

Associations between Optical Properties and Mixotrophic Ciliates Abundances Using Remote Sensing Techniques in Two North Patagonian Lakes (Villarrica and Caburgua, 38°S, Araucania, Chile)

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Abstract

The north Patagonian lakes in their original stage were characterized by their marked oligotrophy, with high abundance of mixotrophic ciliates in lakes with native forest in their surrounding basins. Nevertheless, in the last decades, it was a replace of native forest of different kind of human activities, such as towns and agricultural zones, that generate a transition from oligotrophy to mesotrophy, being replaced the mixotrophic ciliates by different kind of phytoplankton. The aim of the present study was to propose a descriptive model using remote sensing techniques for determining the best model for predict the mixotrophic ciliates abundance in two North Patagonian Chilean lakes. In studies sites, only Caburgua lake has mixotrophic ciliates, that belong to the species *Ophrydium naumanni*, *Stentor amethystinus* and *S. araucanus*, whereas Villarrica lake has not mixotrophic ciliates. The multiple regression analysis revealed that for *O. naumanni* and *S. amethystinus* have significant direct associations between temperature, B01, B07 reflectances, *S. araucanus* abundances, and inverse associations with B02, B04 and B07, and the abundance of both species was significantly inverse. Finally, for *S. araucanus* was positive associations with B04 and *S. amethystinus*. The exposed results would be similar to the first descriptions of mixotrophic ciliates abundances for Argentinean and Chilean Patagonian lakes. On this basis, we propose the use of remote sensing techniques would be an important key tool for study the presence of these organism. © 2022, HARD Publishing Company. All rights reserved.

Author keywords

Chlorophyll; Mixotrophic ciliates; Patagonian lakes; Remote sensing; Spectral properties