Spikes were long maligned as genetically inferior. Long-term research at Comanche Ranch indicates that yearling antler traits are more influenced by environment than genetics.

Is It Time To End The War On Spikes?

ARTICLE BY RANDY W. DEYOUNG, PH.D.

Spikes. In hunting and deer management circles, the word is often associated with adjectives like inferior, mediocre or below-average. To some, a spike is more than substandard—more like a genetic threat to an intensive management program. How did these animals acquire such an unsavory reputation?

To the uninitiated, a spike is simply a 1.5-year-old buck with unbranched or "spike" antlers. Between 1925 and the 1960s, Texas wildlife regulations protected yearling bucks with unbranched antlers. In areas where buck harvest was intense, some began to worry that this practice might result in "high-grading," where hunters harvested the best animals and left only the lower-quality spikes. Over time, this might result in smaller antlers in an entire population.

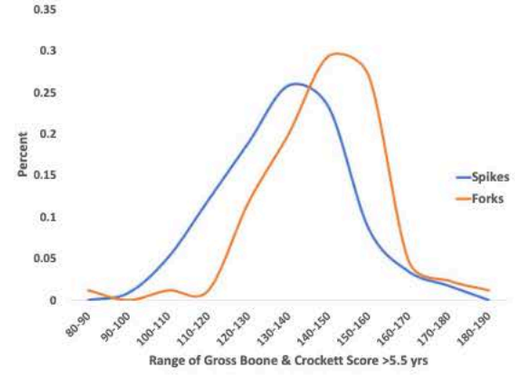
Early research on antler size stemmed in part from concerns about negative effects of the early harvest regulations on antler size. Studies in captive white-tailed deer in the 1970s to 1980s confirmed that antler size had a genetic basis. Furthermore, yearling antler traits were found to be highly heritable and thus a good predictor of genetic quality. The verdict was in: yearling spikes were genetically inferior to fork-antlered yearlings. These findings led biologists to advocate for halting the protection of spike-antlered yearlings and for increased harvest of spikes to improve antler quality.

Intensive management for antler size in white-tailed deer became increasingly common in Texas during the 1980s to 1990s, as land use shifted from a focus on livestock to focus on wildlife. Along with improving deer nutrition and age structure, managers aimed for genetic improvement. Spikes were the perfect target—they could be easily identified and removing them felt like tangible progress. Shooting spikes began to be widely recommended as a management best practice.

Not everyone was onboard with targeting spikes, however. Although the results of early captive studies were compelling, there was uncertainty whether similar results could be achieved in wild populations. Meanwhile, other research in captive deer concluded that yearling antler traits were a poor predictor of genetic quality because antler size was influenced more by environmental than genetic factors. Finally, there were concerns that hunter harvest was too inefficient to achieve genetic changes, especially in low-fenced properties.

The "spike question" resulted in lengthy debates both around the campfire and at scientific meetings. Meanwhile, attempts to affect antler size expanded past yearlings to culling small-antlered bucks of all age classes. The debate continued, but without more information, there was no clear resolution. Out of this stalemate, the Comanche Ranch Buck Culling Study was born.

The Comanche study was the brainchild of Comanche Ranch manager Don Draeger and CKWRI scientist Charlie DeYoung, in cooperation with Texas Parks and Wildlife Department biologists and Mississippi State University scientist Bronson Strickland. First, they partitioned Comanche Ranch into 3 study sites: one where bucks of all ages were culled, one where only bucks 3.5 years and older were culled, and a "control" site, where no culling was done. All sites were either high-fenced or otherwise located to minimize bucks dispersing into or out of the area; all had access to water and supplemental feed. Culling was done via helicopter, far more intensively than hunters could ever accomplish. All bucks were captured, brought to a central processing site, aged and measured. Each buck also received a microchip, similar to the ones used in pets, for later recognition. Bucks that did not meet the culling minimums were removed and all culling was done before the rut. The ranch culled for 6 years, from 2006-2012 and continued to capture, age and measure bucks from 2013-2018 to monitor the results of the culling.



Gross Boone & Crockett score of spike-antlered yearlings vs. fork-antlered yearlings at 5.5+ years old at the Comanche Ranch during 2006-2018. Spike-antlered yearlings averaged 10" smaller at maturity, but the difference was attributed mostly to non-genetic factors associated with early life conditions.

Genetic change can only occur on a generational basis, when the sons of selected bucks breed. In long-lived animals like deer, if selection decisions can be made in early life, generation time is shorter and response to selection occurs quicker. The response to culling then depends on two factors: 1) how well antler traits predict the genetic value of an individual, termed the "heritability" of the trait, and 2) the intensity of culling, or how far above the average are the bucks that a manager keeps. To answer these questions, I worked with graduate students Masa Ohnishi and David Navarro to conduct genetic parentage analyses. This allowed us to calculate heritability of antler traits in wild deer for the first time.

We captured 3,332 individual bucks during the study period and used genetic parentage to assign sires to 1,227 of 1,699 yearling bucks captured. Based on the antler records and genetic relationships among bucks, we found that heritability for yearling antler traits was low; less than 14% of all differences in antler size among yearling bucks was due to genetics inherited from their parents. Environmental conditions in early life had a much greater influence on antler traits than genetics. Antler size of bucks 3.5 years old and older was a more reliable predictor of genetic quality. Genetics accounted for 25% of differences among bucks for antler points and 39% for gross Boone & Crockett (B&C) score. However, early life conditions carried over to adulthood. Up to 30% of the differences among bucks for antler points and 15% for B&C score were due to early life conditions.

Culling is unlikely to result in genetic change in wild deer. Nonetheless, culling may still have a role in management. Spike-antlered yearlings had smaller antlers at maturity than fork-antlered yearlings, about 10" B&C smaller. This is probably due to the lingering influence of early life environmental conditions versus genetics. However, there was much overlap—14% of spikes exceeded 150" B&C, while 15% of forks were less than 130" B&C at maturity.

To cull or not to cull? Outside of a high-fence, culling makes less sense because most yearling bucks will disperse anyway, leaving to set up a new range miles away. If hunters routinely harvest bucks <5.5 years old, culling may not be useful. If fawn crops average less than 40%, increasing fawn survival is probably a bigger priority than culling. If managers value mature bucks of all sizes, culling young bucks will reduce the number of mature bucks. Conversely, a manager may choose not to invest several years of supplemental feed and resources in young bucks that are unlikely to meet their goals. In the end, managers have been successful with and without culling. The results of this study can help managers decide whether culling will be useful for their program. For the average hunter, it may be time to end the war on spikes.

The argument for culling based on yearling antler traits assumed that antler size of young bucks was a good indicator of genetic quality; it was not. Antlers were a better predictor of genetic quality in older deer, yet culling had no effect on population antler size. The variable South Texas environment made culling inefficient—a buck with good antlers one year could get culled the next. If culling was intensive, over time there would be few bucks left. In captivity, managers have total control over breeding. In the wild, bucks had to compete for mating opportunities; even the largest bucks only sired a few sons each year. This lack of control limited our ability to affect genetics in the wild. Management aimed at minimizing environmental effects, such as supplemental feed, may have a greater population-level impact than culling.