Nutrition Effects on Fawn, Doe and Buck Deer

Larry W. Varner and H. Glenn Hughes
Texas Agricultural Experiment Station, Wildlife and Fisheries Sciences Department
The Texas A&M University System

The white-tailed deer is the most recognized and economically important wild, large animal species in North America. Management of this species will necessarily become more intensive in the future due to:

- realization of the deer's worth (economic and aesthetic);
- complementary or competing land usage;
- decreasing amount of suitable habitat;
- increased hunting pressure; and
- increased interest by the public in correct management.

This intensity of management will require more knowledge of nutritional requirements and interactions which affect deer size, productivity and survival.

In order to make management decisions which will result in a healthy, productive deer herd, the manager should consider several factors:

1. What are the general nutritional requirements of various age and sex classes of deer?
2. How do nutrient requirements change during various times of the year as the deer herd goes through its annual production cycle?
3. Which plants are both palatable to deer and good sources of required nutrients during each season of the year?

Nutrient Requirements

The nutritional requirements of deer are not as well understood or documented as those for domestic ruminants. Some physiological processes involving nutrition (e.g. capacity of tureen in relation to body size) appear to be different for deer than for domestic ruminants. Therefore, one should exercise caution when extrapolating sheep or goat nutritional requirements to deer, although in many cases this may be the best information available for estimating requirements.

The nutritional requirements of deer should be considered on a seasonal basis since this corresponds both to the physiological changes in the deer herd (e.g. gestation, lactation or antler growth) and the nutrients available from the range resource. The amounts of various nutrients needed by deer during one season may be influenced to a large degree by nutrients available during the previous season. Deer can survive for relatively long periods with little or no food if they have had an opportunity to store ample body reserves.

Deer require nutrients from five broad categories: (1) protein; (2) energy (e.g. TDN, digestible energy, digestible dry matter); (3) minerals; (4) vitamins; and (5) water. Research on nutritional requirements of deer has been limited mainly to protein, energy and minerals (phosphorous and calcium) because these factors are most often the ones that limit growth, reproduction, antler development, etc.

Protein

Research from Pennsylvania demonstrated the importance of protein in deer growth and antler development. Deer fed 16 percent crude protein (CP) gained 108 pounds the first year; deer on 13 percent CP gained about 100 pounds; deer fed 9.5 percent CP gained 50 pounds; and deer fed 4.5 percent CP gained about 25 pounds. Antler development was directly related to protein intake. Deer fed 16 percent CP had antlers 12 to 15 inches in main beam length with six to eight points. Deer fed 4.5 percent CP made little or no antler growth. Apparently, in the growing fawn, body growth has priority over antler development. Switching animals from a low to high protein diet the following year resulted in improved antler growth; however, animals fed low protein diets during their first year always had smaller antlers than animals fed the 16 percent CP ration their first year. Studies by the Texas Park and Wildlife Department reveal similar results (Table 1). Therefore, a period of inadequate nutrition may adversely influence antler development for several succeeding years. Michigan research has also shown that male fawns may have a higher protein requirement (16 to 20 percent) than female fawns (13 percent).

A summary of available research data would indicate that deer require about 6 percent CP to maintain life and rumen function. It appears, however, that CP content of the diet needs to be in the range of 13 to 16 percent for successful growth, antler development and reproduction in deer.

Energy

Energy is the nutrient required in the greatest amount in the diets of deer. Yet, many times wildlife managers consider only protein when evaluating deer nutrition. Energy requirements are cyclic and are influenced to a great degree by age, growth, gestation, lactation, locomotion, temperature and antler development. Because of the wide fluctuations in energy requirements of deer in different physiological conditions and extremes in climatic variations from one part of the country to another, it is difficult to come up with specific requirements. However, there is enough available information to make general recommendations that will result in acceptable performance.

Mature does require about 25 kilocalories of digestible energy (DE) per pound of body weight per day, which goes up to about 33 kilocalories DE per pound during peak lactation. Since most ranchers think of energy in terms of TDM or digestible dry matter (DDM), which are essentially equivalent, these requirements correspond to a need for does to have plants that contain 55 to 60 percent DDM.

