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Thomas G Stojsavljevic* (tgs@uwm.edu), 1428 E Capitol Drive, Apartment 2, Shorewood, WI 53211. *Evolutionary stable strategy for a multispecies phytoplankton competition model.*

Phytoplankton live in a complex environment with two essential resources forming various gradients. Light supplied from above is never homogeneously distributed in a body of water due to refraction and absorption from biomass present in the ecosystem and from other sources. Nutrients in turn are typically supplied from below. In poorly mixed water columns, phytoplankton can be heterogeneously distributed forming various layering patterns. In this talk, a reaction-diffusion-taxis model describing the vertical distribution of two phytoplankton species competing for light and resources is presented. Using simulations, we exhibit evidence of thin layer formation for motile phytoplankton in poorly mixed environments. A game theoretic approximation is considered, where the depth of the phytoplankton layer is treated as the strategy is then analyzed. The evolutionary stable strategy (ESS) is the depth at which the phytoplankton are equally limited by both resources. We derive the ESS of the game theoretic model and draw connections to the simulations of the original model. (Received September 23, 2017)