

THE EFFECT OF A DIET OF WINTER PASTURE GRASSES ON GROWTH OF WHITE-TAILED DEER FAWNS¹

by

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ABSTRACT

In the winters of 1971, 1972, and 1973 study groups of white-tailed deer fawns (*Odocoileus virginianus*) were fed rations of wheat (*Triticum aestivum* L.), oats (*Avena sativa* L.), and winter ryegrass (*Lolium multiflorum* Lam.), respectively, in order that the effects on growth might be determined. During each eight-week study period, fresh rations were cut and fed daily to individually-penned animals. Analysis of variance showed highly significant differences ($P < .01$) between rations, both for consumption and body weight gain. Average daily consumption of wheat was 6.0 pounds as compared to 6.5 pounds for oats and 7.6 pounds for ryegrass. Fawns fed wheat averaged a weight gain of 2.5 pounds over the study period. Fawns fed ryegrass and oats, however, averaged weight losses of 3.0 pounds and 4.7 pounds, respectively, over the same period.

INTRODUCTION

As more land is being lost each year to agricultural operations, even-aged forest management and encroaching human habitation, suitable habitat is decreasing for many species of wildlife, particularly white-tailed deer (*Odocoileus virginianus* Zimmermann). Estimates are that by the year 2000, participation in hunting will have increased 80 percent over 1960, while habitat will continue to be diminished by highways, water development, urban expansion, and other causes (Yoakum 1971). As this acreage has decreased, however, the deer population has expanded due to enforcement of game laws and proper management. This greater number of big-game animals on a decreasing acreage of land is making food production for these animals increasingly important. Mushrooming numbers of hunters necessitate that wildlife management personnel work for maximum wildlife production in order that the maximum recreational potential be offered for the hunting segment of our populace.

Natural habitat will support only a certain number of animals, depending mainly upon plant type and abundance. This holding, or carrying, capacity may be increased by planting supplementary food crops such as pasture grasses at that time of the year when food availability is most critical (Schrader 1963). This artificial feeding situation can offer a higher animal production potential than under normal conditions.

This paper presents results from feeding trials in which white-tailed deer fawns were fed rations of three winter pasture grasses. Growth comparisons were made to determine which pasture grass would be most desirable for deer food plantings.

PROCEDURE

Immature deer were used in this study. Long et al. (1965) and Fowler (1967) found that as body weight increases, so does food consumption for immature deer, regardless of season. Mature deer, however, voluntarily reduce food intake in the winter.

Fawns less than one week old were taken from pen-reared does during the summers of 1970, 1971, and 1972 and bottle-fed a ration consisting of equal

parts of evaporated milk and water as described by Long et al. (1961). These deer were weaned on a combination of Purina Startena and Creep Chow. After weaning, they were placed on a diet of Creep Chow only until two weeks prior to each feeding trial. At this time, the winter grass under study was gradually introduced into the fawns' diet so the animals would be accustomed to these grasses at the initiation of the feeding trial.

Housing facilities consisted of individual 12 feet by 12 feet, roofed enclosures.

One month prior to each of the winter feeding trials, eight fawns (four males and four females) were randomly selected, based on a random numbers table, from a group of 12 to 15 fawns.

During the feeding trials grasses were clipped to a height of 3 inches daily with a tractor and a side-mounted cutting blade. Ten-pound lots were weighed (green weight) and placed in specially constructed feeding mangers. Uneaten portions from the previous day's feeding were removed, weighed, and the weights recorded to the nearest quarter pound. Weekly weights of the animals were also recorded to the nearest quarter pound.

Feeding trials were conducted from January 21 through March 16 in 1971, 1972, and 1973. Only one of the grasses was used in each winter feeding trial.

RESULTS

Wheat

Rations of wheat were fed to four males and four females during the winter of 1971. Animals fed wheat showed an average weight gain of 2.5 pounds during the eight-week study period. Body weights averaged 46.8 pounds at the beginning of this study and 49.3 pounds at the termination. At the end of this trial, only one of the study animals weighed less than at the initial weighing. This animal, a male, had lost 1.5 pounds. Other animals had gained from 1.25 to 4.75 pounds.

Average daily consumption of all animals was 5.6 pounds in the first week and 5.5 pounds the last week of the study. Daily consumption for individual animals in the first week of the study averaged from 3.2 to 6.7 pounds. During the last week, consumption ranged from an averaged of 4.8 to 6.4 pounds. Females consumed an average of 0.4 pounds per day more than did males.

Oats

Animals fed oats in the winter of 1972 showed an average weight loss of 4.7 pounds. Weights at the beginning of the study averaged 54.3 pounds. At the termination of the feeding trial, weights averaged 49.6 pounds.

