

the summer and rye-vetch winter pasture, have been compared. As in the past, the low cost of the winter pasture system has resulted in the most profit. Under this system, cow cost has been held to a minimum and although the calves have weighed slightly less and have not been as well finished, they have returned more for this system of production. Most costly has been the system featuring silage during the winter plus supplemental protein. However, under the silage program a maximum amount of feed could be produced on limited acreage. Intermediate in profit was year-long grazing on native grass plus supplemental winter feed.

Calves produced from each system have yielded from 56 to 57 percent and graded good-to-choice. They have been of good enough quality and finish to sell either as slaughter calves or to the feeder. The marketing system in which the steer calves sell as feeders and the heifers as slaughter calves has proven to be most profitable.

The addition of a small amount of stilbestrol to the creep-feed of calves during the last 47 days before marketing increased profits slightly and might be more beneficial if continued over a longer period.

Over all, the most profitable system of management would appear to be the use of rye-vetch winter pasture with supplemental roughage as needed. Calves should be creep-fed and the steers sold as feeders and the heifers as slaughter calves. The addition of 5 mg. stilbestrol to the creep-feed may further increase the rate of gain and profit.

Fattening Steers and Heifers on Rations Containing Different Levels of Concentrate.

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The majority of the cattle fattened in the southwest are fed in large commercial feed lots. Generally, ground or rolled milo is the principal grain fed, and alfalfa hay, silage and cottonseed hulls are the chief roughages. There is considerable difference from one feed lot to another in the proportion of concentrate (grain and protein supplement) to roughage in the ration. Opinions vary as to which ratio is best in terms of maximum feed consumption, rate of gain and time required to reach a slaughter grade.

This report deals with the second trial in a project designed to study the performance of steers and heifers self-fed mixed rations in which the amount of concentrate varied from 35 to 80 percent.

Procedure

Eighty-eight, choice, Hereford calves were obtained in July, 1956, from the Harding Ranch, northeast of Stillwater. The calves had been dropped in the fall of 1955, and had been creeped during the summer. In the interval between purchase and the start of the feeding trial, they were fed supplements on native grass in order to maintain condition.

The drove contained 48 steers and 40 heifers, selected to be as near alike in grade and condition as possible. The feeder price per cwt. was \$20 for steers and \$18 for heifers at the time the fattening trial was initiated.

The calves were started on feed in early September at the Fort Reno station. Allotment within each sex was based on shrunk weight and feeder score. Duplicate pens of 5 calves each made up each lot. The calves were fed in small pens with concrete exercise slabs and an open shed to the north under which the self-feeder was located. A watering device and salt box (2 parts salt and 1 part bone meal) was available beneath the shed in each pen.

The mixtures fed, by lots, are shown in Table 1, together with the chemical composition and cost of the mixed rations. The concentrate

Table 1.—Composition and cost of self-fed mixtures.

Lot number	1 & 2	3 & 4	5 & 6	7 & 8
Conc: Roughage ratio	35:65	50:50	65:35	80:20
Feeds used (%)				
Ground milo	17.0	33.2	49.7	65.1
Cottonseed meal	11.0	9.5	7.7	7.0
Molasses	7.0	7.0	7.0	7.0
Chopped alfalfa	32.5	25.0	17.5	10.0
Cottonseed hulls	32.5	25.0	17.5	10.0
Grd. limestone	0.0	0.3	0.6	0.9
	100.0	100.0	100.0	100.0
Ration Composition (%)				
Dry matter	90.55	91.21	90.18	88.52
Ash	5.62	6.55	4.61	4.76
Crude protein	14.36	16.17	13.24	13.49
Ether extract	1.02	1.49	1.43	2.60
Crude fiber	26.27	22.29	16.40	9.66
N-free extract	43.28	44.01	54.50	58.01
Estimated T.D.N. content (%)	55.7	60.4	65.2	69.8
Cost per cwt. (\$)	1.85	2.01	2.17	2.33

portion of the ration consisted of ground milo, cottonseed meal and molasses; while the roughage was one-half cottonseed hulls and one-half chopped alfalfa hay. Small amounts of ground limestone were added where necessary to provide approximately the same calcium and phosphorus levels in all rations. In an additional lot, eight steer calves were used to study the effect of a larger pen area on performance.

