The Effect of Initial Weight, Time on Feed, and Prefinishing Environment Upon Feedlot Performance of Steers

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The Effect of Initial Weight, Time on Feed, and Prefinishing Environment Upon Feedlot Performance of Steers

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Complex decisions face feedlot operators with each new group of incoming cattle, yet many feedlots have inflexible systems of production. This means that in specific cases, cattle may be forced into an inefficient system of production.

It is important that quality of the end product be included in such decision-making if beef is to maintain its enviable position as the most popular meat in the United States. Production of fat is expensive and excessive amounts cannot be marketed profitably through normal channels; however, some fat must be interspersed throughout the edible portion of the carcass to maintain its quality and flavor.

As the cost-price squeeze becomes greater, economic efficiency of beef production may become synonymous with biological efficiency. This may not be true in all areas because of the widely divergent sources and costs of feedstuffs, but instances where compensatory growth (Winchester and Howe, 1955; Winchester and Ellis, 1957) can be used to economic advantage become fewer as the cost of feedstuffs becomes greater in relation to live animal values.

The source of cattle has been shown to be another contributing factor to variation in finishing performance (Ralston *et al.*, 1966). Since this variation is due to previous environment and genetic potential, it also plays an important role in feedlot decision-making.

Results from four trials have been assembled in this bulletin to help the feeder answer the following questions:

1. How long should steers be on a finishing ration?
2. At what weight should finishing begin? and
3. What type of prefinishing treatment should weaner calves receive?

It must be understood that, although each of the above questions may be discussed singularly, the ultimate decision should be based on the weighted consideration of all three.

Experiment 1

This trial was designed to study the response of yearling steers weighing 660 and 850 pounds to varying intervals of time on a finishing ration.

Table 1. Restrictions for Least-cost Finishing Ration

Ingredient	Minimum	Maximum
Net energy, Mcal per pound	.7	.....
Crude fiber, percent	5.0	10.5
Digestible protein, percent	10.0	.....
Beet pulp, percent	.....	15.0
Molasses, percent	5.0	7.5
Urea, percent	.....	1.145
Calcium, percent	.5	.7
Phosphorus, percent	.3	.5

Methods

The steers were fed a least-cost ration based on the restrictions listed in Table 1. All cattle were from a common source, received the same treatment, and were brought to full feed within one month.

The light and heavy steers were allotted randomly to five pens for each weight group. The only difference in the management of the cattle was the time on feed. The cattle were removed from feed at 56, 84, 112, 140, and 168 days.

Results and discussion

Average daily gains, feed conversion, and cost of gains are summarized in Table 2. After a period of 84 days, the longer the animals of a given initial weight were on feed, the smaller the daily gains became. This was reflected in more feed per unit of gain and, conse-

Table 2. The Effect of Time on Feed on Feedlot Performance

Days on feed	Initial weight	Finish weight	Average daily gain	Pounds of feed per pound of gain	Cost per cwt. of gain
	lbs.	*lbs.*	*lbs.*	*lbs.*	*$*
Light steers					
56	638	837	3.55	636	16.01
84	637	950	3.72	644	16.64
112	636	974	3.02	738	19.42
140	634	1,066	3.09	752	19.64
168	636	1,131	3.00	771	20.23
Heavy steers					
56	811	1,017	3.67	697	17.50
84	818	1,123	3.64	713	18.38
112	820	1,200	3.39	794	20.79
140	816	1,279	3.30	776	20.23
168	817	1,359	3.21	816	22.39

quently, a greater cost per unit of gain. The length of time the steers were on a high energy diet had a greater influence upon feed efficiency than the weight of the animal at the time feed efficiency was measured. There are two plausible explanations for this. First, the longer an animal was on a high energy diet, the less feed it consumed when calculated either on a percent of body weight basis or per unit of metabolically effective size (weight$^{.75}$) (Table 3). Second, the longer a steer was on feed the fatter it became, and the conversion of feed to fat was less efficient on a weight basis.

