Distinctly different behavioral responses of a copepod, Temora longicornis, to different strains of toxic dinoflagellates, Alexandrium spp

Zooplankton responses to toxic algae are highly variable, even towards taxonomically closely related species or different strains of the same species. Here, the individual level feeding behavior of a copepod, Temora longicornis, was examined which offered 4 similarly sized strains of toxic dinoflagellate Alexandrium spp. and a non-toxic control strain of the dinoflagellate Protoceratium reticulatum. The strains varied in their cellular toxin concentration and composition and in lytic activity. High-speed video observations revealed four distinctly different strain-specific feeding responses of the copepod during 4 h incubations: (i) the ‘normal’ feeding behavior, in which the feeding appendages were beating almost constantly to produce a feeding current and most (90%) of the captured algae were ingested; (ii) the beating activity of the feeding appendages was reduced by ca. 80% during the initial 60 min of exposure, after which very few algae were captured and ingested; (iii) capture and ingestion rates remained high, but ingested cells were regurgitated; and (iv) the copepod continued beating its appendages and captured cells at a high rate, but after 60 min, most captured cells were rejected. The various prey aversion responses observed may have very different implications to the prey and their ability to form blooms: consumed but regurgitated cells are dead, captured but rejected cells survive and may give the prey a competitive advantage, while reduced feeding activity of the grazer may be equally beneficial to the prey and its competitors. These behaviors were not related to lytic activity or overall paralytic shellfish toxins (PSTs) content and composition and suggest that other cues are responsible for the responses.

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