

Abstract

The litter size is one of the most important determinants of mammalian life-histories. Depending on the size of the litter, the mammals can be divided into two main groups: (1) the monotocous mammals, producing only one offspring per litter; and (2) the polytocous mammals, producing more than one offspring per litter. This life-history dichotomy entails different strategies whereby the mammalian females may optimize their maternal investment. The aim of this Ph.D. thesis is to show variation in the maternal investment strategies of monotocous and polytocous mammals from a life-history perspective. In order to address this issue, I investigated the strategy of maternal investment in the red deer (*Cervus elaphus*), representing a typical monotocous mammal, and the house mouse (*Mus musculus*), representing a typical polytocous mammal. From a life-history perspective, the red deer, producing no more than one litter per year, can be viewed as a model of “K-selected species”, while the house mouse, producing up to ten litters per year, can be viewed as a model of “r-selected species”. The red deer and the house mouse are ideal model organisms for this type of research also because they both are representatives of the most common mammalian mating system – the simultaneous polygyny. A general assumption of the maternal investment theory is that in this mating system the maternal investment is optimized mainly to maximize reproductive success of male offspring. Both in the red deer and the house mouse, the females optimized their maternal investment according to their state. One way whereby the females optimized their investment was by controlling the offspring’s intrauterine growth and date of birth. In addition, the investment tactics partly varied according to the sex of the offspring. In both species, the females tended to provide more investment to male than female offspring, but their investment tactics fundamentally differed depending on the species-specific life-history. The red deer females seemed to optimize their investment mainly to maximize the offspring competitiveness. By contrast, the house mouse females seemed to optimize their investment mainly to maximize the offspring number. In addition, the house mouse females showed a great phenotypic plasticity which may be an adaptation to a colonizing life strategy. The present Ph.D. thesis thus (1) shows the importance of a life-history perspective for understanding the variation in the maternal investment strategies of monotocous and polytocous mammals, and (2) challenges a general assumption of the maternal investment theory that in polygynous mammals the maternal investment is optimized mainly to maximize reproductive success of male offspring.