



DEER ANTLERS

The classification of the white-tailed deer is as follows:

White-tailed Deer Classification	
Kingdom – <i>Animalia</i>	
Phylum – <i>Chordata</i>	
Class – <i>Mammalia</i>	
Order – <i>Artiodactyla</i>	
Family – <i>Cervidae</i>	
Genus – <i>Odocoileus</i>	
Species – <i>virginianus</i>	

This portion of my paper will focus on one of the most fascinating structures in nature, deer antlers. When observing antlers, there is something very enchanting about their appearance. What are they made of, one might ask? Are they heavy? Do they break? Do they all have the same shape? Why do they grow and what is their function? These questions, along with other information will be addressed in this paper. Most, but certainly not all of the information I will present, will pertain to the White-Tailed Deer. I will indicate when I am speaking of speaking of other species.

Our fascination with antlers is not something new. The attraction goes back to

early man who hunted deer, and then used the antlers in several ways (e.g. tools and religious ceremonies) ⁴. Deer antlers are the fastest growing tissue known to man, in the animal kingdom. The growth of the antlers begins at the base of the two pedicles on the top of the head (see picture at top of page). They can grow up to a half-inch per day during the peak-growing period ². The rapid growth is of special interest to cancer research scientists. The hope is that if they can learn how antlers grow so rapidly, they might also learn why cancer cells grow so quickly ¹⁰. Of great interest to me was a study that was conducted by Professor George Bubenik, Department of Zoology at the University of Guelph. In the year 2000 his study tried to see if the use of embryonic stem cells that results in the re-growth of white-tailed deer antlers, could have implications for treatment of human health issues. He strongly believed that this knowledge could affect human re-growth of fingers, limbs, arthritis, osteoporosis, and other disorders. His rationale was the fact that the limbs of humans are similar to the limbs of deer when it comes to composition ¹¹. Deer antlers are solid and are made of bone. The bone is composed of live tissue. Antlers also contain a constant supply of blood and nerves. The bone in the deer antlers is considered true bone and is very different from horns. Contrary to antlers, horns are made of keratin (a fibrous non-polar protein). Animals such as cows and goats have horns. Horns last the entire life of the animal ⁵. Members of the deer family shed their antlers each year and then regrow them later. There is much variety in antler growth and development. Most of the variance is the result of genetics and nutrition. Antler growth and development depends largely on protein and other minerals. Studies of penned deer found a relationship between nutrition and antler growth. Fawn that were fed a low protein diet developed smaller antlers, weighed less, and shed their antlers earlier than deer fed a larger percent protein ration. Deer have adapted naturally to the problem of not having enough protein and minerals in habitat areas where the source is scarce. They store the minerals in their skeleton, and then during the antler-growing season, the deer muster up those minerals for their antlers. Deer naturally select plants with high amounts of protein and minerals. Still other studies have shown no considerable difference in antler size or development in deer that live in areas with poor soil and minerals, with deer that live in areas with unlimited mineral sources. Antler size and development still vary among deer that live in the same area and have the same

supply of protein and mineral sources. In these examples it is believed that the variety is due to genetics ⁸.



In most deer species such as the white-tailed deer, only the male (bucks) have antlers with the exception of a rare female (doe) that has a hormonal imbalance. When talking about other species such as male and female reindeer (also referred to as caribou), both sexes have antlers. Two species, Musk Deer and the Chinese Water Deer do not have antlers at all. The Chinese water deer have curved tusks instead of antlers ⁷. There is a *period* of antler growth, not a lifelong process. Bucks begin antler growth when they are fawns. This growth begins during the months of March or April; only weeks after their previous antlers have been shed. Antlers are full grown by August or September. Growing antlers are covered with living tissue called velvet. During development, the deer's antlers are very delicate and extremely sensitive to the touch. This is also the time when most antler damage or breakage can happen. Antler composition is dependent largely on where the deer is in its stage of growth. Antlers begin growing when the buck is about 6 months old. At that time it will only have small bumps for antlers (much like a tennis ball in terms of size and texture). When the buck is 1½ years old it will usually have 1 or 2 points on each antler. At 2½ years there could be 3 to 5 points on each side. The antlers are small to medium at this stage. When the buck is 3½ years and older, it is considered mature and there are usually 6 points and these antlers can be up to 2 feet long. During the growing stage antlers are 80 percent protein and 20 percent ash. Once the antlers have hardened their composition is about 63 percent ash, 22 percent calcium, 11 percent phosphorus and 4 percent organic matter. Young deer have antlers that are dense. They eventually become more porous as the animals grow older.

The physiology and behavior of the deer is directly attributed to seasonal changes and the amount or length of daylight. The axis of the Earth is the cause of the cycle of the seasons and, it is also responsible for the annual cycle of deer antler growth. Deer have adapted their antler growth cycles to match the seasonal cycles. During the winter

months, bucks will begin the shedding process due to lower hormonal (testosterone) levels³. The process of shedding actually starts after the mating season that occurs in the fall. Absorption of the bone material at the base of the antlers (the pedicle; see picture at top of page) results in the shedding of the antlers. When the tissue that connects the pedicle to the antlers finally dissolve, antlers become loose. This is very aggravating to the deer and the deer begins to rub its antlers against trees and any other hard objects available. This is referred to as “buck rubs”. This activity causes further frailty at the base, and the antlers are finally shed⁹. The degeneration of the tissue between the pedicle and the antlers is considered the quickest deterioration of living tissue known to man. During the summer months the re-growing begins⁴.

One of the questions I posed at the beginning of this paper was, “Why do deer grow antlers and what is their function? There are many theories given by deer experts and researchers. One theory states that deer grow antlers for sexual reasons such as attraction to female deer. Another theory says deer grow antlers for protection. Still others suggest that they are grown for breeding, where the dominant male passes this gene on to the next generation. Many researchers believe that antlers have evolved as weapons to gain dominance over other bucks during the breeding season. There are those who argue with some of these theories, particularly the protection theory. These “experts” say that deer have no predators except for cars and man.

There is so much information on this amazing part of the deer anatomy. I have listed my references and resources should you wish further information.

References:

1. http://www.infovisual.info/02/074_en.html
2. <http://www.pabucks.com/deerantlers.html>
3. <http://www.deernutrition.com/info/news/pastnews/16.html>
4. <http://www.kerrlake.com/deer/antler.htm>
5. <http://www.huntboars.com/WTinfoIantlers.htm>

6. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=15523621&dopt=Abstract
7. www.dnr.state.md.us/wildlife/wtdeerbiology.asp
8. <http://texnat.tamu.edu/symposia/WestTexasDeerStudyGroup2004.pdf>
9. <http://www.britannica.com/eb/article-9029728?&query=deer>
10. <http://www.ohiodnr.com/wildlife/kids/whitewonders.htm>
11. <http://www.uoguelph.ca/mediarel/archives/001241.html>