Effects of Timing of Weaning in a Fall-Calving System on Performance of Beef Cows and Their Progeny

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Story in Brief

Predominantly Angus beef cows were used in two consecutive years to investigate the effects of timing of weaning on cow body weight and condition, reproductive performance, milk production, and calf performance of fall-calving beef cows and their progeny. Cows were assigned to two weaning treatments: (1) Traditional weaning in mid-April at approximately 210 d of age (Treatment=APRIL) and (2) Late weaning in mid-July at approximately 300 d of age (Treatment=JULY). Performance data were analyzed by number of years on trial: (1) Cows/calves in their first year on trial (YOT=1) and (2) Cows/calves in their second year on trial (YOT=2). No statistical differences in performance were noted for YOT=1 cows, although APRIL cows were numerically fleshier than JULY cows at the July weaning date. In their second year on trial, APRIL cows were 83 lb heavier and .8 units fleshier at the July weaning date and .7 units fleshier at pre-calving than JULY cows. Percent pregnant did not differ between treatments for YOT=1 or YOT=2. Progeny of YOT=1 cows did not differ significantly for any pre-weaning or weaning traits measured. However, progeny of YOT=2 APRIL cows were born 8 d earlier in the calving season and were heavier throughout the pre-weaning period. Despite numerically lighter weights in April, progeny of JULY cows out-gained APRIL calves from April to July and were significantly heavier in July in YOT=2. These data indicate that under normal conditions, later weaning fall-born calves results in heavier weaning weights without depressing cow reproductive performance; however, as evidenced by the differences in performance from YOT=1 to YOT=2, there appears to be a cumulative effect of this practice resulting in cows rebreeding later in the breeding season.

Key Words: Fall-Calving, Cows, Timing of Weaning, Performance

Introduction

Oklahoma beef producers are increasingly weaning their fall-born calves later in the summer in an effort to increase pounds of calf sold at weaning. Traditional weaning in a fall-calving system occurs in mid-April at approximately 210 d of age. However, due to the availability of high-quality forage during the spring and early summer, the trend is to extend lactation and the calf growing period through mid-July. This results in weaning at approximately 300 d of age.

This practice appears to have a positive influence on enterprise profitability due primarily to heavier weaning weights of older calves. However, the extended lactation period may result in thinner conditioned cows at the beginning of the calving season. Cow body condition score (BCS) at calving is an important factor affecting the length of the post-partum interval (PPI) and pregnancy rates (Wiltbank et al., 1964; Selk et al., 1988). The greater the BCS at parturition, the shorter the interval to first estrus (Richards et al., 1986; Houghton et al., 1990).

Our objective is to elucidate the effects of timing of weaning on performance of fall-calving beef cows and their progeny.

Materials and Methods

Cattle and Treatments. This study was conducted at the Range Cow Research Center, North Range Unit, approximately 12 mi west of Stillwater, Oklahoma. Prior to this experiment, cows and calves had been managed together as one contemporary group. In two successive years, predominantly Angus, fall-calving cows were randomly assigned to weaning treatments: (1) Traditional weaning in mid-April at approximately 210 d of age (Treatment=APRIL) and (2) Late weaning in mid-July at approximately 300 d of age (Treatment=JULY). All cows carried over from yr 1 to yr 2 remained in the same treatment group as in year one.

Management and Weighing Procedures. In both years, in mid-April (yr 1, April 20, 2004; yr 2, April 19, 2005; d=0) after a 16-h shrink, all cows and calves were dewormed using Ivomec Plus. Cow body weights and BCS and calf weights were recorded.

APRIL calves were separated from their dams and weaned using a fenceline weaning system. APRIL calves were maintained in drylot for 10 d post-weaning and were given ad libitum access to bermudagrass hay and water and were fed a 20% crude protein supplement at a rate of 4 lb/hd per day. On d-10 calves were placed on excellent quality native grass pasture (burned in early April) at a stocking rate of approximately 3 ac per calf.