Only one animal, a female, had an increase in body weight at the termination of this feeding trial, and then, only a 0.5 pound increase. All other animals lost from 0.5 to 16.5 pounds. Data from only seven of the original eight animals were used in this study. A doe died from unknown causes during the feeding trials after losing 18 pounds. This animal was autopsied by personnel of the Louisiana State University Department of Veterinary Science but no diagnosis could be made. This animal was therefore excluded from the sampling because death could not be attributed to the oat rations. The animal that lost 16.5 pounds could have possibly been suffering from the same illness. However, this animal was not excluded from the sampling. None of the remaining six animals lost more than 5.5 pounds body weight.

Average daily consumption for all animals during this feeding trial ranged from 4.8 pounds in the first week to 7.1 pounds in the eighth week. Daily consumption by individual animals varied from 3.3 to 5.9 pounds in the first week and from 6.2 to 8.2 pounds during the eighth week. Males consumed more than females by an average of 0.4 pounds per day.

Ryegrass

Rations of ryegrass resulted in an average weight loss of 3.0 pounds. Weights averaged 55.1 pounds at the beginning of this study and 52.1 pounds at the termination.

Only two of the eight study animals showed weight increases; both gained only 1.0 pound each. Weight losses of the remaining animals ranged from 2.5 to 6.5 pounds.

Daily consumption of ryegrass for all animals averaged 6.1 pounds in the first week and 8.0 pounds in the final week. Average daily consumption of individuals varied from 3.8 to 7.9 pounds in the first week and 6.9 to 9.2 pounds in the eighth week of the feeding trial. Females exhibited higher consumption in this study, eating an average of 0.3 pounds more per day.

DISCUSSION

Analysis of variance showed highly significant differences between the three pasture grass rations both for consumption and body weight. By way of graphical representation it can be seen that consumption and weight did not follow the same trends (Figures 1 and 2). Study animals fed rations of wheat averaged a weight gain of 2.5 pounds over the eight-week study period, whereas animals fed ryegrass and oats averaged losses of 3.0 and 4.7 pounds, respectively, during similar feeding periods. Weight change of experimental animals is presented in Table 1. Average daily consumption was lowest during the wheat feeding trials. Average consumption for this grass was 6.0 pounds as compared to 6.5 pounds for oats and 7.6 pounds for ryegrass.

Long (1967) stated that the digestible energy requirements of whitetails is about 60 kilocalories per kilogram of body weight, or 27 kilocalories per pound body weight. Digestible energy (DE) as defined by Crampton and Harris (1961) is the food energy of a ration minus total energy remaining in feces after the ration has passed through the body. In a table of feed compositions, Crampton and Harris gave digestible energy of various pasture grasses which were fed to domestic sheep (*Ovis aries*). (DE was given in kilocalories per kilogram, which converts to kilocalories per pound by a multiple of 0.4536.) The DE of freshly cut wheat, oats, and ryegrass when fed to sheep is presented in the following tabulation:

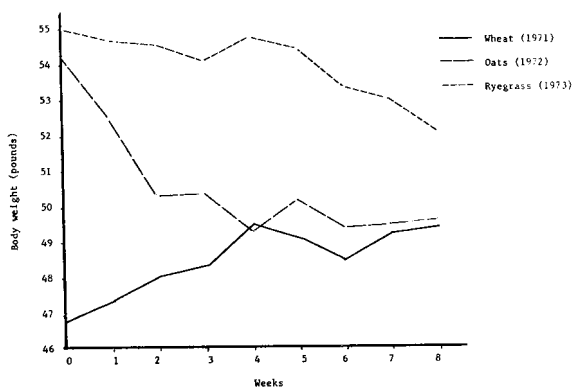


Figure 1. Weekly average body weights of white-tailed deer fawns, Ben Hur feeding trials, 1971, 1972, 1973.

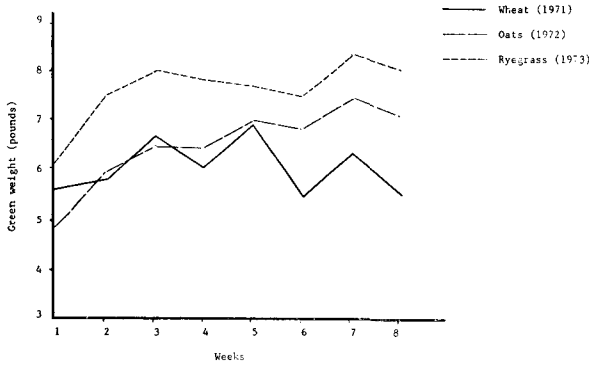


Figure 2. Weekly average consumption of winter pasture grasses, Ben Hur feeding trials, 1971, 1972, 1973.

