THE EFFECTS OF TEMPERATURE, PH AND SILICA CONCENTRATION ON THE GROWTH AND SCALE MORPHOLOGY OF SYNURA PETERSENII (KORSH.) (CHRYSOPHYCEAE)

AN ABSTRACT OF

A THESIS

PRESENTED TO THE GRADUATE FACULTY

OF WESTERN CONNECTICUT STATE UNIVERSITY

BY

ANDREA MARIE NEROZZI

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS

IN OCEANOGRAPHY AND LIMNOLOGY

Abstract

Synura petersenii f. petersenii batch and semicontinuous cultures were grown on temperature (11 - 26 °C), silica (0X, 1X and 10X the DyIII medium silica level) and pH (4.3 - 7.5) gradients. The growth of *S. petersenii* batch cultures was very similar at all temperatures and silica concentrations. The maximum growth rate for all cultures was approximately 0.50 doublings/day and occurred at the beginning of the exponential growth phase. All cultures were able to produce comparable final cell densities (approximately 3.0 - 4.0 x 10^6 cells/ml).

The majority of the semicontinuous cultures maintained on the temperature and silica gradients, as well as those cultures grown at pH 5.7 to 7.5 on the pH gradient, exhibited mean growth rates of 0.30 - 0.40 doublings/day. However, the mean growth rate of cultures grown at pH 4.3 was much lower and ranged from 0.06 - 0.23 doublings/day. A statistically significant difference in growth was found only for those cultures grown on the pH gradient indicating that *S. petersenii* is adversely affected by a low pH environment. Preconditioning the inocula did not affect the growth rates of the silica or pH gradient cultures.

A qualitative examination of scanning electron micrographs of *S. petersenii* silica scales revealed that scale morphology was not affected by temperature but was altered by the silica concentration and pH level. The greatest change in scale morphology was found at 10X silica. Scales were heavily silicified with thick struts and well formed spines. Some of the scales from cultures grown at 0X silica for approximately 3 doublings approached the var. *glabra* type; however, scales could not be found in cultures grown at 0X silica for 10 doublings. Scales from cultures maintained at pH 4.3 were weakly silicified and also approached the var. *glabra* type. This indicates that silica scale morphology can be affected by environmental parameters and that var. *glabra* may simply be an ecomorph of *f. petersenii*.