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Burson, A.; Stomp, M.; Mekkes, L.; Huisman, J.

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STABLE COEXISTENCE OF EQUIVALENT NUTRIENT COMPETITORS THROUGH NICHE DIFFERENTIATION IN THE LIGHT SPECTRUM

Amanda Burson, Maayke Stomp[†], Lisette Mekkes, and Jef Huisman 

Study Description

What explains the coexistence of species? Answering this question may help ecologists to predict how natural communities will respond to environmental change. We transferred phytoplankton communities from the North Sea to laboratory competition experiments. The experiments resulted in coexistence of two species. Monocultures revealed that these two species were equivalent competitors for phosphorus. Yet, in competition, the species displayed stable coexistence rather than the random ecological drift predicted by neutral theory. Interestingly, the two species used different pigments absorbing different colors of light. Hence, coexistence of these equivalent nutrient competitors was stabilized by niche differentiation in the light spectrum.

[†]Deceased, August 4, 2017.

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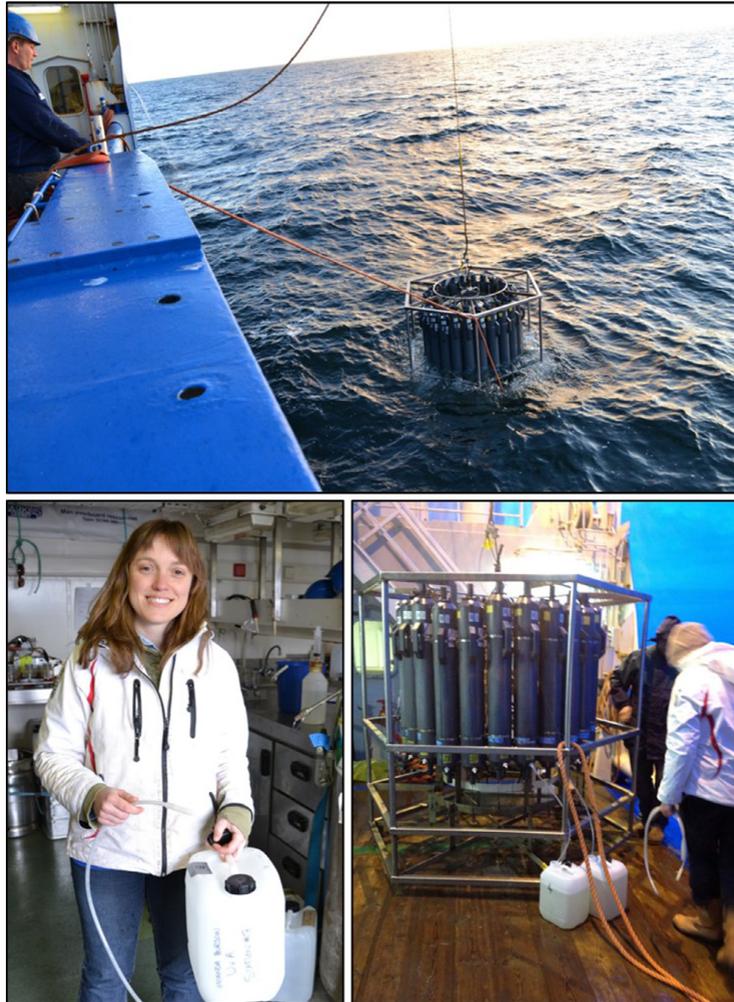


Photo 1. Collecting phytoplankton samples during a cruise on the North Sea with the research vessel *Pelagia*. Top: Sampling the North Sea with a rosette sampler (Photo credit: Amanda Burson). Bottom left: Amanda Burson with a carboy for collection of the phytoplankton community just sampled (Photo credit: Corina Brussaard, with permission). Bottom right: Gentle transfer of water from the rosette sampler to the carboys (Photo credit: Corina Brussaard, with permission).

