

# New Record of Freshwater Red Algae (Rhodophyta) in Thailand: *Batrachospermum mahlacense* Kumano Et Boden-Kerby

Siripen Traichaiyaporn,<sup>a,\*</sup> Shigeru Kumano,<sup>b</sup> Thaweedet Chainapong,<sup>c</sup> Taweesak Khuantrairong<sup>a</sup> and Boonsom Waraegsiri<sup>d</sup>

<sup>a</sup> Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.

<sup>b</sup> National Institute for Environmental Studies, Tsukuba 305-8506, Japan.

<sup>c</sup> Yala Biodiversity Research Center, Rajabhat Yala Institute, Amphur Muang, Yala 95000, Thailand.

<sup>d</sup> Department of Agricultural Extension, Faculty of Agricultural Business, Maejo University, Chiang Mai 50290, Thailand.

\* Corresponding author, E-mail: siripen\_t@yahoo.com

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Freshwater red algae, Division Rhodophyta, has been divided into two classes and seven orders<sup>1,2</sup>. Skuja estimated that 5.7% (ca.200 species) out of 3,500 red algal species live in freshwaters<sup>3</sup>. *Batrachospermum* Roth is classified in Class Florideaceae, Order Batrachospermales Pueschel et Cole, Family Batrachospermaceae C. Agardh<sup>1,2</sup>. One hundred and ten taxa of the genus *Batrachospermum* are recognized around the world, and thirty nine taxa have been described and reported from the Western Pacific region including China, Japan, Malaysia, Philippines, Indonesia, Micronesia, and Papua New Guinea<sup>2</sup>. In Thailand, four species of *Batrachospermum* Roth have been reported, viz *Batrachospermum moniliforme* Roth var. *confusum* (Hass)<sup>4</sup>, *B. macrosporum* Montaque, *B. vagum* Agardh<sup>5</sup>, and *B. cayennense* Montaque ex Kützing<sup>6</sup>.

*Batrachospermum mahlacense* Kumano et Boden-Kerby was described as a new species reported by Kumano and Boden-Kerby<sup>7</sup>. It was found at one location on Guam, a pacific island, where 6 new species of freshwater Rhodophyta genus *Batrachospermum* Roth have been reported: *B. doboense* Kumano et Boden-Kerby, *B. omobodoense* Kumano et Boden-Kerby, *B. tabagatenense* Kumano et Boden-Kerby, *B. nechochoense* Kumano et Boden-Kerby, *B. feroense* Kumano et Boden-Kerby and *B. mahlacense* Kumano et Boden-Kerby<sup>7</sup>.

*B. mahlacense* was found in the southern half of Guam, which is mainly of ancient volcanic origin, where heavy tropical rainfall, an average 2,000 mm/year, is absorbed by the limestone areas, but runs off in the southern volcanic areas, forming several well-developed drainage systems. A smaller limestone cap overlies at high elevation in the southern which absorbs all rainfall and releases the water as numerous perennial springs

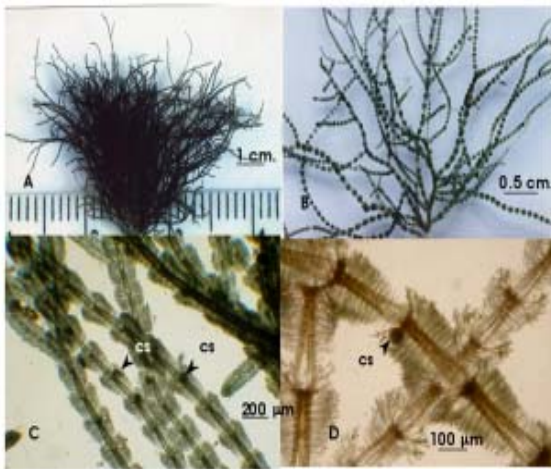
at the lower elevation, where the water meets impervious volcanic rock<sup>7</sup>.

## Topography and Environments

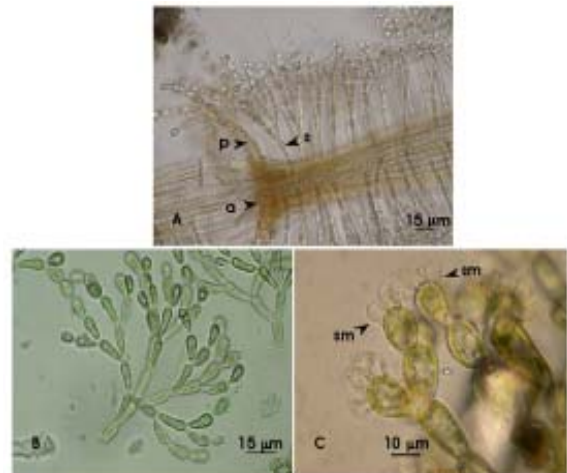
*Batrachospermum mahlacense* is a new record of a freshwater red algal species in Thailand. It was found in shallow streams in a mixed deciduous forest at about 243 m above mean sea level in Tambol Huay Kha Yeng, Amphur Thong Pha Phum, Kanchanaburi Province. It attached on rocks in a slow flowing stream with low light intensity and low temperature. Physico-chemical water quality recorded in November 2003 and January 2004 were as follows: crystal water color, depth 0.13-0.30 m, water velocity 0.13-0.22 m/sec, water temperature 19-21°C, pH 7.08-7.35, conductivity 86.70-93.00 µS/cm, hardness 93.00-93.67 mg/l as CaCO<sub>3</sub>, nitrate nitrogen 0.50-1.70 mg/l, nitrite nitrogen 0.002-0.003 mg/l, orthophosphate 0.210-0.310 mg/l and silica 6.576-7.600 mg/l.

