

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

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Abstract

The present paper is a continuation of the studies of southern Japanese species of genus *Antithamnion*. Four species are newly detected and are proposed as new ones. They are *A. callocladus*, *A. crouanioides*, *A. secundum* and *A. tanakae*.

Antithamnion callocladus spec. nov.

Fig. 1 A-B, Fig. 2

Thallus minutus, epiphyticus, sparse ramosa et opposite pinnata, repenti, axe primario per rhizoideum affixo; rhizoidibus cristatis vel obtusis a cellulis basilibus pinnarum emittentibus; axes primari ecorticati, usque ad 60-70 μ in diam., cellulis diametro 2.5-3.7 plo longiore; pinnis lanceolatis, ad 380-550 μ longiore, cellulis basalibus pinnarum subquadratis et usque ad 45 μ crassis, inferne pinnatis, superne latere pinnatis inferiore; omnis ramulus attenuatis, admodum subacutus; glandicellulae admodum nullae vel raro formantes, in pinnulis brevioribus supra cellulas tres sitis, oblonga; tetrasporangia oblonga, 55-60 \times 75-85 μ diam., cruciatim divisa, in cellulis basalibus ramulorum; reproductio sexualis nonvisa.

Plants 1-2 cm. in extent; mostly creeping, purplish red in color, epiphytic; indeterminate axes ecorticate, 60-70 μ in diameter, of cells about 60 μ in diameter and 2.5-3.7 times as long as broad; oppositely and distichously provided with determinate lateral branches; determinate lateral branches almost straight, about 380-550 μ or 10-16 cells long, 45 μ in diameter near the base, gradually tapering toward the tips, bearing adaxial and abaxial determinate branchlets; determinate branchlets about 120-135 μ or 6-8 cells long, gradually tapering, provided with additional order short branchlets oppositely; last order branchlets about 30 μ or 3 cells long; all branch-tips subacute; attachment rhizoids about 18-21 μ in diameter, formed from the basal-cells of some of the determinate lateral branches, solitary or numerous, tips crested or obtuse; gland cells mostly absent or very rarely formed in some frond, oblong, resting on three cells; tetrasporangia oblong, 55-60 by 75-85 μ in diameter including thick envelope, formed on the basal cells of of branchlets, cruciately divided; sexual reproduction not seen.

Hab.: Biroujima near Sata-misaki, Oosumi Puninsula. Growing on hydroid or on larger algae at the depth of about 40 m. Collected on Nov. 19, 1969, no. 19711. Additional materials have been collected from the same locality on April 19, 1971.

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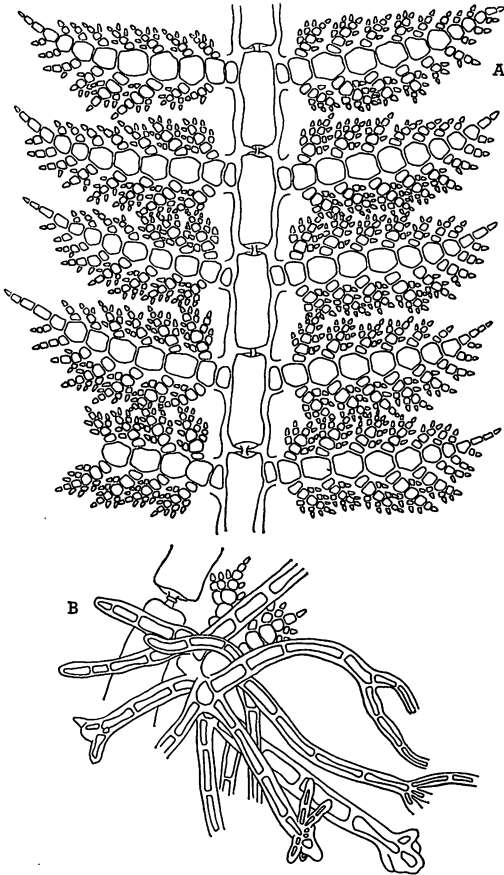


Fig. 1. *Antithamnion callocladus* spec. nov.
 A. Distichous arrangement of pinnae.
 ($\times 73$)
 B. Group of developing attachment
 rhizoids. ($\times 73$)