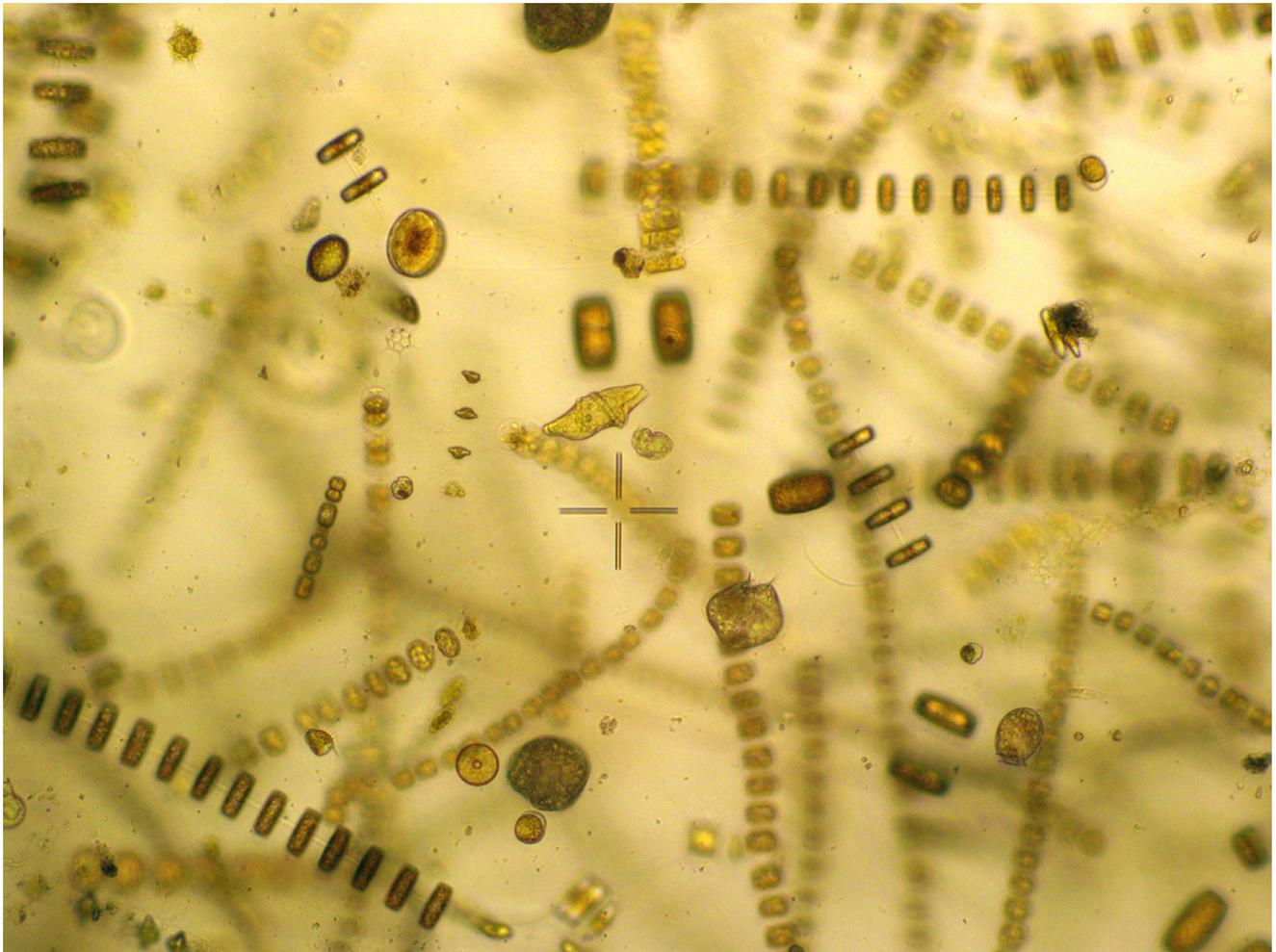


Photo 2. A look through the microscope at the natural phytoplankton community collected while on the North Sea cruise. The natural community consisted of a rich variety of species and provided the starting material for our multispecies competition experiments. Photo credit: Amanda Burson.



Photo 3. Laboratory experiments with species isolated from the North Sea samples. Top: Chemostats with monocultures of the eustigmatophyte *Nannochloropsis* (left) and the picocyanobacterium *Cyanobium* (right). Bottom: Lisette Mekkes preparing to take a sample from one of the competition experiments. The flat chemostats used in these experiments are specifically designed for phytoplankton studies and allow full control of the temperature, nutrient, and light conditions. Photo credit: Amanda Burson.

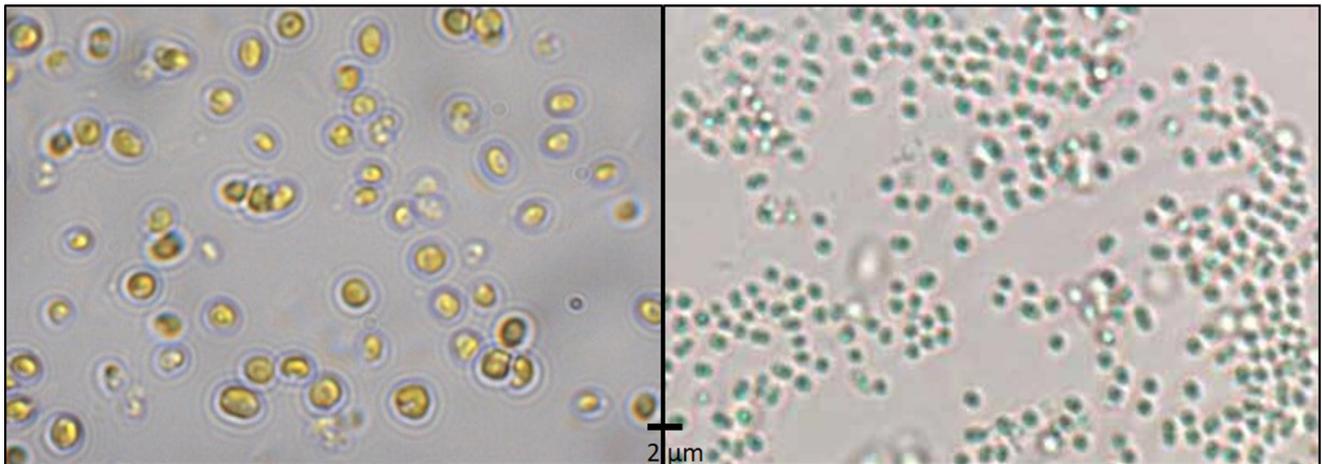


Photo 4. The two competitors under the microscope. Left: The eustigmatophyte *Nannochloropsis*. Right: The picocyanobacterium *Cyanobium*. Note the difference in color of the two species, caused by the presence of different photosynthetic pigments. Photo credit: Amanda Burson.

These photographs illustrate the article “Stable Coexistence of Equivalent Nutrient Competitors Through Niche Differentiation in the Light Spectrum” by Amanda Burson, Maayke Stomp, Lisette Mekkes, and Jef Huisman published in *Ecology*. <https://doi.org/10.1002/ecy.2873>