Comparative Study of *Thorea gaudichaudii* (Rhodophyta) from Guam and Okinawa[1]

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Abstract.—The morphological characteristics of *Thorea gaudichaudii* C. Ag. from freshwater habitats in Guam (water temperature 28°C) and Okinawa (water temperature 21–22°C) are compared. The mean cell width of both specimens are similar (5.2 μm), but the mean cell length of the Guam specimens are somewhat longer (25.5 μm) than the specimens from Okinawa (21.4 μm). The mean length and width of the monosporangia of both specimens are similar.

Introduction

The genus *Thorea* was established by Bory (1808) and eight species have been reported in the world. *Thorea gaudichaudii* was first described by C. Agardh (1824, 1828) from the Pago River on the island of Guam; however, this alga has not been recorded again from Guam. In 1977, C. P. Neubauer, a graduate student at the University of Guam, collected specimens of *T. gaudichaudii* from the Ylig River located just south of the Pago River. In March 1978, I had an opportunity to visit Guam and collected additional specimens of *T. gaudichaudii* in the Ylig River, but failed to find specimens in the Pago River. In Japan, *Thorea gaudichaudii* was identified by Yamada (1949) from Okinawa.

This paper presents additional information on the morphological characteristics of *Thorea gaudichaudii* collected from Guam and Okinawa. The study is based on specimens which I collected on March 27, 1978, on rocks in the Ylig River, Guam, and specimens collected by Y. Okada from March 3 to April 3, 1937, on the edge of a spring in Okinawa, Japan. The materials collected from Guam are preserved in 10% formalin solution, and the Okinawa specimens are dried.

Comparison Between Guam and Okinawa Specimens

Thorea gaudichaudii from Guam is found on rocks in rather stagnant water in the river, where the water temperature is 28°C and the pH value 7.9–8.0 on March 27, 1978. *T. gaudichaudii* from Okinawa is found on the edge of the spring in calm water, where the water temperature is 21–22°C during spring.

According to many authors such as Hassall (1845), Kuetzing (1849), Moebius (1891), Hedgcock and Hunter (1899), Arasaki (1937), Yamada (1949), Swale (1963)

[1] Contribution No. 119, University of Guam Marine Laboratory.

Micronesica 15 (1-2): 35-39. 1979 (June).

Table 1. Comparison of the morphological characteristics of *Thorea gaudichaudii* C. Ag. from Guam and Okinawa.

CHARACTERS	GUAM	OKINAWA
Frond length (cm)	12–30	30–58
Main branch diameter (μm)	1,400–2,000	1,000–1,500
Assimilatory filaments		
Length (μm) &	400–800	300–700–(800)
Number of Cells	18–32	20–36
Basal cells (barrel shape)		
Length (μm)	7–14	10–15
Width (μm)	6–10	7–11
Hair cells (cylindrical, branched)		
Length (μm)	18–36	16–25
Width (μm)	5–6	5–6
Ramification	moderate, originating near the base, 2–3 times alternate, with short patent ultimate branchlets.	
Monosporangia (pyriform or obovate, single or clustered)		
Length (μm)	12.5–28.5 ($\bar{X}$ = 18.9, N = 100)	11–27 ($\bar{X}$ = 18.9, N = 83)
Width (μm)	8–16 ($\bar{X}$ = 10.8, N = 100)	7–14.5 ($\bar{X}$ = 9.9, N = 83)
Frond color	dark brown	reddish brown
Diameter of holdfast (mm) discoid	1.8–4.3	1

and Bischoff (1965), the main criteria used in the classification of species of *Thorea* are 1) length of frond and ramification, 2) features of assimilatory filaments, 3) size and shape of monospores, and 4) characters of plastids. Table 1 presents comparative descriptions of both the Guam and Okinawa specimens.

