

### Summary

Weaner calves fed 62.5 to 77 milligrams of Aureomycin per head daily gained nearly the same in a 128-day wintering period as those not fed Aureomycin. The value of the addition of the antibiotic was studied with 400-pound and 500-pound heifers wintered to gain 0.3 pound per head daily and with 475-pound heifers wintered to gain 0.8 pound per head daily. The average difference in gain was 3 pounds per head in favor of not feeding Aureomycin.

Apparently, Aureomycin has little, if any, value for wintering weaner calves on prairie hay and supplement.

## Fattening Beef Calves with Pelleted Rations Containing Different Concentrate : Roughage Ratios

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Among the many problems confronting the cattle feeder is the proportion of concentrate-to-roughage in the ration and the best method of feed preparation. Numerous feeding trials have been conducted to determine the optimum level of concentrates in rations for fattening beef calves, with somewhat conflicting results.

In three feeding trials at the Fort Reno station, concentrate-to-roughage ratios varying from 1:2 to 4:1 were tested. No significant differences in rate of gain or carcass merit were shown. Thus, it appeared that calves can tolerate a rather wide range of concentrate-to-roughage ratios with quite similar results. In these trials, it was observed that calves fed the highly concentrated ration (4:1 ratio) consumed significantly less feed than those on the higher roughage rations.

In some experimental studies, feed intake has been increased by pelleting or cubing roughages, or the entire ration. With this in mind, it was thought that daily feed intake might be increased on the 4:1 ratio by pelleting, which in turn would result in more rapid gains.

This report concerns two feeding trials in which pelleted and un-pelleted fattening rations were compared. Part I was a pilot study designed to show the effects of pelleting a highly concentrated ration (4:1 concentrate-to-roughage ratio) on feed-lot performance of beef calves. Part II was designed to establish the lower limit of concentrates which beef calves can tolerate and still produce satisfactory gains in the feed-lot. Also, a comparison was made between 1:4 and 4:1 concentrate-to-roughage ratios, when both were self-fed in either meal or pelleted forms.

## Part I

### Procedure

The first trial was a comparison between a completely pelleted ration and the same ration in the mixed, but loose form. The ration selected for this test was the 4:1 mixture used in three previous feeding trials. This ration was chosen because feed intake had been lowest on this mixture in previous trials. The concentrate portion of the ration consisted of ground milo, cottonseed meal and molasses. Equal parts of average quality alfalfa hay and cottonseed hulls made up the roughage. The rations were made approximately equal in protein, calcium, and phosphorus. Pellets made from the mixture were  $\frac{3}{8}$  inch in diameter.

Twenty-four, long-aged steer and heifer calves which had been used in a previous experiment were selected for this test. The cattle were divided into four lots of six calves each on the basis of sex, age, sire, shrunk weight, and feeder grade. Each lot contained three steers and three heifers. Two lots were randomly assigned to each of the two treatments. The cattle were self-fed in large sod pens with an open shed under which the self-feeders and watering devices were located. A mineral mix of two parts salt and one part steamed bone meal was available in each pen.

The cattle were started on the experiment in March, 1958. They were slowly worked up to full-feed and then were given access to the mixtures in self-feeders. At the end of the 110-day feeding period, a shrunk weight (16 hours off feed and water) was taken and the cattle shipped to Oklahoma City for slaughter. Two calves from each lot were retained for use in another experiment. Data were obtained on average daily gain, feed consumption, feed required per cwt gain, dressing percentage, carcass grade, marbling score, and current value for each carcass.

### Results

Results of this trial, involving the use of a complete pelleted fattening ration containing a concentrate-to-roughage ratio of 4:1, are shown in Table 1. Average daily gains on both treatments were low, presumably due to low feed intake during the warm spring and summer months, and the fleshy condition of the calves at the start of the trial.

Results show that rate of gain and daily feed intake were lower on the pelleted ration, whereas efficiency of feed conversion was significantly improved. Feed cost per pound of gain was considerably less on the pelleted ration, in spite of the additional cost of \$6.00 per ton for pelleting. Average dressing percent of cattle on the pelleted ration was 1.4 percent less than for those on the meal ration. Carcass grades were about equal on both rations, however.

