Milo grain	203.00	181.49		120.86
Cottonseed meal	77.22	120.21		60.43
Special supplement			173.85	
Mineral (bonemeal, salt)	4.58	3.97	3.49	3.64
Salt	3.06	2.84	1.54	1.60
Feed cost per cwt. gain	$13.72	$13.74[1]	$12.59	$11.08

1. 50,000 IU vitamin A per head daily. Total cost $14.75 for Lot 2.

The Value of Ammoniated Molasses in Beef Cattle Wintering Rations, 1953-54.

PROJECT 517

D. Richardson, E. F. Smith, F. H. Baker, R. F. Cox, and K. L. McReynolds

There are microorganisms present in the paunch of ruminants which can utilize ammonia from urea, ammoniated products, and other simple nitrogen-containing compounds. In order to do this, readily available energy, minerals, and probably other nutrients must be present at the same time for efficient utilization of inorganic nitrogen by the microorganisms.

The products used in this experiment were ammoniated molasses containing 15 percent and 33 percent protein equivalent. The 15 percent ammoniated molasses was made by simply adding anhydrous ammonia to bring the molasses to a 15 percent protein equivalent. The sucrose in the molasses was inverted and anhydrous ammonia added to bring the ammoniated invert molasses to 33 percent protein equivalent. Sulfuric acid was used to adjust the pH to 7. Theoretically, these products could serve as a substitute for part of the protein in ruminant rations. The purpose of this experiment was to determine the value and amount to use in the wintering ration of beef calves.

Experimental Procedure

Forty head of good quality Hereford heifer calves were purchased from near Pueblo, Colo. They were divided as equally as possible into four lots of 10 heifers each. The starting ration for each lot is shown in Table 12. These rations were calculated to contain the same protein equivalent and total digestible nutrients per lot. The amount of silage was increased as the experiment progressed and all lots received the same amount. All animals were fed the control ration about a week before starting the experiment. During the experiment, the animals were fed once daily during the morning. The concentrates and molasses were spread over the silage and mixed. Warm water was mixed with the molasses in cold weather to make handling and mixing easier. As a result of thorough mixing, no animal was able to eat more than its share of any ingredient. A mineral mixture of steamed bonemeal and salt was fed free choice. Water was available at all times.

Table 12.—Daily Rations Used at the Beginning of the Experiment (Pounds).

Lot	Atlas sorgo silage	Cottonseed meal	Milo grain	15% ammoniated molasses	33% ammoniated molasses
8	20	1.0	2.0		
9	20	.5	1.6	1.46	
10	20	.5	2.0		.7
11	20		2.0		1.37

Results and Discussion

The over-all results of the experiment are shown in Table 13; however, a better idea of the results may be obtained from Table 14 which gives the average daily gains by weigh periods.

Lot 8 animals gained satisfactorily throughout the experiment. The gains probably would have been better if more silage had been fed. These calves cleaned up their feed by late afternoon each day; however, the amount of silage fed daily was maintained at the same level in all lots.

On the eighth day after starting the experiment, some animals in all lots receiving ammoniated molasses were stimulated or affected in some way to make them act in a very crazy manner. An affected animal would start by weaving and winding among and around other animals in the lot. Then it would suddenly dash across the lot and into whatever might be in the way. Fences and even some posts were smashed. One animal broke out part of its teeth. No definite explanation can be given at this time for this peculiar behavior. The blood urea of affected animals was normal.

After stimulation occurred, the ammoniated molasses was removed from the ration for one week. Feeding was resumed and some animals were affected after again eating the ammoniated molasses for a week. About one-third of the animals receiving the ammoniated molasses were observed to be crazy. It is possible that more were affected. The percentage protein equivalent or amount did not seem to be a factor.

Daily gains (Table 14) and feed efficiency (Table 13) were adversely affected by the ammoniated molasses. There was no apparent difference in mineral consumption between lots. When ammoniated molasses was removed or the amount lowered in the ration, the daily gains increased. At the end of the experiment, animals in Lot 10 were beginning to show signs of being affected, even though they were receiving only .5 pound of ammoniated molasses per head per day. All animals receiving ammoniated molasses had excessive watery drainage from the eyes.

Conclusions

1. The forms of ammoniated molasses used in this experiment, as part or all of the protein concentrate, are not satisfactory in the wintering ration of beef calves from the standpoint of rate of gain or welfare of the animal.

2. Further basic research needs to be done to determine the cause or causes of the trouble experienced.

Table 13.—Results of Feeding Ammoniated Molasses in Wintering Rations of Beef Heifer Calves.

December 17, 1953-April 7, 1954—112 days.

