An Economic Look at Feeding Replacement Beef Heifers

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Introduction

The purpose of this paper is to present a case study of the costs to feed replacement beef heifers through the winter. A comparison between heifers fed in a commercial feedlot (Group A) and heifers raised by the owners (Group B) will be made. The effects of the feeding programs on pregnancy rate will then be evaluated. The feeding study was performed by Deseret Ranches, Ltd. of Alberta, Canada, and their computerized results were used for this project. All heifers were examined rectally for pregnancy determination by E.G. Prince, D.V.M.

Unlike the dairyman, the beef breeder derives most of his income from calves born into the herd, making fertility the most important trait. A recent economic study showed that fertility was five times more important than growth rate and ten times more important than carcass quality.[1]

The two major goals of reproductive management are: increase the number of females cycling early in the breeding season, and improve conception rates.[4] It is the first of these goals that is most affected by heifer replacement management programs. The remainder of the discussion, therefore, will center on the ability of the two feeding programs to increase the number of replacement heifers cycling early in the breeding season. The conception rate is assumed to be equal in the two groups since all bulls servicing the two groups successfully passed breeding soundness evaluations and were then randomly distributed between the two groups. The bull:heifer ratio was the same for the two groups (1:30), as were the environmental and management conditions. Both groups were maintained on the same ranch except during the winter when Group A was moved to the feedlot located approximately 20 miles from the ranch. With all other factors being equal, the success of the two feeding programs to increase the number of heifers cycling early in the breeding season, while minimizing cost, is demonstrated by the pregnancy rate.

In order to discuss the results of these feeding trials, a description of the two programs must be given. This will be followed by a summary of the performance of each group during the feeding trial and during the breeding season. The cost of the respective programs will then be discussed and the determined pregnancy rates presented.

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Heifer Management Program (see Table 1)

In both Groups A and B, the physical management practices were similar. At the time of weaning in the fall, heifer calves to be retained as replacements were vaccinated for: infectious bovine rhinotracheitis (IBR), parainfluenza type 3 (PI_3), 8 way clostridia[a], Campylobacter bacterin[b], and vitamin A and D.[2] The breeding season for both groups began on June 1 and lasted 45 days. The June 1 starting date is also 20 days prior to the beginning of the breeding season in the cow herd. This practiced short breeding season for the heifers is in accordance with published results on the benefits of such a program.[1,3,4,5]

It has also been shown that less than 30% of well fed heifers will be cycling at 12 months of age whereas 85-90% of the same heifers will be cycling at 15 months of age.[4] The recommendation to breed heifers at approximately 65% of their adult body weight (13-15 mo. of age) has, therefore, come forth. The heifers of both groups are products of the previous years calf crop that was born between March 15 and the last week of May. Eighty-three percent (83%) of which were born before May 1.[6] The majority of the heifers in both groups would, therefore, be at least 13 months old. The age distribution would also be similar in both groups.

TABLE 1. Treatment Group description for feeding trial calves were selected from a total pool of 1,095 6-month-old heifers. Breed proportions were maintained equally in the two groups; otherwise, the selection was random.

	Group A	Group B
Total Number of Heifers	400	695
Breed	Angus, Hereford Angus X Hereford	Angus, Hereford Angus X Hereford
Feeding regime	Commercial Feedlot (Silage, hay, grain concentrate)	"In house" (Pasture, hay, grain pellets, straw)
Starting Date	November 8, 1985	November 8, 1985
End Date	April 7, 1986	March 31, 1986
	(turned out to pasture with no supplementation)	

[a] *Clostridium chauvei, septicum, novyi, sordellii, perfringens C & D, hemolyticum bacterin.*

[b] *Vibrin, Norden Laboratories, Omaha, Nebraska.*

The important clause in the above mentioned heifer cycling rates is the term "well-fed." The cost of being "well-fed" is also of paramount importance and must be balanced with the return expected from the investment. In other words, an increased pregnancy rate and the sale of a subsequently larger calf crop must offset the cost of intensified feeding programs.

Performance

The heifers in Group A out-performed those in Group B from the time of weaning until all were returned to pasture during the first week of April. When both groups were weighed prior to being turned out on pasture, Group A weighed an average of 77.0 lbs/hd (681.6-604.6 lbs) heavier than Group B (Table 2). Since Group A started the feeding trial an average of 8.7 lbs/hd lighter than Group B, the total gain by Group A was 85.7 lbs/hd greater (Table 2). To accomplish this, Group A gained 1.49 lbs/hd/day through the winter compared to the 1.07 lbs/hd/day gain of Group B (Tables 3 & 4).

TABLE 2. Average weights of heifers from weaning to pregnancy exam. All heifers in both groups were weighed the first week of each month.

	Group A (feedlot)	Group B (owner raised)
Number	399	695
Average Weight (lbs):		
Weaning (11/8/86)	451.3	460.0
January	558.7	500.7
February	615.7	534.0
March	655.8	562.6
April*	681.6	604.6
May	678.0	617.5
September	855.7	—
October	—	824.0

*Both groups were turned out on grass pasture on the ranch after these weights were recorded.