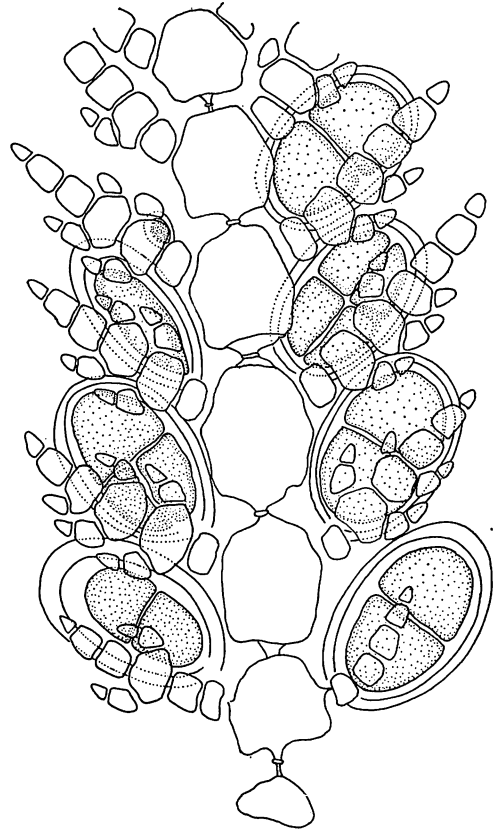


Fig. 2. *Antithamnion callocladus* spec. nov.
 Part of pinna bearing tetrasporangia.
 ($\times 375$)

The gland cell in the present species is very rarely formed. The majority of the specimens at hand are without gland cell. However, a single example of the presence of gland cells is observable in the materials at hand and, hence, the significance of these cells for taxonomic rank seem to be doubtful for some species of genus *Antithamnion*.

The present new species seems to be one of the more robust form of *A. cristirhizophorum* TOKIDA & INABA (1950 : 121) or *A. hubbsii* DAWSON (1962 : 16). *A. callocladus* differs from these two species in the characters of branching manner; namely, the branchlets of the present species bear about 3-4 order branchlets while in the other two species the branchlets bear 2-3 order branchlets.

With regard to reproductive organs, *A. cristirhizophorum* and *A. hubbsii* lack any of the reproductive organs, while *A. callocladus* is provided with tetrasporangial

plants, hence it is impossible to compare with those species.

Within the up-to-now known species of *Antithamnion*, the tetrasporangial features of the present species is most closely related with those of *A. nipponicum* YAMADA & INAGAKI (1935 : 37).

Antithamnion crouanioides spec. nov.

Fig. 2 A-B

Thallus epiphytici, minutus, ad 2 cm. alt., axes indeterminatae prostratae 135 μ diam. e cellulis 3 plo longiore, axe primario per rhizoideum affixo; rhizoidibus a cellulis basalibus pinnarum emittentibus, ca 15-18 μ diam., multicellulae, uniseriatum; rami indeterminati erecti e cellulis 40 μ diam., 3 plo longiore, opposita pinnata et sparce ramosa; rami determinati laterale e 1-10 cellulis constantes, infimis quadratis e 6 μ in diam., alias ca. 2.5-4 plo longiore, paululum incurvatis, parte in basali ramulis oppositis pinnatis necnon parte in distali ramulis abaxiale secundis praediti, omnis ramulus attenuatus, admodum obtusis vel subacutus; cellula basalis rami lateralis determinati par adaxiale ramulorum, brevium compositorum, meristematis progredienter ramosis, incurvatis, plus minusve appressis, factis, involucrum laxum nodale formantibus; tetrasporangia oblonga, cruciatier divisa, 30 \times 45 μ diam., sessilis, in cellulis basalibus ramulorum formantes; reproductio sexualis non visa.

