PRODUCTIVITY OF MATURE CROSSBRED COWS CONTAINING 0, 1/4 AND 1/2 BRAHMAN BREEDING IN SPRING AND FALL CALVING SYSTEMS

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Story in Brief

Four- to eight-year-old cows containing 0, 1/4 or 1/2 Brahman breeding were evaluated for measures of productivity. A total of 853 records produced in 1987, 1988 and 1989 spring and fall calving seasons were considered. Traits analyzed were birth weight, age-adjusted weaning weight, weaning conformation and weaning condition of calves produced. Additionally, four measures of cow efficiency were evaluated. These were percent calf crops born and weaned, and pounds of calf produced per pound of actual and unit of metabolic cow weight. As percentage Brahman in cows increased, birth weights of calves decreased, and fall-born calves were lighter at birth than spring-born calves. Weaning weights were heavier for calves out of 1/4 and 1/2 Brahman cows than those out of 0 Brahman cows. Fall-born calves were lighter at weaning than spring-born calves, but the effect of calving season decreased considerably, as percentage Brahman in cows increased. Calf conformation and condition at weaning was affected similarly. Cows of 0 Brahman breeding tended to have higher percent calf crops born and weaned than the other two groups, but 1/4 and 1/2 Brahman cows weaned more pounds of calf per pound of actual and unit of metabolic cow weight. Spring calving cows were also more efficient than fall calving cows. These results suggest that 1/4 and 1/2 Brahman cows may be effectively utilized in central Oklahoma, and that spring calving may be more efficient than fall calving.

(Key Words: Crossbreeding, Beef Cattle, Brahman, Productivity, Calving Season.)

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Introduction

In order to optimize cow productivity, a producer must select a breed or combination of breeds that best fit the environmental and management conditions of the operation. In general, commercial production systems are most efficient when crossbred females are utilized. The advantages of crossbred females are from the combination of desirable characteristics of two or more breeds, and from maternal heterosis (hybrid vigor).

Crossbreeding systems involving Brahman-cross females are very popular in the warm and humid climate of the southern United States. This is due to their tolerance of the heat and humidity, their superior maternal instinct and the production characteristics of their crossbred calves. The lifetime utility of this type of female, however, has yet to be adaquately evaluated in the more temperate regions of the United States. This study was designed to compare the productivity of mature crossbred cows, containing 0, 1/4 and 1/2 Brahman breeding, in central Oklahoma, for both spring and fall calving programs.

Materials and Methods

Breeding females evaluated in this study are out of Angus and Hereford cows randomly assigned (within breed) to spring and fall calving herds, and were born in 1981, 1982 or 1983. Sires used in these initial matings were purebred Angus, Brahman and Hereford bulls, as well as crossbred Brahman x Angus and Brahman x Hereford bulls. Matings were such that the resulting calves would be of the following six breed types: Angus x Hereford and Hereford x Angus, containing no Brahman breeding; Brahman-Angus x Hereford and Brahman-Hereford x Angus, containing 1/4 Brahman breeding; and Brahman x Angus and Brahman x Hereford, containing 1/2 Brahman breeding. Performance of these calves through weaning was reported by Bolton et al. (1986). Productivity of the two- to six-year old percentage Brahman females and factors affecting productivity have been reported by McCarter et al. (1987a,b, 1988, 1989a,b).

All females in this study were born on and maintained at the Southwestern Livestock and Forage Research Laboratory, near El Reno, OK until calves were weaned in 1986. At that time, the cows were transferred to the Lake Carl Blackwell Experimental Range, west of Stillwater, where they have since been maintained on native range and bermuda grass pastures. Results presented are from the 1987, 1988 and 1989 calf crops, when the cows were between four and eight years of age. Calving occurred from late February to early May, and from early September to late November for spring and fall seasons, respectively. Calves from the 1987 and 1988 calf crops

resulted from breeding seasons consisting of approximately 45 days of artificial insemination to Limousin and Salers sires, followed by 30 days of natural service by Limousin bulls. Calves from the 1989 calf crops all resulted from a 75 day breeding season of artificial insemination to Angus, Gelbvieh and Polled Hereford sires. Weaning occurred at an average age of 205 days for calves born in the spring and 240 days for calves born in the fall.

Calf traits that were analyzed included birth weight, age-adjusted weaning weight, weaning conformation (muscling) score and weaning condition score. Weights were recorded on all calves within 24 hours of birth. Weaning weights were adjusted to 205 or 240 days according to season of birth. Conformation scores ranged from 11 to 16 with 11 being light "beef-type" muscling and 16 being heavy muscling. Condition scores ranged from 5 to 7 with 5 being moderate condition and 7 being heavy condition. Measures of cow efficiency that were analyzed included percent calf crop born, percent calf crop weaned, pounds of adjusted calf weaning weight per pound of cow weight, and pounds of adjusted calf weaning weight per unit of cow metabolic body weight. Both percent calf crop measures were based on the number of cows exposed during the breeding season. All data were analyzed using least squares procedures to determine the effects of percentage Brahman, calving season and the interaction between percentage Brahman and calving season.