The cattle were weighed off test and shipped to Oklahoma City as they were estimated to have reached a slaughter grade of high-good to low-choice. On-foot grade was estimated by a committee from the Animal Husbandry Department and a commission firm. In all, three shipments were made during the trial and the calves to be shipped were

Table 2.—Performance of steers and heifers self-fed rations varying in concentrate-to-roughage ratios (10 calves/lot)

Conc:Roughage Ratio Lot Number Sex	85:65		50:50		65:35		80:20 ¹	
	1 Steers	2 Hfrs.	3 Steers	4 Hfrs.	5 Steers	6 Hfrs.	7 Steers	8 Hfrs.
Av. days on feed	170	167	156	155	165	156	150	169
Av. Weights (lbs.)								
Initial 9-14-56	552	505	552	504	552	504	551	504
Gain to 128 days	258	202	242	212	218	212	242	201
Total gain	328	255	276	255	265	225	267	242
Av. daily gain	1.93	1.52	1.77	1.65	1.61	1.44	1.78	1.43
Av. daily feed consumption (lbs.) ²								
Concentrates	8.05	7.02	10.79	10.58	12.15	12.31	14.04	13.59
Roughage	14.95	13.05	10.79	10.58	6.54	6.63	4.03	3.86
Total	23.00	20.07	21.57	21.15	18.69	18.94	18.07	17.45
Av. daily T.D.N. intake	12.81	11.18	13.03	12.77	12.19	12.35	12.49	12.07
Feed Per cwt. gain (lbs.)								
Concentrates	417	462	610	640	755	855	789	950
Roughage	775	859	610	640	406	460	226	270
T.D.N. per cwt. gain (lbs.)	6.64	7.36	7.36	7.74	7.57	8.58	7.02	8.44
Feed cost per cwt. gain (\$)	22.05	24.32	24.51	25.84	25.25	28.50	23.41	28.12

¹ These calves were started on the 65-35 mixture and gradually changed to the 80-20 mix over the first 3 weeks of the trial. All other calves started on their respective mixtures.

² Computed from records of feed consumed and composition of rations.

selected regardless of treatment. Since length of time on feed varied, a shrunk weight at 128 days (prior to the first shipment) is given as a basis for comparing performance, as well as over-all gain.

Slaughter data included dressed weights, carcass grades, and marbling scores. The live, or "on-foot" value of the cattle was computed from carcass value according to grade and weight, and was based on the final shrunk weight off test at Ft. Reno.

Results

Table 2 shows the average gains, feed consumption and feed required per cwt. gain for each treatment. Market value, carcass data and financial returns are shown in Table 3.

In Table 4, a comparison of steers vs. heifers is given. As in the first trial, average daily gains for both steers and heifers were disappointing. Periodic weights from this and the previous trial indicate that within each treatment, gains were satisfactory for approximately 100 days, whereupon feed consumption declined and gains dropped accordingly. The reason for this slacking off in feed consumption is not apparent. Some difficulty was encountered in getting the various mixtures to feed down uniformly in the self-feeders. Further, the calves on the 80:20 concentrate-to-roughage ration tended to sort out the roughage and leave the concentrates. The fact that the calves were in fleshy feeder condition at the start of the trial probably reduced gains.

Despite the poor gains, trends in this trial were similar to those observed in the first trial (1955-56) and may be summarized as follows:

1. **Time on feed, gains and feed consumption.** There was little variation in the time required to reach market grade. Daily gains were greatest for steer calves fed the least concentrated ration (35-65 mixture), and for heifers fed the 50-50 mixture. As in the first trial, feed intake declined as the level of concentrates in the ration increased. When the daily T.D.N. (total digestible nutrient) intake is calculated for each lot, only small differences are apparent. This may be the chief explanation for the lack of difference in performance among the lots. Calves fed the bulkier rations (35-65 and 50-50 mixtures) required slightly more total feed, but less concentrates, to reach market condition. In general, feed costs per cwt. gain increased as the concentrates in the ration were increased.

2. **Slaughter data.** Dressing percent (yield) and carcass grades were quite uniform, as is to be expected since the cattle were removed for slaughter at the same estimated grade. There is some indication from carcass grades and yield that calves fed the 80-20 mixture could have been sold earlier. Generally, the carcasses in all lots were amply covered outside, but many lacked the inside finish necessary to meet current grading standards. Marbling scores, however, failed to show a significant difference among the lots.

Table 3.—Carcass data and Financial Results.

Conc.: Roughage Ratio Lot number Sex	35:65		50:50		65:35		80:20	
	1 Steers	2 Hfrs.	3 Steers	4 Hfrs.	5 Steers	6 Hfrs.	7 Steers	8 Hfrs.
Carcass Yield (%) ¹	59.3	59.4	59.6	59.7	59.1	59.4	60.0	60.9
Av. U. S. Carcass Grade	6d.+	6d.+	6d.+	6d.+	6d.+	6d.+	6d.+	Ch—
Numerical Score ²	5.7	5.9	6.1	5.7	6.2	6.2	6.2	5.4
Marbling Score ³	2— to 3+	3+	3	3+	3	3	3	2
Financial Results (\$)								
On-foot Value ⁴	19.54	19.43	19.39	19.76	19.19	19.38	19.49	20.19
Market value/calf	171.99	147.51	160.19	150.01	156.78	141.26	159.27	150.95
Feed Cost/calf	72.34	62.01	67.64	65.89	66.92	64.12	62.50	68.06
Total Steer & Feed Cost ⁵	182.74	152.91	178.04	156.61	177.32	154.84	172.70	158.78
Net Return/calf	-10.75	-5.40	-17.85	-6.60	-20.54	-13.58	-13.43	-7.83

¹ Hot carcass weights shrunk 2½%, based on final Ft. Reno weights.

