Food uptake in the harmful alga Prymnesium parvum mediated by excreted toxins

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ABSTRACT: Toxin production is widespread among aquatic microalgae, suggesting a functional advantage for organisms producing toxic compounds. However, the biological role of algal toxin production is only vaguely understood. Here, we show that excretion of a toxic substance in the phagotrophic phytoflagellate *Prymnesium parvum* (Prymnesiophyceae) constitutes a mechanism to immobilize and seize motile prey. Feeding frequency of *P. parvum* in dilute batch cultures was low when fed the motile prey *Heterocapsa rotundata* (dinoflagellate). However, dense cultures caused immobilization of *H. rotundata* cells, thereby allowing *P. parvum* to feed on them. In contrast, when fed a nonmotile prey[]the diatom *Thalassiosira pseudonana*[]feeding frequency was high, even in dilute *P. parvum* cultures. We could demonstrate that feeding frequency of *P. parvum* on H. rotundata was positively correlated with the measure of the toxic effect causing immobilization and lysis of prey cells. The fact that the toxic effect on *H. rotundata* was found in cell-free filtrate of *P. parvum* cultures suggests that immobilization and lysis of prey cells were caused by the excretion of toxins.

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