Dr. Deer's™ PRESCRIPTION

Genetic Drift And Its Role In Deer Management

By Dr. James C. Kroll

It is my opinion that land fragmentation is the greatest enemy to wildlife conservation. Over the 4½ decade spread of my career, I have seen average land parcel size decline at an alarming rate. In east Texas, rural land size has declined from just under 400 acres to less than 20 acres in the last half century. In 2007, the USDA Census of Agriculture reported, out of the nearly 250,000 farming and ranching operations, the average ownership was 527 acres; still large for many areas of the state. However, average often does not mean a great deal. A good friend of mine once said that "average" is like lying with your head in an oven and your feet in a freezer—on average you are going to feel OK!

The meaningful metric lies with the percentage of land parcel size by ownership. Large ownerships of 2,000 acres or more represented only four percent of landowners in 2007, while over 50 percent of properties fell into the 100 acres or less category. The fact is, although Texas has the reputation for large land holdings, the vast majority of landowners operate on relatively small properties. These facts are relevant when you consider recent debates on "hunter opportunity;" specifically how high fencing is taking away hunting from the average guy. Long ago, I learned that "many a beautiful theory has been murdered by a ruthless gang of facts."

So, what does this all have to do with the topic of this Prescription? We're seeing a remarkable phenomenon in recent years in which more and more "Baby Boomers" and even some "Generation X'ers" are returning to the land. These folks either want to return to their family roots, adopt a more simple lifestyle, or get away from the materialistic grind of a long career, finishing out their lives working to make a little piece of God's earth a little bit better. They also are tired of not having control of their world; and owning land is a perfect remedy. Their expectation in



The bucks in this photograph represent the descendants of TD at the author's research facility. Although long deceased, old TD has left a lasting impact on the herd. Note the long browtines, TD's signature trait.

buying land is having access to better bucks and hunting. The reality is quite different.

I receive at least two calls a week from folks who have bought some land and tried to manage it for deer and other wildlife. The demographics of these folks are quite consistent. The owners are a husband and wife, with children of various ages. They have saved up for years to purchase their little piece of heaven, with hopes of leaving it to their children and grandchildren, so they too, can have a good place to hunt. Although a dream come true, the call usually focuses on how they have worked for 5-7 years, spent a relatively great deal of money, but have discovered it's not working like they expected. Their neighbors are absentee landowners who show up a few times a year, and then only to claim their "share" of a harvest they had absolutely nothing to do with.

It's entirely natural for landowners to want to produce bucks with larger antlers; especially after a hunting career of taking yearlings and 2-year-olds. They have read or heard all you have to do is let bucks get older and your problem is solved. This admonition does not pan out very well in the real world. Each time they let a young buck walk, it jumps their fence and the next thing they hear is "boom!" Our many studies on why landowners high-fence their properties consistently have pointed out the No. 1 reason was frustration: the smaller the property, the greater their frustration. I often have opined if states would only manage deer herds for better quality bucks, instead of number of filled tags, there would be a lot fewer high fences.

Whether you have 100 acres or 10,000 acres, just fencing your property does not in any way guarantee you will have bigger bucks. Yet, erecting a high fence does guarantee two things: you now are in control of your herd, and you may have to live with what you now have. The latter means the deer you "catch" in your fence will be the genetic stock (founders) for your future herd. Too often I have heard professional game biologists admonish landowners to not worry about genetic improvement, just manage what you have. This questionable admonition is predicated on the erroneous idea that every deer carries the genetics to produce large antlers.

The process in which a large population is sampled, either naturally or accidentally, into a smaller group is called Genetic Drift. The genes left outside the fence are gone forever unless you bring some into the herd via releases. The smaller the property and initial population, the less likely you have collected great genetics. Even for larger properties of 2,000-plus acres, chances are not great to have significant numbers of good genetics animals.

If you visit www.answers.com/topic/genetic-drift, there's a wonderful video in which the professor talks about how, in 1814, 15 English colonists moved to an island off the coast of Africa called Tristan da Cunha. They established a colony there and by the 1960s, there were 240 people living on the island. It turns out one of the original group carried a recessive gene for retinitis pigmentosa, a serious disease of the retina. In normal English populations, this gene occurs at the rate of 1/30,000 people.

Because of genetic drift, and recombination through reproduction, the frequency in 1962 was 1/15 carriers and four people suffering from the disease. It just as easily could have been some great gene, but it was not. Let's talk about that.

Genetic drift can work in your favor under the Founder Effect. If, for example, you had killed out all the deer on the property, and then stocked it with a buck and three does from a really great breeding program, these founders should be carrying great genetics. That is what we did in 1987 at Ft. Perry, Georgia, when we killed all the deer off a 2,000-acre parcel (not an easy job), then stocked it with 37 deer from at that time the best breeders in the country. In those days it took us 6 months to find those deer, since deer breeding was in its infancy. Or, if we had waited for the deer enclosed from the resident herd to express their potential under great nutrition, then killed every buck that did not exhibit trophy characteristics, and reduced the doe age structure to 3½ years; in practice we would have created a Founder Effect in another way. Either way you have a Founder Effect. But, let's say there is a middle ground. If you do as most landowners and take the best and the worst from your herd in the early years, you now have created a mediocre deer herd. Considering the bell-shaped or normal curve, by definition, the average buck will be average (viz., 130 inches and eight points), which is what a mature buck "wants" to be in nature. Bottom line, the probability you have the genetics you want to produce large numbers of bucks exceeding 160 is slim; and for 170-plus is virtually nil.

