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Abstract

Weanling Angus x Hereford heifers were purchased by a commercial heifer development operation from 12 sources. Heifers were fed a silage-based diet through an initial developmental period and then were retained or culled based on their average daily gain, pelvic area, or disposition. Of the original 591 heifers, 14% were culled. Estrus was synchronized using the Colorado MGA-Prostaglandin (PG) synchronization system with PG administered at either 17 days or 19 days after the 14th day of MGA feeding. Heifers were inseminated artificially (AI) during 30 days followed by 30 days of natural mating. Heifers given PG on day 17 after MGA had a first-service conception rate of 69.9% compared with 65.8% for heifers given PG on day 19. In the day 17 treatment, 64.2% of the heifers were inseminated artificially by 84 hr after the PG injection versus 75.1% for the day 19 treatment. Injections of PG 19 days after MGA tended to tighten synchrony of estrus. Based on source of purchase, first-service conception rates ranged from 50% to 85%, whereas overall pregnancy rates ranged from 65% to 95%. With early culling, accurate records, and pregnancy diagnosis, producers can identify reliable sources from which to purchase their replacement heifers, which should decrease costs and increase profit potential.

Keywords

Kansas Agricultural Experiment Station contribution; no. 97-309-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 804; Cattlemen's Day, 1998; Beef; Replacement heifers; Artificial Insemination; Synchronization; Culling

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INCREASING INTERVAL TO PROSTAGLANDIN FROM 17 DAYS TO 19 DAYS IN AN MGA-PROSTAGLANDIN SYNCHRONIZATION SYSTEM FOR HEIFERS¹

D. W. Nix, G. C. Lamb, V. Traffas², and L. R. Corah

Summary

Weanling Angus × Hereford heifers were purchased by a commercial heifer development operation from 12 sources. Heifers were fed a silage-based diet through an initial developmental period and then were retained or culled based on their average daily gain, pelvic area, or disposition. Of the original 591 heifers, 14% were culled. Estrus was synchronized using the Colorado MGA-Prostaglandin (PG) synchronization system with PG administered at either 17 days or 19 days after the 14th day of MGA feeding. Heifers were inseminated artificially (AI) during 30 days followed by 30 days of natural mating. Heifers given PG on day 17 after MGA had a first-service conception rate of 69.9% compared with 65.8% for heifers given PG on day 19. In the day 17 treatment, 64.2% of the heifers were inseminated artificially by 84 hr after the PG injection versus 75.1% for the day 19 treatment. Injections of PG 19 days after MGA tended to tighten synchrony of estrus. Based on source of purchase, first-service conception rates ranged from 50% to 85%, whereas overall pregnancy rates ranged from 65% to 95%. With early culling, accurate records, and pregnancy diagnosis, producers can identify reliable sources from which to purchase their replacement heifers, which should decrease costs and increase profit potential.

(Key Words: Replacement Heifers, Artificial Insemination, Synchronization, Culling.)

Introduction

Overall profitability of a beef cattle operation depends on proper selection and management of replacement females. Estrus synchronization and artificial insemination (AI) can increase the proportion of heifers bred early in their first breeding season and, thereby, increase their reproductive efficiency. A commonly accepted synchronization regimen is the Colorado MGA-PG system, which involves feeding MGA for 14 days, then injecting PG 17 days later. However, delaying the interval from MGA withdrawal to PG by an extra 2 days could result in a greater proportion of heifers displaying estrus within 72 hr following PG.

Stringent culling practices and monitoring the purchasing source from which heifers are obtained could increase efficiency of commercial heifer development programs. Our objectives were to: 1) evaluate the effects of administering PG to heifers on day 17 or day 19 after the 14th day of MGA feeding and 2) determine the influence of the source of replacement heifers on subsequent reproductive performance.

Experimental Procedures

¹Appreciation is expressed to Losey Bros., Agra, Kansas for providing data for this study.

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A heifer development operation located in north-central Kansas purchased 591 weanling Angus × Hereford heifers from 12 sources. Number purchased from each source ranged from 13 to 100. Heifers were fed a common silage-based diet during the initial development period before a prebreeding exam was conducted in March, 1997. Heifers then were culled based on poor average daily gain (minimum of 1.4 lb per day), small pelvic area (minimum of 140 cm²), poor reproductive tract scores, aggressive disposition, or structural unsoundness. Eighty two culled heifers were either sold directly through a local sale barn or sent to a feedlot.

The remaining 509 heifers were used in an estrus synchronization program during March, 1997. Estrus was synchronized by feeding MGA (.5 mg per head per day for 14 days) then 260 head were given a PG injection 17 days after MGA withdrawal. The remaining 249 heifers were given PG on day 19 after MGA. Heifers were observed for estrus and inseminated artificially 12 hr after the first detected standing heat. Those not showing estrus were given a second PG injection 12 to 14 days after the first. The 30-day AI period was followed by 30 days of natural mating by clean-up bulls. All were tested for pregnancy using real-time intra-rectal ultrasonography, approximately 30 days after insemination. Pregnancy rates after first AI service, 30 days of AI, and natural mating were determined.