Table 1. Body weight change of experimental animals, Ben Hur feeding trials, 1971, 1972, 1973.

	Deer number	Initial weight (pounds)	Final weight (pounds)	Body weight change (percent)
Wheat	1	44.00	48.50	+10.2
	2	45.75	47.00	+ 2.7
	3	41.50	43.50	+ 4.8
	4	51.50	50.50	+ 2.9
	5	46.75	51.50	+10.2
	6	45.25	46.75	- 3.3
	7	51.50	53.50	+ 3.9
	8	48.50	52.75	+ 8.8
			Average	+ 5.0
Oats	1	56.00	55.50	- .9
	2	65.00	59.50	- 8.5
	3	54.00	50.50	- 7.4
	4	53.50	37.00	-30.8
	5 ¹	--	--	--
	6	48.50	46.50	- 4.1
	7	57.00	57.50	+ .9
	8	46.00	41.50	- 9.8
			Average	- 8.8
Ryegrass	1	58.00	55.25	- 4.7
	2	52.50	53.50	+ 1.9
	3	50.50	46.75	- 7.4
	4	66.50	60.00	- 9.8
	5	46.00	43.50	- 5.4
	6	51.50	45.00	-12.6
	7	53.00	54.00	+ 1.9
	8	62.50	58.75	- 6.0
			Average	- 5.3

¹Died from unknown causes.

<u>Pasture grass</u>	<u>DE Kcal/Kg</u>	<u>DE Kcal/lb</u>
Wheat	673	305
Oats	574	260
Ryegrass	546	238

A 50-pound deer should theoretically require approximately 1350 Kcal per day (27 Kcal x 50 lb). Assuming that the digestive capabilities of a deer are comparable to those of a sheep, calculations can be made as to the approximate daily requirements, in pounds green weight, by dividing daily caloric requirements by the DE in Kcal per pound of each pasture grass. These estimates are compared to actual daily consumption of pasture grasses by the study deer:

<u>Pasture grass</u>	<u>Calculated daily herbage requirements pounds</u>	<u>Average daily consumption in feeding trials pounds</u>	<u>Average initial body weight pounds</u>	<u>Average final body weight pounds</u>
Wheat	4.4	6.0	46.8	49.3
Oats	5.2	6.5	54.3	49.6
Ryegrass	5.7	7.6	55.1	52.1

Daily consumption during the feeding trials was higher than the calculated daily requirements. Body weights of the study animals were near the 50-pound weight used in the calculations. The above tabulation shows that, theoretically, less wheat would sustain the daily needs of whitetails than would oats or ryegrass. Animals fed ryegrass consumed much larger quantities than did animals fed oats. Possibly this explains why less weight was lost by the animals during the ryegrass feeding trials than during the feeding trials using rations of oats.

Whether the differences between the consumption and weight gain for the three grasses is due to nutritional content or differences in initial body weights of the three groups of study animals is speculative. Initial average weight of the study animals fed wheat was 7.5 pounds less than those fed oats and 8.3 pounds less than those fed ryegrass. Since all animals were fed equal amounts of grasses, it is possible that the smaller animals fed wheat required less food than the larger animals in the other studies, thus allowing for a weight gain. Conversely, the larger animals fed ryegrass and oats may have lost weight due to larger body size, not necessarily because of nutritional quality of the particular ration.

Proximate chemical analysis showed little difference between the three pasture grasses. Differences in weight gain, therefore, must be attributed to differences in digestive properties of the three grasses, differences in initial body weight of the animals, or some unknown factor such as an undetected illness which caused some animals not to attain their potential body weight.

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SEASONAL FOOD-HABITS OF WHITE-TAILED DEER (*ODOCOILEUS VIRGINIANUS*) IN A TREATED EASTERN NORTH CAROLINA POCOSIN

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ABSTRACT

A study of food-habits of white-tailed deer on approximately 26,000 acres of industrial timberlands in eastern North Carolina was made in a managed pond pine pocosin. A rumen analysis was completed for each of 128 deer collected during the period October 1971 through July 1973. These samples were partitioned into groups: spring, summer, fall, and winter. Although most of the food utilized was leafy browse, definite seasonal trends were established. Fruit of shining sumac and pokeweed was utilized heavily in the fall. A shift to greenbrier and ericaceous plants in the winter was observed. Important spring food items included succulent stems and leafy material of red maple and blackberry. Red maple was also heavily utilized in the summer along with such species as pokeweed, grape, greenbriers, and swamp cyrilla. The importance of species associated with forest openings is documented.

INTRODUCTION

The management of any population of wild animals is indeed extremely difficult, and becomes even more complicated when it must be accomplished coincidentally with other resources of the land. Such is the case on many southern forests. Knowledge of the food-habits of a wild animal such as the white-tailed

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