# Is Trophy Hunting Drai

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Hunters in the U.S. and Canada are the driving force behind the most amazing system of wildlife conservation ever developed. Because of its resounding success, this North American Model of Wildlife Conservation is now being applied in other countries. Unfortunately, this is a largely untold story as most of the public thinks their government takes care of wildlife using their tax dollars. There is a serious lack of understanding and appreciation for the true history of wildlife conservation. Even after learning about this fantastic story, some cannot reconcile the benefits of this system with their emotional qualms about wildlife being killed. Not everyone needs to be a hunter, but the superiority of this conservation model is undeniable.

**The public needs to be told the truth that hunters have always been, and will continue to be, the vanguards of an incredibly effective system of wildlife conservation. Researchers, wildlife managers, and their conservation partners in the hunting community will continue to do what they have done so well for nearly a century: execute the most successful conservation paradigm ever devised.**

With emotions come criticisms. Critics of hunting try desperately to find any information that can be played to their favor. A single action of an inconsiderate or unethical hunter is portrayed as the norm. Likewise, any scientific finding that shows any negative effect of hunting is paraded in the popular press with all sorts of far-reaching generalizations and poetic license. Trophy hunting is one of their most frequent targets. Let's explore the charge that hunters are negatively affecting the gene pool of the very species they strive to conserve.

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## THE GENE POOL?

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## The Building Blocks of a Trophy

Three factors are necessary to produce animals with qualities (such as antler size) far above average for their species. Age, nutrition, and genetics all work together to determine whether an animal is a trophy. Age is the most obvious and easily understood portion of the equation; we learned long ago that antler, tusk, and horn size increases with age. Likewise, the European game keepers in the 14th century were already writing about the importance of good nutrition to antler size. These are not new ideas. But the third factor, genetics, is where our knowledge has increased exponentially in recent decades.

Each animal has a different genetic potential for horn or antler growth. Some individuals have superior "antler genes" to others the same age and some will always be below average just as some humans never reach six feet tall regardless of diet or age.

Humans have the potential to alter the gene pool anytime they influence what animals are available to do the breeding for the next generation. This includes human activities such as selectively harvesting trophy males, culling undesirable animals, establishing harvest restrictions based on horn or antler size, and translocations (moving animals to a new area).

## Tools of Change

In thinking about human-induced changes to the gene pool, we have to understand the concepts of heritability and selection as each plays a role in the ways humans can potentially affect the genes in a population. *Heritability* is simply the inheritance of certain characteristics from the previous generation. Antler, horn, and tusk size or shape have been shown to be heritable; thus, the potential to affect future gene frequencies exists. *Selection* refers to anything that disproportionately removes future breeders from the population based on some characteristic rather than randomly. Selection can be intensive enough to rapidly change the genetic makeup of future generations or so light and sporadic that it is meaningless at the population level. Taking a group of yearling bucks and breeding the five with the largest antlers to all does in captivity (as has been done with cattle and horses for centuries) is much more intensive selection than removing a single trophy buck in a free-ranging population. Both actions represent selection, but potential for changing the gene pool is dramatically different.

Deer researchers in Texas have been able to make changes to antler size in herds maintained within small enclosures where they had complete control of selection. Inversely, no differences in antler size within age class were observed following eight years of intensive removal of small-antlered whitetails on a 10,000-acre portion of the King Ranch in Texas. The question is not whether hunters can be agents of selection; it is the *intensity* of the selection that is the fulcrum upon which this whole issue balances.

