

23 CO-ADAPTATION OF LIFE HISTORY CHARACTERISTICS AND HABITAT PREFERENCE IN *DAPHNIA* (CRUSTACEA, CLADOCERA) L. De Meester - University of Gent (RUG).

Though recent studies indicate that plasticity in diel vertical migration behaviour of zooplankton is high (1, 2), evidence has accrued for a genetic polymorphism with respect to the behaviour, both from field studies using electrophoretic markers (3-4) and from laboratory studies showing a genetic component to the variability in phototactic behaviour in *Daphnia* (5-6). Differences in phototactic behaviour correspond to differences in habitat preference in *Daphnia magna*: positively phototactic clones are characterized by a shallow day-depth, whereas intermediately and negatively phototactic clones remain in deeper water during the day (7). We have conducted life table experiments with *D. magna* clones differing in phototactic behaviour to test for co-adaptation between life histories and day-time vertical distribution. Highly significant interclonal differences were observed for several life history traits. Differences in adult body size, size of the neonates, average duration of the adult instar, and clutch sizes were associated with differences in phototactic behaviour. Positively phototactic clones combine a small adult body size with a high intrinsic rate of increase, by producing offspring at a relatively fast rate. They do so at the cost of producing small neonates that are less starvation-resistant than those from negatively and intermediately phototactic clones. They can afford this cost because they are less likely to face starvation as they remain in the relatively food-rich surface waters. Clones residing at greater depth during the day grow larger, and produce offspring of better quality. Though our observations need corroboration from data on the life history of migrating and non-migrating clones of lake-dwelling *Daphnia* species, our results indicate that vertical migration "strategies" may include differences in life history strategies.

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