

OXYGEN-BASED VALIDATION OF A NEW DILUTION PROTOCOL
FOR DETERMINING MICROZOOPLANKTON
GRAZING RATES

A Thesis Presented to the Faculty
of
California State University, Stanislaus

In Partial Fulfillment
of the Requirements for the Degree
of Master of Science in Marine Sciences

By
Christopher Seianni
May 2008

ABSTRACT

Microzooplankton, small (<200 μm) protozoan and metazoan heterotrophs, are the primary consumers of most phytoplankton worldwide. Their grazing impact has been shown to account for roughly two thirds of all primary production across all marine environments. However, the method currently being used to quantify the grazing impact of microzooplankton, the Chlorophyll *a*-based dilution technique, suffers from an unpredictable pigment related bias known as incomplete degradation that results in underestimates of the true microzooplankton community grazing rates. This paper describes a new production-based dilution technique that removes this source of potential error and therefore should provide more accurate estimates of these grazing rates. When tested under controlled, laboratory conditions, this new production-based dilution technique provided accurate estimates of to the true cell-based microzooplankton community grazing rates (ground truth), whereas the tradition technique underestimated the true rates by a factor of two. The same pattern was observed under field conditions, where the traditional Chlorophyll *a*-based dilution technique underestimated the production-based grazing rates by nearly a factor of two. This work demonstrates the accuracy of this new production-based dilution technique and suggests that it should replace the traditional method as the method of choice for future measurements of microzooplankton community grazing rates.