Financial results show that despite additional pelleting costs, the cost of gain was lower for the pelleted ration. However, net return

**TABLE 1. Effect of pelleting a 4:1 C:R fattening ration for beef calves.**

	Chopped Lot 1	Pelleted Lot 2
No. of calves/lot	12	12
Days on feed	110	110
Average weights (lbs.)		
Initial 3-10-58	622	623
Final 6-21-58	784	771
Gain to market	162	148
Av. daily gain	1.47	1.35
Av. daily feed (lbs.)		
Roughage	3.34	2.53
Concentrate	13.37	10.14
Total	16.71	12.67
Feed/cwt. gain (lbs.)	1142	945
Feed cost/cwt. gain (\$)¹	22.80	20.32
Marketing data		
Av. yield (%)	60.00	58.60
Av. carcass grade²	3.00	3.10
On-foot value/cwt (\$)³	29.18	26.06
Net return/calf (\$)⁴	42.56	23.97

¹ A cost of \$6.00 per ton for pelleting was included in determining the cost of the pelleted ration.

² Carcass grades are based on the values: Prime = 1, Good = 4, and Standard = 10.

³ On-foot value was computed from carcass value according to grade and yield, and based on final live weight at Fort Reno.

⁴ Net return per calf was calculated from market value minus cost of calf and feed.

per calf was less than for the meal ration due to smaller gains and lower carcass yield.

Recently, results from the Montana and Kansas stations indicate that the addition of a few pounds of long roughage will significantly improve performance when highly concentrated rations are pelleted. Whether or not such a procedure would have affected results of this study are not known.

## Part II

### Procedure

The second trial allowed a comparison of 1:4 and 4:1 concentrate-to-roughage ratios, fed in either the meal or pelleted form. The mixtures fed are shown in Table 2, together with the chemical composition and cost of each of the mixed rations. The 4:1 mixture shown was the same ration as used in the previous experiment.

Twenty-four, spring-dropped, Hereford steer calves were selected from the experiment station herd for use in this experiment. The calves were all from one cow herd and were allotted on the basis of sire, age, shrunk weight and feeder grade into four groups of six calves each. They were assigned to individual pens, with an adjoining open shed under which the self-feeders were located. All cattle had access

**TABLE 2. Composition and cost of self-fed mixtures of two concentrate: roughage ratios.**

	C:R Ratio 1:4	C:R Ratio 4:1 <sup>1</sup>
Feeds used (%)		
Ground milo	1.0	65.1
Cottonseed meal	12.0	7.0
Molasses	7.0	7.0
Cottonseed hulls	40.0	10.0
Chopped alfalfa	40.0	10.0
Ground limestone	---	0.9
Ration composition (%)		
Dry matter	91.69	90.31
Ash	7.14	4.64
Crude protein	14.59	14.18
Ether extract	1.91	2.88
Crude fiber	32.17	10.22
N-free extract	55.81	68.08
Estimated T.D.N. content (%)	51.28	70.83
Cost per cwt. (\$)	1.26	1.93

<sup>1</sup> Composition of the 4:1 mixture was the same in both trials.

to water and a mineral mix (2 parts salt and 1 part bonemeal) at all times.

The cattle were started on feed in early November after a short readjustment period following weaning. Prior to taking the initial weight, the calves were worked up to a full-feed of their respective rations. Hence, there is no adjustment period included in the data. This experiment is currently in progress and will terminate about the last of April. Upon completion of the feeding period, the cattle will be slaughtered and data will be obtained on grade, yield and carcass composition.

### Results

The results obtained from the previous trial (Part I) indicate that gains and feed consumption were depressed by pelleting a highly concentrated ration. In contrast, feeding trials at other stations have shown that pelleting roughage mixtures markedly increased rate of gain and feed consumption. Therefore, this trial was conducted to compare the effects of pelleting a high-roughage ration vs. a high-concentrate mixture when both contain the same feeds in different proportions.

Results of the first 129 days of this trial are shown in Table 3. These results show that the greatest average daily gains were obtained from the 1:4 mixture in the pelleted form. Similar, but slightly lower

TABLE 3. Effect of pelleting different concentrate: roughage ratios.