Plants to 2 cm. tall, epiphytic, consisting of prostrate and erect indeterminate axes, lower parts entirely corticated, ecorticate in upper parts; prostrate axes about 135 μ in diameter, of cells about 3 times as long as broad, attached to substrate by means of uniseriate, multicellular rhizoids; rhizoids about 15-18 μ in diameter, tips blunt, formed from basal cell of lateral determinate branches;

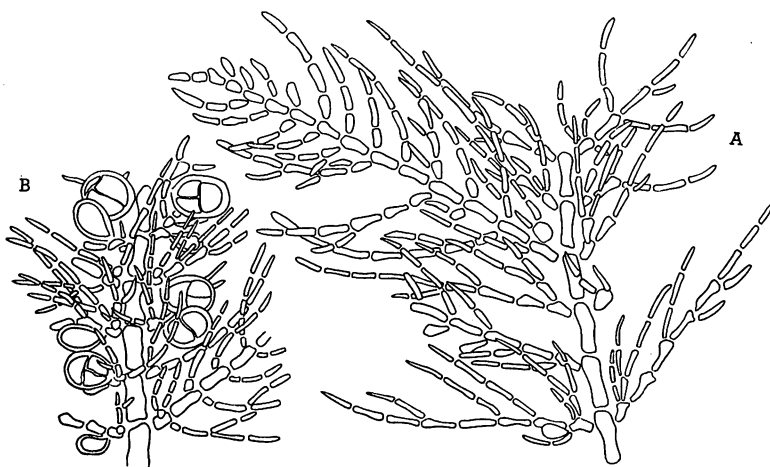


Fig. 3. *Antithamnion crouanioides* spec. nov.

A. Part of indeterminate branches in erect axes. (\times 177)

B. Part of pinnae bearing tetrasporangia. (\times 177)

erect indeterminate axes about 40 μ in diameter, of cells about 20 μ in diameter and 3 times as long as broad, gradually reduced its diameter toward the apex, distichously and oppositely provided with lateral branches from the upper distal ends of each axial cell; determinate lateral branches 1-10 cells long, about 6 μ in diameter near the base, the lower most cell almost as long as broad, the others about 3 times as long as broad, slightly incurved, regularly pinnate except for terminal portion, branch tips blunt or subacute; basal cells of determinate lateral branches of lower portions bearing adaxial paired branchlets, meristematic to the extent of surrounding the indeterminate axes; tetrasporangia spherical or slightly oblong, sessile, about 33 μ in diameter including thick envelope, cruciately divided, formed on the basal cells of lateral determinate branchlets; sexual reproductions not seen.

Hab.: Mage Island. Growing on the fronds of non-articulated coralline algae at the depth of about 20-40 m. Collected on April 21, 1971. no. 19712.

The present author reported *A. subcorticatum* (1969: 40) as a new species from southern part of Japan. The lower portions of that species, as well as *A. corticatum* TOKIDA (1952: 108), *A. cladodermum* (ZAN.) J. AG. (Feldmann-Mazoyer 1940: 249) and *A. pseudocorticatum* DAWSON (1962: 20), are corticated by some of the pinnae of lateral branches.

A. crouanioides is a new corticated species found from Mage Island and is most closely related to *A. corticatum* of northern Japan. However, *A. crouanioides* is distinct from *A. corticatum* in having:

- i.) sessile tetrasporangia formed from the basal cells of lateral determinate branches and branchlets.
- ii.) much thickly and compactly corticated lower indeterminate axes; the cortical branches are formed from the paired adaxial branches of basal cells of determinate lateral branches.
- iii.) entire absence of the descending, intra-membranaceous branching rhizoidal filaments emitted from the abaxial end of the basal cell of branches.

Externally, the presence of corticated nodes at the lower portion of the fronds, whose cortications are due to the prolongation and involutions of adaxial meristematic branches on basal cells of lateral determinate branches, helps us to assort this species into one of the members of genus *Crouania*, and, hence, to propose the specific name of "*crouanioides*".

Antithamnion secundum spec. nov.

Fig. 4 A-B

Thallus epiphytici, repenti, rhizoidibus a cellulis basalibus pinnarum emittentibus ramis aliae algae adfixae; axe primario 40-45 μ diam., cellulis diametro 3-4 plo longiore, sparce ramosa et oppositi pinnata; pinnis ad 275 μ vel 9-13 cellulis longioribus et usque ad 25 μ crassis, adscendenti-curvatis et in latere adaxiari

ramulis determinantibus secundariis productis, apicibus ramorum obtusis; pinnulis 60-70 μ vel 6-7 cellulis longioribus, simplicibus vel raro semel divisis; glandicellulae nullae; reproductio ignota.