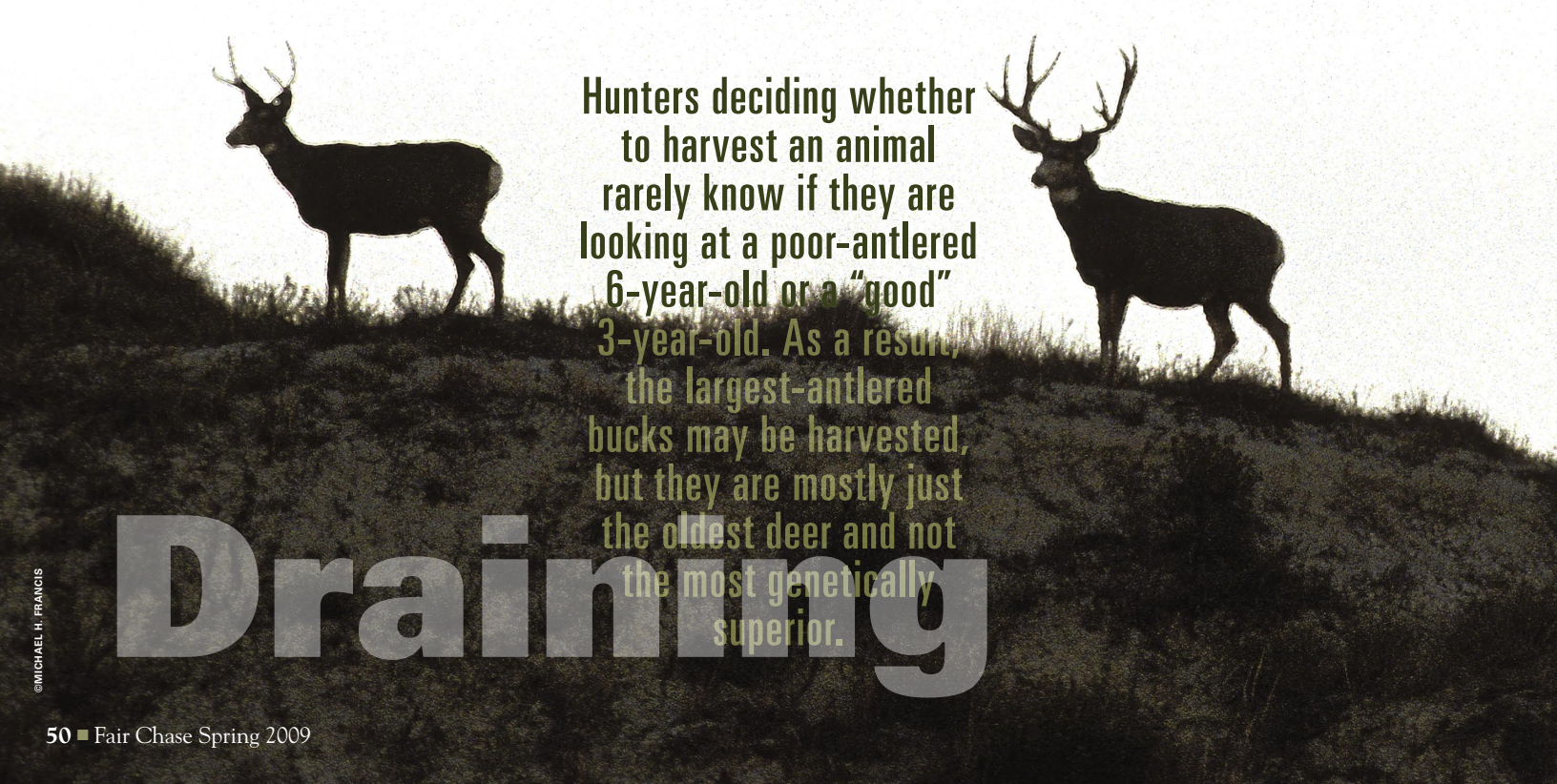
## Obstacles to Selection

Regardless of demonstrated changes in captivity, there are many obstacles to applying intensive selective pressures on a wild population. These obstacles interfere with and lessen the chance of altering the gene pool.

**AGE.** Many times the effects of *age* are confused with those of *genetics*. Hunters deciding whether to harvest an animal rarely know if they are looking at a poor-antlered 6-year-old or a "good" 3-year-old. As a result, the largest-antlered bucks may be harvested, but they are mostly just the oldest deer and not the most genetically superior. Seeing fewer "big ones" is usually a lack of older animals, not a genetic deficiency. Additionally, the older bucks have learned behaviors that make their harvest far less likely.

