Panhandle Mule Deer Nutrition

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Photo courtesy of BRI

Mule deer gather on winter wheat and other crop fields during certain times of the year. Crop use may influence mule deer movements, body condition, reproduction, antler size and survival.

The use of agricultural crops by mule deer in the Texas Panhandle is obvious to farmers, ranch managers, wildlife biologists and even local residents. The increase in mule deer numbers over the past 20 years has also increased the number of deer on crop fields. It is not uncommon to see 50 to 100 mule deer at a time on a wheat field during winter. While most landowners enjoy seeing these deer, concerns about crop damage have increased.

As use of agriculture by mule deer in the Panhandle has become more evident, it has raised many questions about the relationship between mule deer and agriculture. Beginning in autumn 2015, collaborators from the Texas Parks and Wildlife Department, Borderlands Research Institute at Sul Ross State University, Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville, and Texas Tech University came together to work with private landowners to better understand how agriculture influences mule deer movement, survival, antler sizes, body condition, fawn recruitment, diets and nutrition in the Texas Panhandle. This aspect of the study largely focuses on the influences agriculture has on mule deer diets and nutrition.

MULE DEER DIET AND NUTRITION

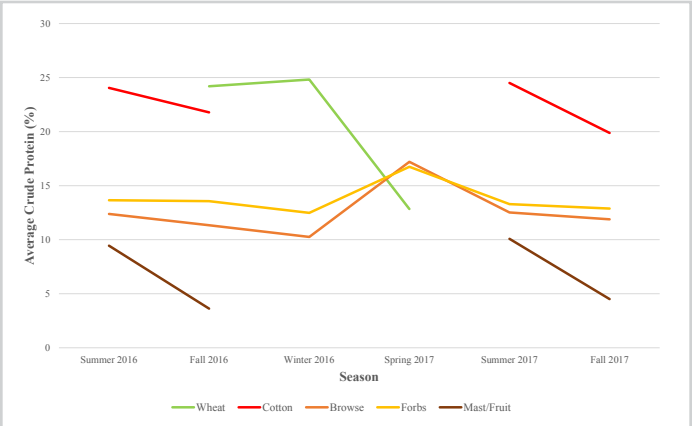
Though agricultural crops may fragment wildlife habitat, they can also provide certain game species with nutritious food that can supplement rangeland forage during different times of the year. Wheat, cotton, rye, sorghum, alfalfa and corn are just a few of the crops available to mule deer seasonally in the Texas Panhandle. These crops may provide mule deer with a supplemental forage during physically stressful times of the year and could explain why Texas Panhandle populations have been steadily increasing in recent decades.

From 2015–2017, mule deer were captured and studied near Turkey, Texas, an area intermixed with both native rangeland and agriculture (predominantly wheat and cotton fields). Objectives of the diet portion of this study included: 1) documenting seasonal forage of native rangeland and agricultural crops; 2) estimating monthly nutritional values of forages in native rangeland and agricultural crops used by mule deer; and 3) determining whether protein or energy is driving the selection of native and cultivated forage.

The first objective was determining what mule deer were eating throughout the year. One would think that plenty of data already exist about mule deer food habits in this part of the world; however, that was not the case.

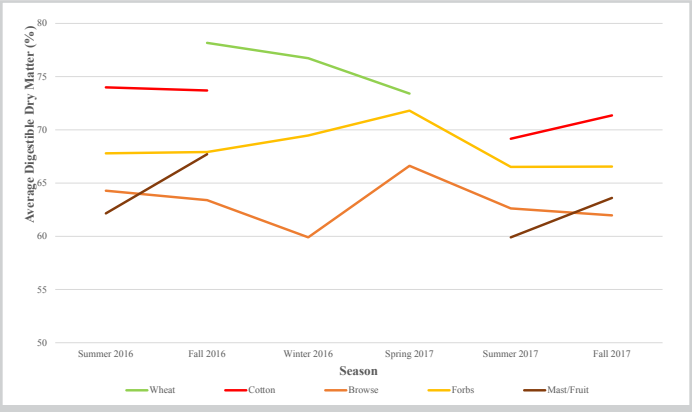
To collect the needed information, mule deer were closely observed during the day until they defecated. The fecal samples were collected and analyzed using a relatively new food habits technique called DNA metabarcoding. On a fundamental level, this technique identifies what plants the deer has eaten based on the plant DNA found in the fecal samples. By analyzing every sample collected, we can get an idea of what plants and crops deer are eating throughout the year and compare diets among seasons.