In the spring, the heifers were returned to grass pasture with no supplementation, Group B out-performed Group A. The heifers that had been on the ranch all winter (Group B) continued to gain weight during the month of April, while Group A lost weight (0.09 lbs/hd/day). When Group A was weighed on May 16th and Group B on May 7th, Group A still weighed 60.5 lbs/hd (680.0-617.5) heavier than Group B (Tables 2 & 3). Neither group was weighed at the beginning of the breeding season. By using each group's rate of gain on grass and their May weights, however, the weight on June 1 can be estimated. The estimations are 696.1 lbs/head [680.0 + 1.07 (15 days)] for Group A and 645.3 lbs/head [617.5 + 1.16 (24 days)] for Group B. Using a 1000 lb range cow as the adult standard weight, Group A heifers are around 70% and Group B almost 65% of this adult weight. Both groups, however, were up to the recommended standards for breeding previously mentioned.

TABLE 3. Average gain per head per day of replacement beef heifers.

	Group A	Group B
Number	399	695
Average Gain (lbs/hd/day)		
January	1.99	0.60
February	1.95	1.17
March	1.25	1.82
April*	0.76	1.41
May	—0.09	0.37
September	1.43	—
October	—	1.35
Overall	1.26	1.12

*Both groups were turned out on grass pasture on the ranch after these weights were recorded.

TABLE 4. Average gain per head per day during winter feeding and summer grass feeding.

	Group A	Group B
Number	399	695
Average Weight Gain (lbs/hd/day)		
Overwintering	1.49	1.07
Summer (grass feeding)	1.07	1.16

Feeding Costs Over Winter

The total costs and cost breakdowns for both Groups A and B are summarized in Table 5. Group A is most cost effective. The overall cost is $0.25/hd/day or $25.00/100hd/day less than Group B. The cost per pound of gain is almost $0.53/lb less for Group A than Group B. If 100 heifers were fed in each of the programs for Group A and Group B, it would cost $3,625.00 (145 days x $25.00/day) more to feed the heifers in Group B through the winter. It is clearly evident that when only the cost of feeding is considered, the overall cost and cost per pound of gain is less when the heifers are overwintered in the commercial feedlot (Group A).

TABLE 5: Cost summary and breakdown for overwinter feeding of replacement beef heifers.

	Group A	Group B
Number	399	695
Feeding Days	148.5 (Nov. 8 - Apr. 7)	143 (Nov. 8 - Mar. 31)
Total Cost	$63,352.73	$131,410.85
Total Gain (lbs)	88,190	106,145
Cost/lb of gain	$0.693	$1.221
Cost/hd/day	$1.07	$1.32

Pregnancy Rates

Although Group A was heavier and at a higher percentage of their adult body weight, Group B had a 4.5% higher

pregnancy rate (Table 2, statistically significant at $p \leq 0.1$). Group A did, however, achieve the suggested pregnancy rate goal for replacement heifers of 85%.[4] Group B exceeded that goal by 6.4%.

Conclusion

Group A out-performed Group B in terms of weight gain and cost of feeding as expressed by the lower cost/lb of gain in Table 2. Group B, however, produced the higher pregnancy rate (Table 6). The reasons for this can only be speculated. Group A was losing weight within two months of the start of the breeding season which may have effected when they began cycling. The physical transportation, although over a short distance, may have had some affect. It has also been shown that females losing weight during the breeding season have an increased incidence of early embryonic death.[7] If the weight losing trend of Group A continued into the breeding season, this may have been a factor. Whatever the reason, the study needs to be followed through calving and weaning in 1987 to see if the 4-5 more pregnancies per 100 heifers in Group B can actually make up for the difference of the lower feed costs of Group A. If the current average weaning weight for calves sold from Deseret Ranches, Inc., is used for an estimate, however, Group A appears to maintain an economic advantage. Four and one-half more calves from one hundred heifers in Group B that would wean at 454 lbs and, subsequently, sell at $1.15/lb[2,6] would yield $2,349.00 (4.5 x 454 lbs x $1.15/lb). This would fall $1,276.00 ($3,625-$2,349.00) short of recovering the difference in feed costs. It appears, then, that even with a slightly lower pregnancy rate, Group A was more economical to feed through the winter.

TABLE 6. Pregnancy rates for replacement beef heifers overwintered in a commercial feedlot versus raising on the ranch.

	Group A (feedlot)	Group B (on ranch)
Number	399	695
Number Diagnosed:		
Non-pregnant	51	56
% open	13.1	8.6
Pregnancy rate (%)	86.9	91.4

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Abstracts

Effects of two glucocorticoids on milk yield and biochemical measurements in healthy and ketotic cows

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Veterinary Record (1987) **120**, 297-299

The effects of two glucocorticoid compounds (Dexamedium; Intervet. Voreen; Boehringer Ingelheim) were tested in 20 healthy and 28 ketotic dairy cows. Both compounds induced an increased blood glucose concentration and a temporary decrease in the milk yield of healthy dairy cows. Dexamedium reduced the milk yield only of cows producing 25 or more kg milk daily. Of 28 ketotic cows 22 were treated with one of the two glucocorticoid compounds, while the remaining six were treated orally with propylene glycol. After treatment all but one of the cows improved clinically within one week. Biochemical analysis of blood samples revealed that after treatment with any of the three therapeutic compounds some animals responded inadequately to therapy or relapsed after initial recovery.

Economic losses due to paratuberculosis in dairy cattle

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Veterinary Record (1987) **121**, 142-146

The results of a study of the economic losses caused by paratuberculosis in dairy cattle are reported. The losses in production and the determination of lost future income due to premature disposal are emphasised. A decrease in milk production of 19·5 per cent compared with the lactation two years before culling was recorded in animals showing clinical signs of paratuberculosis. The decrease in production in the last lactation but one compared with the previous lactation was 5 per cent. In animals with non-clinical forms of paratuberculosis these decreases in production were 16 per cent and 6 per cent, respectively.