**PATTERNS OF BREEDING SUCCESS.** Mature animals usually do most of the breeding, but research on members of the deer and sheep families has shown that younger rams and bucks are participating in breeding to a greater degree than previously thought. Recent whitetail research showed that nearly a third of the fawns were sired by yearling and 2-1/2-year-old bucks. The data further showed that on average, a single buck sired only one to three fawns each year that survived to enter the next year's population. This obviously complicates the idea that hunters are exerting a strong selection by removing large antlered/horned animals.

**GENETIC CONTRIBUTION OF DOES.** Female ungulates contribute at least as much to the antler and horn quality of their male offspring as do the sires. Experiments have shown that whitetail fawns born from the same doe, but sired by very different bucks, often have antler conformations similar to each other and sharing characteristics with their mother's father.

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A male-to-female ratio of 1:2 or 1:3 means that 66-75 percent of the total gene pool is made up of females that cannot be subjected to selective pressures related to horn or antler quality. It would be very difficult to manipulate the quality of horns or antlers by incomplete selection on only 25-34 percent of the gene pool.

**MOVEMENTS.** Although there are exceptions, most big game populations are not isolated from genetic exchange. Even seemingly separate bighorn populations exchange genes with one another. This clustering of interrelated populations into one metapopulation dilutes any selection applied to a population and helps to maintain genetic diversity. In whitetails, approximately 70 percent of 1-1/2-year-old bucks disperse from their birth area, travelling one to five miles on average, with many going 10 miles or more. Likewise, areas inaccessible to hunters serve as genetic reservoirs that contain animals not exposed to this source of selection.

**NUTRITION.** It is no secret that poor nutrition affects the growth of antlers, horns, and pronghorns. Substandard nutrition results in animals not expressing their real genetic potential and thus any selection based on the size of their headgear may be confounded by the lack of nutrition.

**LINKED GENES.** All genes reside on a set of chromosomes. We don't know where most genes are located, but we do know that genes located close to one another on the same chromosome are usually inherited together. When this happens these are referred to as "linked genes." For example, if a gene related to inferior horn size resides close to one that increases survival, these 2 genes may be inherited together most of the time. In this example, intensive selection resulting in smaller horns may increase survival through some other mechanism, thereby confusing the idea of simple selection.

**OTHER ENVIRONMENTAL PRESSURES.** Hunters are not the major selective force in most big game populations. Even if managers are able to exert an intensive selective removal on adult animals, it is not the only selection taking place. Many other factors (predation, malnutrition, disease, weather, etc.) remove individuals from the population irrespective of genetic potential for horn or antler size, and these other removals are not always random but due to many other selective pressures. Each year a population produces a new batch of DNA in the form of lambs, calves, or fawns. At least half of this new genetic material never makes it into the breeding gene pool due to these environmental factors, with absolutely no relation to any selection that may be occurring on the adult population by hunting.

## The Intensity of Selection

There is a misconception among some that hunters in general are selecting mature animals in most cases. The reality is that a very small percentage of hunters are truly passing over young animals and waiting to harvest trophies. Also, for those that are, we find that a trophy is in the eye of the beholder. One hunter may be very satisfied with a buck that another hunter has already passed up in their search for a bigger one. If one hunter's trophy is another's reject, it becomes very difficult to discuss the genetic effect of removing "trophies." Most trophy hunters are simply taking the oldest male, not the most genetically superior. Except in a few very limited cases, trophy hunters do not take the largest males in each age class, but rather the largest they encounter within rifle range, during the season, during daylight hours, while they are in the field. Remember, hunting is not merely an open selection process like grocery shopping. The animals are quite adept at avoiding the hunter while afield, particularly as they mature.

