

# ***Daphnia galeata* in the deep hypolimnion: spatial differentiation of a “typical epilimnetic” species**

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## **Abstract**

*Daphnia galeata* is traditionally regarded to be a non-migratory species which lives in warm epilimnetic waters. Depth segregation or vertical migration is usually attributed to other *Daphnia* species such as *D. hyalina* or *D. longispina*. In a two-year study, we found that in a deep, dammed-valley reservoir (Římov Reservoir, Czechia) the majority of the population of *D. galeata* lives in the warm epilimnetic waters during the summer months, but some specimens of this species could be always found in the deep strata as well. This hypolimnetic subpopulation stays in the cold hypolimnetic water and does not migrate. The abundance of hypolimnetic *D. galeata* does not exceed 1 specimen per litre and usually shows seasonal variation (minimal densities in early spring, maximal in late summer).

Using allozyme electrophoresis, we found that the subpopulation from the deep hypolimnion was clearly genetically differentiated from the population in the epilimnion. We found significant differences in both allele and multilocus genotype frequencies; the  $F_{ST}$  values at most sampling dates exceeded 0.05. However, the spatial segregation between the epilimnetic and hypolimnetic subpopulations is not permanent. The reservoir is dimictic and hence, at least twice per year, all vertically segregated parts of the population are mixed together. Our results suggest that the deep hypolimnetic subpopulation is repeatedly re-established in spring by deepwater “colonists”, at least some of which seem to be ecologically specialised for the hypolimnetic conditions, and dominate the hypolimnion by the end of the season. The genetic differentiation is likely the result of both the different depth preferences of various *D. galeata* clones and different selective pressures in the epilimnion and hypolimnion.