Summary — Trial 5

The effects of fat additions to high concentrate rations were studied. The influence of bulk *per se* was evaluated by using polyethylene fluff as an inert bulk.

The addition of fat to a high concentrate ration increased daily feed and estimated net energy intake. Average daily gain favored the high concentrate ration without fat; however, gain did not necessarily parallel estimated net energy intake. The addition of inert bulk to high concentrate rations resulted in improved utilization of the concentrate portion of the diet.

Three Year Study

The effects of ration density, caloric source and bulk on feed intake of ruminants were investigated. Conventional and high concentrate rations were modified by sand, tallow and inert bulk additions.

Both feed and energy intakes were reduced when a high concentrate ration was compared with a conventional ration. Data indicates that some roughage may be necessary for maximum performance.

Tallow additions to high concentrate rations reduced total feed intake and slightly increased estimated net energy intake. The addition of sand to conventional rations resulted in increased total feed consumption. Intake of nutrient material approached that of a similar ration without sand.

An increase in daily feed consumption was noticed when polyethylene resin (inert bulk) was added to high concentrate rations. Daily gain and feed efficiency favored rations with added polyethylene. It appears that limited bulk may be important in the most efficient utilization of the concentrate portion of rations used in this study. Cost of the inert bulk material prohibits commercial use at the levels reported.

Weight Loss Patterns of Beef Cows at Calving

S. A. Ewing, Larry Smithson, Dwight Stephens and Derald McNutt

It is becoming common practice to make feeding program recommendations for wintering beef cows on the basis of weight change patterns rather than a given quantity of feed. This approach has the advantage of making research results concerning the relationship between level of feeding and productivity, applicable to a wide variety of conditions. It is then the responsibility of the producer to evaluate his feeding or supplementation program under a particular set of conditions.

The recommendations arising from several years of research work at the Ft. Reno Station have been expressed in terms of winter weight change patterns for spring calving beef cows from fall through calving and up to the time that spring grass is ample. In a program of this type, it is important to anticipate weight loss at calving time in order to determine the level of gain that may be appropriate up to calving to prevent excessive total weight losses. Due to the wide differences in opinions as to the amount of weight loss at calving and the limited amount of data available, detailed records have been maintained on a group of cows to more clearly define this weight loss pattern at calving and evaluate the degree of variation encountered.

Procedure

Thirty-two, spring calving, mature Hereford cows were maintained on native tall grass pastures at the Ft. Reno Station for this study during the winter of 1964-65. The cows had ample native pasture available and were fed an amount of supplemental feed comparable to that of the moderate level practiced in project 650, described elsewhere in this publication. The level of supplement used in this particular winter trial averaged 1.56 lbs. of cottonseed caks daily in addition to free choice mineral consisting of two parts salt and one part steamed bone meal. The weights reported are those taken individually in the fall and at 14 day intervals until calving time approached. Weights were also obtained within 3 days before calving for each cow and then again within 1 day after calving. After this the cows were worked back into a 14 day weighing schedule which continued for 168 days after calving. At this time the cows had returned to the weight recorded the previous fall. All weights were taken after a 12 hour shrink period without feed and water.

The data were summarized as averages for cows having heifer calves and those having bull calves as well as averages for all cows, involved in this test. Standard deviations were determined for certain observations.

Results

The results of this study are summarized in Table 1 and Figure 1. The average weight loss at calving of all cows involved in the study, was 129 lbs. with a standard deviation of 29.6 lbs. The average birth weight of all calves was 75 lbs. and this weight made up 58.1 percent of the total weight loss at calving time.

The weight loss at calving expressed as a percentage of cow weight just prior to calving averaged 13 percent. This would indicate that a wintering program devised to result in an approximate 15 percent loss of fall weight through calving to spring would need to involve a level of feed to maintain fall weight with very little added weight loss after calving until spring grass is ample. In this particular study, the weight change pattern from fall through calving until 28 days post partum was approximately 17 percent loss of fall weight. This appears to be an ac-

Table 1. Weight Change Patterns of Range Beef Cows With Weight Loss At Calving And Birth Wt. of Calves.

