New Algal Genera and Species Records from Micronesia: *Chamaedoris orientalis* (Chlorophyta) and *Rhodopeltis gracilis* (Rhodophyta)*

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Abstract.—*Chamaedoris orientalis* Okamura and Higashi (Siphonocladaceae, Chlorophyta) and *Rhodopeltis gracilis* Yamada and Tanaka (Polyideaceae, Rhodophyta) are reported from Guam and represent new generic records in Micronesia.

Introduction

As further collections of marine benthic algae are made in Micronesia, genera which were not previously known from past literature (Tsuda and Wray, 1977) are now being documented from these waters. This paper describes two species, *Chamaedoris orientalis* Okamura and Higashi (Siphonocladaceae, Chlorophyta) and *Rhodopeltis gracilis* Yamada and Tanaka (Polyideaceae, Rhodophyta), from Guam. These two species represent genera not previously known from Micronesia. The specimens are deposited in the Herbarium of the Kagoshima University, Department of Biology and in the Herbarium of the University of Guam Marine Laboratory.

Chamaedoris orientalis Okamura and Higashi

DESCRIPTION: The thallus (Fig. 1) consists of a long stalk and a capitulum which is pale green in color. Of the five specimens collected, the largest specimen is 10.5 cm high. The stalk is monosiphonous, unbranched and clearly annulate, and is approximately 1 mm in diameter and up to 3 cm long. Crustose coralline algae, e.g., *Mastophora,* cover the stalk. Irregularly branched rhizoids, which are septate and very slender in diameter, are produced from the basal portion of the stalk, and serve as holdfasts. The rhizoids branch subdichotomously 3–5 times and terminate in obtuse tips.

The capitulum is compressed and may be oval to oblong, measuring 2.5–4 cm

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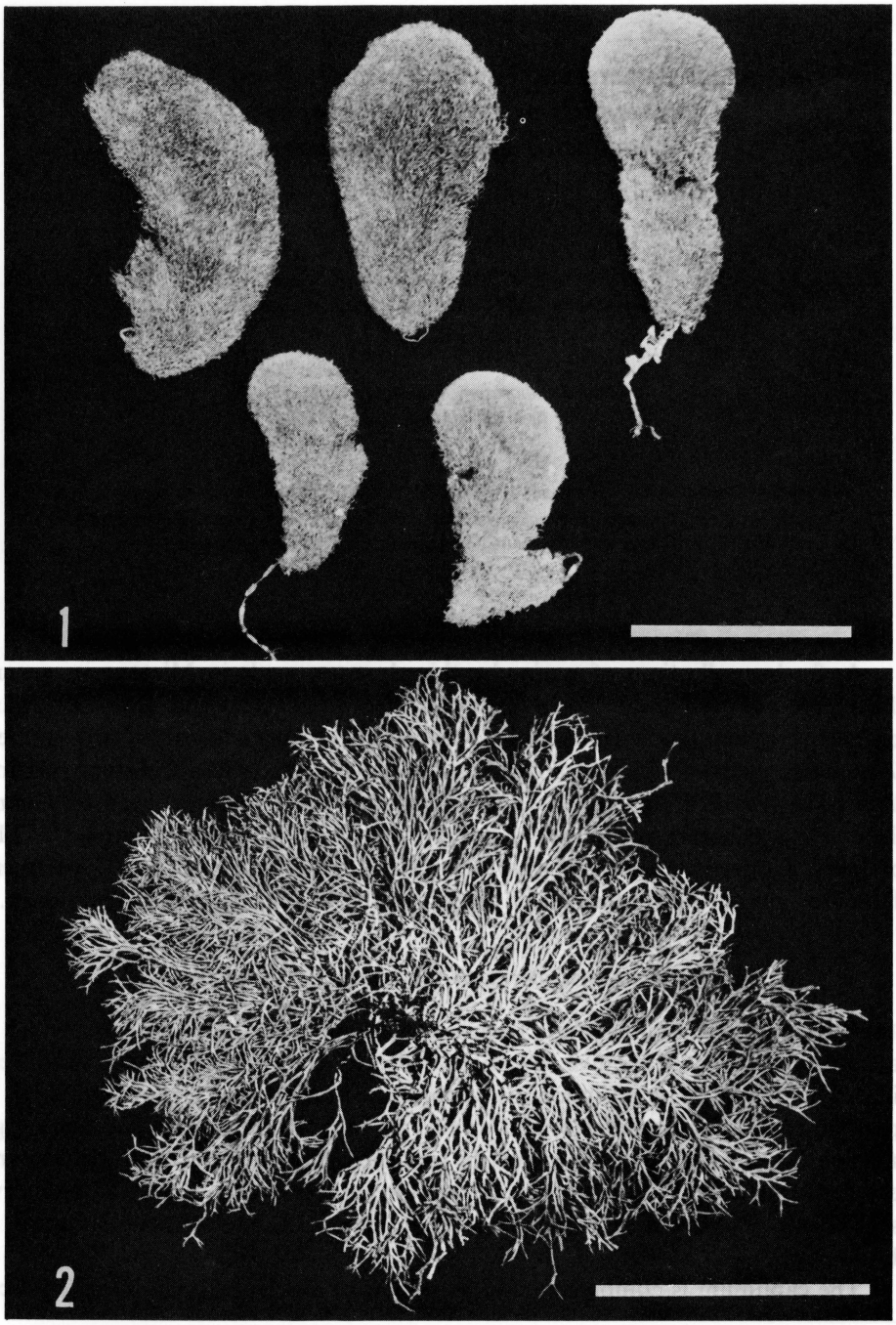