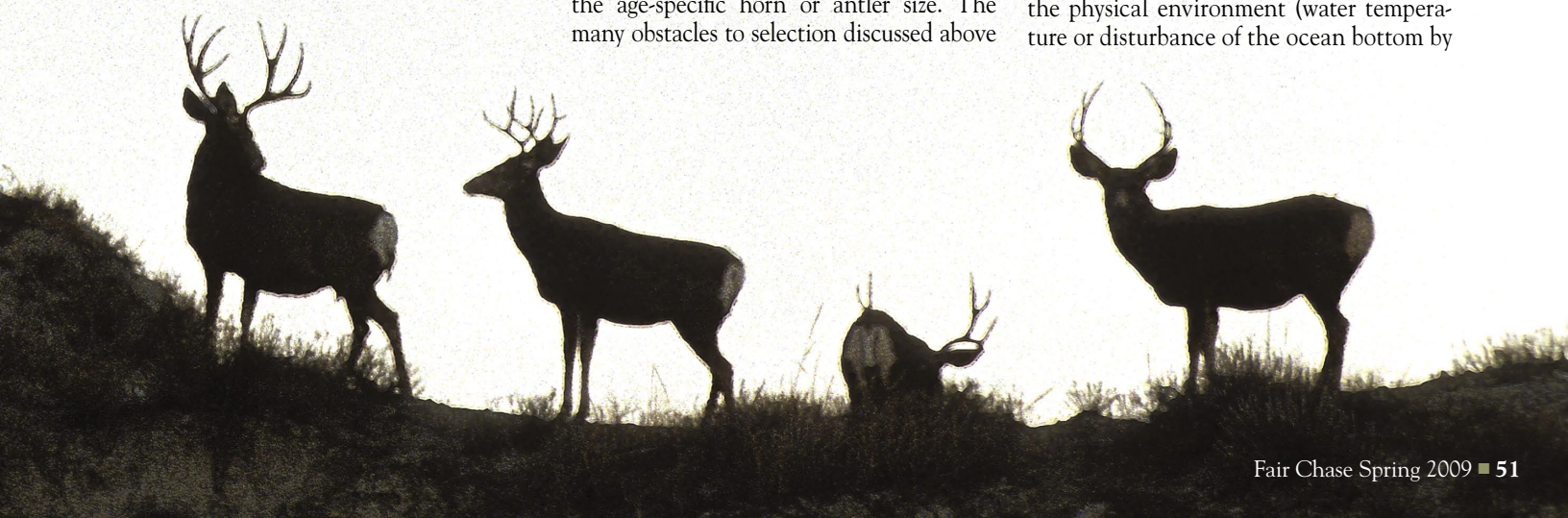
Only in the most intensive selection scenarios could we measurably affect the age-specific horn or antler size. The many obstacles to selection discussed above cushion against any hunter-induced selection on the population. In theory, wide buck-to-doe ratios (rather than trophy harvest) have the most potential to selectively change the gene pool because fewer males in the population reduces overall effective population size.

## Change You Can Believe In?

Research has also illustrated that deer with more genetic diversity have higher Boone and Crockett scores, higher body weights, and better reproductive rates. There are definitely measurable differences in gene pools that relate to real population performance. Because of this, we need to be aware of factors that have the potential to negatively affect genetic diversity. Luckily, genetic work has shown that most hoofed animals have remarkably high levels of genetic diversity and white-tailed deer in particular are among the most diverse mammals.

In the last five years, several newspaper and magazine articles have charged that trophy hunters are degrading the gene pool. "Evolution in reverse," they call it. These arguments may sound good superficially and certainly make for sensational news because the case can be presented to the lay public without any messy details or professional accountability. An article in *Newsweek Magazine* (1/12/09) casts wide, sweeping aspersions on trophy hunters. Many disingenuous, or simply sloppy, writers have generalized this even farther to say "hunters" are degrading the gene pool. As evidence of this assertion, writers trot out the same list of species (fish, elephants, deer, sheep) said to be changed due to human selection.

One species of fish in the Atlantic Ocean became smaller and started maturing later, apparently due to human exploitation. Extensive use of certain-sized mesh nets had intensively gleaned only larger fish from the population. This change is well-documented, but there is some debate about how much of this change is due to genetic factors and how much to changes in the physical environment (water temperature or disturbance of the ocean bottom by



heavy beam trawlers). It is conceivable that nets of a certain size used extensively may apply an intense selection on any fish not small enough to slip through, but this is obviously unrelated to individual harvest that occurs in typical big game hunting situations.

