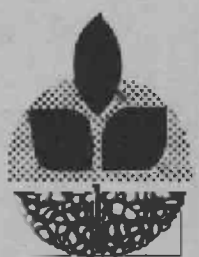
The Effect of Winter Feed Levels on Steer Production

Special Report 584
May 1980



Agricultural Experiment Station
Oregon State University, Corvallis

ABSTRACT

As the margin of profit in the beef cattle industry becomes tighter, producers are forced to look at alternatives to increase returns. Maintaining ownership of weaner calves is one alternative that needs to be considered. Steer calves were wintered at 3 energy levels to evaluate the influence of winter gains on their subsequent performance during summer grazing and feedlot finishing.

Authors: Ralph L. Phillips and Martin Vavra are assistant professor of animal nutrition and associate professor of range nutrition, respectively, Oregon State University's Eastern Oregon Agricultural Research Center at Union. Jerry L. Holechek is assistant professor, department of animal and range sciences, New Mexico State University, Las Cruces.

THE EFFECT OF WINTER FEED LEVELS ON STEER PRODUCTION

R. L. Phillips, J. L. Holechek, M. Vavra

SUMMARY

Thirty-six Hereford and Simmental X Hereford steers weighing about 540 pounds each were allotted by weight and breed into 3 groups and wintered to gain at .87, 1.32, and 1.63 pounds per day (Treatments 1, 2, and 3, respectively). During the wintering phase, average cost per pound of gain and average return for feed cost favored Treatment 3 followed by Treatments 2 and 1. During summer grazing, steers from Treatment 1 had the highest accumulated average daily gain; next were Treatments 2 and 3. Feedlot gains were not influenced by the previous winter or summer gains. Steers from Treatment 3 produced the heaviest and highest quality carcasses. Treatments 2 and 1 were next. Returns over feed costs summed over the 3 phases of the study were the highest for Treatment 2. Treatments 3 and 1 were next.

INTRODUCTION

Several researchers have shown a relationship between level of winter gain and subsequent gains in the summer. Summer rate of gain is inversely related to previous winter gains. Calves wintered at a low rate of gain will outproduce, during the following summer, those wintered at a high rate of gain. This concept is referred to as compensatory gain. Summer gains usually are less expensive than winter gains, making compensatory gains more economical. However, factors other than compensatory gain may influence the overall economic return.

The purposes of this study were to observe the influence of winter gains on summer and feedlot gains and to calculate the return over feed costs.

PROCEDURE

Thirty-six Hereford and Simmental X Hereford steer calves weighing about 540 pounds each were allotted by breed and weight into 3 groups of 12 animals each. The 3 treatments were group fed to gain at .87, 1.32, and 1.63 pounds per day for Treatments 1, 2, and 3, respectively. Treatment 1 was fed alfalfa-orchardgrass hay free choice, Treatment 2, alfalfa-orchardgrass hay free choice plus 2 pounds of barley per head daily, and Treatment 3, alfalfa-orchardgrass hay free-choice plus 5 pounds of barley per head, daily. The feeding period was from November 15 to June 14.

On June 15, all 3 groups were turned out to graze a mixed conifer forest pasture until August 9. From August 10 to September 11, steers grazed regrowth on a subirrigated mountain meadow that had been grazed earlier in the spring.

At the end of the grazing season, the steers were placed in the feedlot, by treatment groups, for finishing. The 3 groups of steers were each fed a series of 5 rations (Table 1) with increasing amounts of barley.

Steers were weighed initially and at 28-day intervals during the winter. While on range, steers were weighed July 18, August 9, and September 11, Periods 1, 2, and 3, respectively. Initial, 28-day periodic, and final weights were taken during the finishing phase. All weights were taken without an overnight shrink off feed and water. Carcass data were collected using USDA carcass ear tags.

RESULTS AND DISCUSSION

Many ranchers in eastern Oregon can increase their returns by maintaining ownership of weaner calves through to finishing with good management. Management practices would include wintering calves at adequate levels to show a return over feed cost, providing good quality summer forage that would maintain economical gains through the grazing period, adjusting cattle numbers to fit summer forage resource, and producing a high quality carcass with a minimum amount of concentrate.

Winter average daily gains for the 3 treatments were .87 pounds, Treatment 1; 1.32 pounds, Treatment 2; and 1.63 pounds for Treatment 3 (Table 4). These gains reflect the feed and energy intake (Table 2) as well as the cost per pound of gain (Table 5) and return over feed cost for the three groups (Table 7). The steers in Treatment 3 consumed less hay and more grain, thus increasing the total cost of wintering when compared to Treatment 1.

However, the return over feed cost was greater for Treatments 2 and 3 than for Treatment 1. Therefore, cost per pound of winter gain was the least for Treatment 3 animals (Table 5). Treatments 1 and 2 consumed the same amounts of hay but the 1.9 pounds of barley consumed by the steers in Treatment 2 increased average daily gains by .45 pounds and returns over feed cost by $30.25.

