

Notes on the Seagrasses of Vanuatu

Norio TANAKA *

The seagrasses (marine angiosperms) of Vanuatu have been studied very little. The only published report for Vanuatu is a record of *Cymodocea serrulata* (R. Br.) Aschers. & Magnus from Efate (Hashimoto *et al.* 1998). For Melanesia, Smith (1979) has published the flora of Fiji, in which he reported five seagrass species: *Halodule uninervis* (Forssk.) Aschers., *Halodule pinifolia* (Miki) den Hartog, *Syringodium isoetifolium* (Aschers.) Dandy (Cymodoceaceae), *Halophila ovalis* (R. Br.) Hook. f., and *Halophila minor* (Zoll.) den Hartog (Hydrocharitaceae). I collected herbarium specimens of seagrasses from Anatom, Efate and Espiritu Santo Islands in Vanuatu from October to November, 2001. From these specimens, I report new records of seagrasses from Vanuatu and the rediscovery of the fruit of *Cymodocea rotundata* Ehrenb. & Hempr. ex Aschers.

New records of seagrasses from Vanuatu

CYMODOCEACEAE

Cymodocea rotundata Ehrenb. & Hempr. ex Aschers.

ANATOM. Seashore of Mystery Island, -1~2 m, S20°14'58'', E169°46'26'', 5, Nov. 2001, Tanaka 161 (TNS). Seashore of Anelghowhat -1~2 m, S20°14'07'', E169°46'50'', 6, Nov. 2001, Tanaka 174 (TNS). Seashore of Anelghowhat, -1~2 m, S20°14'07'', E169°46'50'', 6, Nov. 2001, Tanaka 175 (TNS).

EFATE. South seashore of Erakor Island, Port Vila, S17°46'34'', E168°18'27'', 12, Oct. 2001, Tanaka 2 (TNS). South seashore of Erakor Island, Port Vila, S17°46'34'', E168°18'27'', 12, Oct. 2001, Tanaka 4 (TNS).

ESPIRITU SANTO. Seashore in front of Hotel Santo, Luganville, S15°31'07'', E167°10'07'', 16, Oct. 2001, Tanaka 5 (TNS). Seashore of Sarunda, -0.5 m, S15°27'52'', E167°12'49'', 19, Oct. 2001, Tanaka 11 (TNS). Seashore of Palikuro, -0.5 m, S15°28'58'', E167°14'47'', 22, Oct. 2001, Tanaka 27 (TNS). Seashore of 3 km from Palikulo to Sarunda, -0.5m, S15°29'53'', E166°14'10'', with fruit, 27, Oct. 2001, Tanaka 64 (TNS).

Note: This species has been described as ranging from the east coast of Africa to New Caledonia and Queensland, Australia (den Hartog 1970, Phillips and Menez 1988). These records from Vanuatu extend the distribution of this species to the northeast.

Halodule pinifolia (Miki) den Hartog

ESPIRITU SANTO. Seashore in front of Hotel Santo, Luganville, S15°31'07'', E167°10'07'', 16, Oct. 2001, Tanaka 7 (TNS). Seashore in front of Hotel Santo, Luganville, S15°31'07'', E167°10'07'', 31, Oct. 2001, Tanaka 141 (TNS).

*Tsukuba Botanical Garden, National Science Museum, Tsukuba, 305-0005 Japan.

Note: *Halodule* species are dominant in the upper part of the sublittoral belt and lower part of the eulittoral belt. They are pioneer species, which are usually gregarious and dominate places that are less suitable for other seagrasses (den Hartog 1970). On this expedition, however, *H. pinifolia* and *H. uninervis* were collected at only one site for each species.

***Halodule uninervis* (Forssk.) Aschers.**

ESPIRITU SANTO. Seashore of Sarunda, -0.5 m, S15°27'52'', E167°12'49'', 19, Oct. 2001, Tanaka 12 (TNS).

