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A THREE-YEAR ECONOMIC EVALUATION OF A COMMERCIAL HEIFER DEVELOPMENT PROGRAM [1]

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Summary

In 1994, 1995, and 1996, a commercial heifer development operation purchased a total of 1542 potential replacement heifers. Heifers were purchased in the fall preceding the spring breeding season and fed a silage-based diet during the developmental period. Before the breeding season began, heifers that failed to meet minimum requirements for pelvic area, average daily gain, body weight, disposition, or structural soundness were culled. During the first year, 42% of 483 heifers were culled, 17% of 468 heifers were culled in the second year, and 14% of 591 heifers in the third year. Estrus was synchronized and heifers were inseminated artificially (AI) for 30 days followed by 30 days of natural mating by cleanup bulls. First-service AI conception rates averaged 68% and overall pregnancy rates (AI + natural mating) averaged 95.1% over the 3-year period. Heifers culled prior to the breeding season realized a net profit of $9 per head, whereas heifers diagnosed nonpregnant after the breeding season lost $86, and heifers that aborted lost $133. Profits for pregnant heifers sold were $163 for first-service AI, $138 for second-service AI, and $83 for bull bred.

(Key Words: Heifer Develpment, Economic Evaluation, Replacement Heifers.)

Introduction

The demand for genetically superior replacement heifers, artificially inseminated (AI) and synchronized to calve early in the calving season, has increased the popularity and size of commercial heifer development operations in recent years. Heifers purchased from these operations represent the future genetics and profit potential in many cow-calf operations. Therefore, our purposes were to: 1) evaluate the economic performance of all pregnant and nonpregnant heifers sold by a commercial heifer developer during a 3-year period and 2) determine any differences in profitability associated with genetic make-up.

Experimental Procedures

A commercial heifer development facility in north-central Kansas purchased 483 heifers in the fall of 1994, 468 in 1995, and 591 in 1996. Heifers were of either Angus (black) or Angus × Hereford (black-white-face; BWF). Each group was treated in a similar manner during the 3 years. Heifers were fed a similar silage-based diet to gain an average of 1.5 lb per day. Shortly before

[1]Appreciation is expressed to Losey Bros., Agra, Kansas for providing data for the study of this analysis.

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each spring breeding season (i.e., heifers purchased in the fall of 1994 were bred during the spring of 1995), a prebreeding exam was performed and heifers were culled on the basis of pelvic area, average daily gain, reproductive tract scores, disposition, or structural soundness. All culled heifers were sent to a feedlot, where the heifer development operator retained ownership until slaughter.

Estrus was synchronized in the remaining heifers by feeding MGA for 14 days, then injecting prostaglandin $F_{2\alpha}$ (PGF) 17 to 19 days after MGA withdrawal. Heifers were observed for estrus and inseminated 12 hr after first observed heat using semen from a sire with expected progeny differences (EPD) for small birth weights and above- average growth characteristics. Artificial insemination continued for 30 days followed by 30 days of natural mating by cleanup bulls. Conception rates at first- and second- service AI and overall pregnancy rates were calculated.

Heifers open after the breeding season were sold directly through a local sale barn. All pregnant heifers were wintered on native prairie grass or corn stalks until being returned to drylot facilities before a special replacement heifer sale during January of 1996, 1997, or 1998. At that time, pregnancy was reconfirmed to determine which heifers had aborted since the previous pregnancy diagnosis. Aborting heifers were sold locally, whereas pregnant heifers were sorted into groups according to their pregnancy status, genetic origin and expected calving dates.

Results and Discussion

Table 1 summarizes the culling percentage, first-service AI conception rates, and overall pregnancy rates over the 3-year period. During the first year, 42% of 483 heifers were culled. In the second year, 17% of 468 heifers were culled, and 14% of 591 heifers were culled in the third year. Decreased culling percentages from the first to third year indicate improvement in initial performance evaluation and heifer quality. Some heifer sources were used only once. First-service AI conception rates and overall pregnancy rates were similar among years and averaged 68.0% and 95.1%, respectively.

Net profit or loss for the heifers sold during the developmental period during all 3 years is summarized in Table 2. Heifers culled at the time of the prebreeding exams and finished in a feedlot had a 3-year average net profit of $9, whereas heifers diagnosed as nonpregnant shortly after the breeding season were sold for a net loss of $86. The loss for pregnant heifers that were then diagnosed nonpregnant after wintering on native pasture and sold at a local sale barn was $133 per head. Average profits were $163, $139, and $83, respectively, for heifers sold pregnant after first-service AI, second-service AI, or natural mating. The results emphasize the economic importance of early culling and early breeding to cut the losses associated with maintaining open heifers.

Heifers purchased during 1995 and 1996 and subsequently inseminated artificially during the spring of 1996 and 1997 were separated into first- or second-service AI groups according to their origin; Hereford × Angus (BWF) or Angus ([black). Profitability results are shown in Table 3. Among first AI service, pregnant heifers, BWF heifers were nearly twice as profitable ($P<.05$) as black heifers in both years. In contrast, profitability of second-service heifers did not seem to differ with genetic source.

Table 1. Culling, First-Service Conception, and Pregnancy Rates of Beef Heifers in a Heifer Development Operation

Purchase Year[a]	No. of Heifers	Culling Rates[a], %	First Service AI Conception Rates[b], %	Overall Pregnancy Rates[c], %
1994	483	42	66.8	93.8
1995	468	17	69.8	95.4
1996	591	14	67.5	95.8
Total	1542	24	68.0	95.1

[a]Culling rates = no. of heifers culled prior to breeding season/no. of heifers purchased.
[b]Conception rates = no. of pregnant heifers/no. of heifers inseminated.
[c]Pregnancy rates = no. of pregnant heifers/no. of heifers synchronized.

Table 2. Net Profit or Loss Associated with the Sale of Heifers at Various Stages of Development

	Purchase Year			
Stage	1994	1995	1996	Average
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Prebreeding culls	8	16	4	9
Postbreeding culls	-33	-144	-84	-86
Precalving culls[a]	-213	-61	-124	-133
First-service AI	160	164	164	163
Second-service AI	129	88	184	138
Naturally mated	89	72	86	83

[a]Heifers diagnosed pregnant but aborted during the winter.

Table 3. The Economic Effect of Genetics on Artificially Inseminated Heifers Over a Two-Year Period in a Heifer Development Operation

	First-Service AI Heifers		Second-service AI Heifers	
Purchase Year	No. of heifers	Profit, $/Head	No. of Heifers	Profit, $/Head
1995				
Black[a]	28	120[c]	13	133
BWF[b]	136	235[d]	29	175
1996				
Black[a]	108	112[c]	44	198
BWF[b]	147	201[d]	83	177

[a]Heifers of predominantly Angus origin.
[b]Heifers of predominantly Hereford × Angus origin.
[c,d]Profits within a column with uncommon superscript letters differ ($P < .05$).