EFFECTS OF POSTPARTUM BODY CONDITION SCORE OF BEEF COWS ON MILK COMPONENTS AND WEANING WEIGHTS OF CALVES

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Story in Brief

Spring-calving beef cows were used to determine the influence of postpartum body condition score on milk components and weaning weights of calves. In 1995 and 1996, body condition scores were evaluated 8 to 14 d after parturition, and quarter milk samples were collected for analyses of milk components (fat, protein, lactose, and solids-not-fat). Cows were classified by body condition score (BCS; < 3.5, 4, 4.5, or > 5), and by age (young, < 5 yr; and old, > 6 yr). Weaning weights were adjusted to 205 d weights (ADJWW). Body condition score did not influence milk composition. Older cows had a greater percentage of fat in milk compared with younger cows (3.87 vs 3.28 %, respectively). Calf sex, cow age and BCS of cow did not influence ADJWW of calves. Birth weight of calves was not affected by BCS of the cows at calving. Calves weighed more at weaning in 1996 than in 1995 (242 ± 3 vs 212 ± 4 kg, respectively). Milk components were not correlated with ADJWW. We conclude that BCS at calving, in the range we studied, does not influence calf birth weight, adjusted weaning weights, or milk components, and adjusted weaning weights are not correlated with milk composition.

(Key Words: Beef Cow, Body Condition, Weaning Weight.)

Introduction

Adequate weaning weights must be achieved for beef cow producers to maintain profitability. Milk production of the cow is a major factor influencing performance of the calf (Rutledge et al., 1971). Postpartum weight change of primiparous cows influenced adjusted weaning weight of calves (Spitzer et al., 1995). Nutritional restriction of first calf heifers reduced calf birth weight, but did not affect the incidence of calving difficulty (Bellows and Short, 1978). Effects of body condition of mature beef cows at parturition on calf performance has not been elucidated. Therefore, the objective of this experiment was to determine if postpartum body condition influenced birth weight, milk components and adjusted weaning weights of calves.

Materials and Methods

Spring calving Hereford and Hereford x Angus cows (n=156) were utilized to determine the effects of postpartum body condition (BCS) on milk components and adjusted weaning weight (ADJWW) of calves. Data were collected over a two year period (1995, n=82; 1996, n=74). Cows grazed native range at the Range Cow Research Center, 15 miles west of Stillwater.

At 8 to 14 d after calving, BCS was assessed (1 = emaciated and 9 = obese; Wagner et al., 1988), and quarter milk samples were collected from each cow. Calves were separated from cows 2 h before milking. Cows were confined in a squeeze chute and administered 10 units of oxytocin (i.m.) to facilitate milk let-down. Teats where dipped in .1% iodine solution and wiped dry with paper towels. Ten mL of milk were collected into plastic vials, preserved with broad spectrum

Microtablets, and later analyzed for milk components at the Dairy Herd Improvement Laboratory, Manhattan, KS.

Cow weights were determined 8 to 14 d after parturition. Calf weights were recorded within 24 h after birth and again at the time of weaning. Weaning weights were adjusted to 205 d using the GLM procedure and least squares mean separation of SAS (1994). The model included cow age, calf sex, year, and BCS. The milk component (MC) for the quarters of a cow was averaged and used as the value for the cow. Average MC were analyzed using the GLM procedure of SAS (1994). The model included cow age, year, and BCS. Simple correlations were determined between MC and ADJWW.

Results and Discussion

Body condition score did not influence (*P*>.1) MC (Table 1). Year did not influence milk fat or lactose. However, year influenced (*P*<.02) milk protein and solids-not-fat. In 1995, cows had greater milk protein (3.37 vs 3.16 %, respectively) and solids-not-fat (8.60 vs 8.31, respectively) compared with 1996. Cow age did not affect percentages of protein, lactose, or solids-not-fat in milk. However, cow age influenced (*P*<.02) percentage of milk fat, as older (³ 6 yr) cows had greater fat than younger (£ 5 yr) cows (3.87 vs 3.28 %, respectively; Table 1). Percentage of lactose was correlated with ADJWW (r = .19; *P*<.03), however, other MC were not related to weaning weights (Table 2). Clutter and Nielsen (1987) found that milk intake of the calf was highly correlated with 205 d weight of the calf. Therefore, the effect of milk production on weaning weights is probably attributable to milk volume rather than milk quality.

Year influenced (*P*<.0001) ADJWW. In 1995, 205 d ADJWW were 212 ± 3.5 kg compared with 242 ± 3 kg in 1996 (Table 3). More forage of better quality was available during August and September of 1996, and may account for the greater weights during that year. Calves consume more forage as they get older, prior to weaning (Ansotegui et al., 1991; Sowell et al., 1996). The dependency of the calf on milk is decreased after the first 60 days of life, and forage makes a greater contribution to calf growth (Neville, 1962).

Adjusted weaning weights were not influenced by BCS and averaged 225 ± 11 kg (Table 3). Body condition of cows near parturition did not affect (*P*>.1) birth weights of calves (Table 3). Rasby et al. (1990) found placenta from thin cows weighed more than placenta from moderate cows, possibly allowing more nutrients to pass to the offspring. Fetal weight at 260 d of gestation did not differ between mature cows with an average BCS of 3.7 compared with cows in a BCS of 5.7 (Rasby et al., 1990).

Cow age did not influence ADJWW of calves, in agreement with Christian et al. (1965). However, Cundiff et al. (1966) found that older cows had heavier calves compared with younger cows. Calf sex influenced birth weight of calves, but not ADJWW. Male calves weighed more than female calves at birth (40 ± .5 vs 38 ± .6 kg, respectively; *P*<.03). Males are usually heavier than females at birth (Neville, 1962; Cundiff et al., 1966; Melton et al., 1967).

In conclusion, body condition of mature beef cows at calving did not influence birth weight, adjusted weaning weights or milk components. Percentage of lactose, but no other milk component, was correlated with adjusted weaning weights.

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Table 1. Effects of cow age and body condition (BCS) on percentages of milk fat, protein, lactose, and solids-not-fat (SNF) in milk.

Milk Component	Cow Age		BCS			
	Older[1]	Younger[1]	< 3	4	4.5	> 5
Cows, no.	102	54	21	31	63	41

Fat, %	3.87[a]	3.28[b]	3.83	3.47	3.61	3.44
Protein, %	3.34	3.19	3.27	3.19	3.25	3.39
Lactose, %	4.41	4.55	4.66	4.46	4.54	4.26
SNF, %	8.45	8.45	8.62	8.34	8.49	8.40

1Older (> 6 yr), Younger (< 5 yr).

a,bMeans within a row with different superscript letters differ (*P*<.05).

Table 2. Correlation coefficients for percentages of milk fat, protein, lactose, and solids-not-fat (SNF) with adjusted weaning weights (ADJWW).

	Fat	Protein	Lactose	SNF
ADJWW	.02	.003	.19[a]	.13

aSignificant correlation (*P*<.05).

Table 3. Effects of year and body condition score (BCS) on birth weight (BRWT) and adjusted weaning weight (ADJWW).

	Year		BCS			
	1995	1996	< 3	4	4.5	^{3} 5
BRWT, kg	39 ± .6	39 ± .6	39 ± 1.1	39 ± .9	39 ± .6	40 ± .8
ADJWW, kg	212 ± 4[a]	242 ± 3[b]	225 ± 7	225 ± 5	231 ± 4	225 ± 5

a,bMeans within a row with different superscript letters differ (*P*<.05).
