Deer Associates eNews
News from the Deer Research Program at the Caesar Kleberg Wildlife Research Institute

December 2008

Supplemental News
Thanks to Livestock Weekly, we are providing you supplemental information on deer genetics with this follow-up to Randy DeYoung's recent article entitled, "Genetics or Environment: Which causes Physical Differences in White-tailed Deer?"

Managing Deer Genetics Not as Easy As Many May Think

Reprinted from Livestock Weekly
October 23, 2008

By Colleen Schreiber

ALBANY — “Sometimes what you think you know is more dangerous than not knowing anything at all.”

That was part of the opening remarks offered by deer geneticist Dr. Randy DeYoung at the recent West Texas Deer Study Group meeting here. He was referring to just how little we know really about managing genetics on free-ranging whitetail deer populations.

DeYoung is with the Caesar Kleberg Wildlife Research Institute in Kingsville. That appointment also involves some teaching in the Dick and Mary Lewis Kleberg College of Agriculture, Natural Resources and Human Sciences at Texas A&M Kingsville.

A quote with which he opens his big game management class each spring is one borrowed from D.J. Boorstin: “The greatest obstacle to discovering the shape of the earth, the continents and the ocean was not ignorance, but the illusion of knowledge.”

“With all the buzz and talk about genetics, it sounds like we know a lot about managing genetics in free-ranging populations, but I wonder about that,” DeYoung told listeners.

Deer management, he reminded, really rests on three legs of a stool — age, nutrition and genetics.

“All three are important,” DeYoung stressed, “but yet most of the focus seems to be on genetics. Genetics seems to be the only thing people are talking about.”

Referring to genetics as “a little bit of a black box,” DeYoung commented that genetics tends to receive a little bit more of the credit or a little bit more of the blame for some of the things that happen in deer management because the role that genetics plays is so “murky.” It’s murky in large part because little research has been done.

Given that, DeYoung’s comments focused on what is known about genetics, and then how that information can be used, perhaps, in management decisions. Most of the information offered is germane to free-ranging, low-fence operations.

He started by offering a big-picture view of today's deer population, reminding listeners that 50 years ago, before screwworms were eradicated, there were not nearly as many deer as there are today. Once screwworms were eliminated, deer numbers were rebuilt largely by transplanting deer into those areas that had been devoid of them. Today whitetail deer range from South America to Canada, but he added, "If this warming trend continues, deer will probably be in Alaska before we know it."

Reportedly, today there are about 30 subspecies of deer, more or less, over that entire range, though DeYoung said there has always been a question about how real some of the subspecies are.

"Are the differences that we find in coat color, size, etc., are those differences really due to genetics rather than perhaps changes in the environment?"

He noted that large deer, quality deer, are found all over the United States. There is no uniformity in distribution of such deer, and that in itself presents a challenge from a researcher's perspective.

"Some of these differences in these populations are probably due to genetics, but there's probably also some due to the fact that they live in better habitat in areas with better quality soils."

The question, then, is to differentiate between what's caused by genetics and what's due to nutrition, habitat, etc. In an effort to get a handle on some of this, researchers in Mississippi divided the state into five regions based on soil quality, i.e. soil type. Some of the best quality soil in the country, certainly in the state, is in the Mississippi Delta. The researchers found a perfect relationship between buck quality and soil quality. In other words, the habitat with the best quality soils was home to the biggest body weight deer. The same was true of antler size. The best soil types produced the biggest antlered deer. They documented the same trend for doe body weights as well.

"So — the big question — is it really due to genetics? We hear it all the time from guys on the Mississippi coast, 'Ah, we have bad genetics.' I want to say to them, 'Well, you're also in some bad soil, man.'"

As in Texas, deer were extirpated from large portions of the Southeast by the early 1900s, and those populations were kick-started again through trap and release programs. Numbers have grown from an estimated population of only 500 deer in 1929 to today, when some 200,000 to 300,000 deer are harvested annually.

Researchers were interested in trying to learn how the genetic makeup of the deer today compares to that of the original transplanted deer. Some 70 to 80 percent of the deer released throughout the state of Mississippi came from the Leaf River Refuge in the southern part of the state, where soil quality is poor. Today, however, deer from the Leaf River Refuge lineage now live in areas with good quality soils, and by and large, DeYoung said, most of these deer are bigger than the original stock source.

They're not just bigger to the eye, he said, but rather, they're statistically bigger, on average 20 Boone and Crockett inches bigger. The same was true with doe body weights. In fact, dressed weights of does on the better quality soils were five to 15 pounds heavier in than the source population.

All of that again begs the question, how much is genetics and how much is due to habitat and environmental influences? It's a question that requires many more long-term research studies, DeYoung said.

That big-picture view set the stage for what DeYoung talked about in the remainder of his presentation, specifically the issue of a manager's ability to make genetic improvements to free-ranging whitetail deer populations.

He noted that people make many assumptions when employing certain management strategies. Many of these assumptions, researchers are now learning, are inaccurate. Some of DeYoung's own research, much of which is still ongoing, has disproven some such assumptions. One project that has now been well documented and widely discussed in deer circles is a study in which researchers looked at breeding success of different age class bucks on three different study areas. Breeding success is only a tiny part of the study, but it is this part that DeYoung largely focused on for this particular presentation.