The addition of a small amount of barley to the hay used in this study, increased efficiency of gain considerably. Treatment 3 steers consumed 3.3 pounds of barley more than Treatment 2 steers. The additional barley reduced hay intake, increased rate of gain, but did not increase return over feed cost for winter for Treatment 3. Hay of higher quality would have reduced the amount of barley needed to achieve the 1.63 pounds-a-day gain, thus reducing feed cost and increasing returns over feed cost.

The winter data indicate that, under some conditions, maintaining ownership through the winter can increase returns that can help offset the expenses incurred in maintaining the cow herd. Winter daily gains of 1.25 to 1.75 pounds show greater returns than gains of less than 1 pound a day.

Also, the higher winter rate of gain allows more flexibility in

management decisions. In poor summer forage years, calves could be sold to save this forage for the cow herd and show a greater return than if calves were wintered at a low rate of gain. Another management option would be to take advantage of the market conditions if cattle prices were high in the spring. Also, heavier calves could be topped off and sold to help pay for winter feed costs. The lighter calves, if weight is from the level of feeding and not lack of quality in the cattle, could graze summer pasture and still take advantage of cheaper summer gains if forage is available.

The influence of winter gains on subsequent summer gains is shown in Table 4. During the first period on range, Treatment 1 steers gained significantly faster than did those in Treatments 2 and 3. The compensatory gain advantage for Treatment 1 was about 1 pound a day for Period 1. However, during the second period, average daily gains for Treatment 1 steers were not significantly different from those in Treatment 2 but both gained significantly more weight than Treatment 3 steers. After 55 days (second period), the compensatory gain advantage was reduced to about .75 pounds a day for Treatment 1 over Treatment 3. Average daily gains during the third period were still about .50 pounds lower for steers in Treatment 3 when compared to Treatment 1. The accumulative summer average daily gains were significantly higher for Treatment 1 (2.19 pounds) followed by Treatment 2 (1.25 pounds) and Treatment 3 (1.31 pounds) (Table 4). Calves that are well framed but light could be bought in the spring to take advantage of cheaper summer compensatory gain if there is an adequate supply of high quality forage.

As expected, cost per pound of gain was lowest for Treatment 1 followed by Treatment 2 and Treatment 3 (Table 5). Also, return over feed cost (Table 7) was much greater for Treatment 1 ($76.14) than for Treatments 2 ($37.64) and 3 ($33.34). Part of this difference in return over feed cost was because of the 6 cents per pound spread used in calculating values of animals going on range. This price represented the difference paid between 721-pound animals and 886-pound animals at range turn out.

However, the accumulative return over feed cost for the winter and summer period (Table 7) was quite close for the three groups. Steers in Treatment 1 returned an average of $8.25 more than steers in Treatment 2 and $12.63 more than steers in Treatment 3. Again, different prices for feed and cattle would change the return over feed cost during these 2 phases of management.

The length of the winter and summer grazing periods can influence the accumulative returns for these 2 periods. Under most situations, long wintering periods favor wintering calves at the higher rates of gain. The compensatory gain advantage does not last long enough during most summer grazing conditions to overcome the additional weight put on during the winter. The grazing season is not long enough for light calves to catch up to heavier calves. Even at the end of summer, calves wintered at 1.50 pounds a day or more will weigh more than calves wintered at less than a pound per day. Most operations in eastern Oregon feed for about 180 days or more during the winter, making wintering calves gain 1.25 to 1.50 pounds a day more practical.

The quality of summer grazing can influence returns. Work at the Union Station has shown that forage quality of forested ranges is not adequate to support economical gains for yearlings by the middle of August. The Squaw Butte Station has shown that on sagebrush range, summer gain declines rapidly after the first part of July. If high quality pasture is not available then yearlings should be sold or moved to the feedlot for finishing.

Average daily gains (Table 4) and cost per pound of gain (Table 5) were similar for the 3 groups of steers during the finishing phase. All carcasses graded choice or good and had yield grades of 1 or 2. Treatment 3 steers had significantly higher quality grades and marbling scores than steers in Treatment 1 (Table 6). However, there were no significant differences among treatments in back fat thickness, percent internal fat, or yield grades. Steers from Treatment 3 produced significantly heavier carcasses with larger ribeye areas than steers in Treatment 1. The carcass parameters of steers from Treatment 2 were not significantly different from those of Treatments 1 and 3.

These results would suggest that Treatment 3 steers approached their mature weight at a younger age and produced more marbling than steers in Treatment 1, thus producing a higher quality carcass. The degree of marbling increases as an animal approaches its mature weight. During the finishing phase, the heavier animals produced more desirable carcasses than the light animals on about the same amount of concentrate (Table 3).

During the finishing phase, Treatment 3 steers returned an average of $35.76 per head more than steers in Treatment 1 and $2.12 per head more than steers in Treatment 2 (Table 7). This difference was because of the higher value of choice steers and the heavier weight. Choice steers brought about $6 per hundredweight more than good steers at a comparable weight.

The average return for feed cost for 3 phases of management is shown in Table 7. Treatment 2 steers returned $2.21 more than Treatment 3 and $34.34 more than Treatment 1 animals.

