

A Year in the Life of the White-tailed Deer A Coat of Many Functions

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Spring is in the air, and it's time to put those heavy winter jackets and camouflage coveralls away and pull out the shorts and t-shirts. Out in the woods, deer likewise are changing their attire from the dark-colored heavy winter coat to a lighter, reddish summer coat.

While you've been out scouting or hunting during turkey season, you've probably noticed that the deer you saw were looking kind-of ragged and unkempt. They no longer have that sleek, well-groomed look. Instead, the coat looks patchy and often there are areas of hair standing up in all directions, just like my two sons when they get up in the morning. The coat that they've been carrying for the past 7 months or so is starting to show the signs of wear.

Molting typically begins on the head and progresses down the neck to the chest and the sides. The haunches and hind legs are the last to shed the winter coat. The entire process occurs fairly rapidly over the span of just a few weeks, although the condition of the deer can affect the timing and the rate of molting. Deer in good condition will tend to molt earlier and faster than those in poor condition. Apparently the shedding hair itches, and deer spend a lot of time grooming themselves, or each other, which partly accounts for the patches of hair sticking up.

The whitetail's summer coat is much different than the coat it replaces. The summer coat has no underfur and only thin, short guard hairs. These hairs are straight, solid, and about an inch long. The bottom portion of the hair closest to the skin tends to be gray, although the majority of the hair is reddish. In his book *The Deer of North America*, Leonard Rue reported that there are about 5,000 or more hairs on each inch of a deer's summer coat, which translates to over 6 million hairs on an adult deer! Deer have very few sweat glands, so they are unable to keep cool by evaporative cooling as we do. Instead, these short thin solid hairs on the summer coat allow air movement and enable deer to keep cool through simple air convection.

Whitetails keep their summer coat for about 4-5 months before they shed again into their winter coats. While the summer coat provides protection from the sun and helps keep the deer cool, the function of the winter coat is to insulate against the cold. Therefore, the winter coat is much different than the summer coat. The guard hairs are a little more than twice as long, thicker, and tend to be 'kinkier' than the sleek summer guard hairs. They are also hollow, and this trapped air provides excellent insulation. Surprisingly, there are only about half as many guard hairs on the winter coat than the summer coat – about 2500 to the square inch, but they are twice as thick. The winter coat is gray or dark brown with reddish-brown tips, although some black-tipped hairs are scattered throughout. The

darker color absorbs more solar energy, and may help reduce energy expenditure during winter.

Although the coarse, hollow guard hairs of the winter coat provide good insulation, it is the finer, woolly underfur that provides the greatest insulative value. These shorter, finer, twisting hairs trap layers of warm air close to the skin. Although finer, these underhairs are much more numerous than the guard hairs. There may be five times as many. However, it seems to me that deer in more northern regions have much denser amounts of underfur than deer in the South, as you would expect. The long guard hairs coupled with the thick underfur provide such good protection against the cold that snow can accumulate on a deer's back without melting.

Deer can further increase the insulative value of their fur by 'puffing out' their hair. Each hair shaft is attached to a tiny bundle of muscles called arrector pili muscles. In response to cold, the muscles contract causing the hair to stand on end – exactly what happens when humans get 'goose bumps'. This erection of the hairs results in a thicker layer of insulation and helps deer maintain their body temperature even in extreme cold.

As anyone who has 'fallen in' while duck hunting can attest, a wet coat doesn't have much insulating ability. To help keep dry, deer manufacture their own water repellent. Associated with each hair follicle is a small gland called a sebaceous gland that secretes an oily or greasy material called sebum. This oil then coats the hair to keep it from becoming brittle and also help shed water. Interestingly, these are the same type of glands that underlie the tarsal gland and help hold the scent deposited there during rub-urination. However, the sebaceous glands in the tarsal region are much larger than those in other regions of the body.

According to George Bubenik, a Canadian deer researcher, nursing does often keep their summer coats longer than bucks and mothers that have already weaned their fawns. He suggests two reasons for this. Lactating does maintain higher levels of a hormone called prolactin, and it is declining levels of this hormone, coupled with other hormones that are influenced by changing photoperiod, that cause the deer to molt. In addition, lactation is energetically very demanding on a doe, and so is molting, so it is difficult to do both at once. According to Bubenik, an adult buck may grow 3 to 4 pounds of hair with each molt. Growing that much hair in a short period certainly places some additional demands on a deer's metabolism.

Although thermoregulation is the primary function of a deer's pelage, it plays other significant roles as well. Deer use their pelage for social communication (like the warning alarm of the white tail), as well as camouflage. Varying shades of brown along with patches of white hair on the belly and neck help break up the outline of a deer. The white under the belly also counteracts the shadow cast by the body and helps to prevent a predator from seeing a 3-dimensional animal, particularly in a forested area. Similarly, the white and dark markings on the legs mimic the suncast and shade on a shrub or sapling.

Oddities in hair coloration also occur. Piebald deer are the result of a recessive genetic characteristic and often have varying amounts of white marking that may range from extra white on the legs to an almost pure white coat. These deer also typically have other deformities such as short legs, a curved spine, and a Roman nose. Pure albinos are much more rare. These deer lack the ability to produce the pigments that color the hair, and will always have pink eyes and a pink nose. Rarest of all is a melanistic, or pure black, deer. Perhaps you've seen pictures of the black buck that was killed in Pennsylvania last fall. Although extremely rare, these black deer are reported every few years. However, probably the most interesting part about these black deer is not their color, but the fact that they often have a short, stiff mane of hair running from the back of the head to the shoulders.