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Culling of Bucks Doesn't Lead To Bigger Bucks, Research Says

by COLLEEN SCHREIBER | Apr 16, 2020

By Colleen Schreiber

SAN ANTONIO – In the free-ranging deer world, where big antlers continues to be the driving force, culling and heritability traits, specifically heritability of big antlers remains a hot-button topic.

Some 15 years ago, scientists at the Caesar Kleberg Wildlife Research Institute initiated a long-term research project with the Comanche Ranch to investigate whether long-term intensive culling in the wild impacted the antler scores of the standing crop.

The culling project wrapped up a few years ago. There were about five years of capture afterwards to monitor the population and determine if there were any long-lasting effects of culling. Though bits and pieces of the data have been presented in several other formats and venues, at the recent Deer Associates, an annual gathering hosted by the CKWRI, Comanche Ranch manager, Donnie Draeger, focused on aspects that he deemed specifically important from a ranch manager's perspective. The gist of what he said is that he does not recommend culling for genetic improvement. On the Comanche Ranch, they now only cull for population control purposes.

At the outset, he acknowledged that may be viewed as a controversial statement and that not everyone may agree, but Draeger insisted that the data gathered over 13-some years tells the real story.

The study site was the 113,000 acre-Comanche Ranch in Maverick and Dimmit County. The study parameters included a control pasture, a moderate and an intensive pasture. These were not small pastures. The moderate pasture was 18,000 acres under high fence and the intensive pasture was 3500 acres also high fenced.

In the control pasture, there was no culling. All the bucks captured were marked, scored and released. In the moderate pasture, culling of the bucks did not begin until three years of age and then only those with less than nine points were culled. At five years of age and older, those with a Boone and Crockett score less than 145 were culled.

In the intensive pasture, culling began in the yearling age class.

"Intensive is the right word because yearlings were culled if they had less than six points," Draeger told the group.

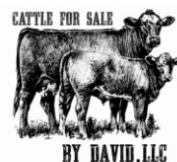
Also, two and a half year-olds with less than eight points were culled and for those three years of age and older the culling criteria was the same as in the moderate pasture.

The methodology used for capture was the standard helicopter net gun approach. In the moderate pasture, an average of six days a year were spent with three helicopters working and in the intensive and control pastures it was about one day a year.

There was a host of information collected from each captured buck, perhaps the most important being a small ear notch used in the DNA analyses. Also, all captured bucks were microchipped so that they could easily be identified in the event they were recaptured.

In all, some 11,000 captures were done over 13 years, making for a solid dataset. In this particular presentation, Draeger focused exclusively on a 10-year period, from 2006-2016, which encompassed data from about 5500 captured bucks in all, almost 3000 individuals and about 2500 recaptures. Also from this dataset, over a period of seven years a total of 1333 deer were culled. Additionally, 963 offspring were assigned to sires.

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In the moderate pasture based on the outlined criteria, 908 bucks were culled. Draeger noted that the three-year-olds took the brunt of the culling; culling waned a bit as the deer aged.

In the intensive pasture, 375 bucks were culled over seven years.

"The yearlings took it right on the chin," said Draeger.

In fact, the six points or less culling criteria equated to a 94 percent yearling culling rate. It was so intensive that recruitment essentially stopped, Draeger said.

The bucks that "made the grade" and were released were a better quality, "by a significant margin" than those in the control pasture. However, the culling did not change the Boone and Crockett score of the offspring. The "standing crop" were larger because only the largest were retained, but no impact on yearling buck scores was working, as would be expected if the culling was working in the sense of making genetic changes to the population.

"With six days of capture using three helicopters on 18,000 acres over seven years and the culling of 908 bucks, we did not change the average Boone and Crockett score of the standing crop," Draeger told the group. "That tells you how difficult it is to really manipulate a large deer herd on a large acreage.

"Frankly, it was shocking to me and I think to the guys who work for me," he added. "There's no substitute for empirical data. So I believe it, but I wouldn't have believed it if it weren't for the data."

In the intensive pasture, where culling went all the way into the yearling age class, there was a marked difference in the sires, almost a 20 B&C inch difference, between the control and the intensive pasture. He warned, however, the data do not translate or represent a genetically superior deer herd in the intensive pasture.

"It has nothing to do with genetics," Draeger stressed. "What the intensive pasture represents is a sculpted cohort."

He further explained that it's sculpted because as he reminded everything with a low B&C score was culled so inherently the average B&C score goes up.