One of the research study areas is on the 3000-acre Noble Foundation in South-Central Oklahoma. The management focus at the Noble Foundation, he noted, was on protecting yearling bucks, while those 2.5 years and older were eligible for harvest. Over a 12-year period, 44 percent of the bucks were found to be yearling bucks while 30 percent were 3.5 years or older. On this particular site, researchers learned that collectively, the mature bucks were siring about 70 percent of all the fawns produced. More important, and perhaps surprising, was the fact that the other 30 percent were sired by yearlings and young bucks 2.5 years of age.

On the King Ranch study area in South Texas the management scheme is geared toward a much more conservative harvest, meaning the goal is to grow deer to an older age classification before they're harvested. In this scenario almost 60 percent of the bucks on the study area were 3.5 years of age and older.

Researchers, however, found similar results in terms of paternity. In fact, about 70 percent of the fawns were sired by the mature bucks and the remainder by the young bucks.

"This was kind of surprising," DeYoung told listeners. "We've been operating under the assumption that a handful of the biggest bucks sire all the fawns and the little bucks don't sire any."

He noted that on the Oklahoma study area over a 12-year period, the buck that sired the most fawns only sired 12.

"There may be more breeding going on by individual bucks," he commented, "but it only counts if that fawn survives. In some of the drier areas it's difficult for a doe to consistently raise one fawn, much less twins. The bottom line is a lot of these bucks are not producing that many offspring."

The King Ranch data did show that young bucks tend to be more successful during the peak of the rut, which indicates that breeding success is, perhaps, affected by competition.

In looking at conception data which was collected by harvesting does in early spring and measuring the size of the fetus, researchers made another interesting discovery.

"We found that about 25 percent of the sired twins were sired by more than one buck. This

again suggests that a lot of bucks are breeders."

The final deathblow in terms of what deer enthusiasts thought they knew about genetics, DeYoung said, is that their research showed no difference in breeding success due to quality. In other words, the bigger-bodied bucks, the bigger-antlered bucks, don't necessarily breed any more does than the "average Joe" deer.

DeYoung also noted that the conception data indicates most of the does are bred over just a couple of weeks, and given the fact that the does are spread out and do not hang together in large groups, this suggests that breeding success is more about buck persistence.

"During the rut, bucks are constantly on the move," he reminded. "They may spend 24 to 48 hours with one doe and then move on to another. So life is pretty tough for the bucks during the rut."

In an effort to learn who is siring whom, on another research project funded by TPWD, CKWRI researchers are studying the relationship between buck behavior (movements, home range size, etc.) and breeding success. Researchers are using GPS collars to track daily movements of bucks.

"During the peak of the rut some of these bucks might travel 15 miles," he told listeners. "They don't do it every day, but they might do it two or 3 times."

One discovery they've made that complicates their genetic research is that during the rut some bucks move well beyond their normal home range. One collared buck made an 18-mile round trip outside his home range and another made an 11-mile round trip. Some bucks, they discovered, stay gone from their normal home range for more than a day or two. For example, one collared buck spent a few weeks outside his normal home range, some three miles away.

"That kind of complicates some of our parentage studies because we're capturing does in the area where the buck was originally captured, and there might be a buck that is siring other fawns three miles away as well as siring fawns in his original home range."

Finally, he noted some interesting discoveries made with respect to buck dispersal. Like many wild animals, whitetail deer bucks tend to move away from where they were born when they get to be a year and half to two years old. It's done most likely to prevent inbreeding.

Researchers discovered that some young bucks may only go a mile or two; others might go many miles away. For example, one collared buck moved eight miles to set up a new home range. They also discovered on another study site in the drier portion of Southwest Texas that some bucks tended not to disperse until they were 2.5 or even 3.5 years old, but all eventually disperse. Generally speaking, though, DeYoung told listeners that on a 25,000-acre property, only 50 percent of the bucks born on that property are likely to remain on the property. In fact, the level of buck dispersal doesn't plateau in South Texas until a property is around 60,000 acres in size. That speaks well, he said, for wildlife management cooperatives that pool contiguous properties and manage as a whole rather than in smaller, separate units.

The point DeYoung came back to was that because so much of what goes into the genetic equation, such as actual breeding and buck dispersal, cannot be controlled, particularly on low-fenced operations, so many of the management strategies that individuals often try to employ are really quite inefficient.

Some point to the genetic changes, the so-called genetic improvements, made by deer breeders as proof that it can be done. They argue that those same principles can be applied in the wild. The biggest difference, however, DeYoung stressed, is the issue of control.

“Breeders have total control; they control who breeds, not only what bucks but which buck breeds which doe. They’re able to concentrate some of the really good traits through the use of linebreeding just like they do with livestock.

“So is it possible to mimic some of that under free-range conditions? The closer you are to a captive pen situation, the more efficient and effective you can be,” DeYoung stressed. “The farther away you get from that, the more difficult it’s going to be and the more inefficient it’s going to be.”

The take-home message, DeYoung said, is that under a free-range scenario, more improvements are likely to be made to a deer population by placing the most emphasis on the basics of habitat, nutrition and age distribution — things that can be controlled — and less on genetics.

“Get the basics right first, then maybe consider other management steps involving genetics,” he concluded.