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New Records of Benthic Marine Algae from Florida

DAVID L. BALLANTINE

Seven species of benthic marine algae are newly reported from the Dry Tortugas, Florida. These are *Halimeda hummii* Ballantine (Chlorophyta), *Audouinella ophioglossa* Schneider, *Botryocladia wynnei* Ballantine, *Champia vieillardii* Kützting, *Monosporus indicus* Børgesen, *Hypoglossum rhizophorum* Ballantine et Wynne, and *Rhodogorgon ramosissima* Norris et Bucher (Rhodophyta). *Monosporus indicus* is reported for the first time from the Atlantic Ocean. The Dry Tortugas represents the northern distributional limit for the remaining species reported, except *Audouinella ophioglossa* and *Botryocladia wynnei*.

The marine algae of Florida have been studied since Harvey's (1852–58) attempt to list all of the algae known from North America. Taylor (1928) was the first to compile those algal species known from Florida. Taylor's floristic treatment concentrated primarily on algae from the Dry Tortugas and was based on his collections in 1924, 1925, and 1926 while he visited the Dry Tortugas Laboratory of the Carnegie Institution (located at Loggerhead Key). Numerous other floristic treatments have since resulted in the Florida marine flora being well characterized (including: Taylor, 1960; Humm and Taylor, 1961; Humm, 1963, 1964, 1973; Dawes et al., 1967; Dawes and van Breedveld, 1969; Dawes, 1974; Earle, 1969; Cheney and Dyer, 1974; Hanisak and Blair, 1988).

This report is based on three collecting trips to the Dry Tortugas National Park, Florida, between September 1991 and September 1992. The Dry Tortugas, an extension of the Florida Keys reef tract, lies roughly 110 km west of Key West at the southern end of the Gulf of Mexico.

METHODS

All plants were collected by SCUBA from four locations within the Dry Tortugas National Park. These were Bird Key (24°36.689'N, 82°52.226'W), Loggerhead Key (24°38.264'N, 82°52.022'W), Pulaski Shoal (24°41.661'N, 82°42.296'W), and Texas Rock (24°40.810'N, 82°53.180'W). Algae were preserved in 10% formalin in seawater immediately after collection. Whole-mount slides were prepared of specimens stained with acidified 1% aniline blue in 20% Karo syrup. Voucher specimens are deposited at the Herbario Marino Puertorriqueño, Department of Marine Sciences, University of Puerto Rico at Mayaguez (MSM) and the U.S. National Museum (US).

LIST OF SPECIES

Chlorophyta
Caulerpaales
Udoteaceae

Halimeda hummii Ballantine

Specimen studied.—D.L.B. 4384, Texas Rock, 12 m depth, 18.ix.1992.

This diminutive *Halimeda* species was originally described from Puerto Rico (Ballantine, 1982). The only other published record for the species is from Costa Rica (Soto and Ballantine, 1986). A single specimen was encountered in the Dry Tortugas, growing on dead *Acropora cervicornis* (Lamarck). The Florida plant was extremely small, being only four segments in length. The Dry Tortugas now represents the northernmost distributional range known for the species.

Rhodophyta
Acrochaetales

Audouinella ophioglossa Schneider

Specimen studied.—D.L.B. 4281, Pulaski Shoal, 9 m depth, 14.v.1992.

Audouinella ophioglossa grows by penetrating the cortical filaments of *Dudresnaya crassa* Howe. This species has a characteristic inflated basal cell remaining in the original spore cell wall. According to Schneider and Searles (1991), the species may possibly be found wherever *D. crassa* is found. *Audouinella ophioglossa* is known in the western Atlantic as far north as its type locality in North Carolina (Schneider, 1983), and in the Caribbean from Puerto Rico (Ballantine and Wynne, 1986).

Rhodymeniales
Champiaceae

Champia vieillardii Kützting

Specimen studied.—D.L.B. 4470, Pulaski Shoal, 9 m depth, 17.ix.1992.

Reports of *Champia compressa* Harvey from the Caribbean (Diaz-Piferrer, 1970; Schnetter and Bula-Meyer, 1979; Almodóvar and Ballantine, 1983) have been referred by Wynne (1986) to *Champia vieillardii*. The single Florida specimen was a small plant, measuring 9 mm in height and 1.2 mm in breadth. The specimen was distinctly flattened, the diaphragms being eight cells across, perpendicular to the plane of flattening. *Champia vieillardii* is known from tropical Africa in the eastern Atlantic (Lawson and John, 1982) and is widely reported from the tropical Pacific (Price and Scott, 1992).

