

# Predatory cues drive colony size reduction in marine diatoms

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## Abstract

1. Chain formation is common feature among non-motile marine phytoplankton. Several theories exist around the potential benefits of larger colonies. 2. Here we test the hypothesis that predation is one of the evolutionary drivers behind chain formation and chain length plasticity. We exposed cultures of *Thalassiosira rotula*, *Chaetoceros curvisetus* and *Chaetoceros affinis* to copepodamides, a chemical alarm signal from copepods. This was coupled with a grazing experiment which compared grazing rates on different chain lengths. 3. Our results show that *T. rotula* and *C. curvisetus* decreased their chain lengths by 79 % and 49 %, respectively, in response to copepodamides. Single cells and short chains were grazed at lower rates and the copepodamide driven size shift led to 30 % and 12 % lower grazing in *T. rotula* and *C. curvisetus* respectively. *C. affinis* did not respond to copepodamides and did not show the same size dependent clearance rate. 4. We found that more chain forming diatoms respond to predatory cues from copepods than previously known, and that predation is likely an important driver in the evolution of colony size and colony size plasticity.

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