Evaluation of Beef Cow and Calf Separation Systems to Improve Reproductive Performance of First-Calf Cows

Paulo G. M. A. Martins, John D. Arthington[1]

Repeated 48-h calf withdrawal may be an effective option for the reproductive management of first-calf Brahman crossbred cows.

Summary

The objectives were to compare the effects of a traditional 48-h calf withdrawal to early-weaning and repeated 48-h calf withdrawals on postpartum interval and measures of performance of first-calf cows. Over two consecutive years, a total of 112 primiparous, Brahman x British crossbred cow-calf pairs were randomly allotted to three treatments: EW (early weaned); IW (interval weaned – 48-h calf withdrawal; four times, 20 d apart); and CON (control; single 48-h calf withdrawal). Treatments were initiated at the start of a 90-d breeding season (average days postpartum = 97 ± 19). Blood samples were collected over 90 d at 10 d intervals for determination of concentrations of progesterone. Cow BW was measured at the start (d 0), middle (d 41), and end (d 90) of the study, and calf BW was determined at the start and end of the study. Pregnancy was diagnosed by transrectal ultrasonography at approximately 45 d after the end of the breeding season. By d 30 of the breeding season, there were more EW cows cycling than IW and CON cows (89.5, 68.9, and 61.1 %, respectively; P = 0.03). Cow and calf BW did not differ at the beginning of the breeding season, but was greater (P < 0.01) for EW vs. IW and CON cows and calves at the end of the study (d 90; 850, 793, and 795, and 377, 278, and 292 lb for EW, IW, and CON cows and calves, respectively; SEM = 8.1 and 4.7). Early-weaned cows tended (P = 0.06) to have a greater pregnancy rate compared to IW and CON cows and IW cows had a greater (P = 0.03) pregnancy rate than CON cows (94.4, 89.7 and 71.7% pregnant for EW, IW, and CON, respectively). Compared to traditional, single-time, 48-h calf withdrawal, repeated 48-h calf withdrawal resulted in similar cow BW and BCS changes, reduced calf BW gain, hastened postpartum anestrus period, and greater pregnancy rate.

Introduction

Percent calf crop is a leading variable impacting the profit of a cow-calf operation. Therefore, to produce a calf each year; cows must maintain a postpartum anestrous period of approximately 80 d or less, which is known to be a major factor impacting calf crop. Suckling, calf presence, and cow body condition score (BCS) are all factors known to impact the duration of postpartum anestrous.

Early weaning (EW) can be a practical and profitable management option for cow-calf operations. Compared to traditional weaning systems, EW cows have been shown to have greater BCS and pregnancy rate with decreased dry matter intake and days of postpartum anestrus. However, there are some disadvantages in adopting EW, such as greater labor and feed requirements for the calves and the need to identify cow/calf pairs. As an alternative to permanently separating the cows and calves, temporary calf withdrawal may be a low-cost management practice for reducing postpartum anestrous and inducing ovulation in suckling beef cows, under grazing conditions.

[1]Range Cattle Research and Education Center, University of Florida, Ona, FL

The objective the current study was to compare the effects of a traditional 48-h calf withdrawal to early-weaning and repeated 48-h calf withdrawals on post-partum interval and measures of performance of first-calf beef cows.

Materials and Methods

This study was conducted over two consecutive years (beginning January 2009) at the University of Florida, Range Cattle Research and Education Center (RCREC). Fall-calving, 2-yr-old, Brahman x British crossbred cow-calf pairs (n = 64 and 48 for Yr 1 and 2, respectively) were randomly assigned to one of three treatments consisting of early weaning (EW; calves early weaned in January); interval weaning (IW; calf withdrawal for 48 h, four times during the breeding season, 20 d apart); and control (CON; single 48-h calf withdrawal at the beginning of breeding season). Treatments were initiated at the start of the breeding season (95 ± 20.7 d postpartum). All cows were exposed to Angus bulls (bull:cow ratio approximately 1:30) during a 90-d breeding season (January to April). Cows grazed bahiagrass (*Paspalum notatum*) pastures and were provided free-choice access to stargrass (*Cynodon* spp.) hay, as well as a commercial mineral/vitamin mix and water. Early-weaned calves were kept in dry lot pen for 10 d for acclimatization and then transferred to annual ryegrass (*Lolium multiflorum*) pastures and provided supplemental concentrate (16% CP; 1.0% body weight daily). During the 48-h withdrawal, IW and CON calves were kept enclosed within a pen located inside the pasture. Calves had tactile contact with their dam, limited to head region, but they were not allowed to suckle. Free-choice access to concentrate and water was provided to the calves during this 48-h period. At all other times, IW and CON calves were allowed free access to their dams.