In August 1997, all nonpregnant heifers were sold through a local sale barn. Pregnant heifers were moved to native prairie grass pasture after the breeding season. In early November, these heifers grazed cornstalk residue for 60 days and were supplemented with prairie hay when necessary. For 2 weeks in January, 1998, heifers were returned to drylot facilities and prepared for a special replacement heifer sale. Pregnancy was reconfirmed via uterine palpation to determine which heifers had aborted. Of the heifers

that were previously diagnosed pregnant, 3% had lost their fetuses and were sold locally. The remaining pregnant heifers were sorted according to date of conception and sold at the replacement heifer sale.

Results and Discussion

Table 1 summarizes the conception and pregnancy rates of heifers given PG either 17 or 19 days after 14 days of MGA. First-service conception rates were similar between treatments. Thirty-day AI pregnancy rates and overall pregnancy rates were also similar between treatments. In contrast, distribution of estrus following PG administration tended ($P=.14$) to differ. Of those heifers in the 19-day treatment, 75.1% were inseminated by 84 hr after PG injection compared to 64.2% receiving PG at day 17 (Figure 1). Nineteen (7.3%) of day 17 heifers were inseminated between 96 and 120 hr after PG. Our results indicate that tighter synchrony may be possible when PG is administered 19 rather than 17 days after MGA, with little difference in fertility.

Our second objective was to evaluate the influence of purchasing source on reproductive efficiency. First-service conception rates calculated by heifer source ranged from 50% to 85% (mean, 67.5%). Following the 60-day breeding season, overall pregnancy rates by source ranged from 90.5% to 100% (mean, 95.8%). When expressed as a percentage of the total number of original heifers purchased from each source, pregnancy rates ranged from 69.9% to 96.0% (mean, 83.8%). These results indicate that source is critical to predicting performance of heifers.

Table 1. Fertility of Beef Heifers Synchronized with MGA Followed by Prostaglandin 17 or 19 Days Later

	No. of heifers	First-service AI conception rates (%) ^a	30 day AI pregnancy rates (%) ^b	Overall pregnancy rates (%) ^c
MGA + PG day 17	260	144 (69.9)	207 (79.6)	246 (94.6%)
MGA + PG day 19	249	129 (65.8)	200 (80.3)	239 (96.0%)
Total	509	273 (67.9)	407 (80.0)	485 (95.3%)

^aNumber of heifers pregnant divided by the number of heifers artificially inseminated.

^bNumber of heifers diagnosed pregnant after the 30-day AI breeding period.

^cNumber of heifers diagnosed pregnant after the 60-day breeding season (30 days of AI +30 days of natural mating).

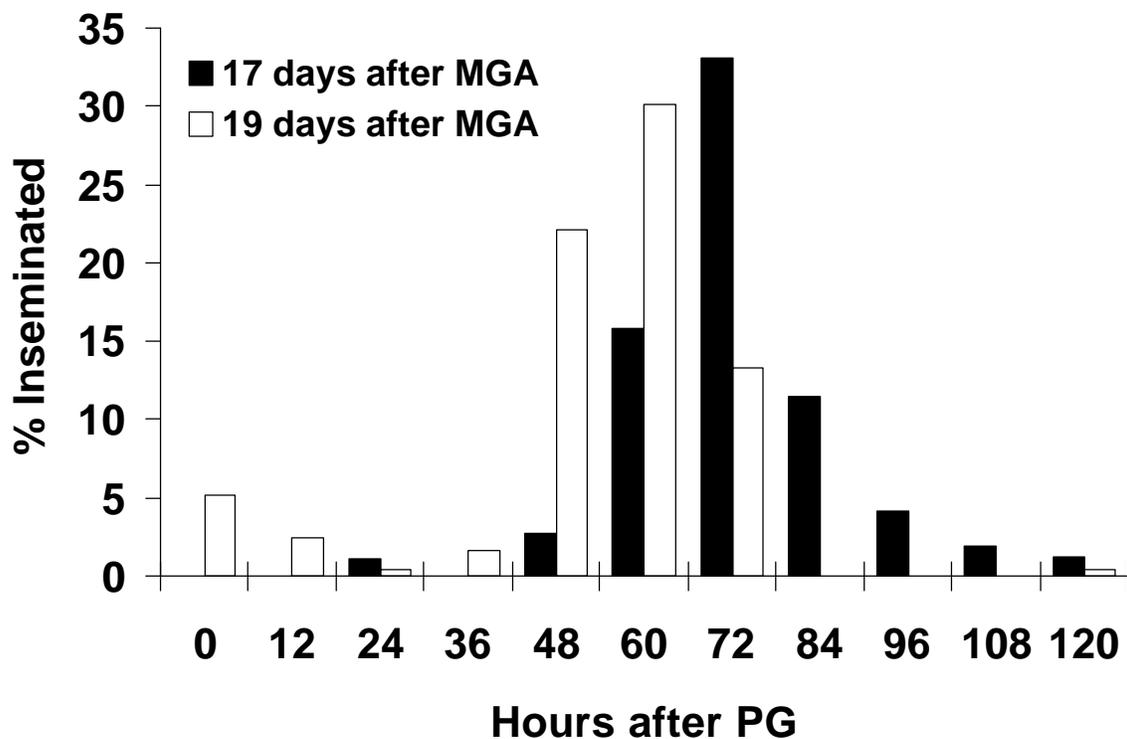


Figure 1. Distribution of AI Times in Heifers Given Prostaglandin (PG) on Day 17 or 19 after MGA.