INSIDE DEER RESEARCH

A newsletter for supporters of the Deer Research Program
Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville

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Supplemental Feed: Protein Pellet or Energy Elixir?

by Ryan Darr

Protein! This nutrient has gained celebrity status in the deer world for its famed ability to grow larger antlers, increase body mass, produce more fawns, and promote survival. Because of protein's renowned importance, many managers select supplemental feed, or "Protein Pellets", based on the protein content. Energy, another important nutrient, is not even reported on feed tags. Deer need both protein and energy, but which nutrient is more limiting for deer in southern Texas?

Luke Garver, Kent Williamson, and I addressed this question using tame white-tailed deer does permanently maintained in 200-acre enclosures near Carrizo Springs. Deer in some enclosures had access to a pelleted supplement and deer in other enclosures did not. We chose does instead of bucks because annual nutrient requirements are higher in females than males due to costs of gestation and lactation. Thus, the addition of protein and energy from supplemental feeding would be more important to does than bucks in any given season. We also did not want to be in the brush with bucks, which may see us as competitors during the rut. Our supplemental feed was 23% crude protein, 17% digestible protein, and had 2.63 kcal/g metabolizable energy (a measure of the energy in food that can be used by the deer).

Over a several day period each season, we followed the tame deer and recorded the amount of each plant species they ate. We used carbon stable isotopes in the feed, forage, and deer tissues to estimate the amount of pelleted feed consumed by deer in the supplemented enclosures. These food habits data allowed us to reconstruct each deer's diet. We then used nutritional analysis of each type of food eaten by the deer to determine the diet quality of both supplemented and unsupplemented does. Finally, we compared diet quality to seasonal nutrient requirements to determine if the protein or energy component of supplemental feed was more important.

MARK YOUR CALENDAR!
Deer Associates Meeting
March 5, 2010

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Tame, radio-collared doe eats the leaves of guayacan during study of supplemented feed effects on deer foraging and nutrition.

Editor's Note: Ryan Darr is a graduate student with CKWRI under the direction of Dr. David Hewitt.

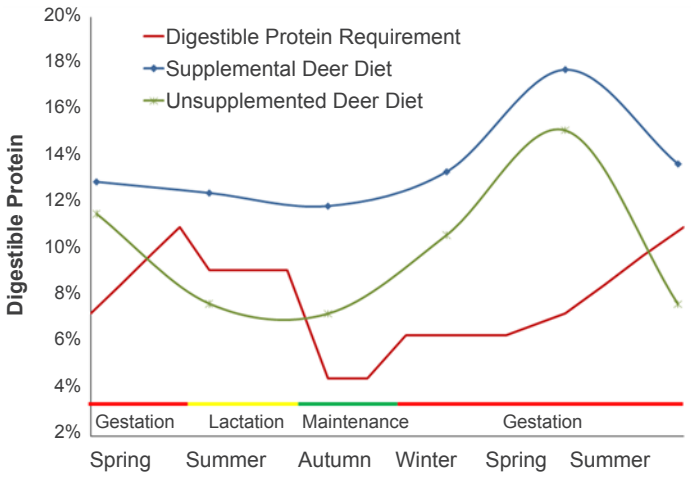

Figure 1. Digestible protein requirement of white-tailed deer does and the digestible protein in diets of supplemented and unsupplemented deer.

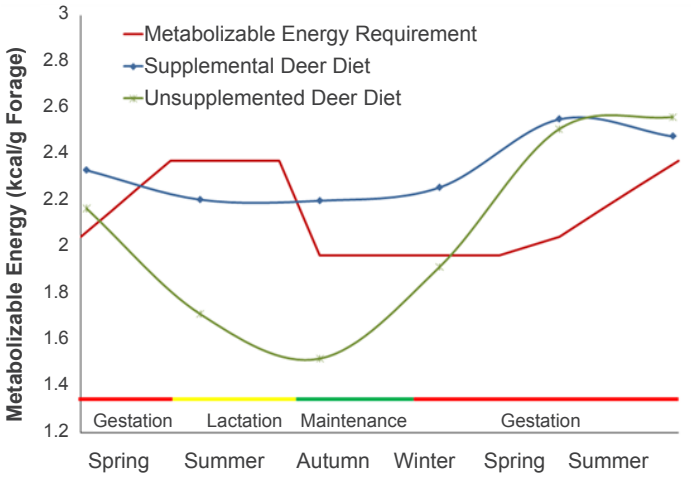

Figure 2. Metabolizable energy requirement of white-tailed deer does and the metabolizable energy in diets of supplemented and unsupplemented deer

Findings

•Energy is more limiting than protein in natural habitats. The digestible protein content of unsupplemented deer diets (green line; Figure 1) is generally above or near the digestible protein requirement (red line). The metabolizable energy content of unsupplemented deer diets (green line; Figure 2) falls mostly below the metabolizable energy requirement (red line). These trends suggest that does are able to more easily meet protein requirements than energy requirements without supplemental feed; therefore, energy is more limiting in South Texas deer habitat.

•The energy content of supplemental feed is more important than the protein content. Energy is more limiting than protein in natural vegetation, so supplemental energy would benefit deer more than additional protein. Figure 2 shows diet quality (blue line) of supplemented deer that nearly equals or exceeds the metabolizable energy requirements (red line). However, figure 1 shows the diet quality of supplemented deer (blue line) far exceeds the digestible protein requirements (red line), which were generally met without supplemental feed (green line). The additional protein is not used by the deer and is simply excreted. Contrary to popular belief, energy is more important than protein in supplemental feeds.

