

# Sexual Selection and Extinction in Deer

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By performing a comparative analysis and using phylogenetic relationships of the Cervidae family this study aimed to address whether or not sexual selection (known as a struggle to reproduce between individuals of the same sex) may play a role in the extinction of species by making species more vulnerable to extinction.

However, the role of sexual selection in making species more vulnerable to extinct is largely unexplored, but there are several factors such as ecological and life history traits which may increase the risk of extinction. Changes in signals might cause sexual selection by changing female preferences or by changing the signalling environment, to produce more effective signals. For example, in Irish elk, the size of antler causes extinction in this species. This ornament was so heavy and it decreased the fitness of males. It was costly and so hard to move with such huge ornament (Up to 40 kg weight and 3 meters width). Such these trait despite attract females but might not being favoured by natural selection.

In all species of the family Cervidae sexually selected characters play a main role in determining species status and thus potentially their probability of extinction. In this study the intensity of sexual selection (measured as sexual size dimorphism, antler size and mating system) and the rate of extinction (IUCN classification and anthropogenic effect) were counted as factors to determine the role of sexual selection intensity in both species-rich and species-poor clades.

By using the programme MESQUITE and phylogenetic trees, the results show an association between species with larger body size and dimorphism, living in open habitats and having larger antler size expanded to more than three tines; such species are mostly non-territorial and form harems during the rutting season. The small species are territorial, live in closed habitats, are monomorphic and have small antler size limited to two tines or less. Moreover species that are more subjected to habitat degradation and anthropogenic effects tend to become smaller in size.

Extinction risk for the species-rich clades with small sized, territorial and small antler sized species is lower than for those consisting of species with larger antler size, larger body size, living in open habitats and using harems as mating system. Therefore I can conclude that the intensity of sexual selection in larger species in deer family put them in risk of extinction; but on the other site, small species are more adapted to the environment by choosing different strategy in mating system, and reducing antler and body size thus diminishing the extinction risk.

Degree project in biology, Master of Science, 30 hp. 2013

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