Plants epiphytic, all creeping upon the host, attached to the substrate by rhizoidal attachments, 0.5-1 cm. in extent; attachment rhizoids 12-30 μ in diameter, formed singly from the basal cells of lateral branches, consisting of pluricellular, uniseriate filaments ending in crested or blunt tips; primary indeterminate axes 40-45 μ in diameter, of cells 18-30 μ in diameter and about 3-4 times as long as broad, almost of the same breadth throughout, provided with an opposite, distichous determinate branches from the upper distal ends of the respective axial cells; lateral determinate branches about 275 μ or 9-13 cells long, about 25 μ in diameter near the base, incurved upwardly when young, and recurved when

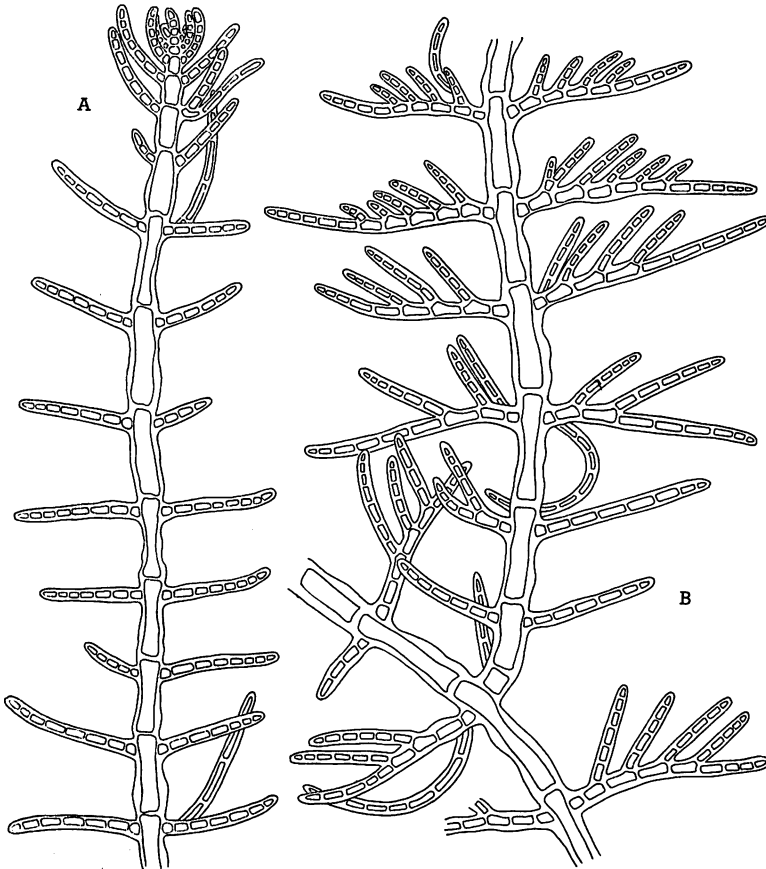


Fig. 4. *Antithamnion secundum* spec. nov.

- A. Distichous arrangement of pinnae in younger part of axes. ($\times 133$)
 B. Mid part of sterile plant showing an indeterminate branch with determinate branch opposite and an adaxial second branching of determinate laterals. ($\times 113$)



Fig. 5. *Antithamnion tanakae* spec. nov.
Habit of sterile plant. ($\times 53$)

matured; the cells about 2 times as long as broad, secundly and adaxially provided with short branchlets; branchlets 6-7 cells or 60-70 μ long, mostly unbranched except the basal most two branchlets; basalmost cells of lateral branches lacking branchlets, quadrate in shape; all branch-tips blunt; gland cell absent; reproduction not seen.

Hab.: Nishinoomote, Tanegashima. Growing on non-articulated coralline algae at the depth of about 20m. Collected on Oct. 1, 1968. no. 19713.