## Description of the Species

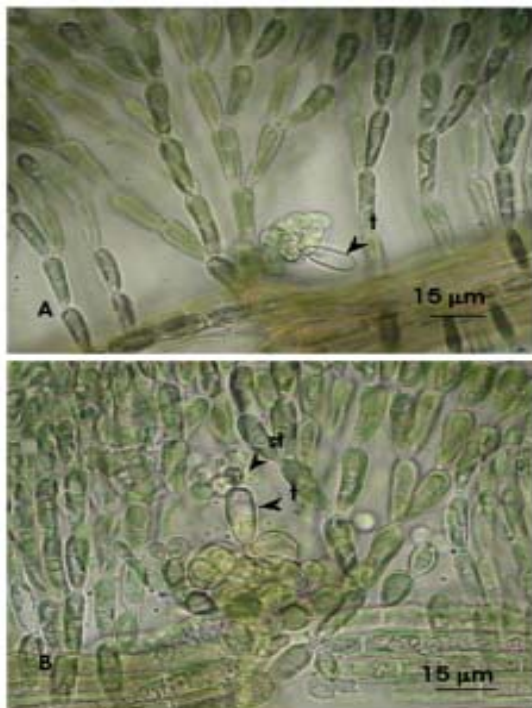
*Batrachospermum mahlacense* (Figs. 1-4). Monoecious thalli, ca. 2-6 cm high, 250-400 µm wide, abundantly and irregularly branched, moderately mucilaginous, dark greyish green (Figs. 1A, 1B). Whorls pear-shaped; carposporophytes within the whorls (Figs. 1C, 1D). Axial cells cylindrical, 30-60 µm wide, 200-400 µm long. Primary branchlets dichotomously branched, consisting of 7-9 cell-storeys; cells of fascicles ellipsoidal; hairs more or less short and cortical filaments are well-developed (Figs. 2A, 2B). Secondary branchlets numerous, consisting of 6-7 cell-storeys, non or dichotomously branched, covering all internodes (Fig. 2A). Spermatangia globose, 4-6 µm in diameter,



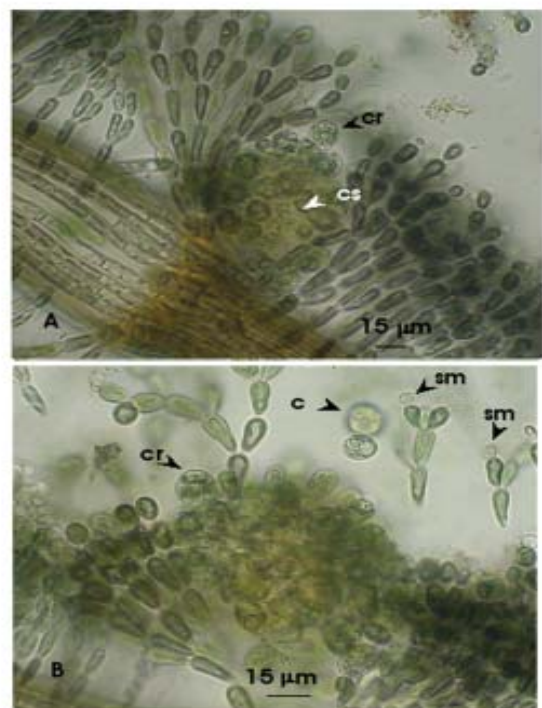
**Fig 1.** *Batrachospermum mahlacense* Kumano et Boden-Kerby  
 (A,B) Morphological features of whole plants  
 (C) A part of thallus showing pear-shape whorls and carposporophyte (cs) within the whorls  
 (D) A part of whorls showing a carposporophyte (cs)



**Fig 2.** *Batrachospermum mahlacense* Kumano et Boden-Kerby  
 (A) Main branch showing axial cells (a), primary branchlets or primary fascicles (p), secondary branchlets or secondary fascicles (s)  
 (B) Fascicle branch  
 (C) Fascicle branch tip with colorless spermatangia (sm)



**Fig 3.** *Batrachospermum mahlacense* Kumano et Boden-Kerby  
 (A) Immature carposporophyte with trichogyne (t)  
 (B) Fertilized carposporophyte with attached spermatia (st) on trichogyne (t)



**Fig 4.** *Batrachospermum mahlacense* Kumano et Boden-Kerby  
 (A) Developing carposporophyte (cs) with carposporangium (cr)  
 (B) Carposporophyte with carposporangium (cr), carpospore (c), short fascicle with spermatangia (sm)

terminal or lateral on primary and secondary branchlets (Figs. 2C, 4B). Carpogonium-bearing branch arising from the basal cell of primary branchlets, consisting of 5-15 barrel-shaped cells, twisted strongly; carpogonium 25-40  $\mu\text{m}$  long, 4-5  $\mu\text{m}$  wide at the base, 7-8  $\mu\text{m}$  wide at the apex; trichogyne ellipsoidal or urn-shaped, more or less distinctly stalked. Bracts numerous and short (Figs. 3A, 3B).

Carposporophyte single or couple, globose or semiglobose, 140-170  $\mu\text{m}$  wide, 80-160  $\mu\text{m}$  high, inserted centrally (Figs. 1C, 1D, 4A, 4B). Carposporangia obovoidal, 7-12  $\mu\text{m}$  wide, 12-14  $\mu\text{m}$  long with carpospores (Figs. 4A, 4B).

**Specimen examined:** Thailand.— SOUTH-WESTERN: Kanchanaburi [Thong Pha Phum, Traichaiyaporn *et al.* 3,7,10 (CMU)].

**Type:** Guam, Boden-Kerby 25/VIII, 1983 (holotype, Kobe University)

**Distribution:** the type locality, Obobang, Palau, Western Caroline Islands, Micronesia in Pacific Ocean, and Thailand.

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