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Thomas G Stojavljevic* (tgs59@drexel.edu). *Theory of Resource Competition Incorporating Preferential Uptake in a Water Column*. Preliminary report.

The theory of resource competition in spatially extended systems incorporating resources and biomass fluxes is far from trivial. Here, we analyze the competition between two phytoplankton species for light and two nutrients, one of which is assumed to be preferred. First, a game theoretic approximation is considered, where the depth of the phytoplankton layer is treated as the strategy the phytoplankton adopt. The evolutionary stable strategy (ESS) is the depth at which the phytoplankton are equally limited by both resources. We analytically derive the ESS of the proposed preferential uptake model. Next, we extend the game theoretic approximation by extending the classic R^* rule to allow for spatial resource gradients. A theoretical framework outlining the competition between the two phytoplankton species is then presented. (Received September 11, 2019)