	C:R Ratio 1:4 Meal	1:4 Pelleted	C:R Ratio 4:1 Meal	4:1 Pelleted
No. of calves/group	6	6	6	6
Days on feed	129	129	129	129
Ave. weights (lb.)				
Initial 11-11-58	488	482	503	509
129 days 3-20-59	732	782	794	774
Gain to 3-20-59	244	300	291	265
Ave. daily gain	1.89	2.33	2.26	2.05
Ave. daily feed (lb.)				
Roughage	15.82	17.48	3.83	3.37
Concentrate	3.95	4.37	15.34	13.46
Total	19.77	21.85	19.17	16.83
Feed/cwt. gain (lb.)	1044	939	848	819
Feed cost/cwt. gain (\$) <sup>1</sup>	13.15	14.65	16.37	18.26

<sup>1</sup> An additional \$6.00 per ton for pelleting was included in calculating the cost of the pelleted rations.

gains were observed on the 4:1 ration in the meal form. Thus, it can be seen that daily gains on the 1:4 mixture were increased about 19 percent by pelleting; whereas, a 10 percent decrease in gain was obtained by pelleting the 4:1 ratio.

Average daily feed intake was greater on both forms of the 1:4 ratio than with either form of the 4:1 mixture. This agrees with results obtained in previous feeding trials in which feed intake was higher for high-roughage mixtures. Pelleting the high-roughage ration resulted in a 10 percent increase in feed intake; whereas, a 12 percent decrease occurred when the high concentrate mixture was pelleted.

Efficiency of feed conversion was greater on the 4:1 ratio, with little difference between meal and pelleted forms. However, a 10 percent increase in feed efficiency was obtained by pelleting the 1:4 mixture. Feed cost per cwt gain ranged from \$13.15 on the 1:4 ratio in meal form, to \$18.26 on the pelleted 4:1 ratio. Pelleting resulted in an increase in feed cost per cwt gain with both ratios; however, the increase was much less on the 1:4 ratio due to the increased gains.

Results of this trial present some interesting and unsolved problems. It was shown that pelleting a high-roughage mixture increased gains, feed consumption, and feed efficiency; whereas, these items were decreased when the high concentrate ration was pelleted. Furthermore, the greatest gains were obtained on the pelleted 1:4 ration despite a greater percent of T.D.N. in the 4:1 mixtures. The increase in gain by pelleting the 1:4 ratio cannot be due entirely to the small increase in feed consumption; therefore, these results indicate that changes occur due to pelleting which influence both feed intake and rate of gain.

Furthermore, the pelleting process apparently affects high-roughage rations and high-concentrate rations differently. Thus, it appears that calves of this age can produce satisfactory gains on a high percentage of roughage, especially if the ration is pelleted. When average daily gains of calves on each ratio are combined there is very little difference between the two. However, from visual observation, the cattle receiving the 4:1 ratio appear fatter than those on the 1:4 mixture at this time.

In an attempt to determine the reason for some of the unexplained differences described above, a digestion trial is currently being conducted to measure the differences in digestibility of rations differing widely in the ratio of concentrate-to-roughage, when they are fed in either the meal or pelleted form.

### **Summary**

Two feeding trials involving 48 beef steers and heifers were conducted to study the effects of pelleting rations for beef calves on rate of gain, feed intake, efficiency of feed conversion, and carcass merit.

In the first trial, pelleting a 4:1 concentrate-to-roughage ratio depressed gains, feed intake, carcass grade, dressing percent, and net return per calf. Feed efficiency was improved, however.

In the second trial, a study of the effects of pelleting rations containing 1:4 and 4:1 ratios of concentrate-to-roughage revealed that pelleting the 1:4 ratio increased gains, feed consumption, and feed efficiency. However, pelleting the 4:1 ratio resulted in decreased gains and feed intake with a slight improvement in feed efficiency. Calves fed the pelleted 1:4 ration made more rapid gains than those fed the 4:1 mixture in either meal or pelleted form. Feed cost per cwt gain on both ratios was increased by pelleting.

## **Effect of Different Levels of Wintering On the Performance of Spring-Calving Beef Cows**

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Studies have been underway at this station since 1948 to determine the effects of low, medium, and high levels of supplemental winter feed on beef cows grazing native grass pastures year-long. The necessity of determining the proper amount of winter supplement is obvious, considering the fact that the cost of supplemental feed is usually the biggest cash out-lay in the cow-calf enterprise.