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DEER RESEARCH ENEWS

NEWS FROM THE DEER RESEARCH PROGRAM AT CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTE

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COMANCHE RANCH BUCK CULLING PROJECT - ENEWS SERIES 1: GENETIC AND ENVIRONMENTAL CONTRIBUTIONS TO YOUNG ANTLER GROWTH

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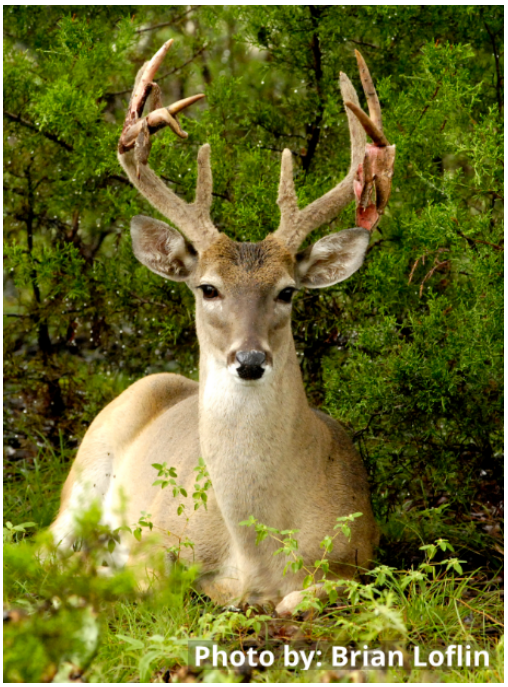

Selective harvest involves the removal of individuals with undesired traits from the gene pool. The remaining animals are retained to pass on their genes to the next generation. Managers use selective harvesting, or culling, with the goal of improving antler size in deer herds. Selection can improve antler size in captive deer. However, the effects of culling on antler development in wild deer

populations are not fully understood. My colleagues and I developed the first manipulative experiment of culling in a wild population of male white-tailed deer on the Comanche Ranch, Dimmit and Maverick Counties, Texas. Our goal was simple. Can we improve antler size via culling in a feasible time period? This eNews is the first in a series of articles describing our findings and insights from the Comanche Ranch Buck Culling Project.

This study involved 3 treatments:

1. An intensive (3,500 ac) treatment, where we culled yearlings with <6 points, 2-year olds with <8 points, 3 and 4 year olds with <9 points, and ≥5 year olds with <145 gross B&C score;
2. A moderate (18,000 ac) treatment, where only bucks ≥3 year olds were culled with the same criteria as above; and
3. A control pasture (5,000 ac), with no culling.

Each autumn during 2006–2016, we captured bucks in each treatment, estimated age, and measured antler characteristics. Bucks that did not meet age-specific antler minimums were sacrificed during 2006–2012. We recorded 5,477 captures of 2,937 individual bucks. We sacrificed 1,333 bucks during the culling period. We collected a tissue biopsy for genetic analyses from all captured bucks, and conducted parentage analyses to determine which bucks were breeding and how closely sons resembled fathers in terms of antler development.

Genetic improvement for antler growth requires that fawns are sired by bucks with desirable antler traits. We confirmed that phenotypically desirable bucks sired most of these fawns in the intensive treatment via genetic parentage analysis (we will provide results in later eNews). Next, we examined trends of culling intensity over time. Ideally, the culling intensity should decline because offspring sired by desirable bucks should have larger antlers. However, culling intensities in both intensive and moderate treatments remained high (Figs. 1, 2). If most fawns were sired by bucks with large antlers, how come young males did not express their genetic potential for antler growth? We attempted to answer this question by estimating the genetic contribution to antler growth. We developed pedigree records using capture records and genetic parentage analyses. Constructing the pedigree records in a wild population is extremely challenging, but 10 years of intensive capture allowed us to make that happen!

Click images to enlarge.