Mule deer diets within the study area largely consisted of forbs and browse throughout most of the year. The most common genera identified throughout the entire sampling period were *Oenothera, Ambrosia, Heterotheca, Quercus, Amaranthus,* and *Erigeron*. These genera represent various species found in the study area, including Missouri primrose (*Oenethera macrocarpa*), western ragweed (*Ambrosia psilostachya*), gray golden aster (*Heterotheca canescens*), sand shinnery oak (*Quercus havardii*), Mohr oak (*Quercus mohriana*), redroot pigweed (*Amaranthus retroflexus*), and prairie fleabane (*Erigeron strigosus*). Wheat and cotton were the most common crops in the study area and were eaten during their growing seasons. However, rye, barley, and bermudagrass were also identified in diet results.



Average percent crude protein of crops and native forage near Turkey, Texas from July 2016 –October 2017.

To complement the diet analyses, samples of forage and crop species were collected across the entire study area to estimate nutritional forage value. Samples were composed only of the portions of the plants such as new growth stems, green leaves, flowers and fruit that are readily consumed by mule deer. This method mimics how deer select different parts of plants and gives an accurate estimate of the nutritional value of the foods the deer may eat. The plant samples were then taken back to a lab at Sul Ross State University where digestible energy and protein were estimated in each plant every month.



Average percent crude protein of crops and native forage near Turkey, Texas from July 2016 –October 2017.

The average nutritional content of rangeland plant species (browse, forbs, and mast) displayed a typical pattern seen in most native plants. Highest average nutritional quality of rangeland plants occurred during the spring while the lowest occurred in the winter.

Both wheat and cotton samples were greater in protein and energy than the native rangeland samples throughout all seasons except spring. This is because winter wheat that is planted in the fall matures and loses nutritional value by spring, and rainfall brings new growth of forbs and browse on the rangeland that are more nutritious than the wheat.

AGRICULTURAL INFLUENCES ON DIET AND NUTRITION

Farmers and ranchers notice that mule deer gather on wheat fields during the winter and then disperse in the spring. Diet and GPS location data confirm these movements. As the wheat matures and diminishes in nutritive quality, rainfall causes new growth of high-quality rangeland plants and a seasonal shift back to rangeland forage occurs.

Mule deer are taking advantage of winter wheat during late fall and winter for both energy and protein reasons. Energy is needed during this time for fat accumulation and rut activities, but an easily accessible and digested forage that provides high protein content is vastly superior to rangeland plants during this time.

In conclusion, winter wheat acts as a key supplemental forage during winter when forage diversity and nutrition is low.

Cotton also appears to be a highly nutritious supplemental forage that is available to mule deer during summer and fall. However, deer do not forage on cotton to the same extent as they forage on winter wheat. Cotton was identified in mule deer diets during its growing season of summer and fall, and GPS location data reports cotton field use during early growth stages and late periods in the growing season, but to a much smaller extent compared to wheat.

Cotton use is likely due to high protein content that is easily digested during early growth stages when protein is needed for maximum growth. While cotton appears to be used in small amounts, deer do not use the cotton to the extent they use winter wheat, likely due to potentially toxic compounds such as gossypol.

Nutritional ecology is a foundational building block in understanding mule deer populations. By accruing knowledge about how mule deer fulfill their nutritional needs we begin to understand how the habitat influences other characteristics of their lives, including movement, survival, fawn recruitment and antler sizes.

Areas near Turkey and the Texas Panhandle do not suffer from extreme winters and therefore allow a nutritious crop like wheat to be grown. This extra boost in nutrition is available to deer during post-rut recovery and could increase survival of the population. This, as well as other effects mentioned earlier, are currently being studied by collaborators in this project as we begin to piece the puzzle together in understanding the relationship between mule deer and agriculture in the Texas Panhandle.