Timed Breeding and Calf Separation in Early and Late Fall Calving Cows

D.W. Kastner, F.J. White, and I. Rubio, D.L. Lalman, and R.P. Wettemann

Story in Brief

The effect of calf separation on pregnancy rate with timed artificial insemination was evaluated in early and late fall calving cows. Forty eight fall calving cows were blocked according to age and prior calving date, and allocated for insemination in late fall or winter. Cows were treated with gonadotropin-releasing hormone on d 0, prostaglandin $F_{2\alpha}$ on d 7, and gonadotropin releasing hormone on d 9 (Co-Synch). Half of the calves in each group were separated from dams for 48 h on d 7, and were returned after insemination on d 9. All cows grazed native grass pastures and were fed supplemental protein in the winter months to maintain a body condition score of 5 until after breeding. Pregnancy rate to timed artificial insemination averaged 48%. Neither calf separation nor breeding season affected pregnancy rates to timed insemination or natural service. Fall calving cows are good candidates for timed insemination because they usually have better body condition at calving and at breeding than spring calving cows due to more favorable grazing conditions.

Key Words: Beef Cows, Fall Calving, Timed Insemination

Introduction

Forage and climatic conditions are favorable for fall calving in Oklahoma and this warrants research to evaluate production systems that utilize ovulation synchronization and timed insemination. Conception rates less than 40% occurred with timed insemination when ovulation was synchronized in spring calving beef cows (Stevenson et al., 2000). Calf separation for 2 d before insemination increased conception rates when timed ovulation was used in spring herds (Geary et al., 2001). The fall breeding season typically occurs from early November to the middle of February, but the optimal months to artificially inseminate (AI) cows in Oklahoma have not been determined. Body condition after calving influences reproductive performance in spring (Selk et al. 1988) and fall (Rakestraw et al. 1986) cows. Since fall calving cows have greater body energy reserves than spring calving cows, it is anticipated that AI will be more successful in the fall than in the spring in Oklahoma. The objectives of this study were to determine the effects of late fall vs winter breeding along with calf separation, on pregnancy rates with ovulation synchronization and timed insemination.

Materials and Methods

Cows that calved between August 25 and October 3 (n=48) were allotted into late fall or winter breeding groups. Breeding dates for the early and late groups were November 8 to December 18 and January 4 to February 13, respectively. Cows were blocked according to their previous calving date and age. Early and late groups of cows were grazed on separate native grass pastures near Stillwater, Oklahoma, with rotation of the groups among four pastures every two weeks. Supplemental protein (40% CP) was fed to maintain a body condition score (BCS) of 5 until the end of the breeding season, then BCS was maintained ≥ 4 until the end of the winter

feeding period (Table 1). Cows had access to native grass hay when snow or ice covered the pastures. Weight and BCS were assessed every month.

Table 1. Winter protein supplementation: kg/cow/d of 40% C P range cubes		
	Breeding Group	
Interval	Early	Late
October 19-December 19,2000	1.4	1.4
December 20,2000-February 12,2001	1.4	1.8
February 13-April 15, 2001	1.4	1.4

Synchronization of ovulation was accomplished by treatment with gonadotropin-releasing hormone (GnRH, 100 µg Cystorelin, Abbott Laboratories) on d 0, prostaglandin F2α ($PGF2_{\alpha}$, Lutalyse 25 mg, Pharmacia Upjohn) on d 7, and GnRH (100 µg) on d 9 (CO-Synch, Geary et al., 1998). Cows were inseminated on d 9, 48 h after treatment with $PGF2_{\alpha}$. Half of the calves were separated for 48 h from the dams at the time of treatment with $PGF2_{\alpha}$. Calves had access to water and good quality hay during separation. Each cow group was exposed to the same two fertile bulls from d 13 to d 48, commencing 4 d after AI.

Concentrations of progesterone in blood plasma were quantified on days -7, 0, 7, 9, and 16 by radioimmunoassay. Cows that had plasma progesterone > 1 ng/mL in at least one sample were designated as having luteal activity. Cows with progesterone > 1ng/mL on days -7, 0, or 7, < 1 ng/mL on d 9, and > 1 ng/mL on d 16, and calved less than 293 after AI, were designated to have conceived by AI. Calves born greater than 293 d after AI were designated as sired by natural service. Pregnancy was verified by rectal palpation 3-4 mo after insemination. The effect of season on percentage of cows with normal luteal activity and total pregnancy rate was analyzed with Proc Freq (SAS 1990). Effects of season and calf separation on pregnancy rate to AI were analyzed using GENMOD (SAS 1990). Season, calf separation, and season by calf separation were included in the model.

Results and Discussion

Body condition of cows at calving was similar for early and late breeding groups and averaged 5.7 (Table 2). At the start of breeding, BCS was similar for early (5.2) and late (5.0) cows (P > 0.10).

Table 2. Body condition score and days postpartum at AI		
	Breeding Group	
Criteria	Early	Late
Cow, no	24	24
BCS prior to calving	5.7	5.7
BCS at the start of breeding	5.2	5.0
BCS at the end of breeding	5.1	5.0
BCS at the end of supplementation	4.3	4.5
Days postpartum at AI	59.2± 2.0[a]	112.2± 2.9[b]
[a,b] Means in a row without a common superscript differ (P < 0.01)		

Cows in both groups lost body weight during the winter months, however a BCS of 5.0 was maintained until the end of the breeding seasons. At the end of the winter feeding period, BCS averaged 4.3 and 4.5 for the early and late cows, respectively. There was a tendency ($P < 0.11$) for less early cows (83.3%) to have normal luteal activity at AI compared with late cows (100%, Table 2). Days postpartum were 53 d greater for the late than the early cows (Table 1). This was by design to produce early and late calving cows from a common group of cows. Neither season nor calf separation influenced the percentage pregnant to AI (Table 3). One possible reason that calf separation did not influence pregnancy is because a majority of the cows were having normal estrous cycles. Wettemann et al. (1986) noted luteal activity of cows with moderate to good body condition was not influenced by calf separation. Pregnancy rate with timed AI averaged 48% for the early and late bred cows. This very acceptable rate with cows only entering the chute three times was possible because 92% of the cows were exhibiting estrous cycles when ovulation was synchronized. Fall calving cows usually have greater BCS at calving, reduced postpartum anestrus, and are better candidates for timed insemination than spring calving cows. Pregnancy rates for the total breeding seasons were similar for early (91.7%) and late (100%) cows.

Table 3. Reproductive performance of beef heifers

	Breeding Group	
Criteria	Early	Late
Cows with normal luteal activity, %	83.3 (24)[a]	100 (24)
Pregnancy rates to AI		
Separated, %	45.4 (11)	63.6 (11)
Suckled, %	38.5 (13)	46.1 (13)
Total, %	41.7 (24)	54.2 (24)
Breeding season pregnancy rate, %	91.7 (24)	100 (24)

[a] Total number of cows evaluated in parentheses

Implications

Producers utilizing the fall environment for calving in Oklahoma should consider the use of timed AI because cows are usually in moderate condition and reproductively active during the breeding season, and it will result in greater genetic progress with more calves born early in the season. With a large percentage of fall calving cows with normal estrous cycles at AI, calf separation may not be necessary to reduce postpartum anestrus.

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