The lighter steers were generally more efficient for a given time on feed because of greater feed intake per unit of body weight (Table 4). Furthermore, if body fat could be used as an indicator of physiological age, then animals were physiologically younger for a given time on feed. This would also add to their efficiency. Such reasoning must be based upon both groups of steers having the same potential mature weight, which may or may not have been true. If one looks only at steer weight, then the heavier groups were more efficient at a given weight for the same reasons stated above. Time on feed and initial weight of the steers were more closely related in their effects upon carcass quality than they were upon growth. Each additional increment of time on feed increased warm carcass weight, dressing percent, marbling score, and back fat, but reduced the percent yield of trimmed cuts (Table 5). The USDA grades were not as closely related to time on feed because increased maturity of the carcasses increased the marbling requirements to grade. The area of ribeye generally increased with time on feed with light steers. This trend was not as apparent in the heavy group.

Experiment 2

This trial was designed to study the effect of steer weight, when the steer were placed on a finishing ration, upon overall and finishing performance. With the exception of the calves placed on the finishing ration at 450 pounds, the remaining lots were on comparable feed prior to and during the finishing ration.

Methods

One hundred and eighteen steers from a common source were stratified as to weight and randomly allotted to 10 pens. Cattle in five pens received alfalfa pellets *ad libitum* and those in the other five pens received corn silage *ad libitum* plus 1% of their body weight in a common finishing ration plus 3.0 pounds of alfalfa pellets per head daily.

At weights of 450, 550, 680, 750, and 850 pounds, one pen of steers on each prefinishing treatment was placed on the common finishing ration. The ration consisted of 41% steam rolled barley, 41% steam

Table 3. Periodic Intake as a Percent of Body Weight or Metabolic Effective Weight

Days on feed	BW[1]	MET[2]	BW	MET	BW	MET	BW	MET	BW	MET
	lbs.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
Light steers										
56	3.05	15.9								
84	3.10	16.2	2.82	15.5						
112	2.92	15.2	2.73	14.9	2.37	13.2				
140	3.20	16.7	2.73	14.9	2.34	13.1	2.13	12.1		
168	3.04	15.8	2.85	15.5	2.42	13.5	2.02	11.5	2.01	11.6
Heavy steers										
56	2.79	15.3								
84	2.68	14.8	2.66	15.3						
112	2.78	15.2	2.63	15.1	2.46	14.4				
140	2.71	15.0	2.59	14.9	2.23	13.1	1.91	11.4		
168	2.73	15.1	2.66	15.3	2.23	13.1	2.04	12.1	1.86	11.3

[1] Percent of body weight.
[2] Percent of metabolic effective weight (pounds of feed ÷ weight$^{.75}$).

Table 4. Periodic Average Daily Gain (ADG) and Pounds of Feed per Pound of Gain (FE)

	56 days		28 days		28 days		28 days		28 days	
Days on feed	ADG	FE	ADG	FE	ADG	FE	ADG	FE	ADG	FE
	lbs.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
Light steers										
56	3.55	6.36								
84	3.71	6.23	3.73	6.85						
112	3.32	6.44	3.23	7.42	2.23	10.17				
140	3.49	6.73	3.43	7.07	2.34	9.71	2.69	8.23		
168	3.28	6.77	3.48	7.18	2.57	9.08	2.29	9.15	2.75	8.11
Heavy steers										
56	3.67	6.97								
84	3.48	7.06	3.95	7.27						
112	3.29	7.71	3.88	7.25	3.10	9.28				
140	3.65	6.84	3.86	7.29	2.62	10.04	2.75	8.73		
168	3.59	7.00	3.64	7.89	2.75	9.52	2.49	10.21	2.97	7.70

Table 5. Effect of Time on Feed on Slaughter and Carcass Characteristics

Days on feed	Live slaughter weight	Warm carcass weight	Dress	Marble score[1]	USDA grade[2]	Back fat	Ribeye area	Yield trim cuts
	lbs.	*lbs.*	*%*			*in.*	*sq. in.*	*%*
Light steers								
56	837	470	56.2	6.9	13.2	.20	10.7	52.4
84	950	557	58.6	11.4	15.4	.33	10.9	51.1
112	974	603	61.9	12.0	16.2	.35	11.5	50.9
140	1,066	662	62.1	17.0	17.5	.48	11.8	49.9
168	1,131	702	62.1	17.1	17.0	.54	12.2	49.5
Heavy steers								
56	1,017	602	59.2	9.6	14.8	.32	12.0	51.5
84	1,123	672	59.8	11.9	16.0	.38	11.9	50.6
112	1,200	734	61.2	12.8	16.3	.46	13.2	50.1
140	1,279	807	63.1	16.2	17.5	.58	13.4	49.0
168	1,359	843	62.5	17.1	16.9	.67	12.6	47.8

[1] Marble score: 6 = traces, 9 = slight, 12 = small, 15 = modest amounts of marbling.
[2] USDA grade: 14 = good, 17 = choice.

rolled wheat, 10% dried beet pulp, 7% molasses, and 1% salt. While on the finishing ration, each animal received daily an additional 1.0 pound of a 40% protein supplement containing 20,000 IU of vitamin A per pound. The steers were weighed periodically and marketed at about 1,050 pounds or the low end of the choice grade.

