender and the determinate branches are more stouter.

(2) Gland cells are mostly lying on two cells.

(3) The main axis are always opposite distichous and without a third determinate branches.

However, the present southern Japanese plant is described as *A. sublittorale* resting on the close resemblance in the external features with Dawson's figures and notes.

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—摘　　要—

日本南海産フタツガサネ属の研究—I

糸　野　　洋

筆者は1967年より南西諸島海域産の海藻類の調査採集を行なってきた．これら採集標本には学術上はなはだ興味あるものが多数見られ，本稿ではこれら採集標本のうちフタツガサネ属に所属する植物についてその第1報として8種の植物を報告した．
これら8種のうち7種は日本新産種，他の1種は新種である．又，日本新産種7種のうちすでに5種はメキシコ，2種はマーシャル諸島よりそれぞれ報告されている種類である．

ヒナフタツガサネ（新称）：本種は鹿児島県佐多町大泊沖合水深20mの海底より採集したものであり，4分胞子嚢を多数有する植物であった．外見上，本種は *Antithamnion elegans* に酷似する．

ホソバヒナフタツガサネ（新称）：本種は枝分れが簡単な事によってDAWSONによって上記のヒナフタツガサネの変種として発表したもので，本邦では与論島より採集された．

ニセフタツガサネ（新称）：本種は外部形態が *A .nipponicum* に酷似しておるが，南日本海産の植物は *A. hubbsii* と決定した．しかし *A. nipponicum* と *A. hubbsii* とは極めて外部形態が類似しており，又，南日本海産の植物は外部形態的には *A. nipponicum* と *A. hubbsii* との中間形を呈しており，極めて変化しやすい植物である．従って *A. nipponicum A. hubbsii* と南日本海域に広く分布するニセフタツガサネとの異同については再検討を要すると思われる．

ニセキヌイトグサ（新称）：本種は与那国及び奄美大島より採集された植物で潮間帯のタイドプールに生育していたものである．体の分枝方法が特異なので他の種とは区別出来る．

フシクレフタツガサネ（新称）：本種は馬毛島より採集されたもので，外部形態はDAWSONによるメキシコ産の植物と極めて類似しているが，メキシコ産の植物とは大きさ等幾分相異がみられる．

カタハノフタツガサネ（新称）：与論島及び与那国島より採集されたもので，*A.defectum*, *A. pteroton* 等と類似するが，体の分枝方法，4分胞子嚢の形態等の相異によって区別出来る．

ナンカイベニハネモ（新称）：本種は与論島北部礁湖の水深10m附近に生育する海藻上に生育していたもので，体の下部主軸の節部が側枝の基部細胞より形成された根様枝によって囲まれる事によって特徴づけられる．

ヒゲネフタツガサネ（新称）：奄美大島竜郷村より採集されたもので外部形態はDAWSONの *A. sublittorale* に類似する．しかし詳細な部分では幾分異なっており再検討を要する．