

## Lebensgeschichte und Demographie von Erdkrötenweibchen *Bufo bufo bufo* (L.)

JOACHIM KUHN

### Life history and demography of female common toads *Bufo bufo bufo* (L.)

The life history of female *Bufo bufo* is analysed in the context of demography and population dynamics. Three populations in southern Bavaria are examined, the spawning ponds of which are sufficiently isolated to exclude exchange of individuals between neighbouring populations.

*Methods:* From March to May, the ponds were completely enclosed by drift fences with pitfall traps capturing all toads that migrated in and out (1989-1992). All toads were marked by toe-clipping, either individually or yearwise collectively. Individually marked animals were measured and weighed at each capture. Fecundity and egg sizes were determined in 451 females. Age and growth history were analysed by means of skeletochronology. Winter mortality was determined in one case (one population, one winter). Juveniles of the three populations were raised in a climate chamber under identical conditions (genetic contribution to growth differences between populations?).

*Mortality and number of reproductive cycles:* Reproduction is linked with very high mortality. Most females reproduce only once. A minority manages to reproduce repeatedly (in up to 5 years, at least). Survival considerably fluctuates between years and between populations. Some females spawn again only after two (to three) years. About 15 to 35% of the females die in spawning ponds. During the study period, winter mortality probably was enhanced by mild winters with little snow; in one case it was as high as 40%.

*Demography:* Females are 3-9 years of age. Even though the distances between the populations are only 10-20 km in latitude and 60-160 m in altitude, they do considerably differ in length and age distributions which furthermore fluctuate from year to year. Weight-length-relationships are similar between populations but to some extent vary between years, thus reflecting nutritional conditions. Generally, condition of recaptures is worse than of first captures. Body length and age normally do not correlate at all.

*Fecundity, egg size, and reproductive output:* Females lay 750 to 8100 eggs. Maximum fecundity strongly depends on body size. Minimum fecundity however is more or less independent of body length ("fecundity threshold"). Fecundity and total egg volume depend on the female's reproductive history, generally being highest in females that spawn for the first time. Furthermore, fecundity and total egg volume are positively correlated with the females' "somatic" condition (i.e. condition after spawning), but negatively with egg size and with age. Egg size increases with body length, somatic condition, and age, but decreases with egg number (trade off). Mean egg volumes of different females vary considerably (smallest : largest eggs = 1 : 2,74). The percentage of spawn in females' body weight increases with body size.