Effects of small-scale turbulence on copepods: The case of Oithona davisae

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Limnol. Oceanogr., 48(3), 2003, 1304-1311 | DOI: 10.4319/lo.2003.48.3.1304

ABSTRACT: We report the effects of small-scale turbulence on the feeding rates of the marine copepod *Oithona davisae*. Laboratory experiments were conducted under a range of turbulence dissipation rates between 10^{-4} and 10^{1} $cm^2 s^{-3}$. Net enhancements of feeding were observed only at the lowest, whereas negative net effects appeared only at the highest, turbulence intensities. These results contrast with expectations from an encounter-based model for this copepod species that predicted positive feeding enhancements at all turbulence intensities. This disagreement suggests the presence of detrimental effects at moderate and high turbulence intensities, very likely driven by either a lower mechanosensor perception capability or lower capture success. In comparison to other ambush copepods, *O. davisae* appears much more sensitive to the presence of turbulence, which might be the result of its strict ambush behavior, whereas copepods like *Acartia tonsa* or *Centropages typicus*, which can switch into different feeding modes, appear to benefit more from turbulence. The response of *O. davisae* feeding to turbulence in our experiments agrees with recent field observations on changes in the vertical distribution of *Oithona* as a function of wind-driven turbulence events. Hence, *O. davisae* seems to choose those depths where small-scale turbulence favors feeding.