

SOME FACTORS AFFECTING WEANING RATE OF YOUNG CROSSBRED COWS CONTAINING 0, 1/4 AND 1/2 BRAHMAN BREEDING IN SPRING OR FALL CALVING SYSTEMS

M.N. McCarter¹, D.S. Buchanan², R.R. Frahm²,
L.W. Knori³ and J.W. Castree¹

Story in Brief

Weaning rate was calculated as the proportion of cows exposed to breeding that weaned a calf and was evaluated using 1060 records on crossbred cows (three- to six-years old) containing 0, 1/4 or 1/2 Brahman breeding. Season of calving, lactational status at breeding, prebreeding weight and condition score significantly affected weaning rate. Interactions affecting weaning rate include crossbred cow group x lactational status, crossbred cow group x condition score, crossbred cow group x weight, season of calving x weight and year of calving x age of dam. Angus x Hereford, 1/4 Brahman-1/4 Angus-1/2 Hereford and Brahman x Angus dams lactating at breeding weaned lower percentages than those cows of similar breeding that were dry at breeding. Angus x Hereford cows receiving a condition score of 5 tended to wean a higher percentage of calves than cows of similar breeding receiving other scores whereas a score of 6 resulted in the higher weaning rate for 1/4 Brahman-1/4 Hereford-1/2 Angus. More calves were weaned by 1/4 Brahman-1/4 Angus-1/2 Hereford dams receiving a score of 3, with weaning rate decreasing as condition score increased. No 0 Brahman cows weighing less than 660 lb at breeding weaned a calf. As proportion of Brahman breeding increased, the effect of weight on weaning rate decreased. Across all calving groups, weaning rate increased as weight increased.

(Key Words: Crossbreeding, Beef Cattle, Brahman, Weaning Rate.)

Introduction

Crossbreeding is a recommended management technique for increasing the efficiency of commercial beef production. Successful crossbreeding

¹Graduate Assistant ²Professor ³Herdsmen

requires the choice of breeds appropriate for the production environment. Brahman-cross cows have been widely evaluated in the Gulf Coast region of the United States. However, few studies outside of this region have involved Brahman breeding and information concerning lactational status, prebreeding score and prebreeding weight and their effects on weaning rate in Brahman-cross dams is limited. The data used for this study come from a project by the Oklahoma Agricultural Experiment Station designed to evaluate the effects of genotype (crossbred cow group), environment (season of calving) and the interaction between genotype and environment. The purpose of this portion of the study was to determine the effects of crossbred cow group, season of calving, lactational status, prebreeding condition score and prebreeding weight on weaning rate of crossbred cows containing 0, 1/4 or 1/2 Brahman, Angus and Hereford breeding in spring or fall calving systems.

Materials and Methods

Angus and Hereford dams were assigned at random to spring and fall calving groups and mated to Angus, Hereford, Brahman, Brahman x Angus and Brahman x Hereford sires to produce crossbred calves that were 0 Brahman (Angus x Hereford and Hereford x Angus), 1/4 Brahman (1/4 Brahman-1/4 Hereford-1/2 Angus and 1/4 Brahman-1/4 Angus-1/2 Hereford) and 1/2 Brahman (Brahman x Angus and Brahman x Hereford). The mating system, origin of foundation breeding stock and growth and performance of crossbred calves were presented by Bolton et al. (1986). Productivity and milk production of these cows was presented by McCarter et al. (1987a,b, 1988). Lifetime productivity of young cows was presented by McCarter et al. (1989). Cows were maintained at the Southwestern Livestock and Forage research Laboratory, El Reno, Oklahoma for production of 1983 through 1986 calf crops. After weaning the 1986 calf crop, cows were moved to the North Lake Carl Blackwell Range, Stillwater, Oklahoma. Pastures were typical tallgrass pastures with some bermudagrass. Cows were exposed to Limousin bulls, in single sire pastures, for a breeding period of 75 days to produce the 1984 calf crop. For 1985 and 1986 calf crops, cows were synchronized and bred artificially to Limousin sires and then placed in single sire pastures with Limousin sires for a total breeding period of 75 days. The calf crop in 1987 was produced by breeding cows artificially to Limousin and Salers sires, twice if necessary, before being placed in single sire pastures with Limousin sires. Spring calving cows were bred to calve in February, March and April and fall calving cows were bred to calve in September, October and November.

