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Effects of small-scale turbulence on marine microzooplankton

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We investigated the effects of turbulence on growth and ingestion rates of 4 dinoflagellates (*Oxyrrhis marina*, *Gyrodinium dominans*, *Peridiniella danica*, and *Karlodinium armiger*) and one ciliate (*Mesodinium pulex*). These protists display different feeding mechanisms: *K. armiger* feeds with a peduncle; *G. dominans*, *O. marina* and *M. pulex* engulf the prey, the first two being active swimmers and *M. pulex* being an ambush predator; *P. danica* possesses a microtubular basket, typical of tube-feeders, but its feeding mechanism has not been fully described yet.

We used an oscillating grid to generate two intensities of turbulence (Low = $1 \cdot 10^{-2} \text{ cm}^2 \text{ s}^{-1}$, open waters conditions; High = $2.5 \cdot 10^{-1} \text{ cm}^2 \text{ s}^{-1}$, coastal conditions) and a plankton wheel (0.2 r.p.m.) to reproduce still conditions. As food, we used *Rhodomonas salina* for the dinoflagellates and *Heterocapsa rotundata* for the ciliate. After 48 h preconditioning to food and turbulence, *O. marina* and *M. pulex* ingestion rates were unaltered by any of the two levels of turbulence; however, *M. pulex* growth rates were negatively affected at the highest intensities. *G. dominans* displayed a negative response in grazing activity only to the highest intensity of turbulence; the effect was not apparent in growth rates. *P. danicum* growth and ingestion rates were negatively affected by both intensities of turbulence. *K. armiger* escaped the oscillating grid and remained close to the bottom of the experimental tank at both intensities of turbulence. We think that the different responses to small-scale turbulence are related to the particular feeding mechanisms of each species.

Keywords: microzooplankton, turbulence, dinoflagellate, ciliate, feeding

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