In the Pacific area, the species whose lateral branches are in opposite pairs, bearing pectinate branchlets on adaxial side, are restricted to only five species, viz. *A. kylinii* GARDNER (1927: 411), *A. defectum* KYLIN (1925: 46), *A. secundatum* GARDNER (1927: 413), *A. pygmaeum* GARDNER (1927: 413) and *A. percurrens* DAWSON (1957: 116). Within these five-species, the present new species is closely related to all of these species in some degree.

In *A. kylinii*, the indeterminate lateral branches opposite a major axes with short determinate lateral branches; however, in *A. defectum*, *A. pygmaeum* and *A. secundatum* the indeterminate lateral branches lack opposing determinate branch. *A. percurrens* bears some conspicuous percurrent axes. From these respects, the present southern Japanese species is most closely related to *A. kylinii*. However, the present species differs from *A. kylinii* in having a prostrate habit, blunt tips of branches and branchlets and in the absence of gland cells.

The specimens of *A. secundum* at hand lack reproductive organs, hence the relationship of the present species to ano-

ther one is uncertain.

Antithamnion tanakae spec. nov.

Fig. 5

Thallus minutus, epiphytici, repenti, axe primario per rhizoideum numerosis affixo; rhizoidibus cristatis vel obtusis a cellulis basalibus pinnarum emittentibus; axes primarii ecorticati, usque ad 90 μ diam., cellulis diametro 3-4 plo longiore, cellulis ramorum principalium pinnis oppositis, quesque spiralis, ex axibus indeterminatis prostratis ramos determinatos erectos et brevioribus constructis; ramos determinatos erectos ad 3 mm. alt., alternato-oppositi pinnulis emittentibus, omnis ramulus attenuatus, 57 μ diam. et cellulis 3 plo longiore ad basim et 30 μ diam. et cellulis 16 plo longiore ad midium; ramos determinatos brevioribus 6-7 cellulis longioribus, 25-30 μ in diam., omnis ramurus obtusis; reproductio ignota.

Plants small, epiphytic; lower indeterminate axes prostrating, attached to substrate by long, pluricellular, uniseriate rhizoids; creeping axes about 90 μ in diameter and of cells about 3-4 times as long as broad, provided with erect determinate and dwarfish determinate branches, oppositely paired branches spiraling at an angle of 90°, not distichous; erect branches on adaxial side of prostrating axes and the dwarfish branches on both flanks; erect axes about 3 mm. high, 57 μ in diameter, of cells 27 μ in diameter and 3 times as long as broad in lower part, 30 μ in diameter, of cells 21 μ in diameter and about 16 times as long as broad at the middle part, alternately and distichously provided with branchlets; branchlets secundly provided with additional ordered branchlets, much shorter in lower parts of erect axes; dwarfish branches unbranched, much shorter, 6-7 cells long, 25-30 μ in diameter; tips of branches and branchlets in erect axes subacute and dwarfish branches end in blunt tips; attachment rhizoids solitary, to 30 μ in diameter, ending in blunt or digitate tips, unbranched, usually formed from each node; gland cells absent; reproduction not seen.

Japanese name: Toge kinuito gusa (nom. nov.)

Hab.: Sakurajima. Growing on calcareous red algae at the depth of about 15 m, in more or less sheltered parts. Collected on Sept. 9, 1970. no. 19714.

A. tanakae slightly resembles *A. lherminieri*. Several early studies on *A. lherminieri* (Nasr 1941: 66; Dawson 1962: 18; 1965: 53; Itono 1969: 35) have been carried out and in comparison with those descriptions *A. tanakae* differs from those species in having the tendency to show more elaborated branching system, entire absence of gland cell and acute tips of branches. These features are ample enough to make the author regard the present southern Japanese species as one distinct from *A. lherminieri*.

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— 摘 要 —

日本南海産フタツガサネ属の研究—II

糸 野 洋

筆者は日本南海産フタツガサネ属の研究の第一報として8種のフタツガサネ属植物を報告した。本稿はその第二報として、さらに4種の本属植物が南日本海域に産する事が認められたのでここに報告した。

これら4種の植物は全て新種として認められるもので、従来知られている植物と形態学的に比較検討した。

本稿で報告したものはいずれもドレッジ又は潜水によって採集したもので比較的深所に生育していたものである。