

ceptable weight change pattern for mature cows, based on lifetime studies at the Ft. Reno Station. It should be noted that 13 percent of the total 17 percent weight change was due to loss at calving time.

Cows giving birth to bull calves averaging 79 lbs. lost 134 lbs. at calving while the cows giving birth to heifer calves averaging 71 lbs. lost 125 lbs. The respective percentage weight losses for cows producing bull and heifer calves were 13.2 and 13.0 percent of pre-calving weight. The percentage of cow weight losses accounted for by birth weight of bull and heifer calves were 58.9 and 56.8 percent, respectively.

Summary

Records were maintained on 32 mature Hereford cows to more clearly define the weight loss of cows at calving time.

On the average, cows lost 129 lbs. at calving with a standard deviation of 29.6 lbs. Average birth weight of calves was 75 lbs. and this accounted for 58.1 percent of total weight loss due to calving.

In the wintering program followed, which resulted in a cow weight loss of 17 percent from fall until 28 days post partum, loss at calving accounted for 13 of the 17 percent. Birth weight of calves expressed as a percentage of cow weight loss at calving was similar for cows having either bull or heifer calves. Weight loss at calving expressed as a percentage of pre-calving weight was also similar for cows having either bull and heifer calves.

Bermudagrass and Beef Cattle

Jack McCroskey

Probably no other agricultural crop has received more praise or criticism than bermudagrass. It has been praised for its high yield potential and carrying capacity and has been blamed for low weaning weights, poor conception, parasite infestation and poor gains. Although some criticisms are valid many have been made unjustly.

The desperate search by cattlemen for ways to increase beef production has led to the hasty acceptance of bermudagrass. The "prairie-fire" manner in which it has spread throughout the state has far exceeded the rate of knowledge accumulation on the forage. As a result many have invested thousands of dollars in the establishment of bermudagrass without adequate information as to its limitations and peculiarities. Consequently, some have been disappointed with cattle performance and have begun to wonder what they should do with the grass.

Currently we have approximately two and one-half million acres of bermudagrass in Oklahoma and the acreage is increasing at a rapid rate. Most of the land now in bermudagrass was once farmland and much of it might be considered as "worn out" farmland. However, many acres of fertile land such as creek and river bottoms or overflow land have been planted to bermudagrass.

Plant breeders have developed many varieties suitable for grazing but Midland is the one best suited to Oklahoma conditions. Although Midland is the highest yielding variety adapted to Oklahoma at the present time there are still thousands of acres of common bermudagrass being grown. All varieties are fairly similar in chemical composition and differ primarily in yield of forage. This discussion will be concerned primarily with the Midland variety but most statements will apply also to other varieties.

The purpose of this report is to bring together some of the facts and recommendations which have been compiled concerning the use of bermudagrass and provide answers to some of the questions cattlemen have raised about its value and use.

Characteristics of Bermudagrass

It is an introduced grass that must be established and managed like a crop. As any other crop, it must be fertilized properly for satisfactory production and forage quality. It is especially a heavy user of nitrogen. If moisture conditions are optimum an acre of bermudagrass can use as much as one and one-half pounds of nitrogen per day. In order to use large amounts of fertilizer and grow rapidly it must have adequate water. With optimum fertility it can use as much as three-tenths inch of water per day. On Oklahoma soils bermudagrass will use nitrogen, phosphorus and potassium approximately in the ratio of 3-1-1. Under optimum moisture and growing conditions each pound of additional nitrogen will produce approximately twenty to twenty-five pounds of dry matter with nitrogen fertilization rates up to 200 pounds per acre. With heavy fertilization and irrigation it is possible to produce as much as 900 pounds of cattle weight gain per acre in a single growing season.

Bermudagrass is a highly productive forage for approximately sixty days (until July 1) but loses its productive value rapidly as the summer progresses. Tests have shown that steers will gain from one and one-half to two pounds per day until about the first of July then drop down to less than one pound per day for the remainder of the season (2). Approximately 70 percent of the total summer gain will be made by July 1. Although calves nursing cows on bermudagrass pasture don't show as much reduction in gain late in the season as steers, their total summer gain is frequently lower than would be expected if cows were on native grass pasture.

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 consistently over-stock bermudagrass further aggravating 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*

*Robert Totusek, Robert E. Renbarger, George A. B. Hall and
Allen D. Tillman***

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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