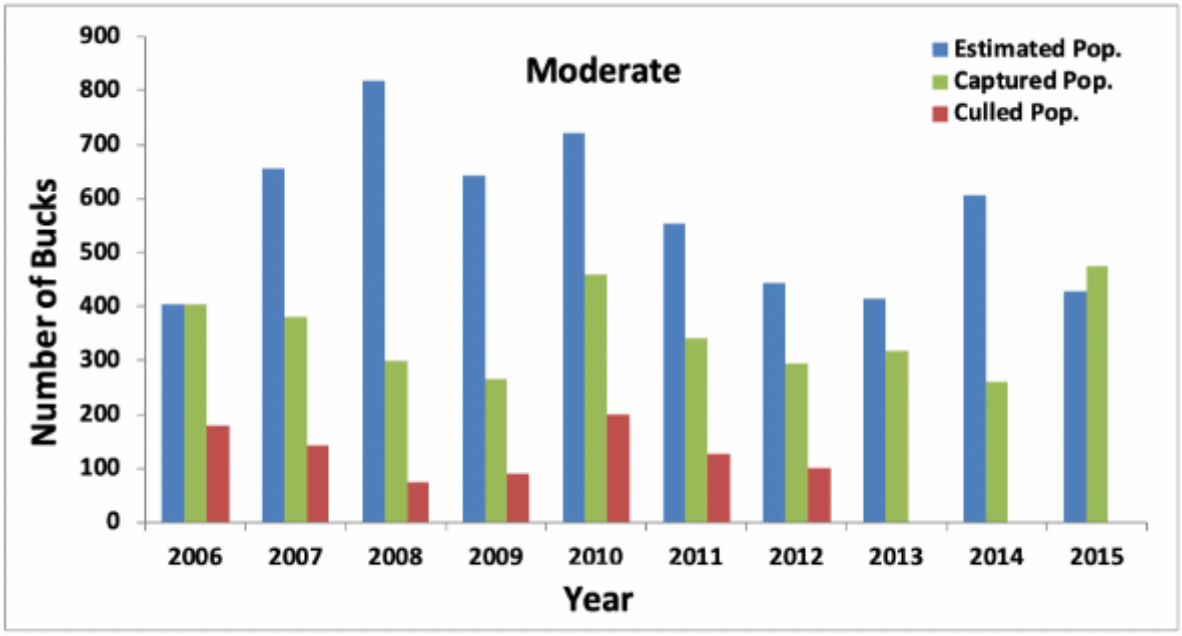

Figure 1. Culling intensities in the moderate treatment remained consistent during the culling period 2006-2012.

