Clifford Ochs
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Grazing on unicellular cyanobacteria (*Synechococcus*) by marine flagellates

Grazing on *Synechococcus*, a unicellular cyanobacteria, has been proposed to occur only at night in the Sargasso Sea (Waterbury et al. 1986). An attempt was made to determine if *Synechococcus* (strain 8012 provided by Dr. John Waterbury) produces a substance during photosynthesis which inhibits grazing. Problems with maintenance of healthy cultures of *Synechococcus* in the laboratory and bacterial overgrowth in experimental treatments prevented resolution of this question. However, a preliminary experiment indicated that *Synechococcus* strain 8012 is unable to prevent grazing by exudation of a inhibitory substance produced during photosynthesis. *Synechococcus* was incubated with heterotrophic flagellates (*Paraphysomonas bandaienfis*) in the presence of a 50% filtrate from a culture containing a high concentration (1.3×10^7 cells/ml) of *Synechococcus* grown in the light. Numerous *Synechococcus* cells in the food vacuoles of the flagellates after a five hour incubation indicated that grazing was occuring despite the high concentration of filtrate. Further experiments should be conducted to examine the possibility that grazing by heterotrophic flagellates is inhibited, if not prevented, by chemical substances produced by *Synechococcus*.

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Nitrogen fixation (acetylene reduction) by cyanobacteria epiphytic on eelgrass (*Zostera*) in a saltwater pond

Sage Lot Pond is a shallow saltwater pond in Falmouth, Massachusetts. A study by the Boston University Marine Program (BUMP) has found a much higher rate of organic matter production in Sage Lot Pond than can be accounted for by calculated inputs of nitrogen. The inputs calculated by BUMP do not include nitrogen fixation. Much of the sediments are covered by a submerged macrophyte, eelgrass (*Zostera*). In the present study, the surface of the leaves of the eelgrass were examined by epifluorescence microscopy and found to be extensively colonized by cyanobacteria, especially a species of *Plectonema*. *Plectonema* has been reported to be capable of nitrogen fixation. I measured rates of nitrogen fixation (acetylene reduction) by cyanobacteria epiphytic on leaves of eelgrass from Sage Lot Pond. Leaves of eelgrass were incubated in the laboratory in sealed vessels and the rate of acetylene reduction measured over almost four days. Maximal rates of nitrogen fixation were very small (mean = 15.5 μg N/gram eelgrass C/day), accounting for a maximum of only 2% of the nitrogen deficit for Sage Lot Pond. No difference in rates of acetylene reduction were observed when the plants were put in the dark. During the incubation, oxygen declined in the chambers to less than 0.5 mg/l but no stimulation in the rate of acetylene reduction was observed. The results suggest that nitrogen fixation does not account for the observed discrepency in nitrogen inputs and organic matter production in Sage Lot Pond. But further studies are recommended to examine the possibility that nitrogen fixation occurs either in the sediments, at other times of the year, or under conditions more closely resembling natural environmental conditions than in this study.