Fig. 1. Habit of *Chamaedoris orientalis* Okamura and Higashi. (Scale: 5 cm)
Fig. 2. Habit of *Rhodopeltis gracilis* Yamada and Tanaka. (Scale: 5 cm)

wide and 5.4–8 cm long. The capitulum consists of tightly interwoven filaments which are cylindrical (190–531 μm in diameter) and usually subdichotomously branched. The filaments terminate in blunt apices free from adjacent filaments or they frequently possess tenaculae at their tips which attach to adjacent filaments.

SPECIMENS EXAMINED: RT 5356, submarine slope, ca. 4.5 m deep, near channel, Ylig, Guam, collected by C. Birkeland, May 19, 1977.

GEOGRAPHIC DISTRIBUTION: Southern Japan, Taiwan, Philippines, and Guam.

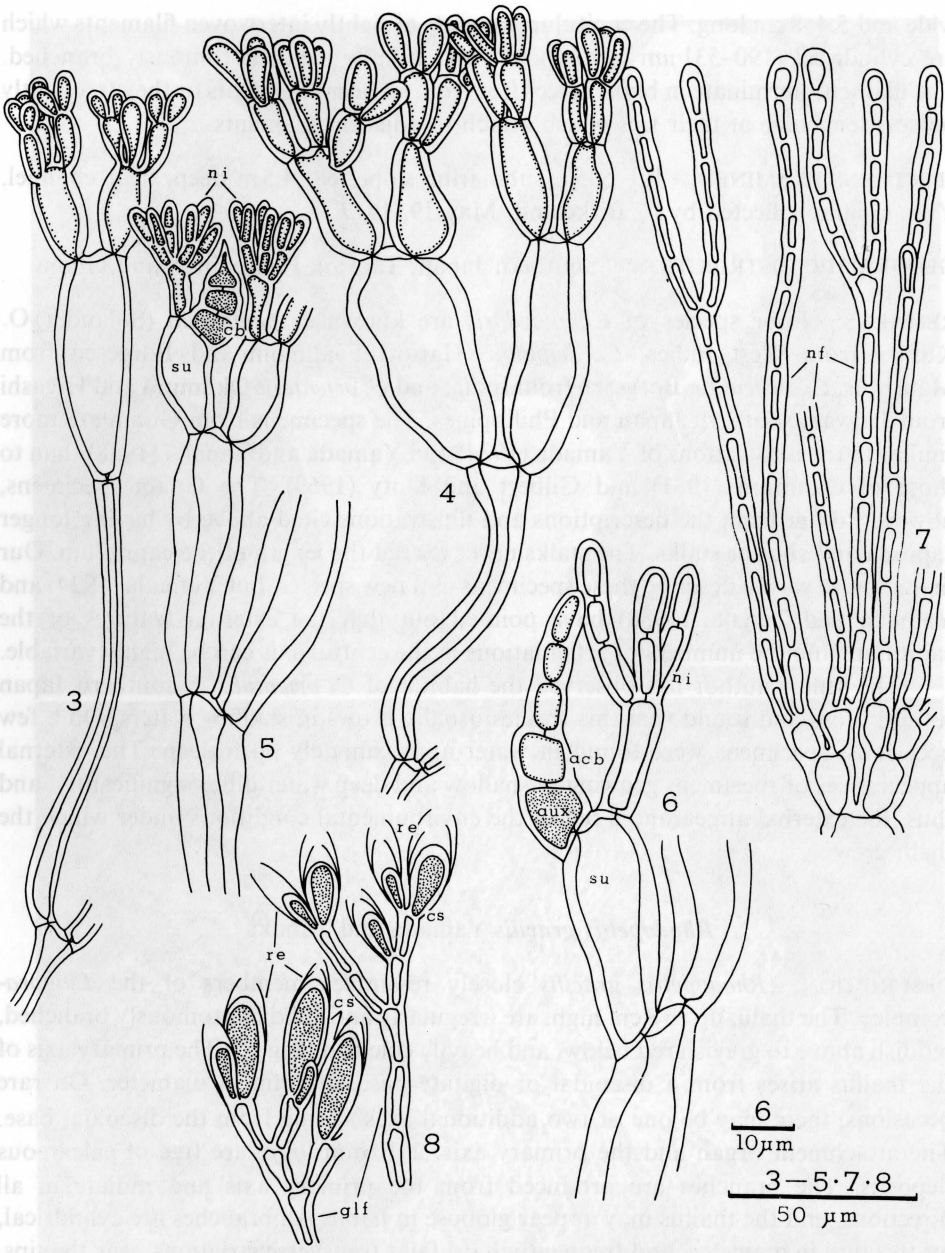
REMARKS: Four species of *Chamaedoris* are known-*C. peniculum* (Solander) O. Küntze from West Indies, *C. delphinii* (Hariot) Feldmann and Børgesen from Mauritius, *C. auriculata* Børgesen from India, and *C. orientalis* Okamura and Higashi from Taiwan, southern Japan and Philippines. The specimens from Guam are more similar to the illustrations of Yamada (1934) and Yamada and Tanaka (1938) than to those of Okamura (1931) and Gilbert and Doty (1969). The Guam specimens, however, differ from the descriptions and illustrations cited above by having longer capitula and shorter stalks. The stalks never exceed the length of the capitulum. Our first impulse was to describe these specimens as a new species, but Yamada (1934) and Yamada and Tanaka (1938) have pointed out that the external features of the capitulum and the numbers of articulations in the central axis can be highly variable.

The senior author has observed the habitat of *C. orientalis* in southern Japan several times and found that this species usually grows in shallow waters. On a few occasions, specimens were found in water approximately 30 m deep. The external appearances of specimens growing in shallow and deep water differ significantly, and thus, the external appearances reflect the environmental conditions under which the thalli grew.

Rhodopeltis gracilis Yamada and Tanaka

DESCRIPTION: *Rhodopeltis gracilis* closely resembles members of the *Liagora*-complex. The thalli, up to 8 cm high, are irregularly and subdichotomously branched, reddish above to greyish red below, and heavily calcified (Fig. 2). The primary axis of the thallus arises from a discoidal or digitate base, 2–4 mm in diameter. On rare occasions, there may be one or two additional axes arising from the discoidal base. The attachment organ and the primary axis, 2–10 mm long, are free of calcareous deposits. The branches are produced from the primary axis and radiate in all directions, and the thallus may appear globose in habit. All branches are cylindrical, up to 1 mm in diameter, and frequently have faint transverse striations near the tips.