Cow body weight (BW) was measured at the start (d 0), middle (d 41), and end of the breeding season (d 90). Calf BW was measured at the start and end of the breeding season. Pregnancy was diagnosed by transrectal ultrasonography at approximately 45 d after the end of the breeding season. To determine the effects of treatment on the length of postpartum anestrous, blood samples were collected on 10 d intervals during the breeding season for analysis of progesterone concentrations. Resumption of cyclicity was defined as two consecutive samples with concentrations of progesterone ≥ 1.5 ng/mL.

Data were analyzed using the MIXED (BW, BCS, postpartum interval) and GENMOD (pregnancy rate) procedures of SAS. The model statement contained the effects of treatment, year, and treatment x year interaction. For postpartum interval, the model statement also included the effect of sampling time. For calf BW, the model statement contained the effects of treatment, sex, year and all possible interactions. Since weaning treatment was applied directly to the cow or calf, cow or calf was the experimental unit for all analyses. Treatment differences were compared by single degrees of freedom contrasts, predefined as EW vs. IW and CON, and IW vs. CON. Significance was set at $P < 0.05$. Response variables were BCS, BW, pregnancy rate and initiation of estrous.

Results

There was no treatment x year interaction for cow BW, and there was no treatment x sex x year interaction for calf BW. Cow BW at the beginning of the breeding season did not differ ($P > 0.10$); however, at the end of the breeding season (d 90), EW cows were heavier ($P < 0.01$) than CON and IW cows (Table 1). Cow BCS tended ($P = 0.09$) to be greater for EW cows compared to CON and IW cows on d 90 (Table 1). Calf BW did not differ at the beginning of the breeding season, but was greater ($P < 0.01$) for EW vs. IW and CON calves on d 90 (Table 2). In addition, CON calves were heavier ($P = 0.05$) than IW calves on d 90 (Table 2). There was no treatment x year interaction for postpartum interval or cow pregnancy rate. By

d 30, more EW cows were cycling than IW and CON (89.5, 68.9, and 61.1%, respectively; P = 0.02). On d 90, there was a tendency (P = 0.11) for more IW cows to be cycling compared to CON cows (94.6, 90.1, and 72.7 % cycling for EW, IW, and CON cows, respectively). Overall pregnancy rate tended (P = 0.06) to be greater for EW vs. the average of IW and CON cows (94.4 vs. 80.7%). Additionally, pregnancy rate of IW cows was greater (P = 0.03) than CON cows (90.1 vs. 72.7%).

In summary, compared to traditional, single-time, 48-h calf withdrawal, repeated 48-h calf withdrawal resulted in similar cow BW and BCS changes, reduced calf BW gain, hastened postpartum anestrus period, and greater pregnancy rate. We conclude that repeated 48-h calf withdrawal may be an effective option for the management of first-calf, Brahman crossbred cows, particularly for producers that are unable or unwilling to early-wean (permanently separate) cows and calves at the start of the breeding season.

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Table 1. Least squares means of cow body weights and BCS of control (CON), interval- (IW), and early-weaning (EW) treatments[1].

Item	Control	Interval-weaned	Early-weaned	SEM	Contrasts	
					(CON&IW) vs. EW	CON vs. IW
Cow BW, lb						
d 0	814	814	816	13.5	0.91	0.97
d 41	818	813	833	9.7	0.19	0.73
d 90	795	793	850	8.1	<0.01	0.80
BW gain, lb	-25	-27	30	8.1	<0.01	0.80
Cow BCS[2]						
d 0	4.3	4.6	4.5	0.16	0.28	0.20
d 90	3.9	4.0	4.7	0.23	0.09	0.85
Change	-0.5	-0.4	+0.2	0.23	0.09	0.85

[1]EW = calves early-weaned on d 0; IW = 48-h calf withdrawal, 4 times during the breeding season, 20 d apart; CON = single 48-h calf withdrawal on d 0. Treatments were initiated at the start of the breeding season (d 0; 95 ± 20.7 d postpartum).
[2]Cow body condition score was estimated using a nine-point scale where 1 = emaciated to 9 = obese.

Table 2. Effect of control (CON), interval- (IW) and early weaned (EW) on calf growth performance[1].

Item	Control	Interval-weaned	Early-weaned	SEM	Contrasts	
					(CON&IW) vs. EW	CON vs. IW
Calf BW, lb						
d 0	191	207	191	6.0	0.29	0.07
d 90	292	278	377	4.7	<0.01	0.05
BW gain, lb	91	77	176	4.7	<0.01	0.05

[1]EW = calves early-weaned on d 0; IW = 48-h calf withdrawal, 4 times during the breeding season, 20 d apart; CON = single 48-h calf withdrawal on d 0. Treatments were initiated at the start of the breeding season (d 0; 95 ± 20.7 d postpartum).