

Studies on freshwater Rhodophyta of Papua New Guinea II.
***Batrachospermum waitapense*, sp. nov.**
from the Papuan Highlands

Shigeru KUMANO

*Department of Biology, Faculty of Science, Kobe University,
Rokko-dai, Nada-ku, Kobe 657, Japan*

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A new species, *Batrachospermum waitapense* (Rhodophyta, Nemalionales), from the Papuan highlands is described. This species belongs to the section *Contorta* and differs from *B. lusitanicum* REIS in having the carpogonium-bearing branch consisting of 4-7 cells and in the size of carposporangia of 12-20 μm long and monosporangia of 10-15 μm long.

Key Index Words: *Batrachospermum waitapense*, sp. nov.; freshwater Rhodophyta; Papua New Guinea; section *Contorta*; taxonomy.

The freshwater algae of Papua New Guinea have received little attention. Exceptions are those written by a few authors such as BRITTON (1952), BROOK and HINE (1966), YAMAGISHI (1975), YAMAGISHI and WATANABE (1979), WATANABE, PRESCOTT and YAMAGISHI (1979), and WATANABE *et al.* (1979). Regarding the freshwater Rhodophyta, JOHNSTONE *et al.* (1980) and KUMANO JOHNSTONE (1983) described a new species of *Batrachospermum* from the Papuan lowlands. The present paper deals with another new species of *Batrachospermum* from the Papuan highlands.

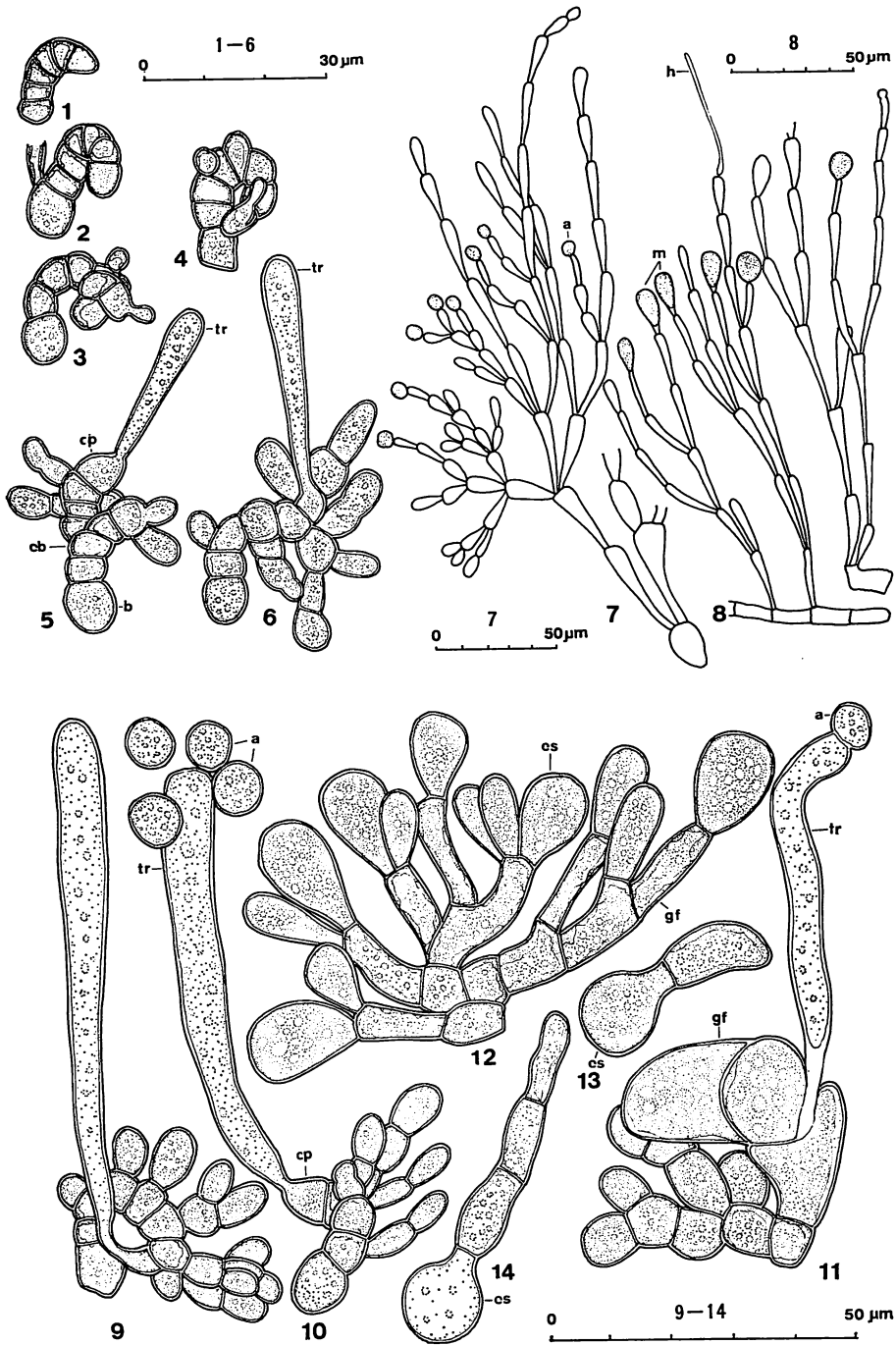
Location and Habitat: New Guinea is a large island situated near the equator in the southern Pacific. The coastal lowlands in the Central District of Papua New Guinea are covered with tropical rain forests, interspersed with mangrove swamp forests, also there are several rubber plantations. On the other hand, there are many *Sphagnum*-swamps around Waitape, a small village situated at about 100 km north of Port Moresby and about 1,500 m above the sea level. The specimens of this new species were collected from a small stream, 1 km east of the airstrip

