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Phenotypic Plasticity in *Choleva agilis* to Maintain Fitness in an Unpredictable Environment (Coleoptera: Cholevidae)*

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Choleva agilis Illiger 1789 is a cold season species which reproduces and develops in winter months and obligatorily aestivates in the early adult stage from IV until IX. Aestivation delays, and tends to synchronize, the developmental cycle with the season rather than avoids deteriorating climatic conditions.

Females [FF] oviposit for about 150 days. However, at the end of pre-imaginal development in the spring the adults emerge within a relatively narrow time interval of about 35 days. Synchronisation of individual development within the population is caused by the differences in thermal thresholds in subsequent pre-imaginal stages, and by the changing temperatures during winter months as well. The narrow time interval of adult emergence is not maintained until the age of first reproduction. By contrast, diapause intensity varies and gives the capability to spread the onset of reproduction over a time interval of more than 200 days, even between full sibs.

Spreading the age at first reproduction even within families, and the relatively low heritability in the duration of diapause ($h^2 = 0.12 \pm 0.018$), are interpreted as bet-hedging mechanisms to cope with the vagaries of weather conditions in an unpredictable environment. Temporal spreading of reproduction is so pervasive that it provides the opportunity for at least some daughters of each single dam to match the correct date of oviposition, independently of birth dates and weather conditions which could be expected in the area of study. There is insufficient synchronisation of the developmental cycle with the season by diapause intensity when (a) oviposition is very early in the season, and (b) the entire pre-imaginal development occurs at extremely high temperatures. Under these circumstances an ecological tuning by photoperiod and temperature is necessary.

Keywords: Diapause intensity - temperature - photoperiod - reproduction - heritability

* Dedicated to the late Professor Dr Hermann Remmert, who gave us many stimulating ideas about ecology