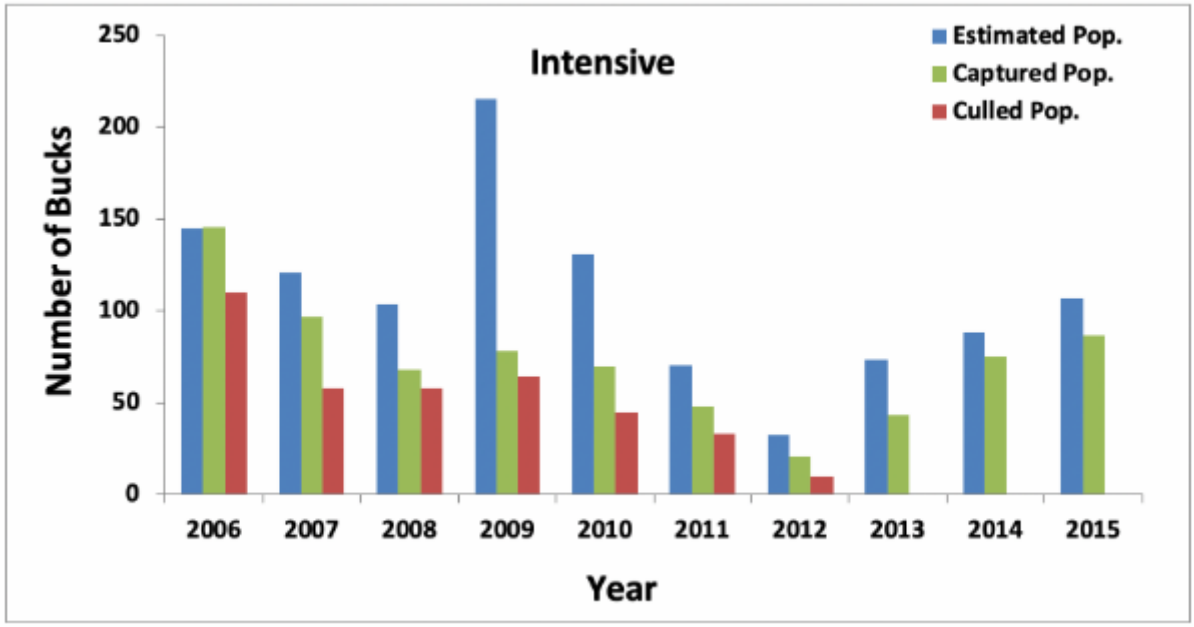

Figure 2. Culling intensities in the intensive treatment remained high during the culling period 2006-2012.

Our analysis showed that genetics explained only 24% of the variation in yearling antler points (Fig. 3). The influence of the environment on antler growth of young deer was much greater than the influence of genetics. Young culling intensities during the treatment did not decline because we were not culling young bucks based on their genetic

potential, but their antler expression, which in turn was heavily influenced by the environment.

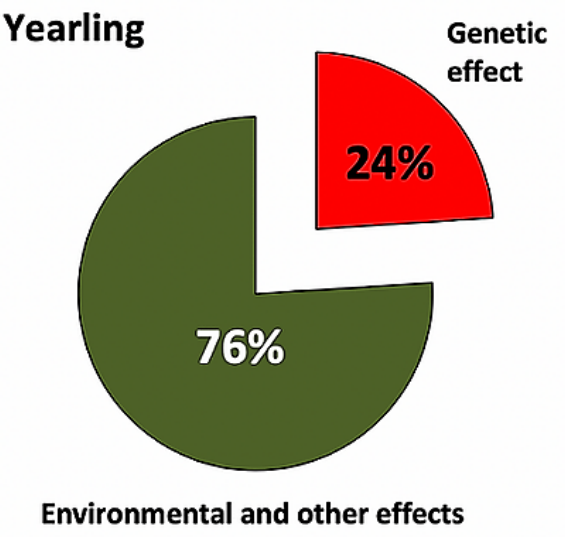

Figure 3. Environmental contribution to antler growth of yearling bucks was much larger than genetic traits. Therefore, antler phenotypes of young bucks did not reflect their genetic potential.

Our results show that culling yearlings is not likely to be a suitable management tool for genetic improvement in south Texas populations. Should we stop culling young deer? It depends on one's goals. Although genetic change appears unlikely, culling remains a valuable management tool. For instance, on the average, spike-antlered yearlings, 3 or fewer points, had smaller antlers compared to fork-antlered yearlings (Figs. 4, 5), an average of 10 Boone & Crockett inches at maturity. Fourteen percent of spikes and 3-pointers scored 150 Boone & Crockett or better vs. 35 % of yearlings with ≥ 4 antler points. The reason for the difference in spikes vs. forks is not immediately clear, other than it is not genetic. Above 4 points, there was no relationship to antler size at maturity– yearling 5-, 6-, or 7-pointers were no larger than 4-pointers (Fig. 6). Thus, fork-antlered yearlings may be preferred by managers because the fork-antlered yearlings have better long-term potential. However, culling yearling bucks means fewer mature bucks in the future. The role and importance of mature bucks on a given ranch ultimately informs culling decisions. One outcome is clear: there is much overlap between antler score at maturity, and some spikes turn out just fine at maturity.

