Hydrobiologia **408/409:** 241–250, 1999.
N. Walz & B. Nixdorf (eds), Shallow Lakes '98: Trophic Interactions in Shallow Freshwater and Brackish Waterbodies

Diel variation in horizontal distribution of *Daphnia* and *Ceriodaphnia* in oligotrophic and mesotrophic lakes with contrasting fish densities

Torben L. Lauridsen[1], Erik Jeppesen[1], Stuart F. Mitchell[2], David M. Lodge[3] & Romi L. Burks[3]
[1]*National Environmental Research Institute, Department of Lake and Estuarine Ecology, Vejlsøvej 25, DK-8600 Silkeborg, Denmark. E-mail: tll@dmu.dk*
[2]*University of Otago, Department of Zoology, Dunedin, New Zealand*
[3]*University of Notre Dame, Department of Biological Sciences, Notre Dame, IN-46556, U.S.A.*

Key words: shallow lakes, *Daphnia*, *Ceriodaphnia*, DHM, predation

Abstract

Recent studies document diel horizontal migration by large zooplankton in eutrophic shallow lakes. Risk of predation from planktivorous fishes could induce such behaviour. We studied diel horizontal distribution of cladocerans in 31 mainly shallow oligotrophic and mesotrophic New Zealand (NZ) and North American (NA) temperate lakes. In terms of weight, fish catch per net ($CPUE_w$) in multiple mesh-sized gill nets was similar in the two sets of lakes, while CPUE by number ($CPUE_n$) was overall higher in the NA lakes. Unlike previous results from eutrophic, temperate lakes, we found no significant diel variations in density in the pelagic and littoral zones, suggesting no diel horizontal migration of zooplankton. In the NZ lakes, *Daphnia* and *Ceriodaphnia* were evenly distributed between the littoral zone and the pelagial, while in the NA lakes *Daphnia* were more abundant in the pelagial and *Ceriodaphnia* in the littoral zone. In the oligotrophic fishless NZ lakes, large *Daphnia carinata* dominated, whereas the smaller *Ceriodaphnia dubia* dominated in lakes with high CPUE's. In both the NZ and the NA lakes, *Daphnia* showed no clear correlation to fish $CPUE_n$. However, in the NA lakes, *Daphnia* occurred at fish $CPUE_n$ values at which they were eliminated in the NZ lakes, which may be related to differences in water transparency, reflecting a higher chlorophyll *a* and humic content in the NA lakes.