

Seasonal variation in size and nutrient content of eggs of the land snail *Arianta arbustorum*

Anette Baur

I examined the size and nutrient content of eggs laid in successive clutches by the land snail *Arianta arbustorum*. Snails from three populations (a lowland, a subalpine and an alpine locality in Switzerland) were examined. Eggs from the subalpine population had the highest protein concentration (28,1%) compared to those from the lowland population (25,6%) and the alpine population (24,4%). Eggs from the lowland and subalpine population did not differ in carbon concentration (32,1% and 32,3%), whereas eggs from the alpine population had a lower C-concentration (31,3%). Clutch size tended to decrease in successive egg batches in all populations. Egg size increased over the reproductive season in snails from the lowland population, whereas no seasonal change was observed in the alpine population. The protein concentration decreased in successive batches in the lowland and alpine populations, but tended to increase in the subalpine population. The carbon concentration decreased over the season in the lowland population, but not in the other two populations.

Egg-species recognition in cannibalistic hatchlings of coexisting land snails

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Under natural conditions hatchlings of various species of herbivorous terrestrial gastropods cannibalize unhatched sibling eggs. Emerging *Arianta arbustorum* first eat their own egg shells and then the eggs of unhatched siblings, including those with fully developed embryos. In *A. arbustorum*, egg cannibalism occurs exclusively during the hatchling stage, juvenile and adult snails being herbivorous. A similar behaviour has been observed in hatchlings of other snail species. It is not known, however, whether hatchlings of these species consume eggs of the other species as well. The present study examines whether cannibalistic hatchlings of coexisting snail species (*A. arbustorum* and *A. chamaeleon* from an alpine meadow and *A. arbustorum*, *Helix pomatia*, *Cepaea nemoralis* and *C. hortensis* from lowland forests) discriminate between eggs of their own and other species.

Egg-choice experiments demonstrated a significant choice for conspecific eggs in newly-hatched snails of both *A. arbustorum* (93,3% in 45 tests) and *A. chamaeleon* (94,6% in 97 tests). Similarly, hatchlings of *A. arbustorum* from lowland populations consumed preferentially conspecific eggs in choice tests with eggs of *H. pomatia* (92,5%), *Perforatella incarnata* (88,8%), *C. nemoralis* (100%), *C. hortensis* (100%), *Bradybaena fruticum* (100%), and *Deroceras* sp. (100%). In another series of choice tests cannibalistic hatchlings of *H. pomatia*, *C. nemoralis* and *C. hortensis* ate preferentially conspecific eggs and not those of *A. arbustorum*. This indicates that egg consumption by newly-hatched snails probably results from active food choice and that the hatchlings may use chemical cues and/or the structure of the egg shell to discriminate between eggs from different species.

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