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Estrous Synchronization Programs for Lactating Cows

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The Select Synch program for synchronizing estrus in lactating cows produced better results in a small study than the one injection PGF program and similar results to the CO-Synch mass AI program.

Summary

Two estrous synchronization experiments were conducted on lactating cows to compare the Select Synch program with the one injection PGF-10-day program and the CO-Synch mass AI program. The Select Synch program in both experiments produced good results. Pregnancy rates during the synchronization period were 62% and 81% for the Select Synch program compared to 49% for the PGF and 61% for the CO-Synch programs. The Select Synch program induced estrus in some noncycling cows. However, the Select Synch program requires two injections (GnRH and PGF) and about seven days of heat detection and AI breeding.

Introduction

Methods of estrous synchronization are needed that will achieve high conception rates during a short AI period at low costs. A major challenge of synchronizing lactating cows is a high percentage of cows are anestrous before the breeding season.

The Select Synch program can induce cycling in cows that have not resumed cyclicity. Researchers also have found calf removal in combination with Select Synch increased pregnancy rates in anestrus cows. The CO-Synch program was developed to include mass breeding; therefore, labor for heat detection is not needed.

Experiments were conducted over two years to compare the Select Synch program with the one injection PGF-10-day program in 1999, and to compare Select Synch with the CO-Synch program in 2000, on estrous response, conception rates, and overall pregnancy rates of lactating cows.

Procedure

Experiment 1

In 1999, 83 red crossbred 3-year-old cows at the West Central Research and Extension Center, North Platte, Neb., were used. The cows calved in March and April and were fed brome grass and alfalfa hay after calving plus some corn silage to meet their nutrient requirements. The cows were body condition 6.0 before the breeding season in early June and were 25 to 77 days post partum.

Cows were allotted to two treatment groups according to calving date and cycling status (determined by ovary palpation). In addition, two blood samples were taken at 10-day intervals before treatments were imposed to determine serum progesterone levels and actual cycling status. Group A cows (Select Synch) were given a 2cc injection of GnRH (Cystorelin, Rhone Merieux, Inc., Athens, Ga.) on day zero

and an injection of PGF (Lutalyse) on day seven with heat detection and AI between injections and for seven days after PGF. Group B cows (PGF) were heat detected and bred by AI for five days, then given PGF on day six and heat detected and bred by AI for five additional days (standard PGF one injection procedure). Semen used for AI was from one Red Angus sire. Two experienced technicians were used for AI and bred equal number of cows in each group.

Cows were moved to summer pasture after the synchronization period and two black Angus bulls were placed with them five days later for a 45-day natural breeding period. Ultrasound was used about 30 days after the synchronization period to determine AI conception rates, which were confirmed by calving dates. Cows were palpated for pregnancy at 60 days after bull removal to determine total pregnancy rates.

Experiment 2

In 2000, 75 red crossbred 4-year-old cows (same cows as in 1999) were used to compare Select Synch and CO-Synch programs. They were fed and managed after calving similarly to Experiment 1. The cows were body condition 5.5 before the breeding season and were 34 to 91 days post partum. The cows were allotted to treatment groups according to calving date and cycling status (ovary palpation). No blood samples were collected. Group A cows (Select Synch) were given GnRH and PGF injections using the same procedure as in Experiment 1. Group A cows were heat detected and bred by AI as in Experiment 1. The Group B cows (CO-Synch) were given the same injections at the same time as the Select Synch cows, but their calves were removed for 48 hours after the PGF injection. These cows were heat detected and bred by AI for two days before the PGF injection and two days after. All cows not detected in heat by 36 hours after the PGF injection were mass bred by AI at 48 hours and a second GnRH injection was given. No heat detection and AI were performed thereafter. All semen used for AI was from one Red Angus bull. One AI technician inseminated all cows in this experiment.

Cows were moved to summer pasture and two Red Angus bulls were placed with them for a 40-day breeding period. Ultrasound was used about 30 days after the synchronization period to determine AI conception rates, which were confirmed by calving dates. Pregnancy palpation at 60 days after bull removal was used to determine total pregnancy rates.

First service conception rate was calculated using the number of cows that conceived to AI, divided by number of cows bred by AI times 100. Percentage pregnant during the synchronization period was the number of cows pregnant to AI divided by total number of cows in treatment group times 100. All data were analyzed by chi-square analyses.

