FEEDLOT PERFORMANCE OF HEIFERS EITHER PROGRAM FED IN DRYLOT OR GRAZED ON NATIVE TALL GRASS PRAIRIE BEFORE ENTERING THE FEEDLOT

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Story in Brief

One hundred beef heifers were backgrounded for 42 days either on dormant range grass plus protein cubes (0.0) or limit fed a high concentrate ration in drylot to gain either 1.0, 1.5, or 2.0 lb/day. Gains achieved during backgrounding were (0.0) 0.27, (1.0) 1.09, (1.5) 1.91, and (2.0) 2.15. After backgrounding, the heifers were allocated to an 80 day intensive early stocking program except for one group that was limit fed at the 2.0 rate that remained in the drylot (2P) for the 80 days. Daily gains for the combined backgrounding and grazing periods were (0.0) 0.75, (1.0) 0.92, (1.5) 1.09, (2.0) 1.13, and (2P) 2.68 pounds per day. Because gains on pasture were less than expected, the heifers which had been fed in drylot weighed 218 pounds more than the average of the heifers that grazed when the feeding period began (804 vs 586). Following the grazing period, all five groups were fed 145 days in the Panhandle State University feedlot at Goodwell. In the feedlot, daily gains of the grazed heifers were higher (3.8 vs 2.8 lb/day) for the heifers that had not grazed. Feed to gain ratio also favored the heifers grazed (5.83 vs 7.13). However, energetic efficiency based on net energy equations did not differ between the groups. This means that difference in feed efficiency can be explained by the difference in the mean feeding weight of the heifers. Based on typical grazing and feedlot fees, the cattle which did not graze would have produced equal profit even if marketed at $4.54 less per hundred pounds of live weight.

(Key Words: Grazing Systems, Limit Feeding, Feedlot Performance, Heifers, Energetic Efficiency.)

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Introduction

Cost per unit of gain of stocker cattle decreases as rate of gain increases. Much of Oklahoma's grass lands are ideal for grazing in May and June. But even with excellent forage, stockers need to gain more weight than pasture alone provides. Cattlemen pick one of two options. The first option is to supplement dormant range in the winter or feed a high concentrate ration in drylot before the grass growing season. The latter option is popular because often it is cheaper to buy grain than to pasture cattle. The second option is to grow cattle in drylot and completely skip grazing.

Materials and Methods

One hundred Limousin crossbred heifer calves (468 lbs) were purchased in Georgia and shipped to the Pawhuska Research Station in February, 1990. The processing, backgrounding, limit-fed ration data, and grazing data were presented previously (McCollum et al, 1991). The winter backgrounding period lasted 42 days. Twenty head grazed dormant range forage and were fed protein cubes (0.0). During this time eighty calves were limit fed a high concentrate ration (Table 1) in drylot to gain 1.0 (1.0), 1.5 (1.5), 2.0 (2.0)

Table 1. Composition of limit-fed ration (as fed basis).

Ingredient	Percentage
Corn, #2 whole shelled	86.96
Supplement	13.04
Supplement composition	
Soybean meal	51.18
Cottonseed meal	29.83
Calcium carbonate	9.96
Potassium chloride	2.06
Salt	2.45
Dicalcium phosphate	.59
Urea	3.46
Tylan 40	.09
Vitamin A, 30 IU/g	.17
Vitamin E, 50 IU/g	.014
Rumensin, 60 g/lb	.19

pounds per day in drylot. The first three groups had 20 calves and the fourth group had 40 calves. The first three and half of the fourth group grazed forage during an intensive early stocking (IES) period from May 1, 1990 until July 20, 1990. The remainder of group 2.0 (20 calves) remained in drylot (2P) during this period. The limit fed group (2P) was moved to Goodwell for continued feeding at the same rate June 1, 1990. At the end of the grazing period, the remaining 80 cattle were gathered, held overnight without feed or water and individually weighed. These weights were used as the starting weight for analyses of the feedlot data. Individual arrival weights at the feeding facility at Goodwell, Oklahoma (310 mile transit) were taken late that afternoon as the cattle arrived and were used to compute transit shrink, the exception being the program fed cattle which already were at the feeding site. The heifers were given booster IBR-PI3 vaccinations on arrival at the feedlot and each winter treatment group was assigned to two 10-head feeding pens. The heifers were implanted with a Synovex-H implant at the start of the winter period and were reimplanted at 84 day intervals throughout the grazing and feedlot phases. The cattle were fed twice daily and allowed to eat ad libitum thoughout the feedlot phase. They were adapted to the 91 percent concentrate diet in 14 days using four workup diets (Table 2). In the workup diets, alfalfa hay and cottonseed hulls (2 to 1 ratio) replaced ground corn to achieve 50%, 60%, 70% and 80% concentrate rations. The cattle

Table 2. Feedlot diet composition.

Item	Diet % of DM
Corn, dry rolled	79.61
Alfalfa hay, ground	5.02
Cottonseed hulls	3.90
Molasses, cane	4.38
Cottonseed meal	3.55
Meat and bone meal	1.42
Distillers grains, corn	.87
Salt	.35
Calcium carbonate	.35
Urea, 46% N	.30
Ammonium sulfate	.21
Vitamin A & D_3[a]	.00375
Rumensin, 60 gram/lb	.018
Trace mineral premix	.014

[a] Contained 88,000 IU vitamin A and 88 IU vitamin D_3 per gram.

were fed until experienced cattle buyers estimated that 70% of the cattle should grade choice and have a suitable dressing percentage. All cattle were fed for 145 days. The cattle were trucked to Dodge City, Kansas (120 miles) for slaughter and collection of carcass data. All feedlot gains and feed efficiencies were calculated assuming that final live weight was hot carcass weight divided by .64. All data were analyzed using the general linear model of SAS with the class being winter treatment.