² Numerical score: Prime=1, Choice=4, Good=7, Standard=10.

³ Marbling score: 1=abundant, 3=moderate, 5=slight to none.

⁴ On-foot value computed from carcass value according to grade and yield, and based on final live weights at Ft. Reno

⁵ Steers charged into feedlots at \$20.00/cwt., heifers at \$18.00.

Table 4.—Comparison of steers and heifers based on lot averages¹.

	Steers Lots 1,3,5, & 7	Heifers Lots 2,4,6 & 8
Ave. days on feed.	160	162
Ave. weights (lbs.)		
Initial	552	504
Gain to marketing	284	244
Ave. daily gain	1.78	1.51
Total feed consumed/calf/day (lbs.)	20.34	19.41
Feed per cwt. gain (lbs.)		
Concentrates	643	727
Roughage	504	557
Feed cost/cwt. gain (\$)	23.81	26.70
Marketing data:		
Yield, %	59.5	59.9
Ave. carcass grade	6d + (6.1)	6d + (5.8)
On-foot value/cwt. (\$)	19.40	19.69
Net return per calf (\$)	-15.64	-8.35

¹ Individual lot data shown in Tables 2 and 3.

3. **On-foot value and net returns.** Little difference is apparent in on-foot value, as computed from grade and yield. Again this was due to the likeness of grade at the time the cattle were marketed. All calves lost money due to the high cost of cattle and feed vs. the low value of dressed beef. Greatest financial losses occurred with calves fed the 50-50 and 65-35 rations, while those fed either extreme lost the least. In the case of the 35-65 mixture, this was probably due to a cheaper ration, while for the 80-20 mixture, less total feed was required to fatten the calves.

4. **Steers vs. heifers.** Taking an average of all lots, steer calves out-gained heifers about .25 lbs. per head daily, at nearly 10 percent less feed cost per cwt. gain. Time required to reach market grade was about the same, although carcass data showed a slight advantage for heifers—as was further borne out by marbling scores. Considering the grade and yield of their carcasses, the heifers should have sold for slightly more than the steers on-foot. Because of a cheaper initial investment as feeders, they suffered less financial loss.

5. **Effect of pen size.** Eight comparable steer calves fed a 65-35 mixture in a special pen approximately twice the size of those used for the other calves gained faster (0.2 lbs. more per head daily) than the steer calves of Lot 5 which served as controls. They were essentially the same in carcass grade and yield. The small pens (approximately 15 × 90 feet) may have adversely affected feed consumption and reduced gains in this trial.

Summary

Eight lots of fall-dropped calves (four lots of steers and four of heifers) were self-fed four different mixtures containing 35, 50, 65 or 80 percent concentrates. The cattle were marketed when it was estimated

they would grade top-good to low-choice. Although gains were disappointing, the results show no significant difference between the mixtures fed in time required to reach slaughter grade, daily gains or carcass grade and yield. Daily feed consumption declined as the concentrate in the ration increased, so that T.D.N. intake was approximately the same for all lots. The data indicate that concentrate-to-roughage ratios in fattening rations for calves can vary widely, with essentially equal results.

The Value of Dehydrated Alfalfa Meal and Molasses in Supplements for Wintering Weanling Calves

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Recent studies with beef cattle supplements have emphasized the feeding of rations which contain the proper balance of the various nutrients. There are suggestions that dehydrated alfalfa meal may have value other than as a source of known nutrients. Molasses may have value above that resulting from added energy or possible increased palatability of the ration. The addition of these components to fattening rations is being extensively studied but little information is available concerning their use in wintering rations. Their use in wintering rations in this area would ordinarily be restricted to their addition to pelleted supplements.

The data reported here are the results of the fourth trial of a study of the value of adding dehydrated alfalfa meal and cane molasses to a wintering ration containing mature, weathered native grass hay as the roughage.

Procedure

Thirty grade, Hereford calves were divided into 3 lots on November 15, 1956. There were six steers and four heifers per lot. All calves were fed the poor-quality hay, free-choice. This hay had been cut from native grass pastures in early November, was relatively coarse textured and was lower in content of protein and phosphorus than prairie hay cut from a similar area in July. Much of the roughage was growth from previous summers. The hay had no apparent green coloring.

In addition to the low-quality hay, the calves had access to a mineral mixture of two parts salt and one part steamed bone meal and were fed an average of two lbs. of protein supplement per head daily. The pelleted supplements contained approximately equal amounts of protein (Table 1) and the ingredients were fed to the various lots as follows:

Lot 1. 1.5 lbs. cottonseed meal, 0.5 lb. corn.

Lot 2. 1.35 lbs. cottonseed meal, 0.15 lb. corn, 0.5 lb. dehydrated alfalfa meal.

Lot 3. 1.6 lbs. cottonseed meal, 0.3 lb. corn, 0.1 lb. cane molasses.