Results and discussion

When average daily gains for the entire feeding period were considered, the differences due to the prefinishing treatments were small (Table 6). Differences in average daily gain due to weight of animal placed on the finishing ration were significant ($P<.01$). The average daily gain of the steers fed alfalfa pellets increased as the time on the finishing ration increased. This trend was not apparent for animals which were fed the corn silage combination.

Periodic gains were irregular, as might be expected (Table 7). However, the gains of steers fed alfalfa pellets undulated more sharply than the gains of steers fed corn silage. The intake of the steers increased during the trial regardless of the ration being consumed (Table 8). However, this increase was only apparent since intake per unit of weight decreased somewhat. A reduction in feed efficiency (total digestible nutrients per pound gain in weight) toward the end of a feeding trial may be due to reduced intake, deposition of an end product requiring more energy, or a reduction in biological efficiency. Feed efficiencies favored feeding finishing rations at the lighter weights, but not significantly so (Table 9).

The steers placed on the finishing ration at 450 pounds had significantly more back fat at slaughter than animals placed on the finishing ration at heavier weights. Dressing percent, marbling score, USDA grade, and area of ribeye were all similar regardless of ration fed or the weight of the steers put on the finishing ration. Steers from all treatments graded low choice or better except the alfalfa pellet-fed steers placed on the finishing ration at 850 pounds of weight.

The total time on feed was 200, 210, 218, 221, and 241 days for animals placed on the finishing ration at 450, 550, 680, 750, and 850 pounds, respectively. The pounds of grain necessary to finish animals from the above respective weights were 3,168, 2,816, 2,361, 1,696, and 1,610. Alfalfa pellet-fed steers on the finish ration for 73 days finished on only 911 pounds of grain. As the competition for grain becomes greater, pelleting of roughage provides a possible improvement for the use of roughage in finishing diets. With a cost of $.0362 and $.0303 per pound of total digestible nutrient from alfalfa pellets and corn silage, respectively, feed costs increased with the length of time on alfalfa pellets but decreased with the time on silage.

Table 6. Effect of Prefinishing Diet and Starting Weight Upon Feedlot Performance

Treatment	Final weight	Average daily gain	TDN[1] per pound gain	Marble score[2]	USDA grade[3]	Back fat	Ribeye	Dressing	Cost per cwt.
	lbs.	*lbs.*	*lbs.*			*in.*	*sq. in.*	%	$
Corn silage + finish from									
450 pounds	1,030	2.75[d]	4.85	14.2	16.4	.59[d]	10.7	59.6	18.27
550 pounds	1,005	2.51[e]	5.05	13.1	16.3	.47	10.9	59.9	18.69
680 pounds	1,032	2.57[de]	4.96	15.8	16.8	.51	10.7	59.4	18.05
750 pounds	1,023	2.51[e]	4.90	13.3	16.3	.51	10.9	59.5	17.61
850 pounds	1,071	2.51[e]	5.09	14.1	16.4	.47	11.8	59.3	17.57
Average	1,032	2.57	4.97	14.1	16.4	.51	11.0	59.5	18.04
Alfalfa pellets + finish from									
450 pounds	1,012	2.75[d]	4.96	15.8	17.0	.63[d]	10.9	60.4	18.67
550 pounds	1,014	2.64[d]	5.06	12.8	16.2	.59[d]	10.2	60.2	19.02
680 pounds	1,030	2.57[de]	5.25	13.2	16.2	.55	10.9	59.8	19.21
750 pounds	1,032	2.51[e]	5.21	14.2	16.3	.43	10.9	59.4	19.58
850 pounds	1,047	2.35[e]	5.25	13.0	15.8	.43	11.0	57.4	19.79
Average	1,027	2.57	5.14	13.8	16.3	.53	10.7	59.4	19.25

[1] Total digestible nutrient.
[2] Marble score: 9 = slight, 12 = small, 15 = modest.
[3] USDA grade: 14 = good, 17 = choice.
[de] Means in the same column with different superscripts are significantly different ($P < .01$).

