

# SUPPLEMENTAL FEEDING OF FREE-RANGING DEER IN SOUTH TEXAS

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## ABSTRACT

Free-ranging white-tailed deer (*Odocoileus virginianus*) near Laredo, Texas were fed a pelleted supplement from February 1976 to August 1977. Adult deer consumed the supplement readily but did not appear to travel far to obtain it. Fawns were never observed utilizing the supplement. Deer use of some feeder sites was curtailed because collared peccary (*Tayassu tajacu*) chased deer away. Consumption of supplement was inversely related to average crude protein content of selected forage plants except during winter. Helicopter counts in October showed significantly higher fawn/doe ratios in the supplemented pastures.

Key words: Deer, *Odocoileus virginianus*, supplemental feed, Texas, white-tailed deer

## INTRODUCTION

Supplemental feed is widely used in Texas, where white-tailed deer are important economically (Ramsey, 1965; Teer and Forest, 1968). Feed is distributed legally during the hunting season as bait to attract deer. Some landowners supplementally feed deer year-round in anticipation of increased income or recreation from more quality animals. There is additional interest in using supplemental feed to deliver medication, such as anthrax vaccine, to free-ranging population (Davis, 1981). The present study was conducted with objectives of documenting the behavior of free-ranging deer in response to supplemental feed and determining the effects of supplemental feed on fawn/doe ratios.

## MATERIALS AND METHODS

The study was conducted on 2,740 acres of the Zachry Blanco Ranch 12 miles southwest of Laredo, Texas. The study area was surrounded by 8 foot high fencing that limited deer movement. This area is within the South Texas Plains ecological region (Gould, 1975) and receives an average of 17.7 inches of precipitation annually. Vegetation of the study area is dominated by cordero (*Coldenia canescens*), blackbrush (*Acacia rigidula*), tasajillo (*Opuntia leptocaulis*), shrubby sage (*Salvia ballotaeflora*), brasil (*Condalia hookeri*), and honey mesquite (*Prosopis grandulosa*) (Sanders, 1963). About 800 acres within the study area had been rootplowed in strips and seeded to buffelgrass (*Cenchrus ciliaris*).

A barbed wire crossfence that divided the study area approximately in half was used as the boundary between a supplemented and a control pasture. The crossfence was not a significant barrier to deer. Trough-type feeders were located at four sites in the eastern pasture from February 1976 to January 1977 while the western pasture served as a control. The treatment in each pasture was then switched. Three feeding sites were established in the western pasture from February through August, 1977, while eastern pasture served as a control. Three or four feeders were spaced about three yards apart at each site to help curb aggression that can occur when only one feeder is present (Espmark, 1971). Feeding sites were fenced to exclude cattle by an 8 by 12 yard rectangular enclosure of four strands of barbed wire.

The supplement was a commercially produced, pelleted mixture of 12.8% digestible protein. A complete analysis of the feed was

given by Zaiglin (1977). The amount of supplement distributed was dependent upon the weather and deer consumption. Normally, about 100 pounds was placed at each site every 5-6 days. When rain occurred, no feed was distributed until the weather cleared. Wet feed was removed from feeders and discarded off of the study area.

Observations of deer behavior at feeder sites were made with binoculars from elevated blinds. Nocturnal observations were made when moonlight was sufficient. Most observations were made during the first two hours after daylight and the last two hours before dark. Consumption per unit time was estimated by timing individual deer feeding on a pre-weighed amount of supplement and reweighing the supplement after deer departed. Feeding deer were timed with a stopwatch while they had their heads in a trough. Timing was discontinued each time the deer raised its head. Total time individual deer remained at feeding sites was recorded by noting when they entered and departed through the fence surrounding feeder sites. Differences in consumption rate and length of visit were tested between sexes using  $t$ -tests.

To estimate the distance deer would travel to obtain the supplement, 12 deer were trapped under baited dropnets (Ramsey, 1968) and individually marked with color-coded collars. Nine deer were marked in the east pasture and three in the west. Marked deer also served to determine if there was an exchange of deer between supplemented and control pastures. Only female deer were marked, at the request of the ranch manager. Sightings of marked deer were recorded on maps of the study area.