Results and Discussion

Birth weight was affected by percentage Brahman and calving season, but the interaction between the two effects was not important. Least squares means for birth weight are presented in Table 1. These means indicate that as

Table 1. Least squares means[a] for birth weight[b] of calves by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	85.7[j]	78.7
1/4 Brahman[c]	82.5[k]	78.9
1/2 Brahman[c]	79.7[l]	76.2

[a] Means are adjusted for sex of calf, sire breeds, years and two-way interactions.
[b] lb.
[c] Means in row are different (P<.05).
[j,k,l] Means within column not sharing common superscripts are different (P<.05).

the percentage Brahman in cows increased, birth weight of their calves tended to decrease. In addition, fall-born calves were lighter at birth than spring-born calves, regardless of the breed composition of the cow.

All three weaning characteristics were affected by the interaction of percentage Brahman in the cow with season of birth. As shown in Table 2, cows containing 1/4 or 1/2 Brahman breeding weaned heavier calves than 0 Brahman cows, regardless of calving season. It is also apparent that calving season had less of an effect on the weaning weights of calves as the percentage Brahman in cows increased. Calving season appeared to have had little effect on weaning weight of calves out of 1/2 Brahman cows, but fall-born calves were substantially lighter at weaning than spring-born calves out of 0 Brahman cows. Weaning conformation and weaning condition of calves were found to have a similar trend, but to a lesser degree. Least squares means for weaning conformation and weaning condition are presented in Tables 3 and 4, respectively.

Percent calf crops born and weaned were affected by calving season; percentage Brahman and the interaction of percentage Brahman with calving season were not important factors. Spring calving cows had and weaned higher percent calf crops than fall calving cows, averaged across percentage Brahman breed groups (Tables 5 and 6). Although the interaction between breed group and calving season was not significant, least squares means indicate that 0 Brahman cows tended (P<.15) to have an advantage in percent calf crop born in fall calving seasons.

Table 2. Least squares means[a] for age-adjusted weaning weight[b] of calves by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	536.1[j]	473.8[j]
1/4 Brahman[c]	570.4[k]	540.5[k]
1/2 Brahman	569.6[k]	567.3[l]

[a] Means are adjusted for sex of calf, sire breeds, years, cow condition score and two-way interactions.

[b] lb.

[c] Means in row are different (P<.05).

[j,k,l] Means within column not sharing common superscripts are different (P<.05).

Table 3. Least squares means[a] for weaning conformation score of calves by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	13.0[jk]	12.5[j]
1/4 Brahman	13.0[j]	12.9[k]
1/2 Brahman[c]	12.8[k]	13.1[k]

[a] Means are adjusted for sex of calf, sire breeds, years, cow condition score and two-way interactions.
[c] Means in row are different (P<.05).
[j,k,l] Means within column not sharing common superscripts are different (P<.05).

Table 4. Least squares means[a] for weaning condition score of calves by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	5.9	5.4[j]
1/4 Brahman[c]	6.0	5.6[k]
1/2 Brahman[c]	5.8	5.6[jk]

[a] Means are adjusted for sex of calf, sire breeds, years, cow condition score and two-way interactions.
[c] Means in row are different (P<.05).
[j,k] Means within column not sharing common superscripts are different (P<.05).

Table 5. Least squares means[a] for percent calf crop born by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman	86.4	85.4
1/4 Brahman	85.2	78.5
1/2 Brahman	85.0	77.6

[a] Means are adjusted for sire breeds, years and two-way interactions.

Table 6. Least squares means[a] for percent calf crop weaned by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman	86.4	83.3
1/4 Brahman[c]	84.8	76.3
1/2 Brahman	85.3[d]	77.5

[a] Means are adjusted for sire breeds, years and two-way interactions.
[c] Means in row are different (P<.05).
[d] Value numerically higher than corresponding value in Table 5 due to bias in overall mean estimation by statistical model. Differences between values within tables are unbiased, but numerical comparisons between tables are not appropriate.

Table 7. Least squares means[a] for age-adjusted pounds of calf weaned per pound of actual cow weight by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	.464[j]	.424[j]
1/4 Brahman[c]	.530[k]	.506[k]
1/2 Brahman[c]	.516[k]	.483[l]

[a] Means are adjusted for sex of calf, sire breeds, years and two-way interactions.
[c] Means in row are different (P<.05).
[j,k,l] Means within column not sharing common superscripts are different (P<.05).

Least squares means for individual cow efficiency scores, based on actual cow weight and metabolic weight, are presented in Tables 7 and 8, respectively. For both scores, percentage Brahman and calving season were important sources of variation, but there did not appear to be an interaction between the two effects. Regardless of the measure of individual efficiency, 1/4 and 1/2 Brahman cows produced more pounds of calf per unit of weight, than 0 Brahman cows, and 1/4 Brahman cows had a slightly higher efficiency than 1/2 Brahman cows. Spring calving cows were also found to be more

Table 8. Least squares means[a] for age-adjusted pounds of calf weaned per unit of metabolic cow weight by percent Brahman cow group and calving season.

	Calving season	
Cow group	Spring	Fall
0 Brahman[c]	2.728[j]	2.451[j]
1/4 Brahman[c]	3.027[k]	2.895[k]
1/2 Brahman[c]	2.967[k]	2.831[k]

[a] Means are adjusted for sex of calf, sire breeds, years and two-way interactions.

[c] Means in row are different (P<.05).

[j,k] Means within column not sharing common superscripts are different (P<.05).

efficient than fall calving cows. These results, in combination with the previously cited reports from this experiment, support the conclusion that cows with 1/4 Brahman breeding may be used to advantage in Oklahoma.

Literature Cited

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