Digging deeper, he further backed up his comment that it had nothing to do with genetics by pointing out that if the sires in the intensive pasture were 20 inches or better than those in the control, then it stands to reason that the next generation of yearlings would be better. Again, that is not what the data showed.

"What we actually saw is a downward trend in the size of yearling antlers over time," said Draeger. "That's completely counterintuitive."

He and other researchers surmised that one possible explanation was conception date, which was pushed back later and later because of the skewed sex ratio.

"We were harvesting so many bucks that we took a sex ratio of 1:1 or 1:2 to 1:6 or 1:7," Draeger explained. "That changed the average conception date. So, the severely skewed sex ratio forced many does to be bred during the second estrus, which caused yearling antler size to decrease because late-born fawns simply have less time to grow before their antlers harden and with the intense culling criteria, they simply couldn't overcome that."

That realization that they were essentially exterminating the buck herd in the intensive pasture led researchers to the decision to stop culling at year seven.

More data shared debunked the notion that once a cull always a cull. What they found was that 68 percent of yearlings that had five points or less ended up with eight points or more as two-year-olds. Likewise for the two year-olds, 56 percent went from seven points or less to nine points, for the three to four year-olds 44 percent went from eight points or less to nine points or more, for the five year-olds a third went from less than eight points to above 145 inches and all the five-plus grouped together about 14 percent moved up and down from 145 B&C points from year to year.

"What we found was that 30 percent of your trophies will turn into culls in almost any given year in any age class," said Draeger.

He next discussed breeding value, which he defined as "the predicted estimate of an individual's genotype based on the phenotypic values of its offspring."

He noted that the average scoring mature buck in South Texas is 120-130 B&C. However, the variation in breeding values between the 120-130 B&C bucks can range from a negative 23, which translates into an offspring B&C score of 102, to as high as a positive 29, which translates into an offspring with 154 B&C score.

"That's a 52-inch swing in offspring breeding size within a 10-inch window of your average deer in South Texas," said Draeger. "How do you cull when there's so much variation within 120-130 B&C scores?"

Researchers determined that a buck's antlers do not correlate strongly enough to his breeding value to give a manager enough information to know what kind of offspring that buck is going to produce.

Draeger addressed some of the comments that he's heard from others when he's presented these data in various other formats and at different venues. One common comment is that the study is wrong because culling should be part of maintaining a healthy deer herd.

"I don't disagree with that," Draeger said. "However, the culling needs to be defined."

He outlined two types of culling. There is culling with the intent of creating genetic change like this study tried to do or culling either bucks or does to create more resources for the remainder of the deer herd.

"By no means are we saying shooting bucks for the purpose of maintaining proper densities and a buck:doe ratio is wrong," Draeger stressed. "Do that, but don't fool yourself into thinking that if you harvest this smaller buck and leave the bigger one, that you'll make genetic change because this study says otherwise."

Another common comment from some is that they've been supplemental feeding and culling for many years, and they've seen improvement in antler quality. He acknowledged this is likely 100 percent accurate, but the real question is what is causing that improvement in antler quality.

"I bet it's rare that someone is only doing supplemental feeding or only culling," he pointed out.

The point being that there are many studies, including the Comanche-Faith study, that clearly show that supplemental feeding creates generational increases in antler size and body size. Specifically, the Comanche-Faith study found that with all things held constant a mature buck in South Texas on protein feed is 15 B&C inches or bigger than a mature buck without protein feed.

"What I think happens is many people confuse generational antler increases due to an elevated nutritional plane with genetic improvement," Draeger said.

He noted again that it goes back also to the sculpted cohort concept. If someone harvests all their eight points and they then say that their ranch has only 10-pointers that may well be true, but it doesn't mean that the herd genetically produced more 10-pointers.

"A sculpted cohort increases the standing crop quality and gives the illusion of genetic improvement," he reiterated.

Still others contend that culling works because the deer breeding industry has proven it.

"Again, I wouldn't disagree," said Draeger.

That said a caveat is needed, he told the group, in that approximately 40 percent of a mature buck's antler size, those three years of age and older, is due to inherited genetic traits. Therefore, the other 60 percent is due to different types of environmental variation, and that environmental variation is diminished or non-existent in a deer pen, he stressed. In the wild, the environmental variation outweighs the genetic potential or even the expression of antlers or both.

"What that says is that Mother Nature outweighs DNA," Draeger stressed. "For example, in a drought year if a deer lives in poor habitat, it doesn't matter what his genotype is; that deer may never make it."