Table 7. Effect of Prefinishing Diet and Starting Weight Upon Periodic Average Daily Gain

Days on finish ration	Average daily gain (pounds)							
	Periods							
	56 days	28 days	28 days	28 days	28 days	28 days	28 days	28 days
Corn silage								
200	*1.65	2.73	3.06	3.30	3.32	2.84	.....	.....
154	1.21	2.24	*2.29	2.99	3.10	3.32	2.60	.....
106	1.65	2.31	1.87	2.57	*2.88	3.41	3.15	.....
81	1.34	2.18	2.44	2.29	2.68	*2.53	3.74	.....
73	1.80	2.09	2.13	2.20	2.57	2.13	*2.90	3.37
Alfalfa pellets								
200	*1.96	2.93	2.64	2.62	3.39	2.99	.....	.....
154	1.65	2.16	*1.65	2.93	4.31	3.41	.....	.....
106	1.58	2.68	1.30	2.88	*2.88	3.43	3.61	.....
81	1.54	2.46	1.58	2.75	2.46	*3.32	3.26	.....
73	1.39	2.64	1.61	2.79	2.13	2.75	*2.05	2.95

* Change to finish ration.

Table 8. Effect of Prefinishing Diet and Starting Weight Upon Periodic Intake of Total Digestible Nutrients

Days on finish ration	Total digestible nutrients, (pounds per head daily)							
	Periods							
	56 days	28 days	28 days	28 days	28 days	28 days	28 days	28 days
Corn silage								
200	*7.9	10.8	13.4	14.3	15.0	15.6	.....	.....
154	7.9	8.4	*12.1	13.4	15.0	15.4	15.0	.....
106	7.9	9.0	10.3	11.2	*13.9	16.7	17.2	.....
81	8.1	9.0	10.1	11.4	11.9	*15.2	16.9	.....
73	7.9	8.8	10.1	11.9	11.7	13.6	*15.0	18.0
Alfalfa pellets								
200	*9.7	11.7	13.4	13.2	15.0	15.8	.....	.....
154	7.7	9.5	*10.3	12.5	16.9	17.4	.....	.....
106	7.9	9.7	9.5	12.3	*14.3	17.4	17.6	.....
81	7.9	9.9	10.1	12.3	13.0	*16.3	18.3	.....
73	8.1	9.7	10.1	12.1	12.5	13.6	*12.1	16.3

* Change to finish ration.

Table 9. Effect of Prefinishing Diet and Starting Weight Upon Periodic Feed Efficiency

Days on finish ration	Feed efficiency (pounds TDN per pound of gain)							
	Periods							
	56 days	28 days	28 days	28 days	28 days	28 days	28 days	28 days
Corn silage								
200	*4.8	4.0	4.4	4.3	4.5	5.5	-----	-----
154	6.5	3.7	*5.3	4.5	4.8	4.6	5.8	-----
106	4.8	3.9	5.5	4.4	*4.8	4.9	5.5	-----
81	6.1	4.1	4.1	5.0	4.4	*6.0	4.5	-----
73	4.4	4.2	4.7	5.4	4.5	6.4	*5.2	5.4
Alfalfa pellets								
200	*4.9	4.0	5.1	5.0	4.4	5.3	-----	-----
154	4.7	4.4	*6.3	4.3	3.9	5.1	-----	-----
106	5.0	3.6	7.3	4.3	*5.0	5.1	4.9	-----
81	5.1	4.0	6.4	4.5	5.3	*4.9	5.6	-----
73	5.9	3.7	6.3	4.3	5.9	5.0	*5.9	5.5

* Change to finish ration.

Experiments 3 and 4

Trials 3 and 4 were conducted in an attempt to categorize the major factors causing variations in feedlot performance due to source of cattle. The fact that most feedlot performance was only moderately heritable (Warwick, 1958) and that total variation in average daily gain and carcass characteristics were greatly affected by source of cattle (Ralston and Taylor, 1963) seemed to justify the following trials.

