Influence of Winter Supplemental Feeding of Cottonseed Cake on Activities of Beef Cows[1]

THADIS W. BOX, GERALD BROWN, AND JOHN LILES

Professor of Range Management and student assistants respectively, Texas Technological College, Lubbock.

Highlight

Feeding beef cows 1.5 pounds of cottonseed cake on alternate days during winter on shortgrass range caused no apparent increase in feeding time over cattle receiving no supplement. However, cattle fed supplemental feed were easier to handle, ruminated more, and walked less time than cattle with no supplement.

Some ranchers claim that small amounts of cottonseed cake fed during the winter months will cause range cattle to spend more time grazing, thus increasing the utilization of dry forage. Others maintain that supplementation will actually reduce the amount of time cattle spend feeding. There is little evidence to support either theory.

Many workers have observed grazing habits of cattle on rangelands. Cory (1927) compared the grazing habits of cattle with behavior of sheep and goats on the same ranges. Bonsma (1953) studied the effect of climatic conditions on the habits of African cattle. Peterson and Woolfolk (1955) reported on activities of beef cattle in the northern Great Plains. Grazing studies have been conducted on such other portions of the Great Plains as Nebraska (Brinegar and Keim, 1942), Kansas (Moorfield and Hopkins, 1951), and Oklahoma (Dwyer, 1961). The influence of supplemental feeding on activities has been a major part of only one study, made in California (Wagnon, 1963). He found that cattle fed no supplemental ration spent 5% more of their time grazing than did cattle receiving supplemental feed.

[1]*Research area (located southeast of Tahoka in Lynn County), livestock, and funds for this study were furnished by the Post-Montgomery Ranch, Levelland, Texas.*

Methods

During the winter and spring of 1962, grazing habits of beef cattle were observed on a mixed prairie range in Texas. Two 80-cow herds of 3-year old Hereford cows with their first calves were grazed in adjoining 1700 acre pastures. Both pastures were in the same range condition and contained similar forage species (Table 1). Pastures were lightly stocked, and there was no apparent competition for forage (Figure 1).

Cows in one pasture were wintered on the native grass only. In the other pasture, cows were fed 1.5 pounds of 41% cottonseed cake on alternate days from January 1 through March 31. Cattle were called to the feed truck and fed pelleted feed on the ground.

The grazing behavior of the cattle was observed from February 1 to the end of the feeding period. In each pasture, a cow was selected by an observer and followed throughout the cow-day using procedures established by Dwyer (1961). The amount of time devoted to each activity was recorded in field notes. A total of 20 observations were made by two observers. A cow from each feeding treatment was studied on each observation day. Investigators rotated between the supplemented and non-supplemented herds at each observation day to remove bias due to investigator. In addition to the cow-day records, four 24-hour observations were made. Differences between activities of cattle in the two pastures were tested by Chi-square analysis.

Table 1. Percentage composition of forage plants on pastures where grazing behavior study was conducted.

SPECIES	Composition NSP[1]	SP[1]
Aristida sp.	1.11	0.58
Bouteloua curtipendula	4.61	13.18
Bouteloua gracilis	15.45	21.25
Buchloe dactyloides	41.78	30.75
Hilaria mutica	3.33	1.42
Muhlenbergia arenicola	1.61	3.92
Panicum obtusum	4.39	8.84
Tridens pilosa	0.46	0.67
Other species	0.73	3.42

[1] NSP=Non-supplement pasture; SP=Supplement pasture.

FIGURE 1. Hereford cows and calves used in grazing behavior study on a Texas mixed prairie.

Results

Real differences existed between the behavior of cattle in the two pastures only in the activities of walking, ruminating, and in total distance walked (Table 2). Cattle receiving no supplement spent significantly more time walking, walked over twice as far, and ruminated less than supplemented cattle. Wagnon (1963) reported that cows receiving supplemental feed during winter months rested almost twice the amount of cattle receiving no supplement. In his study, supplemented cows fed 44% of their time compared to 56% of the time for nonsupplemented animals.

Table 2. Activities of Hereford heifers receiving cottonseed cake supplement as compared to those receiving no supplement.

Activity	Supplemented	Non-Supplemented
Grazing (hr. & min.)	13.13	12.59
Walking (hr. & min.)	0.41	1.18a
Resting (hr. & min.)	10.06	9.43
Ruminating (Times/cow day)	5.1[1]	2.7
Walking (mi./day)	1.9	4.1[1]
Nursing (Times/day)	2.9	2.4
Drinking (Times/day)	2.0	1.7
Urinated (Times/day)	2.5	2.0
Deficated (Times/day)	2.4	2.5
Salted (Times/day)	0.5	0.5

[1] Values significantly ($P > .05$) higher than corresponding value for other treatment.