He also pointed out another advantage that the deer breeders have is that they get a "pseudo breeding value" simply by observing the quality of the offspring they get from any one of their sires. They then make future selections for breeding pairs off of that information.

"That's impossible to do in the wild under large acreage," Draeger noted.

Also, with the "pseudo-breeding value" is that it speeds up generational change. For example, say a super buck produces a fawn that at yearling stage has a good set of antlers. That yearling buck can then be used to breed several more does. In the wild it would take more like six to eight years to get that change, said Draeger.

Another debate that has been around for some time has to do with whether or not antler characteristics are inherited. The study done at the Kerr Wildlife Management Area related to whether or not to cull spikes, is probably one of the most propagated studies in the state, Draeger said.

However, there are a few other studies, one known as the King Ranch study done by Mick Hellickson and Texas Parks and Wildlife and another on the Comanche Ranch [RWD1] also with TPWD, that in the last five years that have, according to Draeger, started to shift the tide somewhat.

The Kerr study says that antlers are heritable. Broadly most would agree with that, but Draeger contended it's more complicated than that. He noted again that research shows that for 3.5-year-old and older bucks, 40 percent of a buck's antler size is due to inherited traits; the other 60 percent is due to environmental variation. However, for one and two-year-olds only 20 percent of their antler size is due to inherited traits.

"That means 80 percent of their antlers that you see on top of their head is being influenced more by the environment," stressed Draeger.

Another claim in the Kerr study is that removing inferior deer improves the deer herd.

"That's possibly true, but I think it's very misleading, and the reason it's misleading from what we now know, from both modeling and from the King Ranch and the Comanche study, is that heavy culling doesn't do much over a few years," he told the group. "Small gains may occur over decades on high fenced properties. And by small gains, I mean like less than five inches of change."

Draeger also stressed that the Kerr study was done in pens while the King Ranch and the Comanche Ranch studies were done in the wild, noting again that in the wild there are barriers that simply can't be overcome.

"You can plow forward, headstrong and cull for 20 years and maybe get five inches if everything goes right," he reiterated. "The potential for nutritional gains greatly outweighs the potential for genetic gains, by 15 inches in one generation by adding protein or you can settle for five inches in 20 years by culling."

He also offered another perspective, admittedly it is a bit anecdotal in that it only involves one deer. Nonetheless, he insisted it makes a point. The deer is Ace, first captured in as a three year-old with a B&C of 149, so named because he had the distinction of being the most successful breeder of any of the male offspring captured in the Comanche culling study. He had seven male offspring that researchers found. Ace was never harvested and actually was never seen after the 2011 season, but they know he lived to at least through the 2012-13 season because they captured a son of his after that point.

He shared a picture of Ace as a six-year-old, estimating him to have a B&C score of 190, "a trophy by anyone's standards."

He also showed pictures of Ace's offspring starting in 2009. Based on the study's culling criteria, one was immediately culled as a yearling, another captured as a two year-old survived the culling inspection and as a three-year-old scored 96, at four, 113, and at six-years of age, 117.

"Not too impressive from a sire that was a 190-inch deer," said Draeger.

He also looked at Ace's offspring from the 2010-2011 season. Both of his offspring in this year were culled as yearlings.

In 2013, Ace sired three male offspring. One was immediately culled and of the two others that survived the culling criteria, the last time they saw one of them was in 2014, so they assumed he died in the pasture. The other one scored 123 in 2016 and in 2017 as a five-year-old 110, "a 110 buck from 190-inch B&C sire," said Draeger.

The last offspring captured in 2014, a three-year-old that scored 135, and 135 at again four years of age and 145 at five years of age.

"He was the only buck out of all seven of Ace's male offspring that made it above the culling criteria," said Draeger, "and he made it by the skin of his teeth."

Finally, he showed pictures of two different sires, a six-year-old 132 B&C buck and a four-year-old 152 buck.

"Which buck would you rather have as a sire?" he asked the audience.

Turns out the 152-scoring buck was the son of the 132-inch buck. One year the son scored 160 and another year 215.

"That buck came from a 132-inch sire," Draeger stressed. He reiterated the take home point that antlers don't equal breeding value.

"You cannot tell how a buck's offspring is going to look, good or bad, by looking at the sire's antlers."

Draeger concluded by telling the group he no longer loses sleep over whether a seven-point buck or that four-inch spike might ruin the herd.

"This data is very liberating for me," he insisted. "We put a lot more emphasis on nutrition at Comanche Ranch than we do genetics. I worry when our feeders don't get filled in time or when we don't get rain. I don't get hung up on the rest," he concluded.

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