

Abstract

Optimization of litter size can be defined as adjustment of litter size according to actual environmental conditions or condition of mother to reach a compromise between the maximum number of offspring and their individual fitness. Rodents are an ideal taxon to study this topic because of their enormous interspecific variability in life strategies across the whole order.

The variation in litter size among rodent species was influenced by countless ecological and social factors during their evolution. These include the geographical location of the breeding populations, various life and reproductive strategies such as r-/K-strategy, the presence of altricial or precocious offspring, various ways of life, the presence of water in the environment, predation rate, hibernation, and sociality.

Litter size can be adjusted already before fertilization, for example by choosing a partner, by timing reproduction, condition, age and social status of the mother. Genetic factors affecting litter size are, for example, MHC glycoprotein polymorphism and *t*-haplotype. Reduction of the litter size may occur before insemination by influencing the ovulation rate, female reproductive hormone levels and exposure to the stressors, during implantation by selective abortion, and postpartum by infanticide, siblicide, and offspring rejection. Reproductive parameters that affect litter size are the size and sex of the offsprings.

The evolution of rodents resulted in a great diversification of life strategies. This corresponds to an enormous interspecific variability in litter size and optimization mechanisms, by which female rodents maximize their investment in offsprings.

Key words

litter size, reproductive optimization, maternal investment, life-history evolution, rodents, Rodentia