Although no real differences existed between the grazing and resting time periods for supplemented and unsupplemented cows in the present study, there were observable differences. In general, the cattle in the non-supplemented herd were more restless, spent less time grazing at one location, and were easier to become disturbed than were animals receiving supplemental feed. Animals receiving no feed began earlier in the morning, and grazed more times during the day than did animals receiving feed.

Cows in the herd with no supplemental feed walked 4.1 miles per day, over twice the distance of supplemented animals. They fed throughout the pasture most every day while animals on supplemental feed tended to spend their time in a more restricted area.

Animals receiving feed were considerably gentler than those receiving no supplement. Although there was no apparent benefit in increased feeding time due to supplementation, there may well be an advantage to feeding animals sufficient feed to gentle them and make handling easier.

The cows in the supplemented herd weighed an average of 15 pounds per head more than the unsupplemented cows at the end of the feeding period. However, there was no real difference between the weights of the cows in the two herds the fall following the study. Neither were there any differences in the weaning weight of the calves from the two herds.

Cows in both pastures spent more time grazing than did animals from previously reported summer studies. Both Dwyer (1961) and Wagnon (1963) suggested that grazing time is related to quantity of forage present. Adequate amounts of preferred species were present in both pastures to provide sufficient feed for animals to eat in a short period of time. Evidently, forage quality, palatability, morphology of forage plants, or some other factor caused cattle to spend longer times gathering their feed during winter periods since forage availability was not a limiting factor.

Supplemented cattle ruminated almost twice as many times as did animals receiving no supplemental feed, but the amount of time they spent resting was not significantly greater. They appeared to be more at ease and began ruminating as soon as they bedded down, while cows receiving no supplement were restless and more alert while bedded down.

Environmental conditions did not influence grazing habits to the extent reported in summer studies. Morning temperatures of freezing or below and mid-afternoon temperatures as high as 70° F did not materially influence livestock activities. Moderate to strong winds prevailed during most of the study. Cattle continued to graze normally in wind up to 25 to 30 miles per hour, but stopped grazing and took shelter in brush areas when wind reached strong gusts and high velocities.

Calves generally nursed 3 times a day; morning, afternoon, and near bedding time. Several times the calves would miss an afternoon feeding when the cow was some distance from the calf. This occurred more often in the herd receiving no supplement because the cattle tended to cover greater distances during the day. Calves in this study nursed fewer times than the four times reported for calves from summer study of Dwyer (1961). Wagnon (1963) reported that calves nursed from 3 to 11 times per day depending upon the age of the calf and the time of the year.

Animals in the present study watered about half as often as animals in Dwyer's study (1961). However, the number of times animals took salt did not appear greatly different.

Numbers of defications per day were much lower for animals in this study than from other studies reported in the literature. Dwyer (1961) reported cows averaged 12.2 defications per day on prairie pastures. Wagnon (1963) reported that defication rates varied according to intensity of grazing, condition of the forage, and time of year. He reported defication rates of from 3 to 13 per day per cow. He found no difference between rates for supplemented and non-supplemented animals. Numbers of urinations per day were also lower in this study than in previously reported papers.

There was no apparent benefit in increased grazing time due to supplemental feeding. However, cattle fed supplemental feed were easier to handle, and appeared more contented. On the other hand, animals receiving no feed covered a greater portion of the pasture each day. Although no apparent differences in utilization patterns existed in the experimental pastures, animals covering a greater portion of the pasture in any one day might

utilize poorly watered pastures more uniformly.

Summary

Activities of cows receiving cottonseed cake during the winter months were compared to those receiving no supplement. Animals receiving no supplement walked over twice as far as those receiving supplemental protein. The time devoted to walking was about 50% greater for the non-supplemented group. Supplemented cattle ruminated more than those receiving no supplement.

When compared with activities of cattle reported from summer studies, the cattle during winter spent more time grazing, less time resting, and deficated and urinated less.

LITERATURE CITED

BONSMA, J. C. 1953. Influence of environment on grazing habits of cattle. Farming in S. Africa 15:373-385.

BRINGER, T. E. AND F. D. KEIM. 1942. The relations of vegetative composition and cattle grazing on Nebraska rangeland. Nebraska Agr. Expt. Sta. Bul. 123. 39 pp.

CORY, V. L. 1927. Activities of livestock on the range. Tex. Agr. Expt. Sta. Bul. 367. 47 pp.

DWYER, DON D. 1961. Activities and grazing preferences of cows with calves in northern Osage Co., Oklahoma. Okla. Agr. Expt. Sta. Bul. B-588. 61 pp.

MOORFIELD, J. G. AND H. H. HOPKINS. 1951. Grazing habits of cattle in a mixed prairie pasture. J. Range Manage. 4:151-157.

PETERSON, R. A. AND E. J. WOOLFOLK. 1955. Behavior of Hereford cows and calves on shortgrass range. J. Range Manage. 8:51-57.

WAGNON, K. A. 1963. Behavior of beef cows on a California range. Calif. Agr. Expt. Sta. Bul. 799. 59 pp.