Fawns, because of their rapid growth, require about 70 kilocalories DE per pound of body weight. Generally, fawn nutritional needs are not a major problem if the doe is producing sufficient milk. It is because of their high nutritional requirements that fawn mortality is high when any factors such as drought, disease, etc. affect the health or nutritive status of the does.

Energy requirements of bucks are difficult to ascertain because food consumption drops about 50 percent during the rut and they generally will not eat enough to maintain body weight even if food is available. This is not detrimental to the buck if food of sufficient quality is available in the subsequent spring and summer to allow replacement of body energy stores. Generally, an intake of about 40 kilocalories DE per pound will allow maximum growth and allow sufficient energy to replenish body stores.

Minerals

Essentially, all research on mineral requirements of deer has been with growing fawns and little or no information is available on requirements of adult deer, particularly for maximum antler growth in mature bucks. A summary of the available research indicates that diets containing 0.40 percent calcium and 0.28 to 0.30 percent phosphorous will support acceptable growth and development in deer.

Nutrient Content of Deer Food Plants

Tables 2 and 3 show how the average nutritional content of several classes of South Texas deer food plants changes during various seasons of the year. This research by the Texas Agricultural Experiment Station indicates that in South Texas, energy (DDM) may be a limiting nutrient, particularly in the summer when does are lactating and bucks are in a period of maximum antler growth. Under good range conditions,

Table 1. Average Antler Measurements and Body Weights of Bucks Fed Different Protein Levels for Four Years[1].

Age	Protein in diet	Sample size	Inside spread, in.	Basal circumference, in.	Avg. no. points	Antler wt., grams	Body wt., lbs.
1½	16%	5	9.0	2.3	5.2	160	----
2½	16%	5	12.7	3.0	6.8	428	151
3½	16%	5	13.5	3.7	8.2	717	173
4½	16%	5	13.8	3.7	8.4	720	165
1½	10%	4	9.8	2.8	5.5	144	----
2½	8%	4	11.2	2.7	5.7	233	115
3½	8%	2	13.9	3.5	9.0	610	140
4½	8%	2	12.2	2.9	7.5	214	123
1½	16%	3	10.9	2.7	4.0	157	----
2½	8%	4	13.3	2.8	6.2	334	118
3½	16%	4	15.8	3.7	8.0	733	150
4½	8%	4	16.3	3.5	8.7	637	142
1½	10%	4	11.6	2.9	4.5	154	----
2½	16%	4	15.1	3.4	7.5	484	128
3½	8%	3	15.0	3.9	8.0	709	141
4½	16%	2	16.8	4.4	9.5	889	147

[1]Texas Parks and Wildlife Department

Table 2. Average Seasonal Nutritional Contents of Four Classes of South Texas Deer Food Plants.[1]				
Plant class	**Spring**	**Summer**	**Fall**	**Winter**
		Kcal DE per lb. dry matter		
Browse	1024	944	919	962
Forbs	1298	1204	1237	1448
Grasses	990	907	842	966
Prickly pear	1720	1580	1581	1645
		% Crude protein		
Browse	21.5	18.1	18.5	16.9
Forbs	16.8	14.0	16.1	21.4
Grasses	12.5	12.0	13.1	14.4
Prickly pear	13.3	5.6	10.3	5.4
		% Phosphorous		
Browse	.22	.15	.16	.14
Forbs	.26	.20	.22	.29
Grasses	.22	.27	.23	.21
Prickly pear	.22	.08	.17	.09

[1]Average of species shown in Table 3.

South Texas deer will likely have available to them forb and/or browse species that are adequate in CP any time during the year. Forbs are good sources of CP, energy (DDM) and phosphorous during any season of the year. Browse plants are good sources of CP and prickly pear certainly has to be considered an important factor in meeting the energy needs of deer in this region. These nutritional analyses indicate why most diet studies show that deer, particularly in South Texas, prefer forbs first, browse and prickly pear next and eat relatively little grass.

