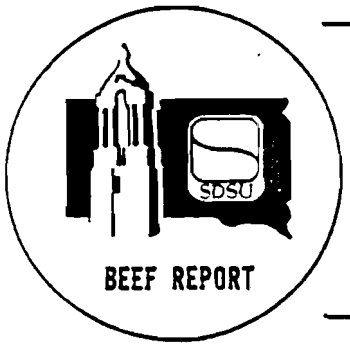
1987

Effects of Bull Exposure on Post-partum Interval and Reproductive Performance in Beef Cows

C.D. Naasz
South Dakota State University

H.L. Miller
South Dakota State University

R.H. Haigh
South Dakota State University



EFFECTS OF BULL EXPOSURE ON POSTPARTUM INTERVAL AND REPRODUCTIVE PERFORMANCE IN BEEF COWS

C. D. Naasz[1], H. L. Miller[2] and R. H. Haigh[3]
Department of Animal and Range Sciences

CATTLE 87-14

Summary

Spring calving beef cows were utilized to study the effect of bull exposure early postpartum on return to estrus and fertility. In the spring of 1985 and 1986, cows were randomly exposed to epididectomized bulls 3 to 7 days after calving until beginning of the breeding season or not exposed to bulls. Cows were observed for estrus twice daily beginning approximately 4 weeks after the start of calving until synchronization. In 1986, blood samples were collected weekly by jugular venipuncture during heat detection and serum progesterone concentrations were determined. All cows were synchronized with Synchro-Mate B and inseminated 48 hours after implant removal. Calves were removed for 48 hours following implant removal. Each year a group of cows was selected from the two treatment groups and cannulated at estrus following Synchro-Mate B implant removal. Blood samples were collected at 15-minute intervals for 2 hours and every 2 hours for 46 hours for determination of luteinizing hormone concentration. Bull exposed cows had a shorter ($P<.01$) interval to first estrus in 1985 and there was no difference ($P>.05$) in 1986. The percentage exhibiting estrus prior to synchronization was greater ($P<.01$) for bull exposed than nonexposed in 1985 and there was no difference ($P>.05$) in 1986. There was no difference ($P>.05$) in conception rates to the timed insemination in 1985 and 1986 and the total percentage pregnant did not differ ($P>.05$) in either year. Bull exposure may reduce the interval from calving to first estrus and increase the percentage cycling prior to breeding, but conception rates are not influenced.

(Key Words: Cows, Bull Exposure, Postpartum Interval, Reproductive Performance.)

Introduction

The postpartum interval is the period of time from calving until the first postpartum estrus that is accompanied by ovulation. A prolonged postpartum interval is of major economic importance in terms of cow productivity. The achievement of a 365-day calving interval requires a calving to conception interval of 80 to 85 days. The postpartum interval of the suckled beef cow ranges from 46 to 168 days. Induction of estrous cycles soon after calving in late calving cows or in cows that have long postpartum intervals would be advantageous to the producer. However, evidence that conception rates are higher in cows that have had a postpartum estrous cycle preceding the time of breeding is conflicting.

Recent evidence indicates that the presence of bulls during the postpartum period influences the time when cows resume estrus cycles after calving. The purpose of the present study was to determine if exposure to sterile bulls after calving influences the interval from calving to first estrus and subsequent fertility.

Materials and Methods

Seventy-two beef cows were randomly allotted to one of two treatments after calving in the spring of 1985. The experiment was repeated with 41 cows in the spring of 1986. Treatments consisted of cows exposed to epididectomized teaser bulls beginning 3 to 7 days after calving until synchronization or cows not exposed to bulls. Cow groups were maintained in separate pastures with no fence-line contact. Cows were maintained on pasture and provided corn silage and alfalfa haylage until pasture was adequate to meet nutritional requirements. A trace mineral salt was also available throughout the experimental period.

---

[1] Former Graduate Assistant.
[2] Associate Professor.
[3] Manager, Purebred Beef Unit.

Cows were observed for estrus twice daily beginning approximately 4 weeks after the beginning of calving until synchronization to determine resumption of estrus. In 1986, blood samples were collected weekly by jugular venipuncture. Serum progesterone values were determined by radioimmunoassay to confirm cycling status.

All cows retained for breeding were synchronized with Synchro-Mate B. Calves were removed from the cows for 48 hours following Synchro-Mate B implant removal. Cows were artificially inseminated without regard for estrus approximately 48 hours after implant removal. Epididectomized bulls were utilized for estrous detection in both groups of cows during a 30-day AI period. An intact bull was turned in for the last 30 days of a 60-day breeding season.

Each year a group of cows was randomly selected from the bull exposed group (n = 8, 1985; n = 7, 1986) and the nonexposed group (n = 8, 1985; n = 7, 1986) and observed for estrus beginning 24 hours after implant removal in 1985 and 18 hours after implant removal in 1986. The cows were cannulated upon observation of estrus. Cows not observed in estrus were cannulated by 34 hours following implant removal. Blood samples were collected at 15-minute intervals for 2 hours and every 2 hours for 46 hours. Blood samples were assayed for serum levels of luteinizing hormone.

