

New Algal Records from the Singapore Mangroves

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Abstract

The following marine algae are newly recorded for Singapore mangroves: *Bostrychia pinnata* Tanaka et Chihara, *Bostrychia simpliciuscula* Harvey ex J. Agardh (Rhodophyta, Ceramiales, Rhodomelaceae), *Caloglossa angustalata* nom. prov. (Rhodophyta, Ceramiales, Delesseriaceae) and *Boodleopsis carolinensis* Trono (Chlorophyta, Caulerpales).

Collections and Observations

The rapidly dwindling mangroves of Singapore are an interesting and diverse habitat of various estuarine algae. Johnson (1979), Teo and Wee (1983) and Chapman (1984) recorded many of these. In June 1989 I had the opportunity to collect specimens in several sites for laboratory culture investigations on their reproductive biology. Below are listed four taxa previously unrecorded in Singapore. The classification, reproductive condition, date of collection, specific location, habitat and culture observations are given for each record.

Chlorophyta, Caulerpales

Boodleopsis carolinensis Trono

Johnson (1979) recorded *Derbesia fastigiata* Taylor as the only genus of the Caulerpales in the Singapore mangroves, but the vegetative and reproductive features of the present specimens are similar to *B. carolinensis*. A dense green turf is formed by erect filaments 15-21 μm diam., di- to tri-chotomously branched and with prominent constrictions present at the nodes. This system arises from a basal system comprised of lighter pigmented, more irregularly shaped and branched filaments of a greater diameter. Subspherical sporangia up to 110 μm diam. are present occasionally on the erect filaments. These features generally fit the description provided by Trono (1971) for *B. carolinensis*. *Boodleopsis pusilla* (Collins) Taylor, Joly et Bernatowicz (Taylor, et al. 1953, Calderon-Saenz and Schnetter 1989) is a more widely distributed species but the filament diameter is greater (23-45 μm). *Boodleopsis siphonaea* A. et E.S. Gepp also is larger in filament diameter (30-60 μm) according to the comments of Tanaka and Chihara (1988). *Boodleopsis hawaiiensis* Gilbert also conforms to the general appearance of these specimens except for the greater range in filament diameter (60-110 μm) and the apparent lack of sporangia (Gilbert, 1965).

Collections were made on 12 June 1989 at Kranji and on 13 June 1989 at Mandai. In both sites *Boodleopsis* formed a dense turf at the +3.0 m level above chart datum on decaying logs and on mud.

Rhodophyta, Ceramiales, Rhodomelaceae

Bostrychia pinnata Tanaka *et* Chihara

This species, described in 1984 by Tanaka and Chihara from Okinawa, appears to be distributed widely in Asia (Indonesia: Tanaka and Chihara, 1988, Australia: King and Puttock, 1986, West *et al.*, 1992). It was found in two localities in Singapore: Lim Chu Kang, mixed with *Catenella* and *Caloglossa*, 13 June 1989 and Lim Chu Kang, on *Avicennia* bark at +3.0 m above chart datum, 16 June 1989. All field plants were nonreproductive, but both isolates have developed tetrasporangia in culture. Tetraspores developed into unisexual and bisexual gametophytes. Both female and bisexual gametophytes formed well developed carposporophytes that released viable carpospores that again developed into tetrasporophytes.

Bostrychia simpliciuscula Harvey *ex* J. Agardh

This species also is widely distributed in Asia (King and Puttock, 1989). It was obtained in two localities in Singapore: Tetrasporangiate plants occurred at Mandai in a *Boodleopsis* turf at +3.0 m above chart datum on 13 June 1989. Vegetative and male plants were present in mud at +3.1 m at Lim Chu Kang on 16 June 1989. The Mandai isolate in culture has completed a *Polysiphonia-type* life history with self-compatible unisexual and bisexual gametophytes. The Lim Chu Kang isolate in culture is a male that is cross-fertile with the Mandai isolate.

The *B. pinnata* and *B. simpliciuscula* collected in Singapore and elsewhere contain D-dulcitol and D-sorbitol as compounds important in osmotic acclimation (Karsten, *et al.* 1992).

Rhodophyta, Ceramiales, Delesseriaceae

Caloglossa angustalata nom. prov.

Vegetative plants were collected in the upper turf areas at +2.0-3.0 m above chart datum at Mandai on 13 June 1989 and Lim Chu Kang on 16 June 1989 mixed with *Caloglossa stipitata* Post. Both isolates in culture have completed a *Polysiphonia-type* life history and remain uniform in morphology.

A careful survey of the literature and herbarium specimens indicate this species is undescribed. The narrow axes with wing cells often absent makes this most distinctive in comparison with other *Caloglossa* species. The final description of *Caloglossa angustalata* will be published in *Botanica Marina* (West, in preparation).

A similar species, *C. ogasawaraensis* Okamura, was isolated into culture from collections made from mud-covered *Avicennia* pneumatophores in Darwin, Northern Territory, Australia and from *Rhizophom* prop roots in Ilha do Cardoso, Sao Paulo, Brazil and Tumbes, Peru (West, 1991). *Caloglossa ogasawaraensis* produces 3-5 wing cells along each side of the midrib in the upper region of each internode whereas *C. angustalata* rarely forms more than 1-2 wing cells even at its widest. All *Caloglossa* species including *C. angustalata* produce mannitol for osmotic acclimation (Karsten, *et al.* 1992).

For all of the above-mentioned species, herbarium voucher specimens have been deposited at the University of California, Berkeley, Herbarium (UC). The culture isolates are deposited in The Culture Collection of Algae, Department of Botany, University of Texas, Austin, TX 78713-7640.

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