Abstract

Sexual size dimorphism (SSD) defined by differences in body size of a conspecific male and female are widespread phenomenon in the animal kingdom and ungulates belong among the most dimorphic mammals. In most species males are the larger sex which is often explained by differing sex-specific reproductive roles. While parental investment is predominantly left to females which are the selective sex, males have to fight for access to receptive mates in intensive combats where body size, strength, and condition are often critical. The relationship between male body size and reproductive success varies according to a mating system with the highest SSD being achieved by harem and promiscuous species.

Even though several compilation studies of SSD have been done on ungulates it is rare that systematic research is closely concentrated on a well-defined specialised homogenous group where detailed knowledge on its life-history traits is also available. I have focused on subfamily *Caprinae* and *Bovinae* with the objective to conduct a detailed analysis of their SSD and its evolutionary traits. Using advanced phylogenetic methods I could reconstruct the ancestral state in wild goats and sheep that was characterised by medium SSD which then took two different routes of evolution depending on a type of habitat and mating system the specific taxon adopted. The highest SSD has been recorded for a homogenous clade of wild goats and sheep, a similar value to the one of wild bovines, while the lowest SSD has been found among gorals and serows (*Capricornis* and *Naemorhedus* spp.). These species are known to deviate from the typical social organisation, polygynous reproductive system, and habitat type. Furthermore, we found significant decline in SSD following the domestication process which suggests the role of sexual selection in origins of SSD. We could also provide support for allometric Rensch's rule on the intraspecific level, i.e., SSD was positively correlated with a breed body size.

As the evolution of intersexual differences in body size put a lot of pressure on fast male body growth since birth, selective maternal investment and adaptive adjustment of secondary sex ratio (SSR) appears to be an interesting consequence of ungulate SSD. According to the Trivers-Willard hypothesis mothers in good body condition should produce higher proportion of sons because this would lead to inclusive fitness increase. Having analysed a large dataset on offspring sex ratio in domestic goats we found that SSR deviated significantly from the balanced ratio in favour of males. However, it fitted the binomial distribution. Moreover, based on GEE models we failed to find support for the Trivers-Willard hypothesis with only the maternal age and season of oestrus displaying significant but small-sized effect.