

# THE OCCURRENCE OF *MONOSTROMA* AND *ENTEROMORPHA* IN OHIO<sup>1, 2</sup>

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Taft (1946) reported *Monostroma wittrockii* Bornet from the Portage River at a point 16.5 miles west of Port Clinton, Ohio. The collection was made July 15, 1941, and is the only Ohio record of *M. wittrockii* known to me. Since this record was published, *Monostroma bullosum* (Roth) Wittrock and *Enteromorpha intestinalis* (L.) Greville have been collected in the Portage River at Elmore, Ohio. The location, in the extreme southwest corner of Ottawa County, is approximately three miles upstream from that where *Monostroma wittrockii* was discovered.

The Portage River, at the village of Elmore, flows over an outcrop of limestone where bedrock is exposed during stages of low water. At such times the water flows through a number of shallow and irregular channels which vary in width from several inches to a few feet. The water is swift and turbulent because of the sharp downstream declivity of the limestone outcrop and the irregular contours of the channels. Colonies of *Monostroma bullosum* were found attached to the limestone and to lodged driftwood in the swiftest and most turbulent water in the channels during August 1951 and 1954. The colonies, with diameters to 5 cm, were bright green, saccate, and mostly spherical to subspherical. Though their appearance in the current resembled somewhat that of young colonies of *Tetraspora*, they differed from the latter by being firmer and of a tougher consistency.

*Enteromorpha intestinalis* occupied an essentially different habitat. Colonies were found in partial shade from adjacent trees at several points near the south bank of the river where there was mostly no flow of water from the main channel. The colonies generally occurred in water less than one inch deep in shallow depressions in the bedrock. The water, however, was not stagnant. In every case the depression either surrounded a fault in the lime formation, or lay downstream and adjacent to such a fault. A quantity of very fine, clean sand along the edge of each fault was good evidence that water was welling up from below, while a small but constant flow of water from one fault was observed. The young colonies were attached at, or near the edge of the fault, while those farther out in the depression floated free. The free-floating colonies showed no specific orientation as they lay in the water, while those attached at the edge of the fault were always on the down-stream side and were mostly oriented in the direction of the current. The

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<sup>2</sup>Contributions from the Franz Theodore Stone Biological Laboratory, Put-in-Bay, Ohio. Papers from the Department of Botany and Plant Pathology, The Ohio State University. No. 676.

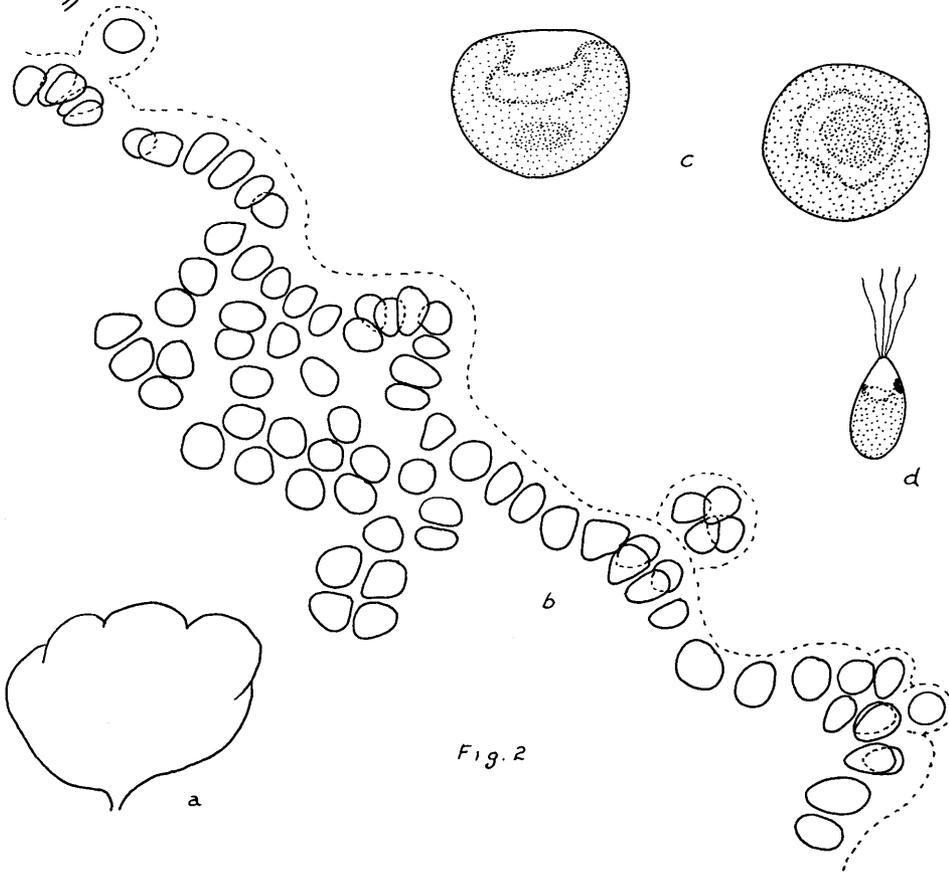
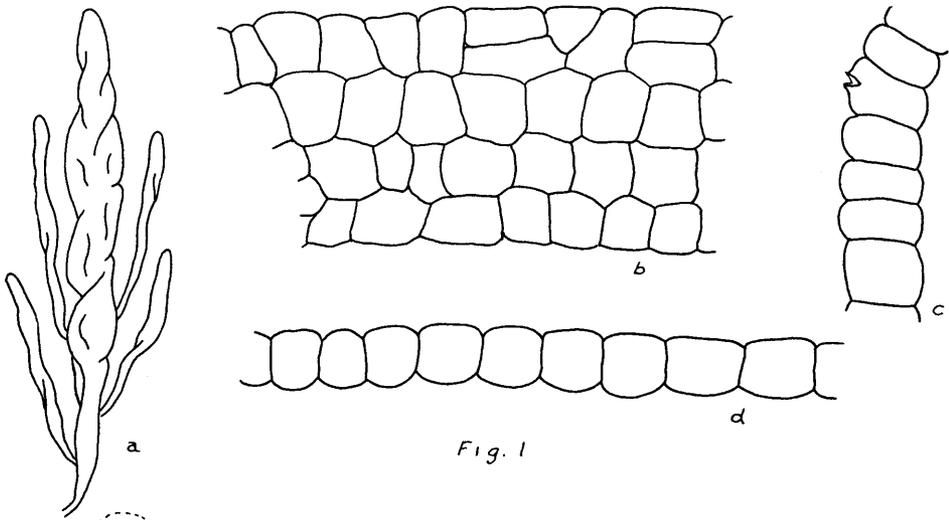
## EXPLANATION OF FIGURES 1 AND 2