Lot number	8	9	10	11
Number heifers per lot	10	10	10	10
Number days on trial	112	112	112	112
Av. initial wt. of heifers, lbs.	356.9	358.8	358.0	357.6
Av. final wt. of heifers, lbs.	546.5	490.5	490.0	503.0
Av. gain per heifer	189.6	131.7	132.0	145.4
Av. daily gain per heifer	1.69	1.18	1.18	1.30
Av. daily ration per heifer:				
Sorghum silage	23.21	23.12	23.21	22.46
Ground milo grain	2.0	1.7	2.0	2.0
Cottonseed meal (41%)	1.0	.65	.53	.66

Ammoniated molasses (15%)		.89[3]	.05[2]	.04[2]
Ammoniated molasses (33%)		.06[1]	.49	.47
Salt	ad lib	ad lib	ad lib	ad lib
Salt, steamed bonemeal	ad lib	ad lib	ad lib	ad lib
Total feed consumed (lbs.):				
Sorghum silage	26000	25900	26000	25150
Ground milo grain	2240	1904	2245	2254
Cottonseed meal	1120	730	590	738
Ammoniated molasses (15%)		1000	52[2]	42[2]
Ammoniated molasses (33%)		65[1]	547	530
Total gain (lbs.)	1896	1317	1320	1454
Feed per 100 lbs. gain:				
Sorghum silage	1371.3	1966.6	1969.7	1729.7
Ground milo grain	118.1	144.6	170.1	155.0
Cottonseed meal	59.1	55.4	44.7	50.7
Ammoniated molasses (15%)		75.9	3.9	2.9
Ammoniated molasses (33%)		4.9	41.4	36.4
Total feed per cwt. gain	1548.5	2247.4	2229.8	1974.7

1. Substituted due to delay in receiving 15 percent molasses.
2. Substituted due to delay in receiving 33 percent molasses.
3. No molasses fed the last 28 days of the trial.

Table 14.—Average Daily Gain by 28-Day Weigh Periods (Pounds).

Lot	8	9	10	11
1st 28-day period	1.84	1.11	.86	.40
2nd 28-day period	1.75	1.05	1.41[2]	1.57[1]
3rd 28-day period	1.66	1.11	1.48	1.84
4th 28-day period	1.51	1.43[3]	.96	1.37
Av. entire 112 days	1.69	1.18	1.18	1.30

1. 33 percent ammoniated molasses reduced to .33 pound and .75 pound cottonseed meal added at end of first 28-day period.
2. Amount of ammoniated molasses reduced from .7 pound to .5 pound per head daily.
3. Molasses removed completely because of stimulation. Animals put on control ration.

The Effect of Grazing Systems on Livestock and Vegetation

Comparison of Different Methods of Managing Bluestem Pastures, 1953.

PROJECTS 353-3 and 353-5

E. F. Smith, K. L. Anderson, and F. H. Baker

The objectives of this experiment are to determine the effects of different stocking rates, deferred grazing, and burning on livestock gains,

on productivity of pastures, and on the bluestem vegetation itself. In addition to the yearly report, a brief summary of the cattle gains for the past four years is included.

Experimental Procedure

Good quality Hereford yearling steers weighing approximately 565 pounds were used to stock the pastures. The method of management of each pasture was as follows:

Pasture 1—Normal rate of stocking, 3.75 acres per head.

Pasture 2—Overstocked, 2.74 acres per head.

Pasture 3—Understocked, 5.45 acres per head.

Pastures 4, 5, 6—Deferred and rotation grazing, 3.75 acres per head. All the steers were held in two pastures until June 30, then turned into the protected pasture until August 3. On that date they were placed on the better of the two pastures previously used, where they remained until August 10. After that they were allowed the run of all three pastures.

Pasture 7—Burned March 13, 1953; rate of stocking was 3.67 acres per head.

Pasture 8—Burned April 9, 1953; rate of stocking was 3.67 acres per head.

Pasture 9—Burned April 30, 1953; rate of stocking was 3.67 acres per head.

Observations

1. The largest gains were made by the steers in the late spring-burned, the understocked, the normal-stocked, and the mid spring-burned pastures.
2. The lowest gains were made by the steers in the overstocked, the deferred and rotated, and the early spring-burned pastures.
3. The season was dry. The overstocked, the early, and the mid spring-burned pastures were grazed closely.
4. Effects of the various stocking treatments on the vegetation did not become apparent until 1952. Before that, the better than average moisture conditions resulted in better than average growth of forage that tended to obscure the effects of heavy grazing. Despite the drought of 1952 and 1953, bluestem vegetation improved under light stocking and under deferred grazing, while rather severe depletion is developing under heavy stocking.

The chief criterion for evaluating pasture condition is the vegetative population. Under conservative use the major forage species, big bluestem, little bluestem, indiangrass, and switchgrass, are increasing while less valuable forage species like sideoats, grama, buffalograss, and blue-grama, as well as the weedy invaders, are decreasing. Opposite trends are noted in pastures stocked heavily and are beginning to occur under early and mid spring burning.