The primary axis and branches have fundamentally similar filamentous structures. The medulla consists of compact filaments, 1.8–4.5 μm in diameter. The cortex consists of loosely radiating filaments which are dichotomously branched in the inner layer and trichotomously branched in the outer layer (Figs. 3 and 4). The filaments are usually five cells long and highly differentiated in form. The innermost



Figs. 3–8. *Rhodopeltis gracilis* Yamada and Tanaka. Figs. 3–4. Assimilatory branches. Terminal three cells are pigmented. Fig. 5. Assimilatory branch showing a carpogonial branch (cb) on supporting cell (su). Nemathecial-filament initials (ni) are already initiated at this stage. Fig. 6. Assimilatory branch with an auxiliary-cell branch (acb). Auxiliary cell (aux) is the lowermost cell of the auxiliary branch and the nemathecial-filament initials (ni) are initiated at this stage. Fig. 7. Mature nemathecial filaments (nf). Fig. 8. Two gonimoblast filaments (glf) with terminal carposporangia (cs). Each carposporangium has one or two ruptured carposporangial envelopes (re).

cells are elongated and resemble the medullary cells; the outermost cells are spherical to ovate. The terminal three segments of the filaments in the cortex are pigmented.

The carpogonial branch (Fig. 5) lies lateral to the supporting cell which is a vegetative cell of the cortical filament, and is produced in place of the outer assimilatory branch. The carpogonial branch is three or four cells long at maturity (usually three-celled) and is almost straight or slightly incurved, measuring 37–110 μm long and 11–18.5 μm wide at the broadest portion. Each carpogonium has a trichogyne measuring up to 80 μm long.

