

## **The impacts of nitrogen on the growth of toxic and non-toxic Gulf of Maine dinoflagellates**

Harmful algal blooms (HABs) are a rising problem in most coastal regions due to the increase of eutrophication. While eutrophication can happen due to many factors, nitrogen (N) rich runoff is one of the major contributors, which can be detrimental as N is typically limited in coastal systems. When marine phytoplankton come in contact with an abundance of nutrients, especially limiting nutrients, the growth rate increases and could potentially lead to high toxicity levels and biomass of concern. This study compared toxic, *Alexandrium tamarense*, and nontoxic, *Prorocentrum micans*, phytoplankton in different N concentrations by examining the effects on their growth rate in limiting (0 M), non-limiting ( $8.82 \times 10^{-4}$  M) and excess ( $17.64 \times 10^{-4}$  M) N conditions. Phytoplankton cultures were made in triplicate using NCMA L1 Medium and adjusting nitrate ( $\text{NaNO}_3$ ) and measured daily for fluorescence units. It was concluded that the average (0 M), ( $8.82 \times 10^{-4}$  M) and ( $17.64 \times 10^{-4}$  M) growth rate for *A. tamarense* and for *P. micans* was 0.18 d<sup>-1</sup>, 0.17 d<sup>-1</sup>, 0.18 d<sup>-1</sup> and 0.07 d<sup>-1</sup>, 0.10 d<sup>-1</sup>, 0.07 d<sup>-1</sup>, respectively. The data showed that both species had the same (respectively) growth rates in limiting and excess N, however in non-limiting N conditions, *P. micans* and *A. tamarense* experienced faster or lower (respectively). This data supports that the decrease of N pollution would help slow down the growth rate of phytoplankton.

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