Materials and methods

This report includes data obtained from two prefinishing trials using 108 and 120 weanling beef steer calves from 9 and 10 different sources for trials 3 and 4, respectively. The calves initially weighed about 500 pounds and finished at approximately 1,025 pounds. Since the calves were from different ranches each year, they were of different genetic strains but were not necessarily a representative genetic sample of the beef cattle population.

The calves from each source were randomly allotted to 10 different prefinishing treatments consisting of five different roughages and two levels of concentrate.

During trial 3 the following rations were fed: (1) wheat chaff *ad libitum* plus 1.5 pounds of supplement per head daily; (2) chopped alfalfa *ad libitum;* (3) corn silage *ad libitum* plus 3 pounds of chopped alfalfa per head daily; (4) wheat chaff-alfalfa (1:1) pellets plus 0.75 pound of supp'ement per head daily, and (5) corn silage *ad libitum* plus 0.75 pound of supplement per head daily. Rations 6 through 10 consisted of rations 1 through 5 plus concentrate (85% barley and 15% beet pulp) at 1% of body weight.

In trial 4 the rations consisted of: (1) wheat chaff *ad libitum* plus 2.0 pounds of supplement and 1.0 pound of concentrate per head daily, (2) chopped alfalfa at 2.5% of body weight, (3) corn silage *ad libitum* plus 3.0 pounds of chopped alfalfa per head daily, (4) wheat chaff-alfalfa (1:1) pellets *ad libitum,* and (5) corn silage *ad libitum* plus 1.0 pound of supplement per head daily. Rations 6 through 10 consisted of rations 1 through 5 plus concentrate at 1% of body weight.

After 110 days on these rations the steers were fed a finishing ration consisting of alfalfa pellets, steam rolled barley, dried beet pulp, molasses, supplement, and salt. The alfalfa pellets were fed at a gradually reduced rate (Table 10).

The initial finishing ration contained 13.3% crude protein and 18% crude fiber, but was gradually reduced to 10.5% crude protein and 8% crude fiber.

The animals were weighed periodically, and equal numbers were slaughtered from each treatment so that differences in carcass characteristics would be due to prefinishing treatment and genetic potential

Table 10. PERCENT COMPOSITION OF FINISHING RATION BY PERIOD[1]

	28 days	14 days	Trial 3 14 days	54 days	55 days
	28 days	28 days	Trial 4 28 days	28 days	28 days
Alfalfa pellets	40	30	20	10	5
Steam rolled barley	32	44	55	67	77
Beet pulp	20	18	15	15	10
Molasses	7	7	7	7	7
Salt	1	1	1	1	1

[1] Protein supplement fed at 1.0 pound per head daily consisted of 2.5% cottonseed oil meal, 2.5% alfalfa meal, 3.25% urea, 38% cull peas, 1.25% limestone, 1% steam bone meal, 0.5% vitamin A (10,000 IU/gm), 1% trace mineralized salt, and 50% barley.

and not to the length of the finishing period. Weight and live grade were the criteria used in selecting the animals for slaughter.

The yield of boned, closely trimmed retail cuts from round, loin, rib, and chuck were estimated by the method described in the Federal Register (1962).

Results and discussion

Prefinishing gains by pens varied from 0.03 to 1.87 pounds and 1.06 to 2.40 pounds per head daily for trials 3 and 4, respectively. Treatments were designed expressly to achieve different rates of prefinishing gain by using two levels of energy for each type of ration. Success in achieving different rates of gain was incomplete because the addition of concentrates to the chaff-alfalfa pellet ration reduced the pellet intake which, in turn, reduced the amount of variation in the high and low energy levels. Finishing gains were significantly different but less variable and were negatively related to prefinishing rates of gain. However, the difference in rate of gain during the finishing period was not significant for the treatment group which barely maintained its weight during the prefinishing period (pen 1, trial 3) and a group which gained as much as 1.47 pounds per head daily (Table 11). This was greater than the 1.20 pounds per day reported by Castle and others (1961) as the largest winter gain that could be expected without reducing subsequent summer gains on pasture. It does support in part the 1.60 pounds per day reported by Wallace and others (1962) as the upper limit of winter gain without subsequent reduction in summer gains on the range.