of Waitape, on 16th January 1974, by Dr. T. YAMAGISHI of Nihon University, Japan. In a small stagnant pool in the *Sphagnum*-swamp near this stream, the water pH was 5.2 and the water temperature was 20°C at the time of collecting.

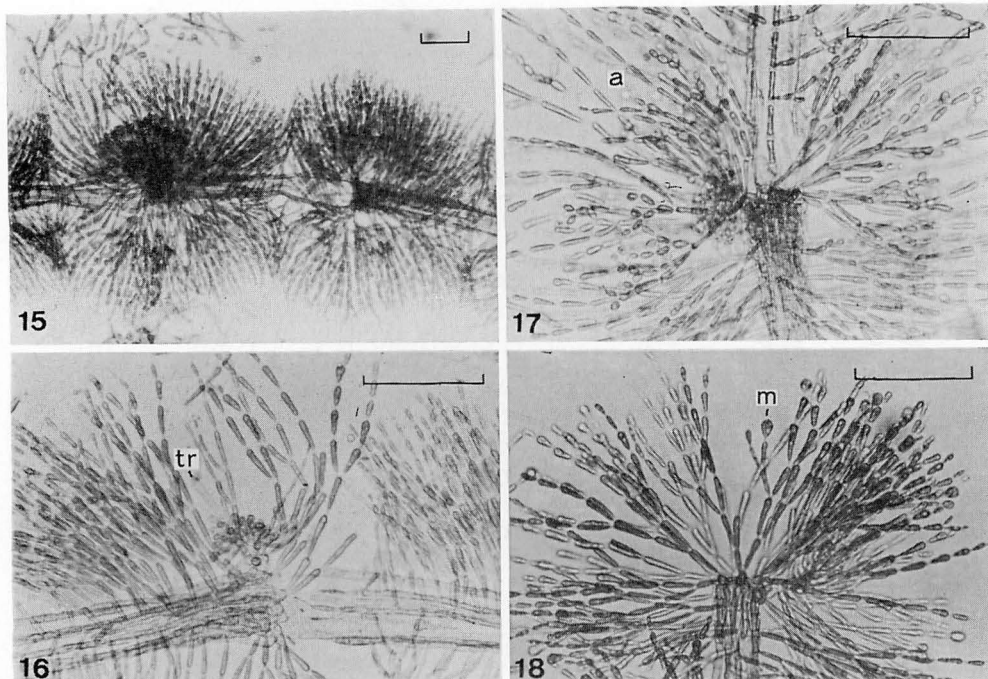
Description of Species

***Batrachospermum waitapense* KUMANO**, sp. nov. (Figs. 1-14, 15-18)

Frons monoica, 3-6 cm alta, 300-700 μm crassa, plus minusve irregulariter ramosa, mucosa, olivaceo-viridis. Cellulae axiales cylindricae, 40-150 μm crassae, 150-700 μm longae. Verticilli pyriformes plerumque contigui. Ramuli primarii abundanter ramicantes, ex 6-12 cellulis constantes; cellulae inferiores fasciculorum arcuato-claviformes, 3-5 μm crassae, 20-40 μm longae, cellulae superiores fusiformes vel ellipsoideae, 3-5 μm crassae, 10-20 μm longae. Ramuli secundarii ex 5-7 cellulis constantes; pili rari. Antheridia globosa, 5-7 μm diametro, in ramulis lateralibus terminalia. Ramuli carpogoniferi e cellulis basi ramulorum primariorum orientes, 25-40 μm longi, ex 4-7 disci- vel dolii-



Figs. 1-14. *Batrachospermum waitapense* KUMANO, sp. nov. 1-2. Carpogonium initials and carpogonium-bearing branches at very early stages; 3-4. Early stages in development of twisted carpogonium-bearing branches and carpogonium with trichogyne initials; 5-6. Twisted carpogonium-bearing branches with young carpogonia with young trichogynes; 7. Antheridia terminating the laterals of primary branchlets; 8. Monosporangia terminating primary branchlets; 9. A carpogonium-bearing branch with a mature carpogonium; 10. A fertilized carpogonium with antheridia; 11. An early stage in development of the gonimoblast filament; 12. Carposporangia terminal on gonimoblast filaments; 13-14. Young germlings of carpospores. (a: antheridium, b: basal cell of the whorls, cb: carpogonium-bearing branch, cp: carpogonium, cs: carpospore or carposporangium, gf: gonimoblast filament, h: hair, m: monosporangia, tr: trichogyne).