In order to compare supplement consumption against status of the natural forage, a crude protein index was determined using four to eight deer forage species biweekly throughout the study. Forage species selected for each sampling were high in occurrence in deer rumens during corresponding months on the Zachry Randado Ranch approximately 33 mile southwest of the study area (Arnold, 1976). What seemed to be the most edible portions of several widely scattered plants of each species were plucked at each collection. Standard micro-Kjeldahl nitrogen analysis was used to estimate crude protein.

The fawn/doe ratio was determined within each pasture by counting and classifying deer from a Bell Model 47 helicopter flown at 35 miles per hour and at about 75 feet elevation during October 1976 and 1977. Each pasture was flown separately using the crossfence as a starting point. The two observers, one counting on each side of the flight line, had previous experience conducting aerial counts, which was important in obtaining reliable results (Le Resche and Rausch, 1974). The pilot had several hundred hours of experience in flying deer counts and was able to fly uniform transects while the observers counted a strip about 200 yards wide. Complete coverage of the study area was attempted by flying adjacent strips.

The fawn/doe ratio was calculated by dividing total number of fawns by total number of does observed in each pasture. Data for the two years were pooled and tested for differences between fed and unfed pastures using a 2 x 2 contingency table.

## RESULTS AND DISCUSSION

A total of 257 hours was spent observing feeder sites, primarily during February to August 1976 and June to August 1977. A total of 379 deer visits were recorded, many of which were obviously repeat visits by the same individuals. Length of visits ranged from a few seconds to 37 minutes. Bucks remained at feeder sites for an average of 13.4 minutes, as compared to 11.4 minutes for does. The difference was not significant ( $P > 0.05$ ).

Only four fawns were observed near feeder sites through the study. Fawns were always accompanied by a doe. The does would enter a site and feed, but fawns remained outside of the surrounding fence.

Deer typically were cautious around feeders and seldom ap-

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proached without hesitation. Deer would typically approach within a few yards of the fence surrounding the site, and remain stationary for several minutes before entering. Feeding was generally crepuscular and nocturnal, but by checking for tracks at the sites, some feeding was found to occur at all times. Large bucks commonly entered feeder sites after sundown and remained after dark, often making several visits of short duration. Ozoga (1973) reported that in Michigan nocturnal use of feeders by deer accounted for 75% of the total feeding time in spring. Nocturnal observations in the present study also indicated frequent visits by deer.

There were 48 sightings of marked deer, but only one marked deer was observed outside of the pasture in which it was trapped. This individual was observed once watering at a pond in the west pasture, approximately one mile from its trap site in the east pasture. Seven of the marked deer were observed at feeder sites, but never more than one-fourth mile from their capture site.

Comparison of the two helicopter counts indicated some redistribution of deer from the east pasture into the west pasture in 1977 (Table 1), possibly because of counting variation or different cattle grazing patterns between pastures. Cattle were present in the east pasture for several weeks prior to the 1977 count, while the west pasture was deferred. Adams (1978) reported that in some circumstances, deer will vacate pastures grazed by cattle and move to adjacent areas without cattle.

Aggressive behavior of collared peccary curtailed deer use at some feeder sites. In 12 encounters with peccary inside the fenced rectangle, deer were displaced 11 times. Peccary remained at feeder sites for long periods to feed on spilled supplement and often bedded at the site. Six visits by peccary that were timed averaged 30.1 minutes. Deer approaching within approximately five yards were repelled, usually by a single peccary. The peccary would either walk or run toward the approaching deer. Deer would retreat often to return after departure of the peccary, but they would sometimes leave the vicinity altogether.

Deer were observed utilizing the supplement within two days of its distribution in the eastern pasture versus 7 days in the western pasture. This rapid acceptance may have been attributable to the fact

**Table 1. Results of October deer counts conducted from a helicopter in a pasture with supplemental feed available versus a control pasture lacking feed on the Zachry Blanco Ranch near Laredo, Texas.**

