

THE DEER 'S ANTLERS

The deer's antlers are true bone structures that possess a unique feature: each year they grow, demineralize, drop-off and regrow. Thanks to this peculiarity, the antlers begin to grow in such a manner that the part attached to the skull is the oldest one. Antlers grow symmetrically and simultaneously, i.e. they do not grow like a tree, where a first, thin stem appears and then strengthens. Here, the growth starts from the wide base, on which the new antler re-generates. Unlike the antlers, the horns do not have bone's characteristics, as they are of ectodermal origin and, except for the Mexican pronghorn, they do not regrow. In the case of the mouflons, for example, the horns grow throughout their lives and throughout the year. In regions with temperate climate (diversified according to seasons) during the winter growth stops, while in spring it speeds up. Due to this reason, different formations develop, based on which - as in the horns' case - you can determine the animal's age. With antlers this possibility does not exist, despite the widespread misconception that the age of a deer can be estimated based on the number of its antlers' branches. The deer's antlers cast occurs at the beginning of the spring or a little later.



Red deer's fallen antlers – Šumava, March 2012

The antlers' formation and growth primarily involve zoologists and hunters, although recently also human medicine has examined this phenomenon. The antlers growth is a unique, hormone-regulated process. Immediately after the shedding, the new formed tissue covers the wound in a few days and on this scar tissue the antlers regenerate, concurrently with the testosterone levels' seasonal increase. Once the testosterone has reached a certain level, the growth stops, the antlers mineralize, i.e. they ossify while achieving their growth peak (for the red deer, this happens approximately in August). When the rut season begins, the antlers are at their maximum growth level while the testosterone levels reach their peak.

As to the red deer, during the breeding period, the herd leader usually joins the group of the does in heat and fights the rivals back. When deers have plenty of food, they defend their 'harem' instead of their territory.



*Trophies of killed Deers with antlers intertwined during coupling period
Hunting Museum - Ohrada Hunting Lodge*

The antlers are a secondary sexual characterisitic, based on which the red deer females choose their mate. Many hunters believe that while the herd leader is fighting its rivals back, the lower ranked deers "threaten the honor" of the leader's females. Deer experts have found that things are actually quite different. Deers with lower social rank obviously do not have many qualms, but the female is the one who chooses her babies' father. Czech scientists, including Prof. Luděk Bartoš, have cooperated with several, long-term international research projects concerning the antlers formation, trying to understand what the female's decision is based on. The antlers are one of the sexual traits suggesting the potential partner's organic quality. Studies have allowed us to collect sufficient evidence, particularly in relation to the red deer, demonstrating how larger and more articulated antlers correspond to a higher reproductive success rate. The aforementioned studies were carried out in experimental farms with domesticated deers. The animals were purposely domesticated to allow scientists to analyze the existing relationship between the red deer's behaviour (with a focus on the antlers' growth period) and the physiology the antlers' growth depends on. The domesticated deers were fitted with a special collar allowing the recognition of each animal. During the antlers' growth period, researchers used GPS telemetry-equipped collars, which let them know the location and movements of individual deers as well as the friendly or competitive relationships they had with their peers. Each animal was monitored by studying the relations with the other mates and the hormone levels-related interference. The research findings prof. Bartoš obtained in cooperation with his collaborators are currently available in scientific literature. Some interesting information concerning the game's behavior and genetics, are found in hunting literature as well.

The current scientists' opinion is that the key to understanding how big the antlers will be is the social success during their growth, ie in the period elapsing from the cast (for the red deer, in March) to the growth peak (for the red deer, around August). When the deer has a high *social rank*, this reflects on its endocrine condition. In simple words, when the deer is self-assured and occupies the top position in the social hierarchy, a condition favoring the achievement of the highest levels of testosterone exists, which favors the antlers' growth as well. The opposite situation occurs when a deer is in a lower hierarchical position and it is under stress due to the continuous attacks by the dominant deers.



Dominant Red Deer in the social hierarchy during the mating season

Fenced reserves managers, where deers are bred, follow attentively the results of these studies. Farmers want to know what they need to do in order to obtain excellent trophies that will increase the prestige of their reserve. According to the scientists, the optimal development of the deers' antlers depends on about 30, optimally combined factors. Finding the absolute winning recipe is therefore impossible. Some of the factors identified by the scientists, however, can provide the deer breeders with some useful information. The first factor to be considered is the size of the mother upon the conception, which, in turn, affects the magnitude of the fawn at the time of birth, which influences the moment of birth. All these conditions determine how big the deer will become in the period elapsing from the beginning of the growth until the age of a year and a half, which, in turn, closely affects the size of the adult deer. Of course, in each development phase food, health and an optimal environment play a crucial role and the farmer can improve them as required. However, all this alone, does not ensure the optimal antlers' growth, as the latter is strongly influenced by social factors as well. Researchers estimate that the genetics accounts for one third only. The considerations made so far, in principle, hold exclusively for the deer family, which includes dozens of species - from wapitis deer with its huge antlers to southern pudu deer with 1 cm – long antlers. Studies have focused on red deer because of its remarkable diffusion (from the Arctic Circle to southern Europe) which is a consequence of its great adaptability.