### FIGURE 1. *Enteromorpha intestinalis* (L.) Greville

- a. Habit sketch.
- b. Portion of a thallus that shows cell arrangement.
- c. Cross section of a portion of a mature thallus; one cell with a pore.
- d. Cross section of a portion of a lateral proliferation.

### FIGURE 2. *Monostroma bullosum* (Roth) Greville

- a. Habit sketch.
- b. Portion of a thallus that shows cell arrangement and the origin of saccate lobes.
- c. Two views of a cell that show the massive chloroplast and the pyrenoid.
- d. A zoospore.



FIGURES 1 AND 2

colonies, with lengths to 20 cm, were bright green to yellow-green, tubular, wrinkled-convolute and intestine-like, with numerous branched proliferations from the sides.

Several attempts to collect material since August, 1954, have failed. Each time that a visit to the area was possible, the river channel was flooded. It may be that, as with *Monostroma wittrockii*, a peculiar set of circumstances contributed to the appearance of these two genera and that they now have disappeared. This is doubtful, especially for *Monostroma bullosum*, because it did remain from 1951 through 1954. With favorable conditions of low water and sufficient time for development, it should be found again.

It is difficult to account for the occurrence of either *Monostroma* or *Enteromorpha* in the Portage River because of the inland location. Though both genera are occasionally found in fresh water, they are essentially algae of marine and brackish habitats. *Enteromorpha*, which is widely distributed in the oceans, occurs along the North American coasts, in estuaries, and to some distance inland in rivers that flow into the oceans. It also occurs inland in brine lakes and salt springs. *Monostroma* is world-wide in the oceans, but species are known from brackish waters of varying salinity, and from freshwater. *Monostroma wittrockii* Bornet was probably introduced into the Portage River by discarded oyster shells from a near-by kitchen midden. There is no evidence that *M. bullosum* and *E. intestinalis* were similarly introduced.

*Enteromorpha intestinalis* (L.) Greville (fig. 1).—Colony tubular, wrinkled and convolute, intestine-like, with numerous elongate proliferations from the sides, green to yellow-green. Thallus composed of a single cortical-like layer of cells, cells ovoid to rectangular, diameter 10 to 25  $\mu$ , thickness 16 to 18  $\mu$ . Chloroplast a relatively thin plate against the outer wall.

Locality: Portage River, Elmore, Ohio. Collected by C. E. Taft, August 25, 1954.

*Monostroma bullosum* (Roth) Wittrock (fig. 2).—Colony saccate, spherical to subspherical, up to 5 cm in diameter, with saccate lobes, bright green, slippery, in swiftly flowing water. Thallus composed mostly of a single layer of cells except at the beginning of a lobe, lobes later becoming saccate. Cells mostly in 2's, sometimes in 4's, hemispherical, ovoid, or spherical, mostly with long axes at right angles to the surface of the thallus. Small cell diameter 7  $\mu$ , maximum cell diameter 14  $\mu$ . Chloroplast massive, parietal, opening outward, one pyrenoid. Zoospores 8 to 16 per cell, ovoid, quadriflagellate, prominent pigment body, 5  $\mu$   $\times$  7  $\mu$ , strongly phototropic.

Locality: Portage River, Elmore, Ohio. Initial collection by Robert J. Doyle, Aug. 23, 1951. Collection by C. E. Taft, Aug. 25, 1954.

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