In mid-July (July 13, 2004, yr 1; July 12, 2005, yr 2; d=84), after a 16-h shrink, cow body weights and BCS and calf weights were recorded for both treatments. JULY calves were separated from their dams and weaned using the fenceline weaning system. JULY calves were managed post-weaning the same as APRIL calves. Shrunk calf weights were recorded for both APRIL and JULY calves on d-105.

Cow weights and BCS were recorded at pre-calving in late-August, at pre-breeding in late November, at pre-green up in late March (yr 1)/early April (yr 2), and at both weaning dates. Cows were pregnancy checked at the pre-green up weigh date. All open cows remained on the study until the July weaning date and were then removed from the study.

In both years, cows were artificially inseminated for a 3-wk period before clean-up bulls were turned in for an additional 6 wk.

Statistical Analysis

Cow and calf performance data were analyzed using the MIXED model procedure of SAS. Interactions and covariates that were non-significant (P>.20) for the F-statistic were removed from the model. Cow performance, calf weaning performance, and calf pre-weaning performance data were analyzed separately by number of years on trial: (1) Cows/calves in their first year on trial (YOT=1) and (2) Cows/calves in their second year on trial (YOT=2). Data presented in tables are the least square means.

Cow analyses 1 and 2 included in the model terms for weaning treatment and cowage. Both calf analyses 1 included in the model terms for weaning treatment, cowage, sex, birth date, and birth weight. Calf analyses 2 included in the model terms for weaning treatment, cowage, sex, and breed of sire. For analyses 1, year and all possible interactions were considered random

variables. For analysis 2, year was not different, therefore a random variable was not included in the model.

Results and Discussion

Performance of Cows and Their Progeny in Their First Year on Trial. Data in Table 1 are pooled performance results for cows in their first year on the trial in yr 1 (from April 2004 to April 2005) and in yr 2 (from April 2005 to April 2006). By design, initial cow body weight and BCS did not differ significantly between treatments. APRIL cows tended to have higher BCS in both July and at pre-calving in late August (P=.13 and .14, respectively). Differences in subsequent calf birth weight and cow pregnancy rate were not statistically significant.

Pooled performance data for calves nursing cows when the study was initiated (YOT=1 for their dams) are shown in Table 2. JULY calves tended to weigh more than APRIL calves in July (P=.17), although August weights and averaged daily gain differences were not statistically significant.

These weaning treatments have potential long term influence on cow and calf performance. Therefore, the performance of the cows and their calves during the production cycle following execution of the treatments are presented. Table 3 includes performance data for calves born to cows after the APRIL and JULY weaning treatments (YOT=1). No statistical differences were observed for any traits measured.

Table 1. Effect of weaning treatment on cow performance for cows in their first year on trial (YOT=1).

Item	APRIL	JULY	SE	P value
No. of Cows	36	35	---	---
April Wt.	971	962	49.5	.7988
April BCS	4.5	4.5	.23	.9612
July Wt.	1225	1148	36	.2209
July BCS	6.2	5.3	.16	.1311
BCS Change, Apr-Jul	1.5	.77	.27	.2693
BW Change, Apr-Jul	270	203	42.9	.1220
Pre-Calving Wt.[a]	1308	1227	35.5	.2128
Pre-Calving BCS	6.5	5.9	.17	.1402
Pre-Breeding Wt.	1159	1139	42.7	.6144
Pre-Breeding BCS	5.1	4.9	.19	.4463

Pre-Green Up Wt.	1028	1028	44	.9934
Pre-Green Up BCS	4.3	4.3	.18	.9330
% Pregnant	100	84.4	11	.2678

Table 2. Effect of weaning treatment on performance of calves reared by cows in their first year on trial (YOT=1).

Item	APRIL	JULY	SE	P value
No. of Calves	38	38	---	---
April Wt., d=0	401	406	31.1	.7690
July Wt., d=84	573	614	25.3	.1771
August Wt., d=105	628	659	24.5	.2323
ADG (Apr-July)	1.98	2.5	.18	.2809
Cumulative ADG (Apr-Aug)	2.10	2.45	.16	.3694

Table 3. Effect of weaning treatment on performance of calves born to cows after weaning treatments were applied (YOT=1).

