Competition and seasonal succession dynamics between *Pyrocystis fusiformis* and *Thalassiosira pseudonana* in the Northern Sargasso Sea

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Research Question

In which seasonal duration, does Pyrocystis fusiformis dominate over Thalassiosira pseudonana in the Northern Sargasso sea?

Background

The Northern Sargasso Sea, an ecologically diverse region in the North Atlantic, is home to abundant planktonic life essential to the marine ecosystem. Pyrocystis fusiformis, a bioluminescent dinoflagellate, and Thalassiosira pseudonana, a significant diatom, play critical roles in this environment. Pyrocystis fusiformis ranges in size from 50 to 100 micrometers, while Thalassiosira pseudonana measures between 4 to 10 micrometers. The larger size of Pyrocystis fusiformis can potentially outshade the smaller Thalassiosira pseudonana, intensifying the competitive pressure for sunlight (g) across the different seasons.

Predators like zooplankton and fish (P) consume both phytoplankton species (C1 and C2), extracting nutrients (N) and energy. When these predators die, they release nutrients back into the water, sustaining the ecosystem that the two phytoplankton species live in.

Sketch

Pyrocystis fusiformis

Thalassiosira pseudonana