***Syringodium isoetifolium* (Aschers.) Dandy**

ANATOM. Seashore of Mystery Island, -1~2 m, S20°14'58'', E169°46'26'', 5, Nov. 2001, Tanaka 162 (TNS). Seashore of Anelghowhat, -1~2 m, S20°14'07'', E169°46'50'', 6, Nov. 2001, Tanaka 172 (TNS).

Note: The collecting site for this species was restricted, as with the sites for *Halodule* species. Since *S. isoetifolium* often occurs interspersed in seagrass vegetation, it might be overlooked. However, *Syringodium* leaves are usually washed ashore at their habitat and no leaves were found washed ashore except at the collecting site. Therefore, it is probable that the distribution of this species is restricted in Vanuatu.

HYDROCHARITACEAE

***Enhalus acoroides* (L. f.) Royle**

EFATE. South seashore of Erakor Island, Port Vila, S17°46'34'', E168°18'27'', 12, Oct. 2001, Tanaka 3 (TNS).

Note: This species is said to range from the east coast of Africa to the Solomon Islands, New Caledonia, and Cape York in Queensland, Australia (den Hartog 1970, Phillips and Menez 1988). This record from Vanuatu extends the distribution of this species to the northeast.

***Halophila ovalis* (R. Br.) Hook. f.**

ANATOM. Seashore of Anelghowhat, -1~2 m, S20°14'07'', E169°46'50'', 6, Nov. 2001, Tanaka 176 (TNS).

ESPIRITU SANTO. Seashore in front of Hotel Santo, Luganville, S15°31'07'', E167°10'07'', 18, Oct. 2001, Tanaka 8 (TNS). Seashore of Sarunda, -0.5 m, S15°27'52'', E167°12'49'', 19, Oct. 2001, Tanaka 9 (TNS).

Note: *H. ovalis* is widely distributed in the Indo-West Pacific, including Fiji and New Caledonia (den Hartog 1970). Den Hartog described four subspecies: subsp. *bullosa*, subsp. *hawaiiiana*, subsp. *australis*, and subsp. *linearis*. The specimens from Vanuatu were identified as *H. ovalis* subsp. *linearis* based on his description. However, this subspecies is reported only from Mozambique. Since it is difficult to consider specimens from Mozambique and Vanuatu as belonging to the same taxon, the variation in leaf blades, which is the key character, must be re-examined. Therefore, I simply assigned these specimens to *H. ovalis* (R. Br.) Hook. f.

***Thalassia hemprichii* (Ehrenb.) Aschers.**

ANATOM. Seashore of Mystery Island, -1~2 m, S20°14'58'', E169°46'26'', 5, Nov. 2001, Tanaka 160 (TNS). Seashore of Anelghowhat, -1~2 m, S20°14'07'', E169°46'50'', 6, Nov. 2001, Tanaka 171 (TNS).

EFATE. South seashore of Erakor Island, Port Vila, S17°46'34'', E168°18'27'', 12, Oct. 2001,

