

POSTPARTUM WEIGHT LOSS INFLUENCES OVARIAN FUNCTION OF RANGE COWS

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Story in Brief

Fall calving Hereford cows were used during four years to determine the effects of postpartum weight loss on ovarian function and reproductive performance. Percentage of cows with ovarian function, based on progesterone in blood plasma, and pregnancy rate can be reduced by body weight loss before or during the breeding period. If cows lose weight before and during the breeding period luteal function after estrus may also be reduced.

(Key Words: Cow, fertility, nutrition, postpartum, progesterone, reproduction)

Introduction

Loss of weight after calving may result in a longer interval to estrus and conception and pregnancy rate may be reduced. Reproductive responses of range cows vary tremendously between years because of available nutrients, body energy reserves and climatic conditions. The objectives of this experiment were to evaluate the effects of postpartum weight loss of fall calving cows, before and during breeding, on presence of ovarian function during the breeding period, ovarian function immediately after estrus and pregnancy rate.

Materials and Methods

Mature Hereford range cows calving in September and October during four consecutive years were used to evaluate the effects of postpartum weight loss on ovarian activity and reproductive performance. Results of weight changes and reproductive performance of years 1, 2 and 3 were reported previously (Rakestraw et al., 1983, 1984). A total of 217 cows in body condition scores (1 = emaciated, 9 = obese) that averaged 6.7, 6.9, 5.5 and 5.4 at calving during 1980, 1981, 1982 and 1983, respectively, were assigned to the following treatments at calving: (1) Maintain weight from calving through rebreeding, (2) Lose about 10 percent of the first postcalving weight by the beginning of breeding and be fed the same as Group 1 during breeding, and (3) Maintain weight from calving to the beginning of breeding, followed by a loss of 10-15 percent of the first postpartum weight during the breeding season. Cows were maintained on native range and supplemental hay and protein were fed to obtain the desired weight changes.

The breeding season was 60 days commencing about December 1 each year. Estrus was detected by sterile bulls with chin-ball markers before breeding and with fertile bulls during breeding. Blood plasma samples were collected at weekly intervals during the breeding period. Progesterone in plasma was quantified to assess ovarian activity.

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Ovarian activity was defined as the presence of greater than 1 ng/ml of progesterone in plasma for two successive weeks.

Results and Discussion

Body weight losses during the four years were influenced by climatic conditions and available forage. Weight losses for the four years from calving to breeding ranged from .6 - 4.4% for Group 1, 3.0 - 17.1% for Group 2 and .9 - 2.2% for Group 3. During breeding, weight losses for the 4 years ranged from 3.1 - 8.5% for Group 1, 1.6 - 6.6% for Group 2 and 9.5 - 14.5% for Group 3.

The percentage of cows in estrus during the breeding period was not significantly influenced by treatment, however there was a tendency for more cows that maintained weight to exhibit estrus (Table 1). The number of days from calving to the first estrus, for those cows that initiated estrous cycles was not significantly influenced by treatment but cows that lost weight before breeding tended to have a longer interval.

Table 1. Influence of postpartum weight changes on reproductive characteristics of fall calving cows.

Criteria	Treatment		
	Maintain weight	Lose weight before breeding	Lose weight during breeding
Cows (no)	70	71	76
Cows in estrus (%)	89	76	79
Calving to estrus (da)	58	69	58
Ovarian activity at start of breeding (%)	49 ^a	28 ^b	38 ^b

^{a,b}Treatment in rows differ ($P < .05$).

Percentage of cows with ovarian activity during the first two weeks of breeding was influenced by treatment. Forty-nine percent of the cows that maintained weight until and during breeding had functional ovaries at the start of breeding and only 28% of the cows that lost weight before breeding had ovarian activity. Also, fewer cows that were fed to lose weight during breeding had ovarian activity during the first two weeks of the breeding period. Reduced ovarian function in these cows could be associated with reduced nutrient intake and rapid weight loss during the time estrous cycles were initiated.

The percentage of cows with increased progesterone in plasma (luteal activity) during the first week after behavioral estrus was significantly influenced by treatment in two of the four years (Table 2). In 1980-81, when cows lost weight during the breeding period only 41% had increased progesterone after estrus whereas 93% of the cows that maintained weight had luteal activity. In 1982-83, luteal activity after estrus was reduced in cows that lost weight either before or during breeding compared to cows that maintained weight. Although the effect was not significant, in 1981-82 71% of the cows that lost weight before breeding had luteal activity after estrus compared to 100% of the cows that maintained weight. Nutrient intake, ambient temperature and body condition are probably factors that influence the occurrence of luteal

activity after estrus. For example, luteal activity after estrus was extremely reduced for cows on all treatments in 1983-84. This may be associated with the thinner body condition that all cows were in at calving and breeding during that year and extremely cold weather during the breeding period. These data indicate that weight loss after calving may result in estrus without normal development of a corpus luteum.

Table 2. Influence of postpartum weight changes of fall calving cows on luteal activity after estrus.

Treatment	Year			
	80-81	81-82	82-83	83-84
Maintain weight	93 ^b	100	94 ^b	33
Lose weight before breeding	79 ^{bc}	71	64 ^c	40
Lose weight during breeding	41 ^c	92	62 ^c	20

^aPercent of cows with increased progesterone in plasma during the week after estrus.

^{b,c}Treatments in columns differ ($P < .05$).

Postpartum weight change influenced the pregnancy rate (Table 3). In 1980-81 only 50% of the cows that lost weight during breeding were pregnant compared to 79% of the cows that maintained weight and 88% of the cows that lost weight before the breeding period. In 1981-82, pregnancy rate tended to be reduced in cows that lost weight either before or during breeding but pregnancy rate was not significantly influenced by treatment in 1982-83. Extreme variations in pregnancy rates between years may be associated with nutrient intake, temperature and body condition. Pregnancy rate was reduced for all treatment groups in 1983-84 when cows were thinner and were exposed to very cold environmental temperatures. Those cows that lost weight either before or during breeding had the lowest pregnancy rates during these adverse conditions.

Table 3. Influence of postpartum weight changes on pregnancy rate (%) of fall calving cows.

Treatment	Year			
	80-81	81-82	82-83	83-84
Maintain weight	79 ^a	87	89	59 ^a
Lose weight before breeding	88 ^b	53	84	19 ^b
Lose weight during breeding	50	65	85	28

^{a,b}Treatments in columns differ ($P < .05$).

This experiment demonstrated that if cows are in good body condition at calving, this will not insure adequate rebreeding of fall calving cows. Percentage of cows with ovarian function at the start of breeding and pregnancy rate can be influenced by weight loss before or during the breeding period. If cows lose weight before or during the breeding

period, the percentage of cows with normal luteal function after estrus may be reduced.

Literature Cited

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