Time of Weighing	Cows having Bull Calves	Cows having Heifer Calves	Average of All Cows
Fall Wt. (11-20-64)	1040	991	1014
Days before calving:			
56	1049	1021	1035
42	1028	1005	1016
28	1015	985	999
14	1016	970	991
3	1010	960	983
Days after calving:			
1	875	835	854
14	862	824	841
28	853	827	840
42	873	819	844
56	899	835	865
70	938	856	894
84	969	890	927
98	991	918	952
112	1002	944	971
126	1026	948	986
140	1032	968	998
154	1050	981	1013
168	1044	989	1014
Birth wt., lbs.	79	71	75
St. Dev., lbs.	---	---	9.5
Cow Wt. loss at Calving., lbs.	134	125	129
St. Dev., lbs.	---	---	29.6
Birth Wt. as a percent of Cow wt. loss	58.9	56.8	58.1
Cow Weight Loss at Calving as a persent of pre-calving wt.	13.2	13.0	13.1

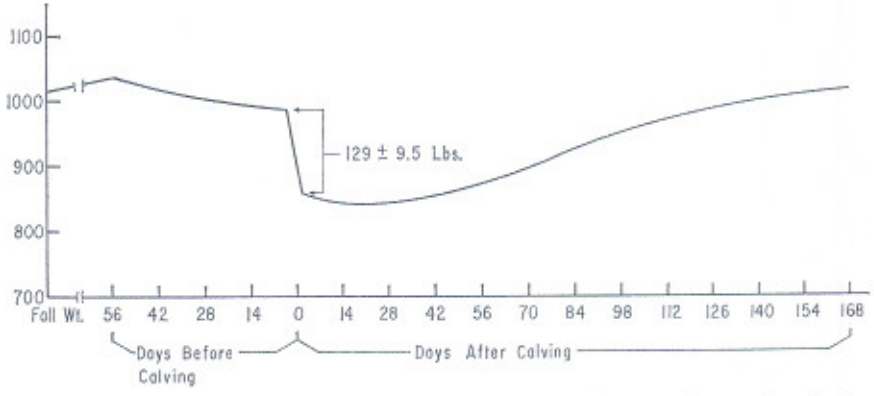

Figure 1. Weight change pattern of range beef cows through calving (line represents average cow weight).

Advantages of Bermudagrass

One real advantage is that with proper management it has an extremely high carrying capacity. With native pastures a year-round stocking rate of one cow unit for every eight to ten acres is recommended in the tall grass areas of Oklahoma. Bermudagrass on the other hand will carry a cow unit to every two to three acres if adequate moisture and fertility are available. Another definite advantage of bermudagrass is its ability to respond to fertilization. In fact, it must be fertilized or it will not produce satisfactorily. Due to the rapid growth rate it is possible to graze bermudagrass and harvest one or more hay crops during the same growing season without damaging the stand.

Problems Associated with Bermudagrass

One of the first problems observed concerning bermudagrass has been the lack of satisfactory gains during the last half of the growing season. This has been more pronounced with stocker steers than with nursing calves because of the ability of the cow to draw on her body reserves when feed is in short supply or poor in quality. The apparent drop in nutritive value around mid-summer is not clearly understood and is probably due to a number of things. First, we know that as the grass matures and summer progresses the percent of lignin increases. Furthermore, studies have shown that generally as the percent lignin increases the dry matter digestibility of the plant decreases (3). Secondly, there is evidence which indicates that cattle consume much less grass as it matures and as temperature increases.

In short, cattle probably gain poorly in middle and late summer simply because they don't eat enough grass. The apparent reduction in forage intake is probably due to a combination of factors. We know that a feed of low digestibility will remain in the digestive tract longer than one that is highly digestible, thereby reducing the total amount of feed that can be consumed. Low intake may also be due to reduction in palatability of the forage as a result of chemical or physical changes in the plant brought about by high temperatures and/or longer periods of daylight. Furthermore, an insufficient supply of grass will certainly cause an abnormally low consumption of forage.

Some cattle producers have observed a higher incidence of breeding problems with cows on bermudagrass than on native grass. Some feel that reproductive problems are associated with a nutrient deficiency in the grass or possibly a buildup of harmful compounds resulting from heavy fertilization. Although these are possibilities, it is much more likely that any breeding problems observed on bermudagrass are due primarily to lack of feed intake rather than harmful materials or nutrient deficiencies in the forage.

Many bermudagrass pastures in Oklahoma are inadequately fertilized or not fertilized at all resulting in low forage production. In addition, many livestock producers consistantly over-stock bermudagrass further agravating the problem of insufficient forage. Inadequate in-

take may also occur if forage quality is so low that it is low in palatability. Grass that has been allowed to make seed heads and rank growth will be less palatable as well as lower in digestibility and will therefore be low in productive value.

Internal parasites are a greater problem with cattle on bermudagrass than on native grass because of stocking rate and height of plant. As we increase stocking rate we also increase the buildup of internal parasite eggs in the soil and on the grass. Thus, if we increase stocking rate from one cow to ten acres up to one cow to two or three acres we should expect a significant increase in the parasite level of the pasture. In addition to a higher level of parasite eggs the problem is further complicated by the fact that bermudagrass is a shorter plant than native grasses and consequently cattle must graze closer to the soil, hence increasing the probability of picking up parasite eggs.