Item	APRIL	JULY	SE	P value
No. of Calves	29	28	---	---
February Wt.	327	320	12.6	.5715
March Wt.	382	372	22	.5026
April Wt.	411	404	12.6	.6723
Cumulative ADG (birth to April)	1.57	1.52	.06	.5921

Performance of Cows and Their Progeny in Their Second Year on Trial. Table 4 presents cow performance data for YOT=2 from April 2005 to April 2006. April weight and BCS did not differ significantly between treatments. However, at the July weaning date, APRIL cows were 83 lb heavier and .8 units BCS greater than JULY cows. Similarly, at pre-calving, APRIL cows were 73 lb heavier and .7 units BCS greater than JULY cows. APRIL cows tended to calve earlier than JULY cows (9.5 d, P=.16). Calf birth weight did not differ between treatments (81

vs 82; P=.74). No statistical differences were recorded for pregnancy percent between treatments.

Shown in Table 5 are performance data for calves reared by dams in their second year on trial. Progeny of JULY cows outperformed APRIL calves in the 84-d period from April to July (35 lb) and overall from April to August (25 lb).

Pre-weaning performance data for calves born to cows after weaning treatments were applied the second year (YOT=2) are shown in Table 6. APRIL calves tended (P=.08) to be heavier in April, outweighing JULY calves by 34 lb. APRIL calves also tended (P=.17) to out-gain JULY calves from birth to April.

Table 4. Effect of weaning treatment on cow performance for cows in their second year on trial (YOT=2).

Item	APRIL	JULY	SE	P value
No. of Cows	17	13	---	---
April Wt.	962	958	27.7	.9076
April BCS	4.2	4.0	.16	.5078
July Wt.	1295	1212	29.6	.0442
July BCS	6.2	5.4	.14	<.0001
BCS Change, Apr-Jul	2.0	1.4	.15	.0010
BW Change, Apr-Jul	346	267	19.8	.0019
Pre-Calving Wt.	1383	1310	31.2	.0912
Pre-Calving BCS	7.0	6.3	.18	.0049
Pre-Breeding Wt.	1177	1174	38.9	.9377
Pre-Breeding BCS	5.1	5.1	.14	.8132
Pre-Green Up Wt.	1081	1087	44.9	.9180
Pre-Green Up BCS	4.6	4.6	.24	.8909
% Pregnant	82	94	9.0	.2431

Table 5. Effect of weaning treatment on performance of calves reared by cows in their second year on trial (YOT=2).

Item	APRIL	JULY	SE	P value
No. of Calves	18	19	---	---
Birth Weight	83	72	2.7	.0036
April Wt., d=0	423	398	10.3	.0655
July Wt., d=84	596	631	12.7	.0341
August Wt., d=105	650	675	15.7	.2188
Cumulative ADG (Apr-Aug)	2.15	2.61	.09	.0004

Table 6. Effect of weaning treatment on performance of calves born to cows after weaning treatments had been applied the second year (YOT=2).

Item	APRIL	JULY	SE	P value
No. of Cows	17	13	---	---
Birth Date	9/16/05	9/24/05	2.8	.0469
Birth Weight	80.7	82.4	4.3	.7405
February Wt.	348	318	12	.0647
March Wt.	419	381	14	.0452
April Wt.	435	401	14.3	.0820
Cumulative ADG (birth to April)	1.68	1.56	.07	.1658

Implications

Delaying weaning until July dramatically increased weaning weights during this 2-yr study due to forage quality and availability during the extended lactation period. However, substantial cow weight gain and gain in cow body condition are sacrificed when calves are weaned late. This practice may eventually lead to reduced reproductive performance of the cow/calf enterprise. Additionally, one would expect cow and calf performance to differ under varying conditions such as prolonged heat and/or drought. This experiment will be continued and expanded to measure feed intake during early lactation, blood sampling to determine cyclicity at the beginning of the breeding season, and to include economic analysis.

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