Although the range in gains was not as great in trial 4 (Table 11), the prefinishing gain of 1.50 pounds (pen 7) was apparently close to the upper limit without a significant reduction in finishing gains. This upper limit or optimum prefinishing gain might have changed materi-

Table 11. Average Daily Gains (ADG) and Feed Efficiencies for Prefinishing, Finishing, and Total Period

Energy level	Pen	Prefinishing		Finishing		Overall	
		ADG	Feed per 100 pounds gain	ADG	Feed per 100 pounds gain	ADG	Feed per 100 pounds gain
		lbs.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
Trial 3							
Low	1	0.03[a]	15,065	3.39[e]	690	2.02	976
	2	0.99[b]	2,298	3.10[b, c]	737	2.22	945
	3	1.03[b]	1,272	3.08[b, c]	729	2.24	836
	4	1.74[e, f]	1,129	2.93[a, b]	793	2.44	903
	5	0.88[b]	1,183	3.41[c]	693	2.38	773
High	6	1.32[c]	1,367	3.26[b, c]	722	2.40	880
	7	1.67[d, e]	1,064	2.99[a, b]	749	2.42	849
	8	1.58[d, e]	887	3.04[b]	722	2.40	771
	9	1.87[f]	1,063	2.68[a]	813	2.31	908
	10	1.47[d, e]	857	3.10[b, c]	674	2.38	724
Trial 4							
Low	1	1.36[b]	1,172	3.06[c, d, e]	732	2.24	856
	2	1.17[a]	1,178	3.08[c, d, e]	730	2.18	840
	3	1.06[a]	1,093	3.06[c, d, e]	701	2.11	793
	4	2.11[d]	1,032	2.75[a, b]	797	2.44	905
	5	1.10[a]	927	3.23[e]	670	2.24	729
High	6	1.85[e]	936	2.88[a, b, c, d]	733	2.38	806
	7	1.50[b]	1,161	3.17[b, c, d, e]	664	2.38	808
	8	1.74[c]	818	2.64[a]	775	2.22	791
	9	2.40[e]	846	2.73[a, b]	800	2.57	820
	10	1.74[c]	749	2.93[a, b, c, d]	743	2.38	745

[a, b, c, d, e, f] Within-year means bearing different superscript letters are significantly ($P < .05$) different.

ally if all animals had been on a common prefinishing diet. The feed efficiencies during the prefinishing period were not always proportional to the rate of gain, since there was a wide variation in digestibility of the feeds used. Pelleting of wheat chaff and alfalfa stimulated intake and gains, but feed efficiency was not as great as for some of the other rations which produced significantly less gain.

When all animals were fed the same finishing ration, feed efficiencies were closely related to the gains produced. The efficient use of feed during the finishing period by the chaff-fed cattle supports the work of Winchester and Howe (1955), but was more costly than the other treatments for the two periods combined.

Statistical analyses of prefinishing gains indicate that level of energy, type of ration, and source of animals contribute significantly to the total variation.

Analyses of finishing gains indicate that the type of prefinishing ration was the most important source of variation. In trial 4, level of energy in the prefinishing ration and source of cattle also made significant contributions to the variation in finishing gains. However, the type of ration was more important.

When prefinishing and finishing gains were considered collectively, the rations containing corn silage during the prefinishing period had the greatest total feed efficiency regardless of the gains produced.

Although differences in marbling scores were nonsignificant (Table 12), carcass characteristics seemed to be more dependent upon source of animals than prefinishing treatment. In trial 4, source of animals significantly affected the variation in estimated yield of trimmed

Table 12. Summary of Prefinishing Treatment Effect Upon Carcass Characteristic

	Trial 3			Trial 4		
Pen no.	Marbling score[1]	Grade[2]	Yield[3]	Marbling score	Grade	Yield
1	12.6	15.6	49.7	13.5	16.5	49.2
2	15.4	16.8	48.3	14.3	16.6	49.1
3	14.7	16.7	48.5	15.4	16.5	49.3
4	16.1	16.8	49.0	16.2	17.2	48.5
5	16.4	17.1	49.4	15.8	17.0	48.9
6	14.6	17.1	49.2	15.3	16.8	48.7
7	16.9	17.3	48.7	15.2	17.1	49.2
8	15.3	16.9	49.2	17.0	16.8	49.4
9	14.3	16.4	48.7	15.8	17.2	48.4
10	17.3	17.0	49.2	16.8	17.5	49.0

[1] Small = 12, modest = 15, and moderate = 18.
[2] Good = 14, choice = 17, and prime = 20.
[3] Percent of carcass in estimated boneless, closely trimmed retail cuts from round, loin, rib, and chuck.

round, loin, rib, and chuck, but the trial 3 differences were not significant. Type of prefinishing diet made a greater contribution to this variation than the level of energy in the prefinishing diet.