The price of cattle, cost of feed, and quality of feed could change the return values used in this study. But in normal years, a rancher planning to hold weaners for future sales should consider that wintering calves at 1.25 to 1.50 pounds a day shows the greatest return if sold in the spring.

Returns are greatest for calves wintered to gain at 1 pound or less a day if they are pastured the following summer on good quality forage and sold in the fall. However, this wintering program may reduce management options, such as adjusting cattle numbers to fit forage resource or maintaining ownership of the calves through the finishing phase. Calves wintered at about 1.25 pounds a day produce good returns through winter and will show the greatest returns if ownership is maintained through the finishing phase.

Also, this winter-fed level provides more flexibility in cattle management. When considering a yearling management system, care must be taken to inventory forage resources and cost so the most efficient (greatest weight gain for the least cost) plan can be initiated.

Table 1. Rations used during the finishing phase

Feed ingredients	Ration 1	Ration 2	Ration 3	Ration 4	Ration 5
			-%		
Grass hay	85	65	42	29	10
Barley	10	30	52	65	85
Liquid supplement	5	5	5	5	4
Limestone	-	-	1	1	1

Table 2. Average daily feed intake of steers during wintering periods

Feed	Treatment 1	Treatment 2	Treatment 3
		lb	
Alfalfa-grass hay	16.8	16.8	15.4
Barley	-	1.9	5.2

Table 3. Average daily intake of steers during the feedlot period

Feed	Treatment 1	Treatment 2	Treatment 3
	lb		
Grass hay	9.2	9.4	9.2
Barley	21.6	22.7	21.3
Liquid supplement	1.5	1.6	1.4
Limestone	.3	.3	.3
Total	32.6	34.0	32.2

Table 4. Average weight and daily gain (ADG) for steers during winter, summer, and feedlot periods

Periods	Treatment 1	Treatment 2	Treatment 3
	lb		
Winter Period			
Initial weight	539	540	541
Weight on range	721	818	886
ADG	.87	1.32	1.63
Summer Period			
Period 1 ADG	2.27	1.30	1.07
Period 2 ADG	1.34	1.29	.55
Period 3 ADG	2.69	2.51	2.11
Accumulative ADG	2.19	1.75	1.31
Feedlot Period			
Weight off range	917	974	1,002
Weight out of feedlot	1,264	1,327	1,335
ADG	3.53	3.60	3.40

Table 5. Average cost per pound of gain during winter, summer, and feedlot periods[1/]

Period	Treatment 1	Treatment 2	Treatment 3
	- - - - - - - ¢/lb of gain - - - - - - - - -		
Winter	58	44	42
Summer	9	11	15
Feedlot	33	34	34

1/ Barley @ $90/ton; grass hay @ $50/ton; alfalfa-grass hay @ $60/ton; pasture @ $6.00/yearling/month; liquid supplement @ $147.35/ton; and limestone @ $80/ton.

Table 6. Average of carcass data for the steers from the 3 groups

Items	Treatment 1	Treatment 2	Treatment 3
Marbling score[1/]	8.6	9.6	10.6
Quality grade[2/]	6.8	7.4	7.8
Carcass weight (lb)	696	735	764
Back fat thickness (in.)	.26	.36	.26
Ribeye area (sq. in.)	12.98	13.48	14.20
Internal fat (%)	2.13	2.02	1.97

1/ Marbling, 1 to 26 scale, abundant = 26, small - 11, devoid = 2.

2/ Quality grade, 1 to 12 scale; prime = 12, choice = 9, good = 6, standard = 3.

Table 7. Average return over feed cost during the winter, summer, and feedlot periods

Items	Treatment 1	Treatment 2	Treatment 3
Initial weight (lb)	539	540	541
Value of calf[1/] ($)	444.68	445.50	446.33
Cost of winter feed ($)	105.33	123.44	145.75
Weight on range (lb)	721	818	886
Value of calf at end of winter[1/] ($)	547.96	597.14	620.20
Return over feed cost for winter period ($)	- 2.05	38.20	28.12
Summer feed cost ($)	17.80	17.80	17.80
Weight off range (lb)	917	974	1,002
Value of calf off range[1/] ($)	641.90	652.58	671.34
Return over feed cost for summer period ($)	76.14	37.64	33.34
Return over feed cost winter plus summer ($)	74.09	65.84	61.46
Cost of feed in feedlot ($)	115.39	120.25	114.07
Weight out of feedlot (lb)	1,263	1,327	1,335
Value of steer out of feedlot[2/]	798.27	847.40	862.15
Return over feed cost in feedlot ($)	40.98	74.57	76.74
Return over feed cost for the three periods ($)	115.07	140.41	138.20

1/ Value 538-540 lb @ $82.50; 700 lb @ $76; 800 lb @ $73; 900 lb @ $70; 1,000 lb @ $67.

2/ Choice 800-1,150 lb @ $67.25; choice 1,150-1,350 lb @ $66.00; choice 1,350-1,500 lb @ $64.25; good 800-1,150 lb @ $60.50; good 1,150-1,350 lb @ $60.50 and good 1,350-1,500 lb @ $59.50.