

**University of South Bohemia in České Budějovice  
Faculty of Science**

**The stabilizing effect of resting eggs banks of  
the *Daphnia longispina* species complex for  
longitudinal taxon heterogeneity in long and  
narrow reservoirs**

RNDr. Thesis

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## ■ Annotation

We compared the spatial distribution of taxa from the *Daphnia longispina* complex in the active water column community and in the resting egg banks in five long narrow reservoirs in the Czech Republic (Central Europe). We concluded that the spatial heterogeneity of *Daphnia* taxonomic composition observed in reservoirs is substantially strengthened by the presence of spatially heterogeneous egg banks.

## ■ Declaration [in Czech]

Prohlašuji, že svoji rigorózní práci jsem vypracovala samostatně pouze s použitím pramenů a literatury uvedených v seznamu citované literatury.

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■ **Co-authors agreement**

The co-authors listed below fully acknowledge that Ivana Vaníčková is the first author of this publication. Ivana Vaníčková participated in field sampling and was responsible for processing of the sediment samples, isolation of the ephippia, DNA extraction from the ephippia and ITS-RFLP analyses, data assembly, statistic evaluation, and writing the manuscript.

All co-authors hereby consent to the publication in the RNDr. thesis of Ivana Vaníčková and support this statement with their signature (in alphabet order without academic titles):

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## The stabilizing effect of resting egg banks of the *Daphnia longispina* species complex for longitudinal taxon heterogeneity in long and narrow reservoirs

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**Abstract** We compared the spatial distribution of taxa from the *Daphnia longispina* complex (*D. longispina*, *D. galeata*, *D. cucullata*, and their hybrids) in the active water column community and in resting egg banks in five long narrow reservoirs in the Czech Republic (Central Europe). In each reservoir, we sampled at both ends of the longitudinal gradient: in the inflow region and at the dam. Ehipippia abundance in the sediments significantly increased in the downstream direction, reflecting differences in the sedimentation regime and *Daphnia* population size. Similarly to the active zooplankton community, in which *D. cucullata* and *D. longispina* tended to occur at opposite ends of the reservoirs,

*Daphnia* species and interspecific hybrids in resting eggs revealed a spatially diversified pattern; however, we observed some differences in taxon distributions between sediments and water columns. High relative abundances of hybrid genotypes (up to 16% of resting eggs, and 74% of *Daphnia* in the water column) confirm that interspecific hybridization is frequent in these reservoirs, and some hybrids are successful in competition with the parental taxa. We assume that the spatial heterogeneity of *Daphnia* taxonomic composition in reservoirs, being affected by the seasonal selection of taxa within the mixed reservoir species pool, is substantially strengthened by the presence of spatially heterogeneous egg banks.

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### Introduction

Long and narrow reservoirs are characterized by a unique tributary-to-dam longitudinal gradient of both abiotic and biotic factors affecting local biota, including turbidity, trophic conditions, food availability, predation, and competition. Varying combinations of these environmental characteristics result in a spatially heterogeneous community at all trophic levels, including bacteria (Šimek et al., 2008), algae (Hejzlar & Vyhnálek, 1998), zooplankton (Seda &