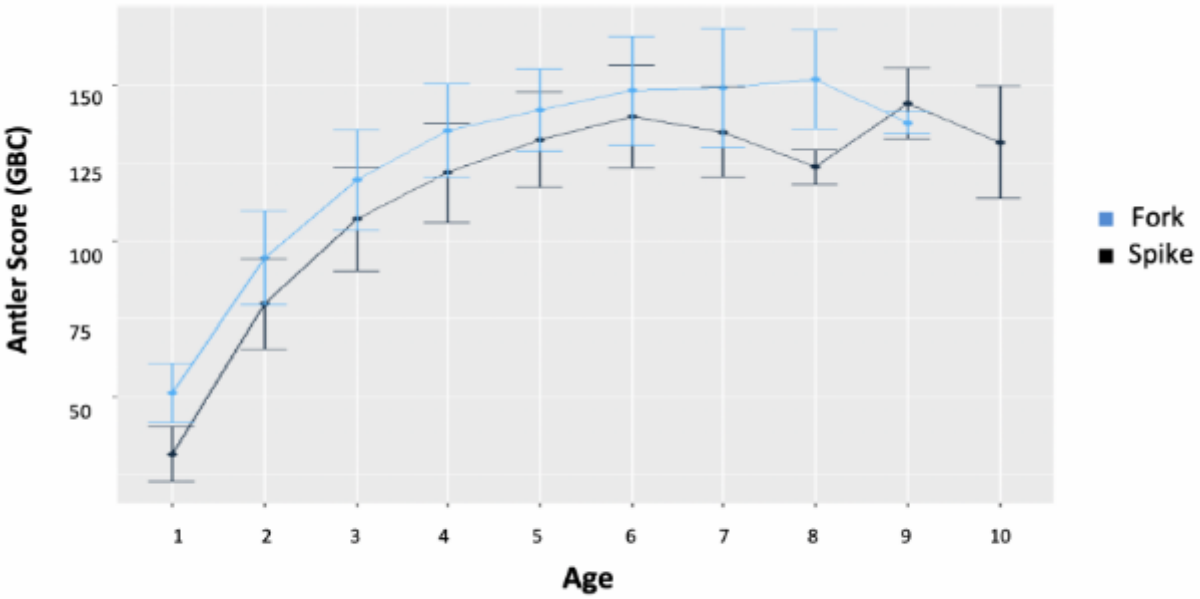

Figure 4. A chronological maturity of fork- and spike-antlered yearlings suggested that culling spike-antlered yearling may have value because they are likely to have smaller antlers at maturity.

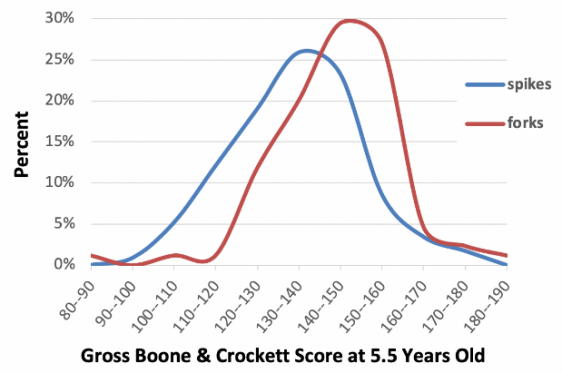

Figure 5. Fork-antlered yearlings tend to grow larger antlers at 5.5-years old than spike-antlered yearlings.

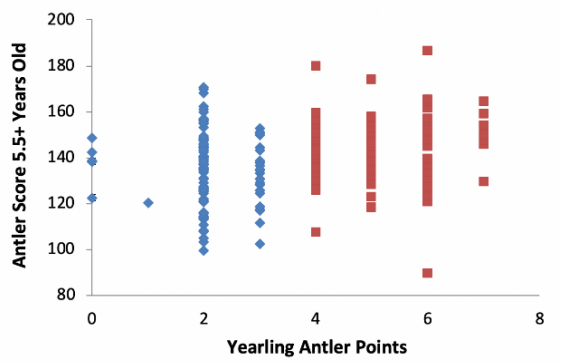

Figure 6. Yearling bucks with 4 points or more (red dots) did not show any relationship to antler size at maturity. Yearling bucks with 5, 6, or 7 points were no larger than 4-pointers in later life.

Like many aspects of wildlife management, the effects of culling to increase antler size were not what were expected. Instead of resulting in an increase in antler size in subsequent generations, there was no change in yearling antler size after 7 years of culling. However, our data show that culling could be a viable way to increase the average antler size of a cohort of bucks because yearlings with small antlers tend to have smaller antlers at maturity versus yearlings with 4 or greater points. These findings will help managers in harvest decisions and enable them to set reasonable expectations for the results of those decisions.

More coming soon on the Comanche Ranch Buck Culling Project

Upcoming Events

2019 DEER RESEARCH MEETING

FRIDAY, MARCH 1, 2019
SAN ANTONIO, TX

Save the date for the
2019 Deer Research Meeting
in San Antonio, Texas.
Details coming soon!

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