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**K** CONTROLLING CALVING INTERVALS WITH PROSTAGLANDIN  
**S**  $F_{2\alpha}$  AND FIXED-TIME INSEMINATIONS  
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Summary

Prolonged or delayed interval to first breeding is a major cause of long calving intervals. Our objective was to test two methods of artificial insemination by appointment after controlling the onset of estrus for all first breedings after calving. Prostaglandin  $F_{2\alpha}$  (PGF) was used to time the onset of estrus for cows in two experimental groups. Control cows (inseminated at first heat after 42 days postpartum) had longer intervals to first breeding than the two experimental groups given PGF at 40 to 46 and 51 to 57 days postpartum. Conception rates were lower in the treated cows than in control cows. However, no differences were observed for calving intervals, which ranged in average days from 379 to 384 for treated cows and averaged 376 days for control cows. We were able to reduce successfully the interval to first breeding so all cows were first bred by approximately 60 days postpartum in the experimental groups, but we were unable to shorten overall calving intervals.

Introduction

Maintaining a calf-a-year program is an economic necessity for maximizing profits on the dairy farm. Many studies have indicated that when cows spend a greater proportion of their herd time in periods of peak lactation (first 3 to 4 months of lactation), they will be more profitable and produce more calves during their herd life. To maximize this efficiency for each cow in the herd, maintaining a calving interval of 12 to 13 months is an absolute must. Optimizing herd calving interval, however, does not always optimize the calving intervals for each individual cow. There remain cows with extremely short or extremely long intervals, which are included in the herd average. This can be likened to a fellow who stands with his right foot in a tube of boiling water and his left foot in one of ice water. On the average, the water temperature in which he stands is quite comfortable. We must treat cows as individuals in the herd, so calving intervals can be as uniform as possible for the entire herd.

Procedures

Using 283 Holstein cows in the KSU dairy herd during a 2-year study (July 1, 1983 to June 30, 1985), we tested the idea that calving intervals could be controlled and perhaps reduced by breeding all cows between 51 and 57 days postpartum following an estrus induced by prostaglandin  $F_{2\alpha}$  (PGF). Group 1 consisted of 77 control cows that were inseminated at their first heat observed after 40 days postpartum. Group 2 consisted of 139 cows and Group 3 of 67 cows. Cows in the latter two groups were given PGF (25 mg or 5 cc Lutalyse®) on a Thursday when they were 40 to 46 days postpartum. Eleven days later, on a Monday, cows were retreated with PGF and inseminated at 80 h (Group 2) or 72

and 96 h (Group 3) after the last PGF treatment. This allowed all treated cows to be first bred between 51 and 57 days postpartum, thus, precisely controlling the first breeding interval.

### Results and Discussion

Results of those reproductive traits measured are illustrated in Table 1. Controlling the time of first services with PGF accounted for all cows first bred by no later than 60 days postpartum. Controls had a longer average interval to first breeding by 5 to 6 days, whereas some control cows were first bred as early as 40 days and others as late as 122 days postpartum. Conception rates were poorer after PGF treatment than in control cows. This was due in part to several reasons. There were some cows that were cycling and failed to respond to the PGF treatment, whereas others were not in a responsive stage of an estrous cycle for PGF to regress the corpus luteum and bring the cow into estrus. Some cows were

Table 1. Reproductive traits for cows following fixed-time first services.

Reproductive Trait	Control	AI at 80 h	AI at 72 and 96 h
No. cows	77	139	67
Days to first service	62.6	57.0*	57.1*
Conception rate at first service, %	50.6	25.9*	31.3*
Services/conception	1.8	2.3	2.2
Calving interval, days	376	379	384

\*Different from control ( $P < .01$ ).

anestrus at PGF treatment, resulting from ovulation failure after an earlier estrous cycle or had not cycled since calving. Services per conception tended to be higher for PGF-treated cows, but because of good conception rates at second and third services for treated cows, calving intervals were similar for treated and control cows.

The methodology employed guaranteed that all cows were first bred by approximately 60 days postpartum, but because of problems encountered with approximately 28% of cows not in true estrus at the fixed-time insemination, low conception rates occurred at first service. We are investigating presently another scheme for controlling intervals to first service where one injection of PGF is given around 60 days after calving, and cows are inseminated according to heat detection. Based on the results of the present study, using the two injection scheme will only increase the number cows in estrus by 20% beyond what could be achieved with one injection alone. One injection was adequate to synchronize estrus for first services in about 60% of all cows treated. Whether this method will maintain an acceptable calving interval remains to be tested in our future work.