Plants shown in Table 3 were collected during a year when rainfall and temperature were relatively close to average for all seasons except winter. Winter temperatures and rainfall were considerably above average, resulting in availability and high nutritional quality of both forbs and browse that would not be seen in a colder, dryer winter. In a more normal year, forbs are only of limited availability and deciduous browse species such as guajillo, granjeno, blackbrush, etc. lose their leaves. This causes a period of nutritional stress for deer. Also, the frequent droughts in South Texas reduce forb availability and cause leaf loss in some of the browse species. At these times, competition between deer and beef cattle for available forage is much greater than would normally occur. In this competition deer always come out the losers, resulting in large deer die-offs such as occurred in South Texas during 1980. Therefore, ranchers unwilling to accept deer die-offs during droughts or hard winters may want to consider reducing livestock numbers to reduce competition for forage nutrients.

An astute wildlife manager will become familiar with those plants that are both palatable and most nutritious for deer and will realize the need to have a diversity of plant species. Deer, like all animals, will generally select the most nutritious plants first and it is these plants that disappear quickly from drought and overgrazing by deer and/or domestic livestock.

Deer can reproduce under relatively poor nutritional circumstances. However, maximum body size and antler development can only be attained under optimum nutritional conditions. The key is to balance deer and/or livestock numbers so that deer have an opportunity to select a diet of sufficient nutritional quality to allow them to express their genetic potential.

Table 3. Seasonal Digestible Dry Matter and Crude Protein Content of South Texas Deer Food Plants.								
	Digestable dry matter (%)				Crude protein (%)			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Browse								
Guajillo	46.4	38.9	35.5	41.4	27.7	21.4	22.2	21.4
Catclaw	62.2	36.7	47.3	42.0	23.3	18.5	17.0	25.4
Blackbrush	34.1	29.0	25.6	37.0	18.2	17.4	19.8	16.5
Twisted Acacia	32.9	36.9	28.0	31.9	16.9	19.6	21.6	16.7
Granjeno	71.7	73.3	73.0	75.2	28.3	23.5	24.5	19.0
Brazil	61.4	42.3	60.4	47.8	23.8	14.3	17.1	17.5
Lotebush	47.7	44.4	50.7	38.8	18.0	16.7	16.3	11.7
Vine-ephedra	66.4	61.2	54.4	57.5	16.4	14.5	17.8	14.6
Kidneywood	62.4	60.2	54.1	49.8	24.4	20.4	17.1	17.0
Guayacan	58.0	56.6	54.9	60.2	26.1	22.6	18.8	17.4
Desert yaupon	61.4	56.0	55.5	58.8	18.1	14.3	14.4	10.7
Lime pricklyash	66.2	48.1	69.3	73.3	21.0	15.9	18.5	16.9
Forbs								
Western ragweed	64.9	60.6	67.7	69.5	21.6	18.5	19.8	21.1
Plains dozedaisy	68.0	65.4	52.4	85.3	11.1	9.2	10.8	19.2
Day-flower	82.7	71.5	75.3	-----	20.0	17.0	16.0	-----
Crown coreopsis	73.0	-----	53.2	81.8	10.3	9.9	-----	23.8
Indian blanket	68.7	68.0	60.5	90.7	12.0	10.7	12.9	22.5
Texas hermannia	74.3	64.5	66.2	-----	21.6	15.8	16.6	-----
False ragweed	57.2	60.8	65.9	68.4	17.7	13.8	16.6	20.6
Groundcherry	74.5	77.9	78.6	78.7	19.8	17.1	19.9	21.0
Grasses								
Grassbur	58.7	57.1	48.0	54.4	10.9	9.0	10.8	11.8
Hooded windmill	45.3	37.8	45.8	49.5	8.7	9.6	10.0	15.1
Hall's panicum	59.6	37.7	50.4	49.2	10.5	13.8	12.7	12.2
Plains bristlegrass	47.0	43.5	46.9	51.8	20.4	15.5	18.8	18.8
Prickly pear	94.8	86.8	86.8	90.5	13.3	5.6	10.3	5.4