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How Much Protein Feed Do Deer Eat?

By Don A. Draeger

What percent of deer eat protein pellets? Of those deer, how much does protein pellets make up of their diet? I think a lot of us have asked those questions. Before reading any further take a guess at the 2 above questions. Got your guesses? Good.

During the 2007 and 2008 deer season, Comanche Ranch, with the help of Dr. Dave Hewitt and then grad student Ryan Darr, sought to answer those questions and more. We used a pelleted protein feed specially formulated to have a unique stable isotope signature. Stable isotopes allow researchers to estimate the proportional contribution of different foods to an animal's diet. Feed sites in supplemented pastures on the Comanche Ranch are located every 200 acres. Each feed site is enclosed in a 20-yard diameter circle of 30-inch hog panel and has two barrel type feeders. This arrangement ensures feed is always available and that more than one deer can feed at one time, reducing the ability of dominant deer to monopolize feed sites.

Antler and hair samples were collected from 322 deer starting October 2007 to February 2009 inside the study area on Comanche Ranch in Maverick County, Texas. Sampled deer were in pastures provided with our specially formulated feed and our sampling enabled us to estimate feed use during late summer. Samples were analyzed for carbon ($\delta^{13}C$) stable isotope composition by the Analytical Chemistry Laboratory at the University of Georgia. Results showed that only 16 out of 322 deer sampled did not eat protein feed. The yearling age class had the lowest percent of bucks that ate protein feed compared to all other age classes. Averaging across the 2 years of the study, 82% of yearlings sampled ate protein feed compared to an average of 98% of all other age classes combined (Figure 1). However, the proportion of yearling bucks eating feed varied between the 2 years of study. In 2007 only 74% of yearlings ate protein feed and in the next year 93% of yearlings ate protein feed. Why the difference? We believe that it was due, at least in part, to hierarchal dominance and an ongoing intensive culling experiment. During 2007 yearlings comprised 18% of the standing buck population. Due to intense culling of older age class bucks and a large fawn crop in 2007 becoming yearlings in 2008, yearlings were 42% of the buck population in 2008. We theorize that during the 2007 season when yearlings made up only 18% of the buck herd they were likely experiencing some sort of hierarchal dominance issues that suppressed their access to protein feed. In 2008 the yearlings made up 42% of the buck herd and 93% of

the yearlings sampled had eaten protein feed. We also theorize that in 2008 yearlings had fewer negative interactions with mature bucks and were able to access pelleted feed.

What is so great about the stable isotope method is that it not only tells you if a deer has eaten protein pellets recently, but more importantly it can tell you how much of their diet consisted of protein pellets. We examined the relationships between age, body weight, antler size, and deer density versus percent of pelleted feed (POF) in the diet. POF in diet versus weight of yearling deer was positively correlated such that each 10% increase in POF in the diet increased yearling body weight by 3.2 pounds. The only other age class in which body weight was correlated with POF was 3.5 year olds, but the relationship was weak. Antler size was not related to POF in the diet for any age class. In other words, antler size was not greater in bucks whose diet had a high proportion of pelleted feed. This result is mostly due to the fact that most deer sampled did not have a great variation in the POF in diet. We did find that not only did fewer yearling deer eat protein compared to other age classes but they also had 60% POF in their diet, 20% lower than deer in older age classes (Figure 2). Deer in high density pastures displayed a higher POF in diet than deer in medium density pastures. This is intuitive considering the more deer in an area, the more likely they must depend on the protein feed rather than natural vegetation during stress periods.

During 2008 we sampled the female segment of the herd as well. Doe yearlings displayed the same pattern as yearling bucks in regards to percent of deer that ate protein pellets; 69% of yearling does ate feed compared to 94% of all other age classes. There were two main differences in the does POF compared to the bucks. Yearling does had approximately the same POF in diet as the other age classes. The second difference was that POF in doe diets for all age classes averaged 45% compared to bucks $\geq$ 2.5 years old having 60 POF in diet. Therefore, on average a doe's diet consisted of approximately 15% less protein feed than a buck's diet. As in all scientific studies we caution against unreasonable extrapolation of these data. Results may vary with deer and feeder density, time deer have been exposed to protein pellets, and climatic variation during sampling periods.

Now back to the questions at the top. Were you close on your 2 guesses? I can honestly say before we started this research I asked myself the same questions and when we got our results ------- I was way off!

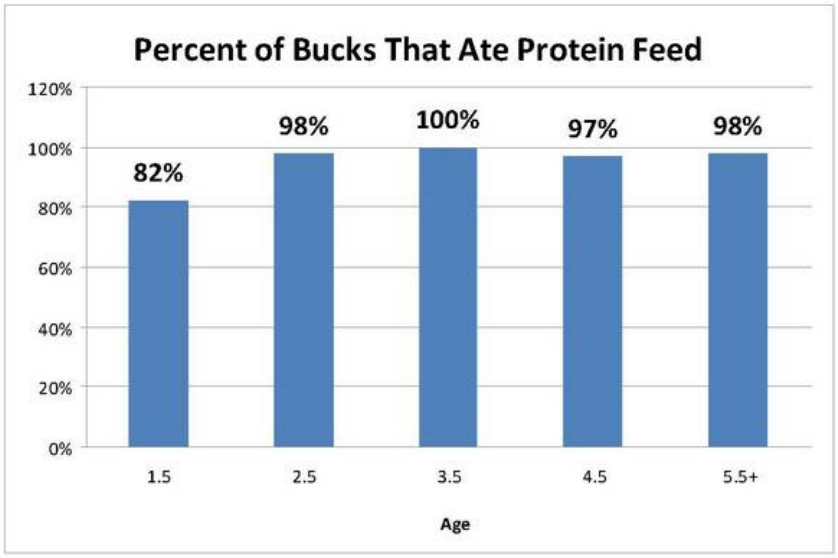

Figure 1

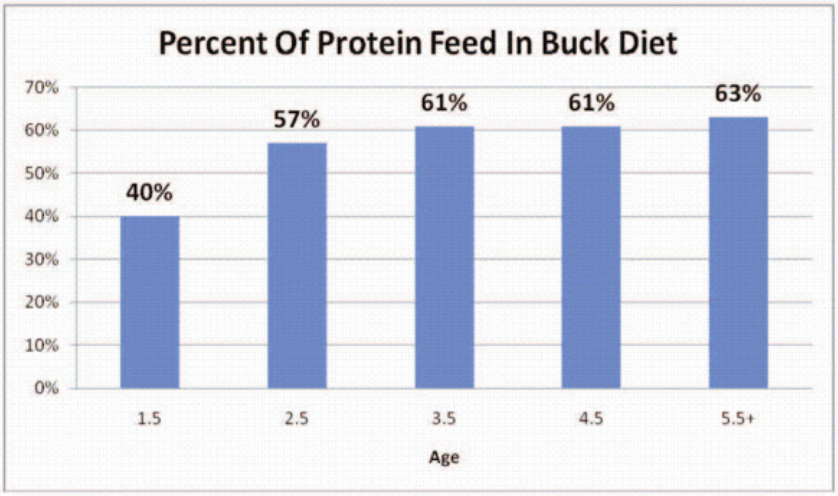

Figure 2

About the Author: Donnie Draeger is the biologist with the Comanche Ranch. The Comanche Ranch has collaborated extensively with scientists at the Caesar Kleberg Wildlife Research Institute.