

Populationsökologie, Lebensgeschichte und Fortpflanzungsbiologie der Erdkröten (*Bufo bufo*) in der Wildflusslandschaft der oberen Isar

JOACHIM KUHN

Forschungsstelle für Naturschutzbiologie, Marktstraße 26, D-89143 Blaubeuren

Population ecology, life history and reproductive biology of *Bufo bufo* in a braided river floodplain (upper Isar, Bavaria)

A *Bufo b. bufo* population is investigated which in several biological respects contrasts with the well-known pattern in this species. The population lives in a dynamic floodplain of an unregulated braided river at the northern border of the Alps. The toads cope with habitat dynamics and unpredictability by means of flexibility in reproductive biology, ecological and behavioural plasticity, alternative mating strategies, distinct habitat selection and local genetic adaptations (synopsis: KUHN 2001a). – The present paper analyzes population structure and dynamics, individual life courses, and several aspects of reproductive biology. Adult toads are relatively big and old, survival rates are high: Females are 4–9 years of age when spawning for the first time, males perform reproductive activities from 3–6 (7) years on. Fast/slow juvenile growth results in early/late maturity. Maximum age found is ≥ 13 years in males and ≥ 14 years in females. Annual survival rates in males are 55–65 % at least, in females rates often markedly exceed 35–45 %. A considerable share of females probably reproduces at intervals of two years. Regression functions of body mass on body length to some extent vary from year to year, thus reflecting nutritional conditions. Correlations of body length and age are weak or non-existent in reproductive toads. Females lay 500 to 4000 eggs. The trade-off between fecundity and egg size favours egg size in this population. Number and size of eggs increase with females' body size and condition, egg size furthermore increases with age. Fecundity probably depends on reproductive history, generally being highest in females that spawn for the first time in life. Breeding pond fidelity is very strong even in the dynamic floodplain habitat, but some males change waterbodies even within one season. Despite of overall population density being high, spawning aggregations usually are small. Aggregation size depends on pond size and depth, warming up capability and quantity of vegetation or other structures. According to multivariate modelling, factors' importance varies year by year. Due to spawn predation, presence and numbers of *Rana temporaria* tadpoles are highly effective determinants of *Bufo bufo* metamorph numbers.

Key words: Amphibia, Anura, Bufonidae, *Bufo bufo*, braided river, breeding site fidelity, clutch size, demography, egg size, fecundity, floodplain, growth, long-term study, maturity, mortality, phenotypic plasticity, population dynamics, skeletochronology.