



Increased sensitivity to ultraviolet radiation in nitrogen-limited dinoflagellates: Photoprotection and repair

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ABSTRACT: Nitrogen (N) limitation significantly increased the sensitivity of photosynthesis to inhibition by ultraviolet radiation (UV) in two estuarine dinoflagellates, *Akashiwo sanguinea* (= *Gymnodinium sanguineum*) and *Gymnodinium* (= *Gyrodinium*) cf. *instriatum*. Biological weighting functions (BWFs) and the kinetics of photosynthetic response to UV indicated that the main mechanism for the increase in sensitivity was less efficient repair. A decrease in cell size and in the concentration of the photoprotective mycosporine-like amino acids also elevated sensitivity. The BWFs predict that increased UV-B due to ozone depletion would cause a more than 1.5-fold greater additional inhibition of N-limited compared to nutrient-sufficient dinoflagellates. The BWFs of the N-limited cultures are similar to those measured for natural assemblages of phytoplankton in the Chesapeake Bay under low N availability.

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