Rhodymeniaceae

Botryocladia wynnei Ballantine

Specimens studied.—*D.L.B. 3888*, Pulaski Shoal, 9 m depth, 16.ix.1991; *D.L.B. 4321*, Loggerhead Key, 9 m depth, 16.v.1992.

Botryocladia wynnei was initially described from Puerto Rico (Ballantine, 1985), but is also known from Georgia and North Carolina (Schneider and Searles, 1991). Florida plants were small, measuring to a maximum of 4 mm in height. North Carolina plants are reported up to 35 mm in height (Schneider and Searles, 1991). *Botryocladia wynnei* differs from the morphologically similar species *B. pyriformis* (Børgesen) Kylin in possessing a netlike layer of cortical cells surrounding the margins of the medullary cells.

Ceramiales Ceramiaceae

Monosporus indicus Børgesen (Figures 1–3)

Specimen studied.—*D.L.B. 4460*, Pulaski Shoal, 9 m depth, 17.ix.1991.

Monosporus Solier, considered to be a form genus by Baldock (1976) and Huisman and Kraft (1982), originally accommodated morphologically similar propagule-forming plants for which sexual reproduction was unknown. However, Huisman and Gordon-Mills (1994) recently reported sexual structures for *M. australis* (Harvey) J. Agardh. *Monosporus* is misnamed for the large asexual structures it produces that are properly called propagules (Guiry, 1978). Taylor (1960) listed two species of the genus, *M. herspetica* Vickers and *M. ?belangeri* (Montagne) De Toni, as uncertain records from the tropical west Atlantic. The former species was described from Barbados (Vickers,

1905). Martinique, West Indies is the type location of the latter species. There are only three other reports of the genus from the tropical west Atlantic. Kemperman and Stegenga (1986), and Aponte (1990) reported *Monosporus* sp. from Costa Rica, Central America, and Puerto Rico, respectively. Stegenga and Vroman (1987) reported *M. herspetica* from Curaçao.

Within the Monosporaeae, there are three genera that produce single-celled propagules (i.e., *Monosporus*, *Mazoyerella*, and *Desikacharyella*). Florida plants are assigned to the genus *Monosporus* due to the apparent lack of sexual reproduction. They are assigned to *M. indicus* on the basis of growth habit and size of vegetative cells and propagules. Plants grow from a leading axis (Fig. 1) that is initially prostrate and becomes erect. Lowermost cells measure to 120 μm and decrease in diameter to 70 μm above. Plants are attached by elongate rhizoids that terminate in digitate pads (Figs. 1, 3). The rhizoids issue from the distal ends of prostrate and lower erect vegetative cells. Propagules are broadly ovate and their cellular contents are highly granular (Fig. 2). They are borne on single-celled pedicels and measure to a maximum size of 140 \times 200 μm . The Florida species differs from *M. herspetica* in having pedicellate propagules; they are sessile in the latter species (Vickers, 1905).

Monosporus indicus was originally described from Bombay, India (Børgesen, 1931) and is also known from Asia (Kim and Lee, 1989). This represents the first report of the species for the Atlantic Ocean.