No article on the perils of trophy hunting is complete without reporting about the African elephant populations purported to be evolving into tuskless freaks. In 1969 and 1972, surveys revealed 10-12 percent of the females were without tusks, but then when surveyed again 1988-93, the estimate was 28-38 percent. They surmised (without data) the change was due to heavy ivory poaching. The problem with this is that there was no monitoring between the two early years and the later period and no evidence at all for cause and effect. Even the original paper concedes that the proportion of the population without tusks changed with movements of elephant groups on and off the study area.

Some deer harvest restrictions based on antler characteristics could apply more intensive selective pressures by age category. This has concerned biologists in some areas, but these are unfounded fears in all but a few very limited circumstances where regulations are not adjusted to local antler development data.

Most articles on this topic have cited a short letter that appeared in the journal, *Nature*, in 2003 that highlighted research conducted on a small, isolated sheep population on Ram Mountain in Alberta. This long-term research was well designed, thorough, and found strong evidence that hunters removing trophy rams in that population had resulted in a reduction in average horn size within age classes. This selection was possible because a ram had to be 4/5 curl to be legally harvested. This resulted in most rams with fast-growing horns (genetically superior) removed before they could breed and some old rams with slow-growing horns that never reached 4/5 curl and were never removed. This intensive selection, coupled with genetic drift from the small gene pool (as few as 26 sheep at one point) and complete isolation from other sheep populations allowed for these genetic changes in horn size. Those responsible for the management of this herd changed the harvest restrictions to full curl before the study was even complete and effectively eliminated the intensive selection.

Researchers of Ram Mountain acknowledged that nutrition and age played a larger role than genetics in determining horn size, and subsequent work in this population and elsewhere showed that when nutrition increased, so did horn size. In fact, the largest horns in that population were produced by increasing nutrition.

### Historical Heritabilities or Heretical Hysteria?

The *New York Times* (1/13/09) followed up the *Newsweek* article with a related one subtitled *"…hunting, fishing and even conservation efforts may have ill effects on some species."* The ridiculous game continues. It's hard to understand the near-hysteria in these popular articles when even the most prominent researcher from the Ram Mountain study has stated: *"While the potential evolutionary impacts of trophy hunting are worthy of consideration, there is currently not enough evidence to determine when they should be seen as a significant concern for conservation."* Some of the articles on this topic contain so many silly quotes from "researchers" that one has to wonder if there is really that much ignorance in the sciences these days. Perhaps some researchers have trouble seeing the forest of facts through the trees of their own biases.

Boone and Crockett Club's *Records of North American Big Game* records book (www.boone-crockett.org) has kept consistent records since 1950, containing data back to 1830, and yet, the number of annual entries has quadrupled since 1980. Since 1993, new World's Records have been set for pronghorn, bighorn, white-tailed deer, moose, caribou, Rocky Mountain goat, musk ox, elk, and Pacific walrus. Likewise, for the Pope and Young Club (www.pope-young.org), which processes data on big game animals taken with the bow and arrow, entries have increased eightfold over the past 25 years with a minimum of 23 new world records in the last 12 years. Both organizations use the same scoring system that evaluates only the antlers, horns, or skull (bears and cougars) of a trophy.

To continually warn about the dangers of trophy hunting based on this one exceptional case and a few poorly-supported anecdotes takes significant ignorance or bias—neither of which is flattering for a scientist or writer. This is not to say human selection and maintenance of genetic diversity should be ignored. The demonstrably high genetic diversity in wild sheep and deer, gene flow among populations, and all the other selective pressures work to "reshuffle" the genetic card deck to inhibit detrimental change in horn and antler size.

The public needs to be told the truth that hunters have always been, and will continue to be, the vanguards of an incredibly effective system of wildlife conservation. Researchers, wildlife managers, and their conservation partners in the hunting community will continue to do what they have done so well for nearly a century: execute the most successful conservation paradigm ever devised. ■

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