Results and Discussion

Initiation of estrous cycles occurred 24 days earlier (P<.01, table 1) for bull exposed cows than nonexposed cows in 1985 and 6 days earlier (P>.05) for bull exposed cows in 1986. The difference in 1986 was not significant. By synchronization time in 1985, 76% (25/33) of the bull exposed cows had initiated estrous cycles compared with 17% (6/35) of the nonexposed cows (P<.01). In 1986, 81% (13/16) of the bull exposed cows and 65% (11/17) of the nonexposed cows were in estrus prior to synchronization (P>.05). Any cows less than 30 days postpartum by synchronization time were not considered in these calculations because they had not had sufficient time to resume estrous cycles.

TABLE 1. LEAST SQUARES MEANS FOR CALVING DATES AND DAYS FROM CALVING TO FIRST ESTRUS[a] AND CYCLING RATES PRIOR TO SYNCHRONIZATION

Item	1985		1986	
	Bull exposed	Non-exposed	Bull exposed	Non-exposed
No. of cows	35	37	20	20
No. of cows >30-days postpartum	33	35	16	17
Avg calving date[b]	3/24±3.31	3/25±3.22	3/30±4.38	3.27±4.38
Avg days from calving to first estrus[cd]	47.2±3.13	71.4±3.04**	45.8±4.14	52.2±4.02
No. of cows in estrus prior to synchronization[cd]	25(76)[e]	6(17)**	13(81)	11(65)

[a] Values are means ± SE.
[b] For all cows in the trial.
[c] Determined from visual observation in 1985 and serum progesterone in 1986.
[d] For cows >30-days postpartum.
[e] Percentages are given in parenthesis.
** P<.01 within year.

The results of 1986 show no advantage (P>.05) for bull exposed cows compared to nonexposed cows regarding return to estrus. This is in contrast to the results of 1985. This could be due to the small number of cows available in 1986, making it more difficult to obtain significant results. Another reason could be due to the different methods used to determine resumption of estrus each year. Visual observation for estrus was utilized for 1985 and progesterone values were utilized for 1986. Research had indicated that cows exhibit more definite signs of estrus in the presence of bulls. The advantage for bull exposed cows in 1985 may be due to a failure to detect estrus in the nonexposed cows.

The average calving date the spring following treatment was not affected (P>.05) by bull exposure (table 1). A slight advantage was apparent for the bull exposed group in 1985. Average calving date was March 25 for bull exposed cows and April 1 for nonexposed cows in 1985. Average calving dates following treatment for cows in 1986 were March 20 and March 19 for bull exposed and nonexposed cows, respectively. A year effect (P<.05) was present because of the breeding season was started 10 days earlier in 1986.

The percentage of cows conceiving to the time insemination was not affected (P>.05) by bull exposure or year. Conception to the timed insemination in 1985 was 63.3 (19/30) and 45.2% (14/31) for bull exposed and nonexposed cows, respectively. In 1986, conception rates for the timed insemination were 43.8% (7/16) for bull exposed cows and 50% (8/16) for nonexposed cows. The total percentage pregnant at the end of the breeding season was similar (P>.05) between treatments and years. Pregnancy rates at the end of the breeding season in 1985 were 93.3 (28/30) and 96.7% (30/31) for bull exposed and nonexposed cows, respectively. In 1986, the total percentage pregnant was 87.5% (14/16) for bull exposed cows and 100% (16/16) for nonexposed cows.

Each year a group of cows from each treatment was randomly allotted to determine luteinizing hormone response following estrous synchronization with Synchro-Mate B. A luteinizing hormone peak precedes ovulation. The number of cows exhibiting an LH peak corresponding to ovulation did not differ (P>.05) between treatment or year (table 2). Peak luteinizing hormone levels did not differ between treatments (P>.05) but were different (P<.05) between years. The reason for this difference is not known. Time to the luteinizing hormone peak following Synchro-Mate B implant removal and calf removal did not differ (P>.05) between treatment and year. The luteinizing hormone peak corresponding to ovulation occurred between 20 and 50 hours after Synchro-Mate B implant removal.

TABLE 2. LEAST SQUARES MEANS FOR TIME FROM SYNCHRO-MATE B (SMB) IMPLANT REMOVAL TO LH PEAK AND PEAK IN LH LEVELS[a]

Item	1985		1986	
	Bull exposed	Non-exposed	Bull exposed	Non-exposed
No. of cows	8	7[b]	7	7
No. exhibiting LH peak	7	5	5	5
Hours from SMB implant removal to LH peak	31.28±3.10	30.20±3.67	25.05±3.67	34.35±3.67
Peak LH levels (ng/ml)[c]	7.25±5.78	7.65±6.84	21.53±6.84	21.99±6.84

[a] Values are means ± SE.
[b] One cow dropped due to inadequate sampling.
[c] Year effect (P<.05).

The results of the two trials are inconclusive. The small number of cattle used in 1986 and the different methods of estrous detection used each year made it difficult to determine the effects of bull exposure on the postpartum interval. Bull exposure soon after calving may reduce the postpartum interval and increase the percentage cycling prior to the breeding season. Conception rates were not influenced by bull exposure. Bull exposure also did not influence time from Synchro-Mate B implant removal to the luteinizing hormone peak or peak luteinizing hormone levels.