Delesseriaceae

Hypoglossum rhizophorum Ballantine et Wynne

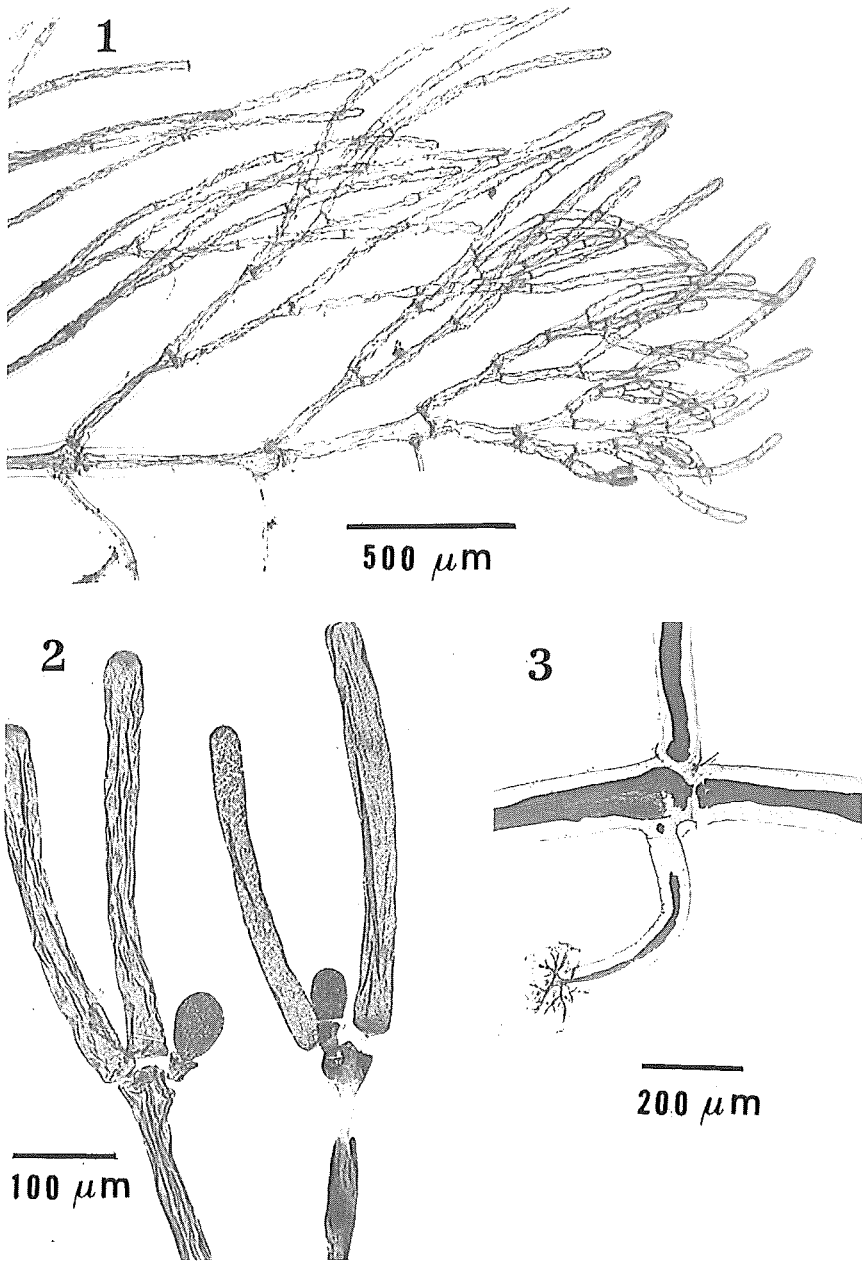
Specimens studied.—*D.L.B. 3824*, Pulaski Shoal, 9 m depth, 17.ix.1991; *D.L.B. 4297*, Bird Key, 9 m depth, 18.v.1992.

Hypoglossum rhizophorum is a common alga associated with deep reefs throughout the Caribbean (Ballantine and Wynne, 1988). Specimens of this plant were tetrasporic and they represent the first reproductive plants known from nature. The Dry Tortugas now represents the northernmost distributional range for the species.

Uncertain affinity

Rhodogorgon ramosissima Norris et Bucher

Specimen studied.—*D.L.B. 3804*, Pulaski Shoal, 9 m depth, 14.ix.1991.



Figs. 1–3. *Monosporus indicus* Børgesen. Fig. 1. Habit of plant showing prostrate axis with elongate rhizoids and erect-growing branches. Fig. 2. Two branchlets with pedicellate propagules. Fig. 3. Portion of prostrate axis with rhizoid which terminates in a digitate pad.

Rhodogorgon ramosissima is an unusual genus of uncertain systematic position (Norris and Bucher, 1989). It fits none of the currently circumscribed orders of red algae, although Ogden (1992) provisionally placed it in the Nemaliales. It is never abundant and has been found sporadically at a number of Caribbean Islands (Norris and Bucher, 1989; Ogden,

1992). Of the two *Rhodogorgon* species described by Norris and Bucher (1989), Florida plants would conform to *R. carriebowensis*. Ogden (1992), however, placed *R. carriebowensis* into synonymy with *R. ramosissima*. The Dry Tortugas now represents the northernmost distributional range known for the genus. *Rhodogorgon ramosissima* is probably not a regular el-

ement of the Florida flora. It was not observed on the same substratum following its initial collection.

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