

Presenter: Leah Gorman, leah.gorman@purchase.edu, 518-281-2933, SUNY Purchase, Environmental Studies

Faculty Advisor: George Kraemer, george.kraemer@purchase.edu

Oral Presentation

The effect of temperature on growth of non-native seaweed species *Gracilaria vermiculophylla* in the Long Island Sound as compared to native *Gracilaria tikvahiae*

Abstract

In the past two decades, the red alga *Gracilaria vermiculophylla*, a species native to the waters of Korea and Japan, has invaded marine coastal areas of Europe and the Americas, persisting in conditions that differ from those of its native habitat. In recent years, *G. vermiculophylla* has been discovered in the Long Island Sound (LIS) growing alongside the native congener *Gracilaria tikvahiae*. The goal of this study was to determine whether the *G. vermiculophylla* strain growing in LIS exhibits phenotypic plasticity, and whether physiological differences can explain the success of the invasive species. Two strains of *Gracilaria vermiculophylla* (isolated in Korea and LIS) and a strain of LIS native *Gracilaria tikvahiae* were grown for four weeks under temperatures ranging from 20° C to 34° C using temperature gradient tables, while all other environmental conditions remained constant. At the end of each week, wet weight of each sample was recorded. Thalli were reduced to the original stocking density of 3 g L⁻¹, excess biomass was preserved for tissue carbon and nitrogen analysis, and water samples were collected. The LIS strain of *G. vermiculophylla* grew more similarly to *G. tikvahiae* than to the Korean strain. After one week of growth *G. tikvahiae* grew 12.9%, 19.3%, 13.4% and 0.5% d⁻¹, at temperatures of 20, 24, 29, and 34°C respectively. *G. vermiculophylla* (LIS) grew 8.6%, 7.9%, 7.0%, and 4.2% d⁻¹, while *G. vermiculophylla* (Korea) grew 28.1%, 56.6%, 60.3%, and 15.4% d⁻¹, a much higher growth rate than ever previously reported. These results suggest that the non-native species may have differentiated genetically. Analysis of tissue carbon and nitrogen concentrations, and ammonium uptake are currently in progress to help understand differences in other physiological performance of the strains.

Keywords: invasive species, Gracilaria vermiculophylla, Gracilaria tikvahiae, Long Island Sound, macroalgae