Records of two-year old dams were deleted from the analysis so that all cows had the opportunity to produce a calf and be lactating at the onset of this study. Weaning rate was analyzed as the proportion of cows exposed to breeding that weaned a calf. Values of 0 and 1 were assigned to cows not weaning a calf and to cows weaning a calf, respectively. Data were analyzed using least squares procedures to determine the effects of crossbred cow group, season of calving, lactational status, condition score, weight and all two factor interactions on weaning rate.

Results and Discussion

All main effects, with the exception of crossbred cow group, significantly affected weaning rate. The amount of variation attributable to crossbred cow group was reduced by the addition of condition score and weight to the model as differences did exist between crossbred groups. Two way interactions found to be significant were crossbred cow group x lactational status, crossbred cow group x condition score, crossbred cow group x weight, season of calving x weight and year x age of dam. Subclass least squares means are presented for these significant interactions.

Table 1 contains the least squares means for weaning rate by crossbred cow group x lactational status. No differences were found between dry and lactating Hereford x Angus, 1/4 Brahman-1/4 Hereford-1/2 Angus and Brahman x Hereford. For the remaining three groups, Angus x Hereford, 1/4 Brahman-1/4 Angus-1/2 Hereford and Brahman x Angus, weaning rates for lactating cows were lower ($P < .05$) than for dry cows.

Least squares means for weaning rate by crossbred cow group x condition score are presented in Table 2. Weaning rates for Hereford x

Table 1. Least squares means for weaning rate by crossbred cow group x lactational status.

Crossbred cow group ^a	Lactational status	
	Dry	Lactating
0 Brahman:		
HxA	77.6 ^{bcd}	67.8 ^{bc}
AxH	86.7 ^{bd}	53.7 ^c
1/4 Brahman:		
1/4 B-1/4 H-1/2 A	89.9 ^{bd}	81.8 ^{be}
1/4 B-1/4 A-1/2 H	111.6 ^f	78.1 ^{be}
1/2 Brahman:		
BxA	100.0 ^{df}	83.7 ^{be}
BxH	94.5 ^{def}	86.7 ^{bd}

^aH=Hereford, A=Angus and B=Brahman.

b,c,d,e,f Means not sharing at least one superscript differ ($P < .05$).

Table 2. Least squares means for weaning rate by crossbred cow group x prebreeding condition score.

Crossbred cow group ^a	Prebreeding condition score				
	3	4	5	6	7+
0 Brahman:					
HxA	74.7 ^b	66.0 ^b	78.8 ^b	76.3 ^b	67.4 ^b
AxH	77.7 ^{bc}	74.0 ^{bc}	92.8 ^b	53.0 ^c	53.4 ^c
1/4 Brahman:					
1/4 B-1/4 H-1/2 A	86.3 ^{bc}	76.7 ^b	88.4 ^c	89.6 ^{bc}	88.4 ^{bc}
1/4 B-1/4 A-1/2 H	111.8 ^{bc}	109.7 ^b	90.6 ^d	74.9 ^e	87.4 ^{cde}
1/2 Brahman:					
BxA	96.9 ^b	88.6 ^b	99.1 ^b	90.0 ^b	84.8 ^b
BxH	101.8 ^b	91.7 ^b	83.6 ^b	83.7 ^b	92.1 ^b

^aH=Hereford, A=Angus and B=Brahman.

^{b,c,d,e}Means not sharing at least one superscript differ (P<.05).

Table 3. Least squares means for weaning rate by crossbred cow group x prebreeding cow weight.

Weight class ^a , lb	Crossbred cow group ^b					
	HA	AH	BHA	BAH	BA	BH
≤660	--	--	62.1	81.0	77.1	90.2
661 - 770	97.3	63.2	98.1	74.0	98.1	87.8
771 - 880	93.2	66.4	80.0	83.1	78.9	85.3
881 - 990	83.7	94.6	89.2	87.4	92.7	90.0
991 - 1100	77.1	80.9	89.5	90.4	94.4	82.7
1101 - 1210	97.1	91.8	80.0	113.9	88.8	94.0
>1210	68.5	104.2	102.3	134.3	112.8	104.3

^aCows were group by increments of 110 lb.