Management of Bermudagrass

Although bermudagrass is a hardy plant that can survive under severe abuse, it will not produce satisfactorily unless it is properly and carefully managed. One of the first requirements is that we must fertilize in order to achieve satisfactory performance. The amount and kind of fertilizer depends largely upon the fertility level of the soil. Since it is such a heavy user of nitrogen this is the element with which we should be most concerned. Assuming adequate levels of phosphorus and potassium are provided we should plan to add 100 to 200 pounds of nitrogen per year unless it is overseeded with a legume.

It has been estimated that a good stand of legumes will provide approximately the equivalent of 100 pounds of nitrogen. The form in which nitrogen is applied has no appreciable influence upon efficiency of utilization. Response to nitrogen fertilization may be achieved any time during the growing season that there is adequate moisture. In general, it is recommended that at least 50 pounds of nitrogen be applied per acre at the time the grass begins to "green up" in the spring. Thereafter, nitrogen should be applied according to soil moisture and the need for grass. If a hay crop is to be harvested and high yield is desired it is well to apply nitrogen about a month ahead of the planned cutting time. The entire summer allowance of nitrogen may be applied in one application if the grass is to be made into hay or divided into two or more applications when used for grazing in order to maintain forage quality and provide a uniform supply of grass throughout the growing season. When irrigation is available nitrogen should be applied just prior to irrigation.

Strict management of grass and cattle is absolutely necessary for satisfactory beef production on bermudagrass. It should be kept at a height of five to eight inches to maintain a high quality forage for grazing. If a hay crop is to be harvested it should be allowed to grow for a period of about four weeks or to a height of 15 to 18 inches (1,4). In order to maintain high quality forage throughout the growing season

it is best to stock pastures heavily for a short period of time then rotate cattle to another pasture. One system which has been used satisfactorily is to graze five days and let the pasture rest for about 15 days to allow for regrowth. In order to encourage uniform grazing it is advisable to clip pastures to remove rank growth and use a drag to scatter manure piles after each grazing period. Any time a pasture gets too rank for good grazing it should be clipped or mowed for hay.

Wintering on Bermudagrass

Studies are currently being conducted at this station to determine the kind and amount of supplement to feed cows during the winter. Preliminary results indicate that cows wintered on bermudagrass pastures should receive about the same kind and amount of supplemental feed as on native grass. Although bermudagrass is generally higher in protein content throughout the growing season and even in the winter than native grasses, there is a definite need for protein and phosphorus supplements during the winter months.

Suggested Use of Bermudagrass

It appears that bermudagrass is better adapted to a cow-calf operation than a stocker-feeder program. Although stocker cattle gain well on bermudagrass early in the growing season their gains are normally poor after July 1. Cows on the other hand can maintain weight and continue to produce enough milk for adequate growth of calves (2). Preliminary work at Alabama indicates that creep-feeding calves on bermudagrass may be advisable during the latter part of the growing season.

It is not advisable to plow up good native grass and establish bermudagrass because of the high establishment and maintenance costs involved. A program of pasture management in which bermudagrass is used in connection with native grass as a part of the total pasture program seems advisable. Bermudagrass is at its peak in nutritive value during the months of April, May and June. These are the months when native grasses are restoring nutrient reserves in the roots and are harmed most by heavy grazing. Thus, if cattle were put on bermudagrass during this period and native pastures allowed to rest until about July 1, native pastures would have a chance to get ahead of the cattle, thereby increasing the carrying capacity of the native pastures. After cattle are turned in on native pastures the bermudagrass pastures then could be made into hay or used to carry dry cattle for the remainder of the growing season. Sufficient growth of bermudagrass could be retained late in the summer to provide winter grazing. If bermudagrass is the primary or only pasture grass it can be used effectively and profitably under proper fertilization, rotational grazing, parasite control and feed supplementation practices.

Summary

Presently Midland is the variety of bermudagrass best suited for most sections of Oklahoma. Bermudagrass has a much higher carrying capacity and a greater ability to respond to fertilization than native grasses but appears to be less palatable. Although individual animal performance is often 10 to 15 percent less for cattle grazing bermudagrass compared to native grass, the per acre weight gains may be four to five times greater on bermudagrass. Fertilization is absolutely necessary for satisfactory performance on bermudagrass. Although irrigation can increase forage and beef production significantly it is not necessary in most sections of the state for satisfactory production. Management of bermudagrass is the key to its successful use. If good native grass is available it appears that an integrated pasture system in which bermudagrass is used in conjunction with native grass is advisable.

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The Value of Cottonseed Meal, Fish Meal and Urea in Milo Rations for Fattening Calves*

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Many cattle feeders are located in a "one grain area", due to availability and price of grains. This is true in much of Oklahoma and the Southwest, and the "one grain" in this area is milo. One of the serious weaknesses of milo is its poor feed efficiency, which is often 10-20 percent poorer than that of corn and barley. Attempts to improve the utilization of milo through supplementation are continuing at this station.

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