Summary

The experimental trials reported herein do not provide all the answers needed to program feeder cattle for the most economical production of quality beef. Nevertheless, they do provide some basis that may improve the feedlot operators' approach to such complex decisions. These data must not be used singularly but should be considered as a composite, for as one parameter changes so must all others if economical success is to be attained.

After a period of about 84 days, the longer the animals of a given initial weight were kept on feed, the smaller the average daily gain became. This was reflected by more feed required per unit of gain and a greater cost of gain. At a given time on feed, lighter steers may be more efficient. However, the heavier steers were more efficient at a given weight, since they had been on feed for a shorter time. Heavy steers which graded in a shorter period of time on feed had similar back fat and yield of trimmed cuts to steers of lighter initial weight grading the same.

The gains made by calves weighing 450 pounds initially did not vary markedly for the total feeding period regardless of their weight when they were placed on the finishing feed. However, prefinishing gains averaged in excess of 2.1 pounds per day. Under these conditions, steers were finished with as little as 911 pounds of grain. Corn silage was consistently the cheapest prefinishing feed. Steers that gained over a wide range during the prefinishing period due to different rations showed the effects of compensatory growth during the finishing period. However, the type of diet (fiber content) was a greater contributor to variations during the finishing period. Prefinishing gains of up to 1.5 pounds per day did not materially reduce subsequent finishing gains.

Points to be considered in selecting a program for new feeders should include: (1) age and sex, (2) weight and condition, (3) previous feed and gains, (4) potential mature weight, (5) feed sources available and, (6) market demands.

Age and sex

Young cattle six to eight months of age are more flexible. They can be carried for some time on a cheap feed to cheapen the cost per pound of feeder cattle. When cattle approach 18 months of age, they should not be held back but turned as rapidly as possible. Age restrictions on heifers may be less flexible than steers since they mature

physiologically at an earlier chronological age. In other words, heifers cannot be continued on a cheapening ration to as heavy a weight as steers.

Weight and condition

The heavier an animal is, the shorter time that animal should remain in the feedlot. The feeder cannot afford to carry animals having considerable flesh and bloom on a cheapening ration but should move them as rapidly as possible. Steers entering the feedlot at 400 pounds can be carried to approximately 750 pounds before finishing, assuming they do not carry too much initial condition. Heifers should be placed on the finishing ration at 650 pounds.

Previous feed and gains

Weight or condition will be closely associated with previous feed and gains. Cattle that have become accustomed to grain should go directly to finishing. The same may apply to cattle that have been gaining over 2 pounds per day. Gains of up to 1.5 pounds per day do not materially reduce feedlot gains. Lightweight pellet-fed cattle will tend to go off feed if carried on pellets for more than 90 to 100 days. The addition of some hay or silage will alleviate this problem.

Mature weight

Probably the greatest loss of income in a well-run feedlot is caused by the failure of the operator to take advantage of potential mature weight of feeder cattle. A small-type Angus and a large-type Charolais should not be fed to the same slaughter weight. The condition of the animal rather than animal weight should indicate the slaughter date. Cattle with heavy mature weight usually do not marble at the more acceptable market weights. This poses a problem of being satisfied with a lower grading animal or being criticized for an overweight carcass. The advent of an increasing number of breaking rooms in packing houses may help to solve this problem.

Feed sources available

The economic advantage a feeder possesses in the feed market may dictate what type of a program feeder cattle receive. Certainly, if roughages are costly, it behooves the feeder to turn his cattle as rapidly as possible. The feeder would be foolhardy to hold cattle on a growing ration if the cost of gain is not cheapening.

Market demands

The packer really dictates what type of program the feeder may use. For example, if the packer prefers light (500 pound) carcasses that grade low choice or better, the feeder does not have much time to

cheapen 500-pound calves but must finish them rapidly. If, on the other hand, 700-pound carcasses are not docked for extra weight, the feeder has a lot more flexibility in his program. At any rate, the packer must be satisfied or the feeder loses his market.

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