Angus, Brahman x Angus and Brahman x Hereford were not affected by condition score. Angus x Hereford cows receiving a condition score of 5 tended to wean more calves than those receiving other scores. Cows receiving scores of 3 or 4 tended to have higher weaning rates than those receiving scores of 6 or more. For 1/4 Brahman-1/4 Hereford-1/2 Angus dams, those receiving scores of 3, 5, 6 or 7 were similar ($P > .10$). The only difference ($P < .05$) for this group occurred between those receiving condition scores of 5 (88.4%) and 4 (76.7%). For 1/4 Brahman-1/4 Angus-1/2 Hereford, weaning rate tended to decrease as condition score increased.

Table 3 contains the least squares means for weaning rate by crossbred cow group x weight. For all groups, weaning rate tended to increase as weight increased. Zero Brahman cows were more affected by low weights than were 1/4 and 1/2 Brahman cows as no 0 Brahman cows weighing 660 lb or less at breeding weaned a calf. As proportion of Brahman increased, the effect of weight decreased.

Least squares means for weaning rate by season of calving x weight are presented in Table 4. No differences were found between the two seasons for those weight classes below 1100 lb. Spring calving cows weighing more than 1100 lb had higher ($P < .05$) weaning rates than did fall calving cows with similar weights. With the exception of the 660 lb and less weight class, spring calving cows tended to have higher weaning rates than fall calving cows of similar weights.

Least squares means are presented in Table 5 by the year x age of dam interaction. Due to the age distribution of the herd and the limited amount of data available, few differences were found between the age groups present in each year. For 1985, weaning rates for three- and four-year old dams were similar ($P > .15$). The same was true for three-, four- and five-year olds in 1986. In 1987, four- and five-year olds were similar and four-year olds had a

Table 4. Least squares means for weaning rate by season of calving x prebreeding cow weight.

Weight class ^a , lb	Season of calving	
	Spring	Fall
<660	35.1 ^b	62.4 ^{bcd}
661 - 770	87.9 ^{cde}	84.9 ^{cd}
771 - 880	86.8 ^{cd}	75.5 ^d
881 - 990	94.1 ^{ce}	85.0 ^{cd}
991 - 1100	89.6 ^{cf}	82.0 ^{df}
1101 - 1210	102.3 ^e	86.2 ^{cd}
>1210	125.7 ^g	83.1 ^{cd}

^aCows were grouped into increments of 110 lb.

^{b,c,d,e,f,g}Means not sharing at least one common superscript differ ($P < .05$).

Table 5. Least squares means for weaning rate by year x age of dam.

Year	Age of dam			
	3	4	5	6
1984	84.5 ^{ab}			
1985	91.0 ^{ac}	94.1 ^c		
1986	91.2 ^{ac}	94.5 ^c	93.9 ^{ac}	
1987		70.4 ^d	76.4 ^{bde}	63.2 ^e

a,b,c,d,e Means not sharing at least one superscript differ ($P < .05$).

higher ($P < .05$) weaning rate than did six-year olds, 70.4 and 63.2%, respectively.

In summary, Brahman x British crossbred cows were affected by lactational status at breeding in a manner similar to British crosses. However, condition score and weight had less effect on Brahman x British crossbred dams than British crosses. Thus, the condition scoring system developed for British and British cross cows may be of less use for evaluation of Brahman and Brahman x British crossbred cows.

Literature Cited

- Bolton, R.C. et al. 1986. Performance of 0, 1/4 and 1/2 Brahman crossbred calves in spring and fall calving systems. Okla. Agr. Exp. Sta. Res. Rep. MP-118:21.
- McCarter, M.N. et al. 1987a. Productivity of two-year-old crossbred cows with 0, 1/4 and 1/2 Brahman breeding in spring versus fall calving systems. Okla. Agr. Exp. Sta. Res. Rep. MP-119:6.
- McCarter, M.N. et al. 1987b. Milk production of crossbred cows with 0, 1/4 and 1/2 Brahman breeding in spring and fall calving systems. Okla. Agr. Exp. Sta. Res. Rep. MP-119:1.
- McCarter, M.N. et al. 1988. Productivity of three-, four- and five-year-old crossbred cows with 0, 1/4 and 1/2 Brahman breeding in spring versus fall calving systems. Okla. Agr. Exp. Sta. Res. Rep. MP-125:1.
- McCarter, M.N. et al. 1989. Overall productivity of young crossbred cows containing 0, 1/4 or 1/2 Brahman breeding in spring versus fall calving systems. Okla. Agr. Exp. Sta. Res. Rep. MP-127:12.