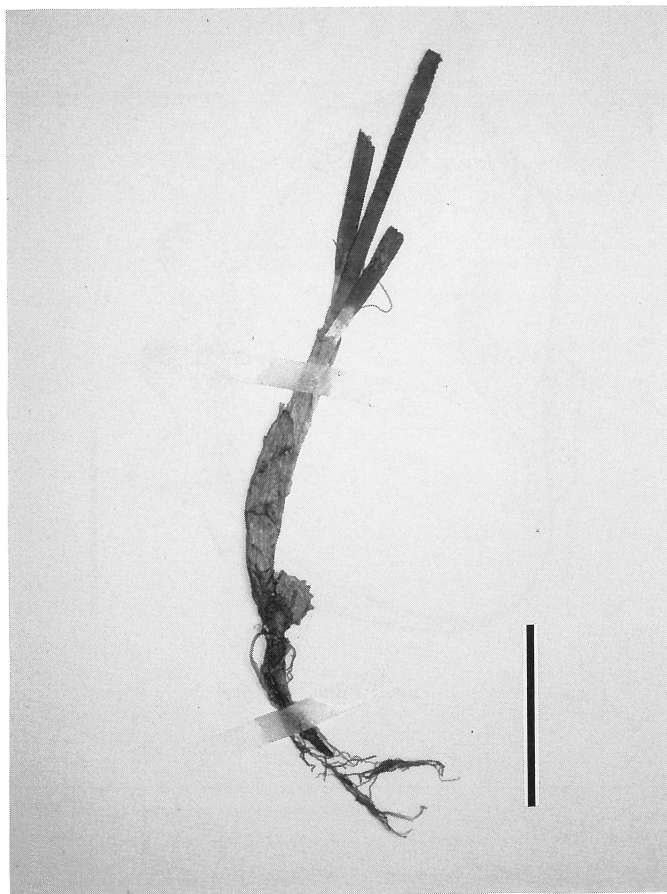


Fig. 1. *Cymodocea rotundata* Ehrenb. & Hempr. ex Aschers. This plant has a fruit at the base of a vegetative shoot. This photograph is of part of a herbarium specimen (Tanaka 64, 27, Oct. 2001, TNS9514697). Scale bar = 30 mm.

Tanaka 1 (TNS). Seashore of Sarunda, -0.5 m, $S15^{\circ}27'52''$, $E167^{\circ}12'49''$, 19, Oct. 2001, Tanaka 10 (TNS). Seashore of Palikuro, -0.5 m, $S15^{\circ}28'58''$, $E167^{\circ}14'47''$, 22, Nov. 2001, Tanaka 26 (TNS). ESPIRITU SANTO. Seashore in front of Hotel Santo, Luganville, $S15^{\circ}31'07''$, $E167^{\circ}10'07''$, 16, Oct. 2001, Tanaka 6 (TNS). Seashore, 3 km from Palikulo to Sarunda, -0.5 m, $S15^{\circ}29'53''$, $E166^{\circ}14'10''$, 27, Oct. 2001, Tanaka 65 (TNS).

Rediscovering the fruit of *Cymodocea rotundata*

Based on den Hartog (1970) and within my knowledge, flowering and fruiting are very rarely observed in *Cymodocea rotundata* Ehrenb. & Hempr. ex Aschers. Male flowers have been found only twice, in 1871 in New Caledonia and in 1967 on Thursday Island, Queensland. A female flower was found for the first time in 1967, on Thursday Island. Fruit have also only been found twice, in 1872 on New Guinea and in 1929 on Bali. In this expedition, I found a *Cymodocea rotundata* plant with fruit southeast of Espiritu Santo (Fig. 1). The fruit is described as follows (Fig. 2):

Fruit: 1, sessile, semicircular in outline, laterally compressed, 9.3 mm long, 7.0 mm wide, 2.4 mm

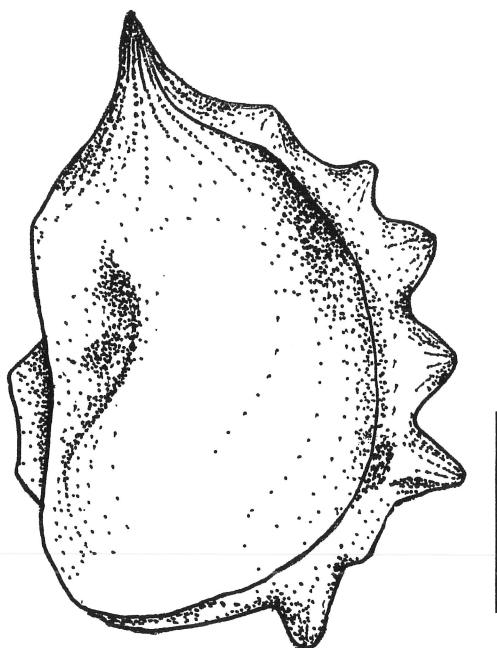


Fig. 2. Fruit of *Cymodocea rotundata*. Scale bar = 3 mm.