The fronds of *Thorea gaudichaudii* from the two localities are both small and somewhat sparsely branched (Pl. I, Figs. 1 and 2). The assimilatory filaments of both specimens are long consisting of a number of cells. The mean cell dimensions of the hair cells of the assimilatory filaments of the Guam specimens are 25.5 μm long and 5.2 μm wide; the Okinawa specimens are 21.4 μm long and 5.2 μm wide (Plate I, Figs. 3 and 4). The cell widths of both specimens are similar, but the cell length of the Guam specimens is somewhat longer than the specimens from Okinawa.

Monosporangia are abundantly found on adult thallus. Both the Guam and Okinawa specimens are similar in size and shape (Pl. II). The measurements of monosporangia (see Table 1) are based on 100 observations of the Guam specimens and 83 observations of the Okinawa specimens. Plastids of both the Guam and Okinawa specimens are parietal laminate and irregularly lobed.

Both the Guam and Okinawa specimens fall within the morphological circumscription of this species and resemble the sketch by Bory (1828).

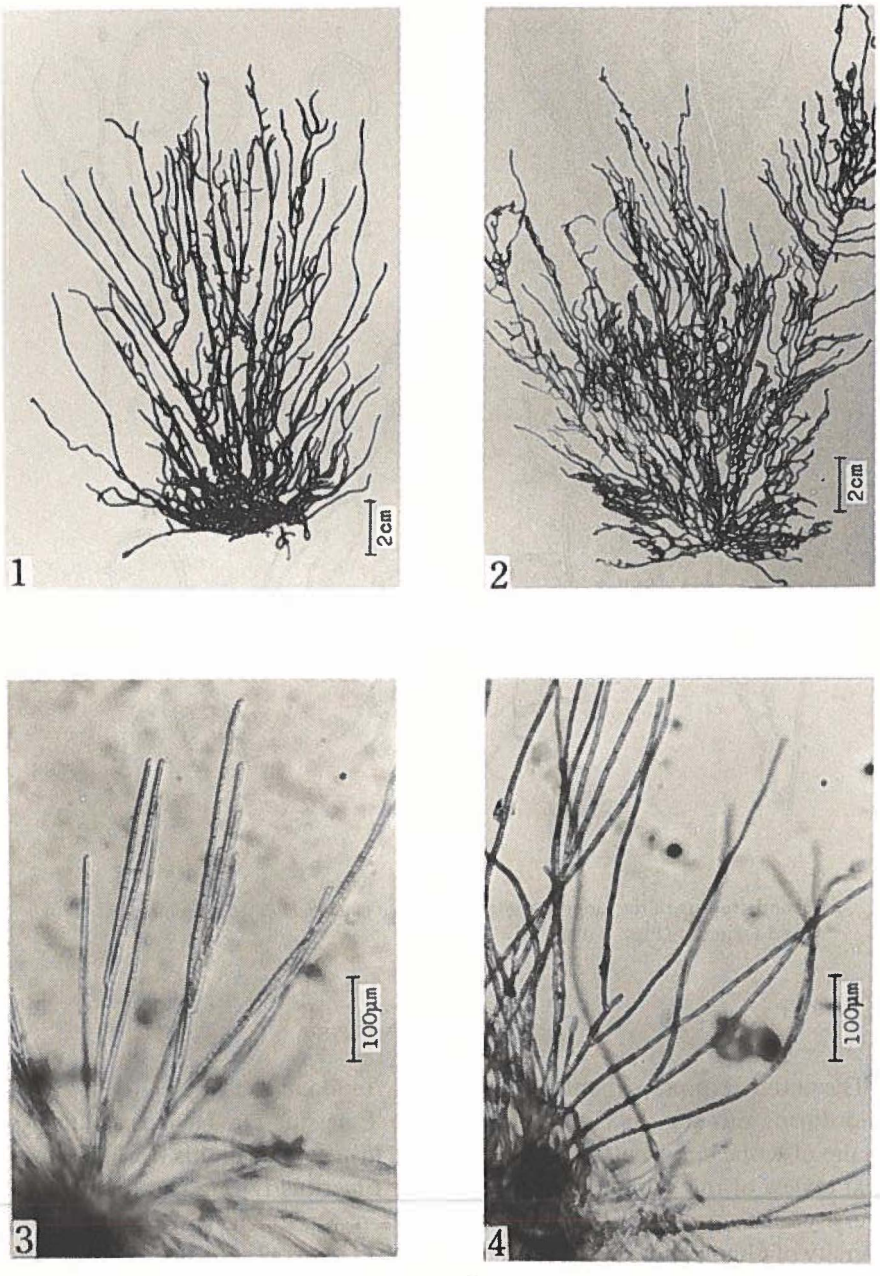

PLATE I

Fig. 1. *Thorea gaudichaudii* from Ylig River, Guam.
Fig. 2. *Thorea gaudichaudii* from Okinawa Prefecture, Japan.
Fig. 3. Hair portion and branched filaments of Guam specimen.
Fig. 4. Hair portion and branched filaments of Okinawa specimen.

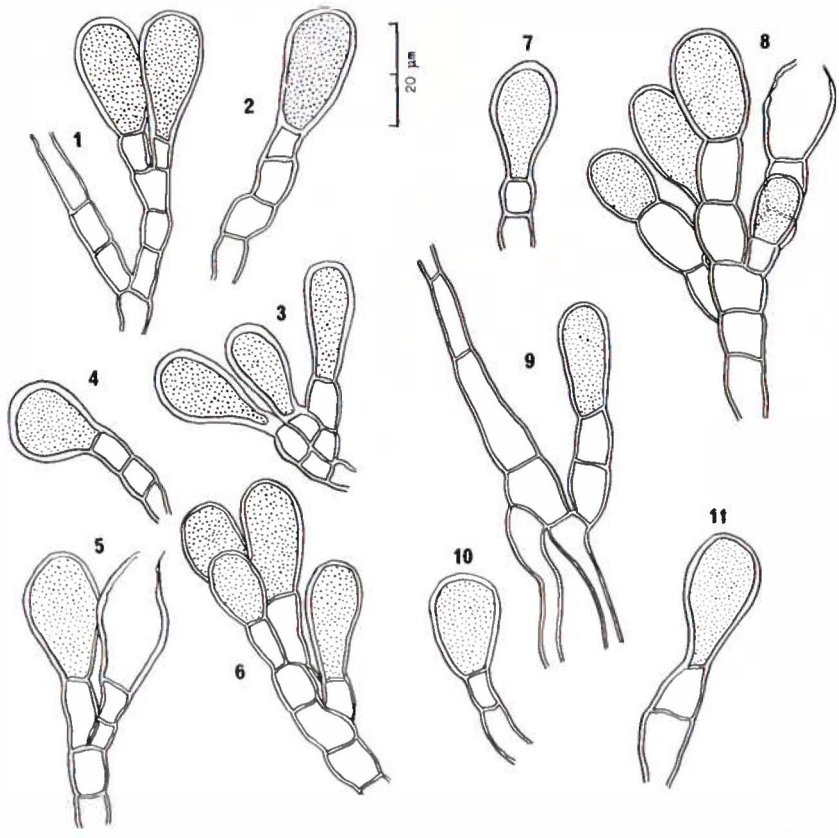

PLATE II

Freehand drawing of the monosporangia of *Thorea gaudichaudii* from Guam (Figs. 1–6) and Okinawa (Figs. 7–11).

ACKNOWLEDGMENTS

The author expresses thanks to Dr. Roy T. Tsuda of the University of Guam for his aid during our stay in Guam, to Professor Emeritus Dr. H. Hirose and Mr. S. Kumano of Kobe University for their continual instructions in this work and for their critical review of this manuscript, to Professor Emeritus Dr. Y. Okada of Nagasaki University for the specimens of *Thorea* from Okinawa, to Mr. C. P. Neubauer of the University of Guam and Mr. M. Shundo of Kobe University for their kind support in the field.

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