The auxiliary cell (Fig. 6) occupies the basal position of the auxiliary-cell branch which is unbranched and approximately five cells long. The auxiliary-cell branches are produced in the same position where carpogonial branches are produced. Either the carpogonial branch or the auxiliary-cell branch may replace the assimilatory branches.

The cystocarpic nemathecia, a typical character of this genus, are circular in surface view measuring approximately 500 μm in diameter and 110–220 μm thick in section. They are produced near the branch tips, and appear as reddish spots which are easily recognized. Sterile nemathecial filaments which surround the gonimoblasts and carposporangia are produced prior to the maturation of carposporangia. They may be initiated when the carpogonial branches and auxiliary cells are produced (Figs. 5 and 6). Mature nemathecial filaments are 7–8 μm broad and usually once dichotomously branched (Figs. 7 and 9).

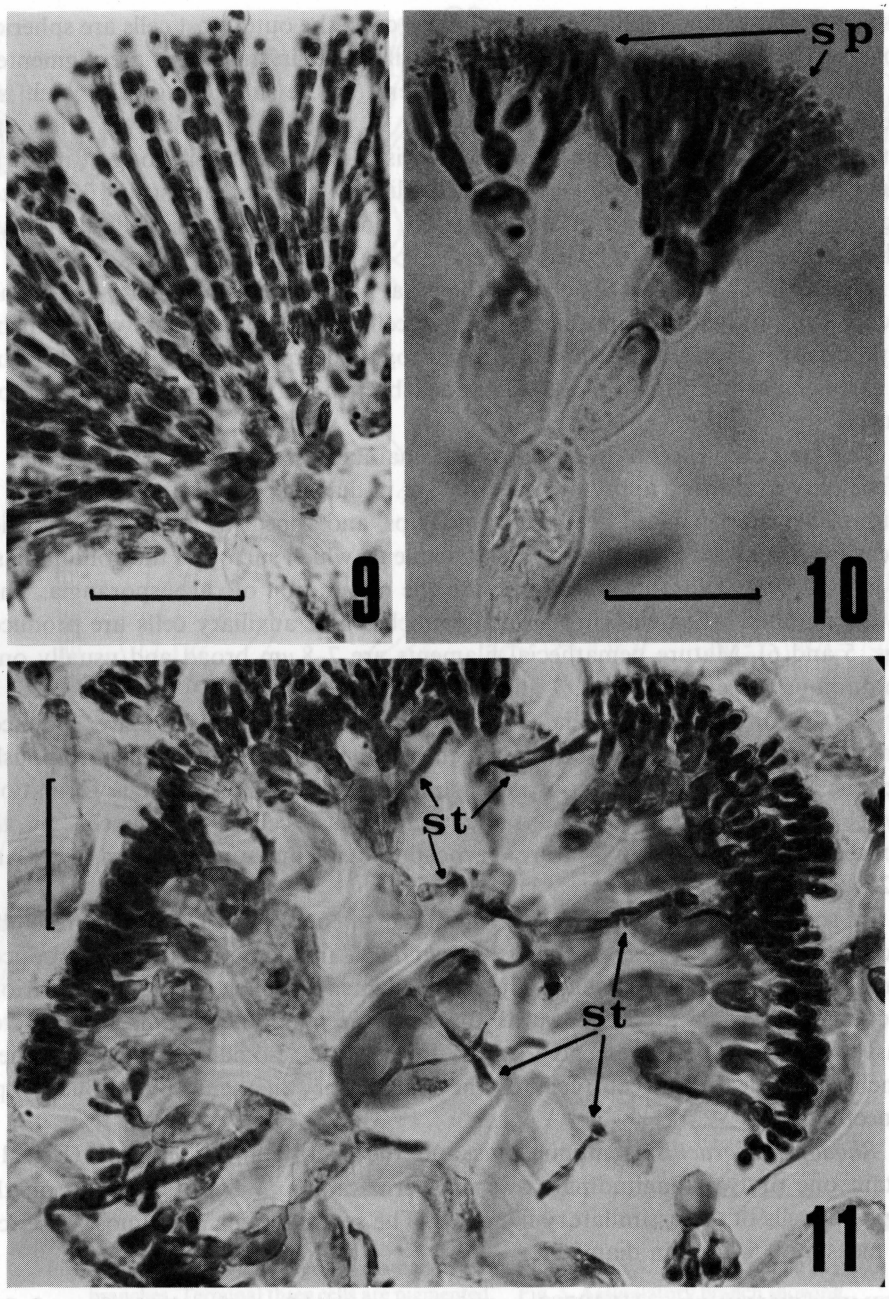
The mature carposporangia (Fig. 8) are oblong-elliptical and are produced terminally on gonimoblast filaments which branch secundly or subdichotomously. After the release of mature carposporangia, one or two carposporangia formations may subsequently occur on the same gonimoblast cells as evidenced by the carposporangial envelopes. Mature carposporangia measure 8–12 μm wide and 18–26 μm long.