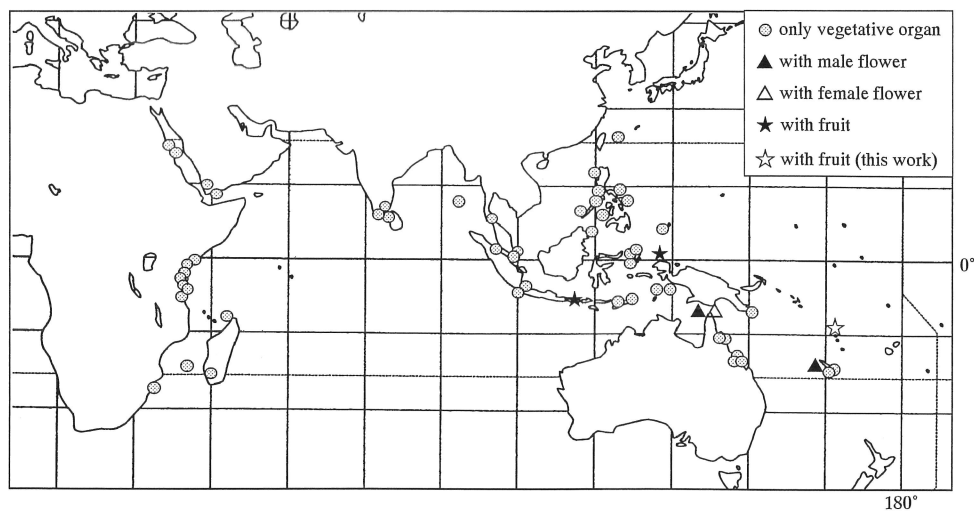


Fig. 3. The distribution of *Cymodocea rotundata* and the sites where its flowers or fruit were collected. The data are based mainly on den Hartog (1970) and partly on the author.

thick, with 3 dorsal ridges, of which the median ridge is set with 5–7 obtuse teeth and the ventral ridge is sinuate; exocarp covered with numerous reddish brown dots, beak apical, 1 mm long (Specimen examined: VANUATU. Espiritu Santo, Seashore, 3 km from Palikulo to Sarunda, –0.5 m, S15°29′53″, E166°14′10″, 27, Oct. 2001, Tanaka 64 (TNS)).

These characters are in general agreement with den Hartog's (1970) description, except for the ventral

ridge bearing 3–4 teeth. In addition, den Hartog recognized the reddish brown dots on the exocarp as tannin cells.

The records of flowers or fruits for *C. rotundata* are ranged from the Malay Archipelago to Melanesia (Fig. 3). Flowers have been collected in April and November and fruits in June and October, suggesting that flowering and fruiting take place year-round.

Acknowledgements

The author thanks Mr. Ernest Bani, head of Environment Unit, Government of the Republic of Vanuatu for providing administrative facilities in Vanuatu. Financial support of this work was provided partially by the JSPS Grant for Oversea Research No. 12575013 (for T. Iwashina).

Summary

Seven seagrass species were recorded for the first time from Vanuatu. The fruit of *Cymodocea rotundata* was rediscovered. Its characters were generally in agreement with den Hartog's description.

References

- den Hartog, C., 1970. The Seagrasses of the World. North Holland Publishing Company, Amsterdam.
- Hashimoto, T., H. Hatta, T. Yukawa, K. Sugimura, S. Chanel and T. Iwashina, 1998. A list of herbarium specimens from Vanuatu, collected in 1996 and 1997, excluding the Orchidaceae. Ann. Tsukuba Bot. Gard. 17: 1–22.
- Phillips, R. C. and E. G. Menez, 1988. Seagrasses. Smithsonian Institution Press, Washington D. C.
- Smith, A. C., 1979. Flora Vitiensis Nova 1. Pacific Tropical Botanical Garden, Hawaii.