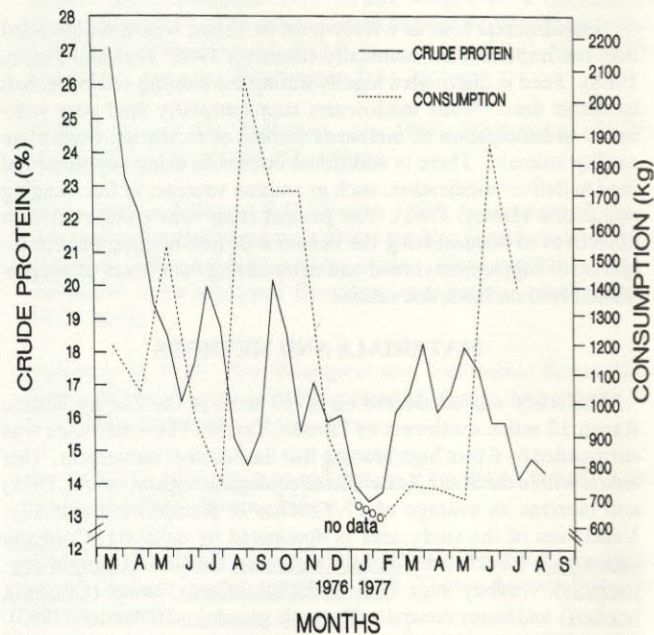
Pasture	Treatment	1976		1977	
		Does	Fawns/doe	Does	Fawns/doe
East	Fed	43	0.39	Control	34 0.08
West	Control	20	0.20	Fed	29 0.24

that deer on the study area were used to feed distributed as bait during the hunting season. Results of 16 timed bouts of deer feeding (head within trough) on pre-weighed amounts of supplement indicated that an average of 0.55 pounds were consumed/minute of feeding. Consumption rate was estimated for an additional 21 buck visits and 20 doe visits by multiplying minutes of feeding time (head within trough) by 0.55 pounds. Bucks fed for an average of 2.4 minutes and consumed 1.3 pounds per visit. Does fed for an average of 2.9 minutes and consumed 1.6 pounds per visit. The difference was not significant ( $P > 0.05$ ).

A total of 44,000 pounds of supplement was distributed during the study. The amount that disappeared from feeders was used to approximate the amount consumed by deer. However, supplement was also consumed by 20 exotic large mammals present on the area from February to July 1976, and by racoons (*Procyon lotor*), rodents, and small birds throughout the study. Liscinsky (1975) estimated that 10% of the supplement fed in his study was consumed by rodents and small birds.

Consumption of supplement was generally inversely related to the average crude protein content of the selected forage plants, except during winter (Figure 1). Previous research has shown that reduced intake by deer during the winter is common, even when high quality food is available (Short et al., 1969; Silver et al., 1969; Ozoga and Verme, 1970; Short, 1975; Holter et al., 1977). Consumption of supplement was particularly high during the late summer both years when crude protein values in the native forage were relatively low. Varner et al. (1977) also found that summer was a critical time in the nutrition of deer in south Texas.

October 1976 and 1977 helicopter counts showed a higher fawn/doe ratio ( $P < 0.04$ ) in the supplemented pastures (Table 1). The overall fawn/doe ratio across treatments was low in 1977 due to drought. Based on annual helicopter counts conducted on the ranch since 1969, large fluctuations in fawn survival are common. The peak of fawning in this area of Texas usually occurs in July (Leal, 1973). The high nutritional demands on lactating does in late summer, the relatively low nutritional value of forage during this period (Figure 1), and the high late summer consumption of supplement all suggest that the supplement contributed to increased fawn survival through improving the diet of the dam. Coyote predation has been thought to be a major factor depressing fawn survival in south Texas (Cook et al., 1971; Beasom, 1974). However, it appears that summer nutrition also may be critical.



**Figure 1. Deer consumption of supplemental feed versus an index of crude protein in the natural forage on the Zachry Blanco Ranch near Laredo, Texas.**

Precise estimates of cost were not possible from the data. However, considering the supplement, feeders, fencing, labor, and vehicles, the cost per additional fawn produced was likely several hundred dollars. Thus, year-around feeding for fawn survival alone was probably uneconomical. However, the data indicated consumption was high for a 2- to 3-month period during summer (Fig. 1), which may have influenced fawn survival. Future research should determine if it is feasible to supplement for a short time during the critical summer period and produce the same results as the year-around supplementation practiced in this study.

Landowners that supplement heavily frequently do so with the goal of increasing antler and body weights of males. We were unable to measure antlers and weights in sufficient numbers to determine if there were differences between supplemented and unsupplemented deer. However, we were unable to detect differences from subjective observations.

In conclusion, deer in South Texas will readily accept a pelleted supplement when crude protein values of the natural forage are relatively low. The exception is during winter months when deer curtail intake of all food. Collared peccaries repel deer at feeding sites and this interference should be considered when planning feeding programs. Year-around supplemental feeding will apparently increase fawn survival in south Texas. However, the cost of the practice is high.

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