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## Evaluation of Possible Causes of Non-Predatory Mortality of Crustacean Zooplankton in a Small Siberian Reservoir

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*Non-predatory specific mortality (NPSM) of dominant zooplankton species, Daphnia (longispina group) and Cyclops vicinus, was estimated during 1997-2000 sampling seasons on the basis of a new direct method: live/dead sorting and sediment trap measurements. Simultaneously measured ecological factors, such as water temperature, pH, dissolved oxygen, biomass of cyanobacteria, diatoms, greens and euglens, levels of polyunsaturated fatty acids of  $\omega 3$  family,  $\alpha$ -linolenic (ALA) and eicosapentaenoic (EPA), were considered as possible causes of the mortality using multivariant canonical correlation analysis. Toxicity was discarded on the basis of another set of study of the reservoir. As found, the best predictor of Daphnia mortality was EPA level, negatively correlated with NPSM value. Nevertheless, large part of variance of Daphnia mortality and practically all variance of Cyclops NPSM remain unexplained and need future investigation.*

*Keywords: non-predatory mortality, Daphnia, Cyclops vicinus, ecological factors, canonical correlation analysis.*

### Introduction

Dynamics of zooplankton populations are known to be of great importance for overall functioning of aquatic ecosystems. Abundance of zooplankton evidently depends on two factors: growth (somatic and generative) and mortality. Meanwhile, data on mortality are very sparse compare to that of growth due to methodical problems (e.g., Polishchuk and Ghilarov, 1981). Consumption by predators, fish (e.g., Luecke et al., 1990; Hulsmann et al., 1999) and invertebrates (e.g., Razlutskiy, 1996; Wojtal et al., 1999) are often the main cause of zooplankton mortality in many locations and seasons. Nevertheless, non-predatory mortality also can play a determinant

role (Luecke et al., 1990; Boersma et al., 1996; Mehner et al., 1998; Dubovskaya et al., 1999; Hulsmann and Weiler, 2000; Hulsmann and Voigt, 2002). In general, causes of non-predatory mortality of zooplankton are believed to be limiting physical and chemical factors, disease, senescence (Velimirov, 1991) and also food (edible phytoplankton) limitation (Luecke et al., 1990; Boersma et al., 1996). However, particular causes of variations of the non-predatory mortality in diverse sites and periods are still unknown. Non-predatory mortality estimations were indirect and included double error, connected with estimations of birth rate and consumption by fish. Finding of any quantitative correlation of such unreliable

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