



Genetics or Environment: Which Causes Physical Differences among White-tailed Deer?

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Managers have long been asking the question whether differences in white-tailed deer antler size and body size can be attributed to genetics or the environment. Understanding these differences will help managers to decide how much of their financial resources need to go toward feeding and habitat programs. To answer this question, I have compiled evidence from studies conducted throughout many parts of the white-tails' range.

A look at some of the evidence:

- Deer with exceptional antlers tend to occur in productive areas, provided that management allows bucks to reach maturity.
- Experiments in south Texas show that intensively fed areas produce heavier deer than unfed areas.
- Deer from the same source stock were released at different sites in Mississippi. Today, 50-80 years later, deer released in the best soil regions average up to 20 B&C inches larger at maturity and dress an average of 25 lbs heavier than deer released in poor-quality soil regions.

Background

White-tailed deer are found from South America to Canada, one of the greatest latitudinal ranges of any big game animal. Across, this range, deer vary in body size, coat color and length, breeding dates, and other characteristics. In fact, the physical features of deer vary enough that white-tailed deer are grouped into 30 named subspecies. On a continental scale, some of the physical differences among deer populations likely have a genetic basis. At local or regional scales, the answer is often less clear. Most white-tail subspecies have not been validated with genetic studies, but genetic research has identified fewer unique genetic groups than named subspecies.

Several studies of deer in the Southeastern US revealed that differences in soil fertility at regional (e.g., state-wide) scales and habitat quality at local scales (e.g., among ranches) affect antler and body size in deer. Deer with exceptional antlers tend to occur in productive areas, provided that management allows bucks to reach maturity. A prime example may be seen in the Texas Hill Country, which historically produced many B&C bucks. Soil erosion, brush invasion, and high numbers of deer and exotic hoofstock make producing quality white-tails difficult in this region today. Collectively, these findings imply that factors other than genetic ancestry may exert a large influence on body and antler size of deer.

What CKWRI research found: We collaborated with colleagues at Mississippi State University to evaluate a natural experiment that occurred during the restocking of deer in the southeastern US. Deer from the same source stock were released at different sites in Mississippi. Today, 50-80 years later, deer released in the best soil regions average up to 20 B&C inches larger at maturity and dress an average of 25 lbs heavier than deer released in poor-quality soil regions. Thus, the same deer perform quite differently in good vs. poor soil regions. Similar findings have been achieved experimentally in south Texas using supplemental feed, where intensively fed areas produce heavier deer than unfed areas.

Take-home message: Although “genetics” is often invoked to explain differences in antler size within a state or among ranches, soil and habitat quality have a large influence on deer antler and body size.

Further reading:

Strickland, B.K., and S. Demarais. 2000. Age and Regional Differences in Antlers and Mass of White-Tailed Deer. *Journal of Wildlife Management* 64:903-911.

Stable URL: <http://www.jstor.org/stable/3803198>

Strickland, B.K., and S. Demarais. 2008. Influence of Landscape Composition and Structure on Antler Size of White-Tailed Deer. *Journal of Wildlife Management* 72:1101–1108.

<http://www.wildlifejournals.org/perlserv/?request=get-abstract&doi=10.2193%2F2007-381>

Boone & Crockett, Pope & Young harvest maps compiled by QDMA

<http://www.qdma.com/map/>