In some cystocarpic specimens, sterile filaments (Fig. 11) which resemble endophytic species, e.g., *Liagorophila endophytica* Yamada, are frequently produced from the cells of cortical filaments. The sterile filaments branch irregularly in various directions, i.e., some ascend towards the nemathecial branch, some are directed transversely, and others descend towards the medulla. Some of the cells in these branches unite with adjacent cells of the assimilatory filaments by secondary pit connections.

Rhodopeltis gracilis is monoecious and the spermatangial clusters (Fig. 10) contain one or two longitudinal rows of spermatangia and are produced on the peripheral cells of the assimilatory filaments. The spermatangia are almost spherical and measure 0.5–1 μm in diameter.

SPECIMENS EXAMINED: HI 19782, growing on vertical face of rock platform, 2–3 m deep below low tide level, Marbo, Guam, collected by H. Itono and R. T. Tsuda, Sept. 7, 1977.

GEOGRAPHIC DISTRIBUTION: Taiwan, southern Japan, Bonin Islands, and Guam.



Figs. 9–11. *Rhodopeltis gracilis* Yamada and Tanaka. Fig. 9. Mature nemathecial filaments. Fig. 10. Spermatangial clusters (sp) on assimilatory branches. Fig. 11. Sterile filaments (st) produced from the inner cells of the assimilatory branches. (Scales: 40 μm)

REMARKS: Kylin (1956) placed *Rhodopeltis* in the family Polyideaceae, but the relationship of this genus to other members of the Polyideaceae is thought to be doubtful. For the purpose of this paper, we have followed Kylin's opinion in placing this genus under the family Polyideaceae.

The cylindrical branches, general morphology of the carpogonial branches, and the auxiliary-cell branches are typical of *R. gracilis*. In describing *R. gracilis*, Yamada and Tanaka (in Yamada, 1935) and Y. Nozawa (1963, 1970) mentioned the absence of annular striations near the branch tips and the presence of annular striations on the branch tips in another species, *R. liagoroides* Yamada. Some of our specimens lack annular striations, but others possess clear annular striations as in *R. liagoroides*. This suggests that the presence or absence of annular striations as a specific criterion for differentiating species of *Rhodopeltis* may not be valid.

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