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Author, Ryan Darr, uses radio-telemetry to track collared tame does on the Comanche Ranch.

•Protein is still important. Figure 1 shows that deer were not able to meet their protein requirements during late spring and summer, the most expensive time of the year. Additional protein provided by supplemental feed was important during this period.

•We conclude that supplemental feed is every bit as much an energy elixir as it is a protein pellet.

Collaborating Researchers: Luke Garver, Kent Williamson, Dr. David Hewitt, Dr. Tim Fulbright, and Dr. Charles DeYoung with the Caesar Kleberg Wildlife Research Institute, Dr. Kelley Stewart with the University of Nevada, Reno, and Don Draeger with the Comanche Ranch.

Funding Contributors: The Comanche Ranch and T. Dan Friedkin, the Faith Ranch and the Stedman West Foundation, and the Environmental Protection Agency's Greater Research Opportunities Fellowship program.

DID YOU KNOW?

◊ Deer walk on the nails (hooves) of their two center toes, which correspond to our middle and ring fingers.

◊ Deer stomp their feet as a warning signal depositing a scent from the interdigital gland located between the two center toes on each foot.

Cottonseed: A Performance Boost or Bust?

by Sarah L. Bullock

Many white-tailed deer managers are looking for alternative methods of supplementing deer populations to increase antler and body size, and improve reproduction. Whole cottonseed (WCS), a by-product of cotton ginning, contains high amounts of digestible energy and protein, moderate amounts of fiber, and is a common feed for livestock. Unlike pelleted feeds, WCS does not degrade in moist conditions and is not readily eaten by non-target animals unless range conditions are poor. These traits are beneficial on Texas rangelands where protection of feed from raccoons, feral pigs, and the elements may be difficult.

A potential drawback of feeding WCS is the presence of gossypol, a natural chemical in WCS that has been shown in livestock to decrease reproductive capability, especially in males, and suppress body weights and condition if consumed at high doses over several weeks. Understanding the effects of WCS on performance and reproduction of white-tailed deer is necessary so managers who choose to supplement deer can avoid unintended consequences.

In a study funded by the Comanche Ranch, personnel at the Caesar Kleberg Wildlife Research Institute conducted two performance trials using 20 mature captive white-tailed deer. The research was done at the Albert and Margaret Alkek Ungulate Research Facility on the Texas A&M University-Kingsville campus. Objectives of these trials were to investigate the effects of diets containing 40-50% WCS on body weight, body condition, antler density and characteristics, and reproductive capability.

This research project showed there was no difference in antler size or density, scrotal circumference, and semen characteristics between bucks consuming WCS and bucks fed a pelleted diet and chopped alfalfa. The fact that WCS had no discernable effect on reproductive capability of bucks may have occurred because bucks did not consume sufficient gossypol to cause problems or because WCS was removed from the bucks' diet five weeks before semen collection, enabling deer to recover from any negative effects on semen quality.

The only potential problem noted was that bucks consuming at least 40% WCS diets were not able to gain body weight from late summer through early autumn, a period when bucks consuming the control diet increased their weight substantially. Similar findings have been reported in fallow deer eating large amounts of WCS. However, after white-tailed deer bucks were switched from a diet containing WCS to the control diet of pellets and alfalfa in October, they were able to gain weight and were similar to the control deer by early December. Female deer consuming diets containing at least 40% WCS had body weight changes similar to those of control females; however, WCS females had reduced rump fat thickness, suggesting poorer body condition. *(cont'd on next page)*

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Sarah Bullock collects data from an anesthetized captive buck at the Albert and Margaret Alkek Ungulate Research Facility.

Editor's Note: Sarah Bullock, M.S. conducted her graduate research at CKWRI under the direction of Dr. David Hewitt.

Deer Associates Meeting

March 5, 2010

Hyatt Regency Hill Country Resort & Spa
San Antonio, Texas

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www.ckwri.tamuk.edu

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Deer in our trials readily consumed WCS up to 25% of their diet. Diets over 40% WCS may have exceeded the amount of WCS the deer desired to eat. If free-ranging deer also limit the amount of WCS they eat, they may benefit from the additional nutrients and grow larger. In fact, in an ongoing field study, most middle-aged and mature bucks in pastures supplemented with WCS were heavier than deer from pastures without supplement. Even though our captive deer eating WCS gained less body weight than deer consuming a pelleted diet and chopped alfalfa, free-ranging deer eating WCS appear to perform better than unsupplemented deer, particularly when natural forage is low in quality or quantity.

Although our research does not suggest that WCS is a panacea for deer management, WCS is high in digestible energy and protein and observationsfrom managers who feed WCS are positive. Our results did not show any of the negative effects on reproduction reported in other species; however, until further research is completed, it may still be prudent to cease WCS supplementation at least five weeks before the breeding season to ensure semen quality remains high.

[1]Brown, C. G. 2001. Evaluation of whole cottonseed consumption on growth and reproductive function in male cervids. Thesis, Texas A&M University, College Station, USA.

Research Collaborators: Dr. David Hewitt, Don Draeger, Jimmy Rutledge, and Dr. Randy Stanko worked with Sarah on this project.

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