Results and Discussion

The amount of feed provided to program-fed heifers was calculated from the 1976 NRC equations (NRC, 1976). These equations are used in the OSU computer program (PROGFEED) Programmed Feeding for Calves (Gill and Lusby, 1991). This program computes the amount of feed needed each day to achieve a predetermined rate of gain based on the energy content of the ration and the sex and weight of the animal. Feed supply was increased every 14 days based on the expected increase in body weight. For the wintering period, projected and obtained gains are shown in Table 3. Heifers that remained in the drylot for a total of 122 days (Table 4) gained

Table 3. Performance of heifers during the 42-day winter phase.

	Dormant range	Programmed gain, lb/day		
		1.0	1.5	2.0
	lb/head			
Cattle, No.	20	20	20	40
Initial weight, lb	467	471	467	468
Final weight, lb	479[a]	517[b]	547[c]	559[c]
Gain, lb	11.3[a]	45.8[b]	80.1[c]	90.2[c]
Daily gain, observed, lb	.27[a]	1.09[b]	1.91[c]	2.15[c]
Daily gain, expected, lb	--	1.00	1.50	2.00
Feed intake, lb DM/day	--	7.4	9.1	10.9
Feed/gain				
Observed		6.8	4.8	5.1
Expected		7.4	6.1	5.4

[a,b] Means with different superscripts differ ($P < .05$).

Table 4. Performance of program fed heifers during the 122 day growing period.

	lb/head
Initial weight, lb	474
Final weight, lb	804
Gain, lb	330
Daily gain, lb	2.68
Feed intake, lb DM/day	11.56
Feed/gain	
Observed	4.32
Expected	5.78

2.68 lbs/day. This exceeds the projected ADG by 0.68 lbs. The later NRC equations (NRC, 1984) for large frame calves and compensating yearling heifers would have predicted gain at 2.69 pounds per day based on the amount of feed fed. Weighing conditions can alter calculations greatly. The program fed cattle (2P) were not shrunk before the start of the feedlot phase. The grazed treatments were gathered from pasture and held overnight without feed or water before being weighed at Pawhuska, typical of a commercial transaction.

Initial weight into the feedlot (Table 5) was much heavier for the program fed lot than the average of the grazed lots (804 vs 506). During the feedlot phase, the grazed cattle tended to consume more feed and gained at significantly higher rate ($P < .01$) than cattle that never grazed..

One comparison of interest is the relative cost of the grazed heifers versus those that never grazed. For comparing the dry wintered cattle (0.0) and the continuously program fed cattle (2P), initial purchase cost of the cattle was $467 for the 467 pound heifers. Prior to the feedlot, the grazed heifers (0.0) each consumed 44 pounds of high protein cubes plus both dormant and green grass. During this period, the drylot heifers consumed 1410 pounds of dry matter of the diet in Table 1. If grass (both dormant and IES) is valued at $40 per head and the protein cubes cost $4.40 (44 lbs @ $200/ton), total pre-feedlot cost was $44.40. The cost of the program feed (2P) was $96.15 (1603 lbs feed @ $120 per ton). Non-feed fixed costs would

Table 5. Feedlot Performance --Winter Treatments.

	Growing Treatment				
		Programmed ADG, pounds			
	Dry wintered	1.0	1.5	2.0	2P
Calves	20	20	20	20	20
Off pasture wt, lb	557[a]	586[a]	594[a]	603[a]	804[b]
Shrink, %	4.83	4.71	3.95	4.76	
Slaughter weight, lb[c]	1072[a]	1137[ab]	1169[ab]	1171[ab]	1210[b]
Total gain, lb	515[a]	551[a]	575[a]	568[a]	397[b]
ADG, lb[c]	3.56[a]	3.80[a]	3.95[a]	3.91[a]	2.80[b]
Feed intake, lb	20.88	21.54	22.21	24.14	19.91
Feed efficiency, lb	5.90[a]	5.68[a]	5.61[a]	6.16[a]	7.13[b]
Calculated NEg, Mcal/Cwt	57.35	60.99	62.40	57.14	59.27

[a,b] Means with different superscripts differ (P<.01).
[c] Final weight was calculated from hot carcass weight/.64.

Table 6. Carcass characteristics.

	Growing Treatment				
		Programmed ADG, pounds			
	Dry wintered	1.0	1.5	2.0	2P
Carcass weight, lb	685.6	726.6[ab]	748.52[b]	749.0[ab]	774.2
% Choice	51.67	65.00	60.00	58.33	53.47
Marbling score[c]	421	451	403	420	425
Fat thickness, in	.41	.48	.53	.56	.51
REA, sq. in,	14.25	13.93	14.43	15.07	15.53
KPH, %	1.97	1.88	2.05	1.95	2.16
Yield grade[d]	1.97	2.37	2.45	2.31	2.18

[a,b] Means with different superscripts differ (P<.05).
[c] 100-199 = Utility, 200-299 = Standard, 300-399 = Select, 400-499 = Choice, 500-599 = Average Choice, 600-699 = Choice +, 700+ = Prime.
[d] USDA 1-5.

add $26.85 to the cost of both groups. The respective breakeven price per 100 lb live weight pre-feedlot were: grazed $96.71 and program fed $73.43. Using standard commercial feedlot ration costs based on $2.75 per bushel of corn, total feedlot cost of gain was $47.79 and $58.30 for these two groups.

The selling price necessary to breakeven was $70.68 for the grazed heifers versus $66.14 per 100 lb live weight for the program-fed heifers. If the cattle sold for $72, the respective profits would have been $14.11 and $70.87 per head. Carcass data (Table 6) show little difference between the five test groups other than heavier weight but no evidence of greater fatness for the groups of cattle that gained more weight during the winter period.

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