Figs. 15-18. *Batrachospermum woiwapense* KUMANO, sp. nov. 15. Structure of whorls showing gonimoblasts inserted central part of thallus; 16. A part of thallus showing axial cells, primary branchlets, cortical filaments with secondary branchlets and a young gonimoblast, in which a fertilized carpogonium and short gonimoblast filaments are observed; 17. Antheridia terminating the laterals of primary branchlets; 18. Monosporangia terminating primary branchlets (a: antheridium, m: monosporangium, tr: trichogyne) (Scale bar=100 μm for figs. 15-18).

formibus constantes, tortuosi; carpogonium basi 5-8 μm crassum, apice 7-10 μm crassum, 40-90 μm longum; trichogyne claviformis, indistincte pedicellata, ad basim saepe flexa. Bracteae breves. Gonimoblastus singulus, globosus vel semiglobosus, 250-700 μm crassus, 150-700 μm altus, in centro verticilli insertus. Carposporangia ovoidea, 8-10 μm crassa, 12-20 μm longa. Monosporangia globosa vel ovoidea, 8-10 μm crassa, 10-15 μm longa, in ramulis secundariis vel primariis terminalia.

Fronde monoecious, 3-6 cm high, 300-700 μm wide, more or less irregularly branched, mucilaginous, olive-green. Axial cells cylindrical, 40-150 μm wide, 150-700 μm long. Whorls pyriform, frequently touching each other. Primary branchlets abundantly branched, consisting of 6-12 cell-stories; lower cells of the fascicles arcuate-club-shaped, 3-5 μm wide, 20-40 μm long, upper cells fusiform or ellipsoidal, 3-5 μm wide, 10-20 μm long.