Results

Table 1 shows results of Experiment 1. The Select Synch program produced better results in all traits than the PGF program. However, more cows were cycling before treatment in the Select Synch group according to blood analysis. The Select Synch program yielded 20% higher (P<0.05) estrous response during the synchronization period, 20% higher (P<0.05) conception rates and 32% higher (P<0.05) pregnancy rates during the synchronization period compared to the PGF program. Overall, 60-day pregnancy rates were similar for both programs.

Table 2 shows results for the noncycling and cycling cows separately. The Select Synch program induced estrus in 36% (P<0.05) of the noncycling cows. First service conception rate was also higher (P>0.10) and pregnancy rate during synchronization period was considerably higher for Select Synch cows, (75% vs 39%, Select Synch and PGF, respectively, P<0.05). Results for the cycling cows also were positive for the Select Synch over the PGF program.

Table 3 shows results for Experiment 2. The Select Synch results were not as high as in Experiment 1. Only 73% of the cows cycled during the synchronization period, which was disappointing. The reasons for this low rate are unknown, but daytime temperatures were high (near 100°F) with strong winds during this period. Conception rate was high which yielded an average (62%) pregnancy rate during the synchronization period.

The CO-Synch results were slightly lower (P>0.25) for all traits than the Select Synch. The CO-Synch first service conception rate on the cows detected in heat was 77%, but it was only 38% for the cows that were mass bred by AI. The extra expense for semen, GnRH second injection and labor to mass breed the noncycling cows, in addition to the 48-hour calf removal,

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Table 1. Comparison of Select Synch Program with PGF-10 day program—Experiment 1[a]

Trait	Group	
	Select Synch	PGF
No. of cows	42	41
Cycling before treatment, %	71	56
Cycling during synch.[b], %	93[c]	73[d]
First service conception, %	87[c]	67[d]
Pregnant in synch. period, %	81[c]	49[d]
Pregnant in 60 days, %	98	93

[a]Cows were 3-year-olds, body condition 6.0 and from 25 to 77 days after calving before treatment. Select Synch program involved a GnRH injection and seven days later a PGF injection. PGF program was the standard procedure with one injection of PGF and five days of AI before and five days after injection.
[b]Synch. Period was 10 days for PGF program and 10 days for Select Synch (four days before PGF and six days after).
[cd]Means with different superscripts in same row differ (P<0.05).

Table 2. Comparison of programs for noncycling and cycling cows. Experiment 1[a]

Trait	Group	
	Select Synch	PGF
Noncycling cows[a]		
No. of cows	12	18
Cycling during synch.[b], %	92[c]	56[d]
First service conception, %	82	70
Pregnant in synch. period, %	75[c]	39[d]
Cycling cows[a]		
No. of cows	30	23
Cycling during synch.[b], %	93	87
First service conception, %	89[c]	65[d]
Pregnant in synch. period, %	83[c]	57[d]

[a]Cycling status determined by blood progesterone levels before treatments began.
[b]Synch. period was 10 days for both programs.
[cd]Means with different superscripts in same row differ (P<0.05).

Table 3. Comparison of Select Synch and CO-Synch Programs — Experiment 2[a]

Trait	Group	
	Select Synch	CO-Synch
No. of cows	37	38
Cycling before treatment, %	83	83
Cycling during synch.[b], %	73	58
First service conception, %	85	77[c]
Conception of mass AI, %	—	38[c]
Pregnant in synch. period, %	62	61
Pregnant in 55 days, %	95	92

[a]Cows were 4-year-olds, body condition 5.5 and from 34 to 91 days after calving before treatment. Select Synch program involved a GnRH injection and seven days later a PGF injection. The CO-Synch program involved the same injections as Select Synch plus 48 hour calf removal after PGF injection and mass breeding at 48 hours after PGF plus a second GnRH injection at AI.

[b]Synch. period was eight days for Select Synch (two days before PGF and six days after). Synch. period for CO-Synch was the same except all cows not AI bred by 36 hours after PGF were mass bred AI at 48 hours with no heat detection and AI thereafter.

[c]CO-Synch conception was 77% for cows detected in heat and 38 % for cows not heat detected and mass bred.

