

Nutritional value of different food sources for the benthic Daphnidae *Simocephalus vetulus*: role of fatty acids

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With 2 figures and 6 tables

Abstract: In this experimental study, growth, survival and fecundity of the benthic Cladoceran *Simocephalus vetulus* were measured when feeding on *Cryptomonas ovata*, *Paraphysomonas vestita*, *Cyclidium glaucoma* and particulate amorphous organic matter to investigate the nutritional value of these food sources. Cladocerans fed *Cr. ovata* (autotrophic flagellate) exhibited the highest fecundity and growth. Particulate organic matter (POM, mainly composed of detrital particles) and *Cy. glaucoma* (ciliate) supported a lower grow and neonate production. *P. vestita* (heterotrophic flagellate) was inadequate to promote development and fecundity of *S. vetulus* and also resulted in high mortality. The concentrations of (n-3) series polyunsaturated fatty acids (PUFA) in the tested diets seemed to be the main factor determining their nutritional quality. *S. vetulus*' fecundity and increase in size were significantly correlated with the percentages of (n-3) PUFA in the diet, especially eicosapentaenoic acid (20:5 n-3). Although PUFA concentrations in *Cy. glaucoma* and POM were substantially lower than those provided by *Cr. ovata*, an apparent ability to bioconvert PUFA allowed *S. vetulus* to reproduce successfully. The fatty acid profiles of neutral lipids and phospholipids of the cladocerans indicate that *S. vetulus* is able to synthesise long-chain PUFA from dietary C18 PUFA through a process of elongation and desaturation. However, the long chain (n-3) PUFA, especially 20:5(n-3), in the lipids of *P. vestita* were apparently too scarce to be compensated for by bioconversion.

Key words: PUFA, diet, food quality, fatty acid composition, Cladocera.

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