Many years ago, we fenced our research facility near Nacogdoches and decided to see what developed from the native herd enclosed. The best buck was an eight point, 120-inch buck and that was as good as we could do. Then removing most of the deer, we released a single yearling buck that, at the time, had two misshaped spikes curling behind his ears. However, we obtained the buck from a friend who had been breeding deer for many years. I took a chance on the buck, but his pedigree



The left buck was culled from the herd, along with his offspring. The right buck, "TD," went on to totally change the antler size of bucks on the research facility.

said he would be just what we wanted. The breeder thought we were crazy for taking such a risk.

We named the buck "TD" after our breeder friend, who will remain anonymous other than his initials. We bet a steak dinner the buck would turn out a fine trophy. At four years of age, he was a 160-plus inch buck, and later broke 170 typical. He had a droptine, was wide, had long beams and very long tines. That one buck turned out to be the founder for the entire herd we have today; and, our bucks generally have TD's phenotypic characteristics. In this case, we made the right decision, but our friend was right; we were taking a big chance on a single buck. (See p. 24-25 photos.)



TD's yearling antlers. Many years later, the best antler characteristics of TD continue to manifest themselves, illustrating how one buck can change a herd's genetics, *provided* stocking occurs during the "Founder" stage of development.

How long does it take to effect a genetic change in a deer herd? The answer is one of those we hate to hear from biologists: "That depends!" But, that is the correct answer. If you had opted for removing all or most of the deer and restocking, it will take 3-5 years. IF, on the other hand you attempted to cull phenotypically inferior bucks and reduce doe age structure, it would take 3-5 deer generations (10-17 years). The latter is determined by the completeness of culling and age control. Most operators fail to adequately cull their bucks, and that's the No. 1 problem we encounter in helping landowners manage their herds.

We recently completed a long-term study on various strategies for stocking to improve genetics. The short version of our findings is Texas offers several options for genetic improvement, but only two really work—the Deer Management Permit (DMP) and re-stocking with genetically superior deer from a breeder. The Trap, Transport, and Translocate (TTT) option came in a distant third. The DMP option was slow to gain acceptance, but now is very popular with landowners. Put simply, the permit allows you to build a temporary fenced area; stock it with a buck and does from your ranch, another ranch or from a breeder; then release the deer and offspring onto your property. The other option (releasing breeder deer) is only feasible if you either significantly reduce the number of native deer prior to release or, as with our Ft. Perry experiment, remove them all. The larger the property, the more difficult that approach becomes.

The bottom line of all this is, if you decide to fence your property to gain control over your herd and produce larger bucks, the best approach is to not rely on what you may have included in your "deer sample." It's a sound strategy to introduce better genetics. But, what about landowners who do not fence? What impact does Genetic Drift and the Founder Effect have on these properties? I have one of the only copies of the Texas deer stocking records from the 1930s to recent times. The deer now residing on the Texas landscape mostly originated from only a few areas. The most common sources for deer stocking were the King Ranch, a handful of other South Texas ranches (Texas whitetail subspecies) and the Aransas Wildlife Refuge area (Avery Island subspecies) north of Corpus Christi. DNA studies tend to support that, once deer are stocked and become established, they do not tend to move large distances. So, we end up with pockets of deer that are genetically similar around the original stocking sights. If you're a Hill Country rancher, you may have "won the lottery," and ended up with great genetic potential or you may not have fared so well. The deer that landowners have today on their land are the result of Genetic Drift.

In areas with very heavy buck harvest, your local deer may long ago have degraded genetically from "negative selection." I worked for years with a timber company owned hunting operation here in eastern Texas. For over 30 years, the property was day-hunted by a large number of pay hunters. In those days, it was illegal to shoot a doe or a spike, so the hunters shot any buck with a forked antler. Now, spikes are not genetically inferior, but removing any buck with forked antlers over at least 10 deer generations, certainly had a negative impact. The timber company shifted policy to quality management over a decade ago; and to date, the average mature buck is far inferior to those from nearby properties. In this case, not only was Genetic Drift involved, but also the Founder Effect.

Whether you're a small landowner, with or without a high-fence, or one of the small percentage of Texas farmers and ranchers with large properties, the buck quality on your property has been influenced by Genetic Drift and the Founder Effect. Only a handful of modern ranches enjoy the original genetics from historic herds, and in my opinion represent a Texas treasure. Understanding the concept of Genetic Drift and the Founder Effect can lead you into the right direction for improving antler quality on your property.