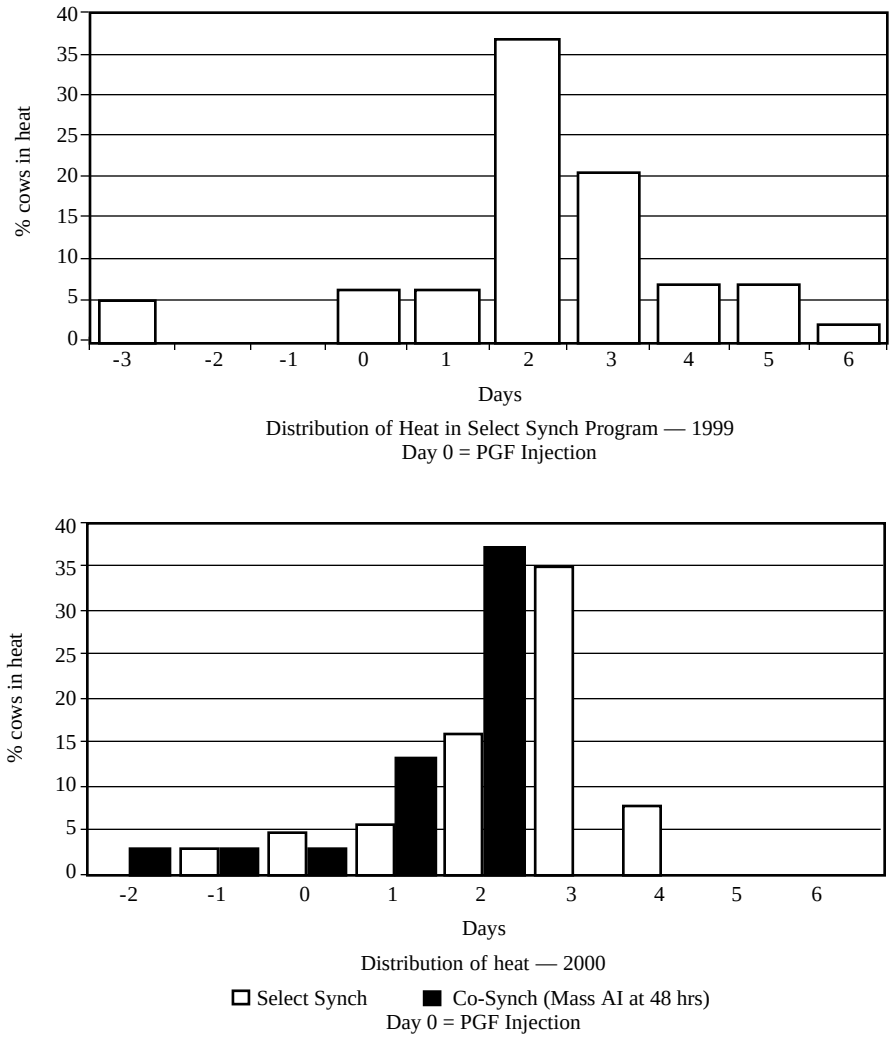

Figure 1. Distribution of cows in heat in 1999 and 2000 experiments.

was not justified in this small study. Experiments with large numbers of cows are needed to determine differences between programs.

Figure 1 shows the distributions of heat (estrus) for the Select Synch program in 1999 and 2000. Note the differences between years. Cows showed heat on days five and six in 1999, but not in 2000. Days two and three after the PGF injection had the large majority of cows in heat in the Select Synch program.

In the CO-Synch program, about 37% of the cows showed heat on day two. Our observations on the cows in this group indicated about 10 hours after the second GnRH injection all estrous activity ceased. The loss of estrous activity may have been due to the GnRH causing ovulation and cessation of heat. The timing of mass AI in relation to the GnRH injection may need to be delayed to get higher conception rates. Colorado research has indicated a 24-hour delay in mass AI is not necessary, but more research is needed.

Results of these two small experiments indicate Select Synch produced better results than the one-injection PGF program and similar results to the CO-Synch mass AI programs. Our results support research findings in other states. More information on these synchronization programs, is available in Extension Circular EC00-279, *Synchronizing Estrous in Beef Cattle*.

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