Secondary branchlets consisting of 5-7 cell-stories; hairs rare. Antheridia globose, 5-7 μm in diameter, terminating the laterals of the fascicles. Carpogonium-bearing branch arising from the basal cell of the primary branchlets, 25-40 μm long, consisting of 4-7 disc- or barrel-shaped cells, twisted; carpogonium at the base 5-8 μm wide, at the apex 7-10 μm wide, 40-90 μm long; trichogyne club-shaped, indistinctly stalked, often bent at the base. Bracts short. Gonimoblast single, globose or semiglobose, 250-700 μm wide, 150-700 μm high, inserted centrally. Carposporangia ovoidal, 8-10 μm wide, 12-20 μm long. Monosporangia globose or ovoidal, 8-10 μm wide, 10-15 μm long, terminating the secondary and primary branchlets.

Holotype: YAMAGISHI No. 52622a, 16/1 1974, Herbarium of the National Science Museum, Tokyo, TNS. Isotype: YAMAGISHI No. 52622b, Herbarium of Faculty of Science,

Kobe Univeristy. Other specimens examined: YAMAGISHI NG 288 (F0188), 16/I 1974, YAMAGISHI No. 52623, 16/I 1974.

Type locality: Small stream, Waitape, Central District, Papua New Guinea.

With the description of *Batrachospermum procarpum*, SKUJA (1931) erected the section *Contorta* and named it in reference to the carpogonium-bearing branch twisted spirally or bent like a hook. Many taxa belonging to this section have been described by some authors, such as JAO (1941), FLINT (1953), REIS (1965, 1972, 1973, 1974), STARMACH (1975), KUMANO (1978, 1982) and so on. Among those taxa, three species of *Batrachospermum* have been reported to furnish monosporangia besides carposporangia. Namely, *B. intortum* JAO and *B. pseudocarpum* REIS are alike in having the monosporangia terminating the laterals of the carpogonium-bearing branches. On the other hand, *B. lusitanicum* REIS is reported to furnish the monosporangia terminating the primary branchlets. *B. waitapense* KUMANO resembles closely *B. lusitanicum* REIS in having the monosporangia terminating the secondary and primary branchlets, but differs from the latter in the size of carposporangia and monosporangia. Carposporangia are 15-20 μm long, monosporangia 10-15 μm long for *B. waitapense*, while carposporangia are 20-23 μm long and monosporangia 20-27 μm long for *B. lusitanicum*. A key to the above-mentioned species having the monosporangia of the section *Contorta* is shown as follow:

1. Monosporangia terminating the laterals of carpogonium-bearing branches, sometimes primary and secondary branchlets.
 2. Monosporangia 13-23 μm long.
..... *B. pseudocarpum* REIS
 2. Monosporangia 11-15 μm long.
..... *B. intortum* JAO
1. Monosporangia terminating the primary and secondary branchlets.
 3. Carpogonium-bearing branch consisting of 4-7 cells.
..... *B. waitapense* KUMANO
 3. Carpogonium-bearing branch consisting of 6-14 cells. *B. lusitanicum* REIS

Monosporangia form a single spore generally without meiotic division of the nucleus. Such monosporangia may be found at any phase in the life history of Rhodophytes duplicating the parent phase. Monosporangia have been reported at the gametophytic phase for four species of the section *Contorta* of the genus *Batrachospermum* as well as well as the section *Moniliformia* and *Turficola*. The monosporangia found at the gametophytic phase of *Batrachospermum* seems to repeat the parent phase, but nothing is known about the number of nuclei and chromosomes of the phase produced by the spore.

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熊野 茂: パプア・ニュー・ギニアの淡水産紅藻 II.
高地産 *Batrachospermum waitapense*, sp. nov. について

パプア・ニュー・ギニア高地のワイターペ (ポート・モレスビーの北約 100 km, 標高約 1,500 m) 近くのミズゴケ性湿地の小流から、カワモツク属の 1 新種 *Batrachospermum waitapense* (紅藻・ウミゾウメン目) が記載された。本種は *Contorta* 節に属し、本節中の単胞子をつける種のなかで *B. lusitanicum* REIS 1965 に最もよく似るが、造果器をつける枝が短い点、果胞子および単胞子の大きさで区別できる。(657 神戸市灘区六甲台 神戸大学理学部生物学教室)