Life history responses of Daphnia pulicaria to diets containing freshwater diatoms: Effects of nutritional quality versus polyunsaturated aldehydes

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ABSTRACT: Like marine diatoms, some freshwater diatoms produce α, β, γ, δ-polyunsaturated aldehydes (PUA) when damaged. Some of these oxylipins are suspected of impairing egg viability in marine copepods. To determine whether these compounds also play a role in influencing the trophic interactions in freshwater environments, we measured growth and reproduction of the cladoceran *Daphnia pulicaria* in response to diets composed of seven diatoms differing in PUA production. The juvenile growth rate of *Daphnia* varied with the diatom species, but was not related to oxylipin production. Egg hatching success was nearly 100% in all clutches for all diets, except with a diet of the decadienal producing Fragilaria sp., where it decreased dramatically in clutches 5-7. In vitro tests of egg hatching in the presence of PUA showed a dose-dependent inhibition for decadienal. Population parameters (i.e., life-time fecundity and instantaneous rate of population growth) were not affected by PUA, as the contribution of late clutches to them was negligible. Consequently, the wound-activated production of PUA by diatoms cannot be regarded as a defensive mechanism against *Daphnia* population recruitment.