



Rotational Crossbreeding of Beef Cattle: Weaning Weight Per Cow Exposed and Cumulative Weaning Weight Per Cow in Breeding Herd

D.E. Franke

Department of Animal Science

Findings

- # Rotational crossbred cows produced more calf weaning weight annually per cow exposed and over their lifetime than straightbred cows.
- # Three- and four-breed rotation cows produced more calf weaning weight annually per cow exposed and over their lifetime than two-breed rotation cows.
- # Angus-Brahman-Hereford three-breed rotation cows produced more calf weaning weight annually per cow exposed and over their lifetime than other three-breed combinations.
- # Brahman-Hereford two-breed rotation cows produced more calf weaning weight annually per cow and over their lifetime than other two-breed rotation cows.

Introduction

Rotational crossbreeding is a system of mating that can involve two or more breeds. In a two-breed rotation system, two breeds of sires are used, such as Angus and Brahman. Angus sires are mated to Brahman or existing cows. Heifers from the Angus sires are developed and mated to Brahman sires. Heifers from Brahman sires are developed and mated to Angus sires. Thus, daughters of a sire breed are mated to the other sire breed. Three- and four-breed rotation systems are designed the same way,

except that more breeds are involved. The advantage of rotational mating systems is that replacement heifers are produced internally in the herd.

Actual and adjusted (to a 205-day, mature cow and equivalent sex basis) weaning weight are the traits most often used to compare breeds, breed combinations or mating systems for cow-calf production. These traits focus mainly on growth potential of calves and maternal ability of cows. Neither fertility of the cow nor longevity of the cow in the herd is taken into consideration. Weaning weight per cow exposed is a good measure of productivity per cow maintained in the herd on an annual basis. It is more useful than average weaning weight if one is trying to calculate costs and returns on a per cow basis. Weaning weight per cow exposed in the breeding herd is influenced by growth rate of the calf, maternal ability of the cow, reproduction of the herd and earliness of calving (expressed as age of the calf at weaning). Cumulative weaning weight per cow over her life in the herd is also a useful measure of production. This measure of performance includes calf potential for growth, calving date, reproduction of the cow, her maternal ability and longevity in the herd. Cows that stay in the herd longer tend to be more profitable over their lifetime than those that have a shorter productive life.

The purpose of this report is to compare the performance of two-, three- and four-breed rotational crossbreeding systems and straightbreds for calf weaning weight per

cow exposed and for cumulative weaning weight per cow entering the herd. Average birth weight, average daily gain from birth to weaning, actual weaning weight and weaning weight adjusted to 205 days for each of the mating systems and breed combinations discussed here were reported in the 1997 Louisiana Beef Cattle Research Report.

Experimental Approach

Angus, Brahman, Charolais and Hereford breeds were involved in two-, three- and four-breed rotational crossbreeding systems, with the restriction that each breed combination include Brahman, over four generations of mating. Three two-breed rotation combinations (Angus-Brahman, Charolais-Brahman and Hereford-Brahman), three three-breed rotation combinations (Angus-Brahman-Charolais, Angus-Brahman-Hereford and Brahman-Charolais-Hereford) and one four-breed rotation combination were involved in the study.

Weaning weight per cow exposed can be calculated by taking the average weaning weight for a breed group and multiplying it by the weaning percent of the group. Cows not weaning calves are included in this measure of weaning weight as well as those that did wean calves.

A cow entering the herd at the beginning of a generation had the opportunity to produce four calves. Several straightbred cows of each breed were assigned to the herd as replacements in mid-generation, resulting in fewer numbers of possible calves for these cows. Cumulative weaning weight per cow entering the breeding herd was obtained by totaling the weaning weights of calves produced by each cow over her lifetime in the herd. Cows were culled from the herd if they failed to calve in two consecutive years or for injury or disease.

Results and Discussion

Adjusted means for weaning weight per cow exposed in the breeding herd and cumulative weaning weight per cow over her lifetime in the herd are given in Table 1. The average weaning weight per cow exposed for all cows in the study was 341 pounds. The average cumulative weaning weight per cow over her lifetime in the herd was 1,220 pounds. Angus-Brahman-Hereford three-breed rotation cows had the highest weaning weight per cow exposed at 414 pounds. Angus-Brahman-Hereford three-breed rotation cows also had the highest cumulative weaning weight over their lifetime at 1,550 pounds.

Rotational crossbred cows produced 103 pounds more calf weaning weight per cow exposed on an annual basis than the average of straightbred cows ($P < .01$). Three- and four-breed rotation cows produced 50 pounds more calf weaning weight per cow exposed than two-breed rotation cows ($P < .05$). Higher fertility of three-breed rotation cows was the primary reason for the higher production level on a per cow basis. We previously reported that average weaning weight for three- and four-breed rotation calves was 11 pounds more than that of two-breed rotation calves.

Among straightbred groups, Charolais cows had a higher weaning weight per cow exposed in the breeding herd and a higher cumulative calf weaning weight than other straightbred cows ($P < .05$). Charolais cows were followed by Angus, Hereford and Brahman cows for weaning weight per cow exposed and cumulative calf weaning weight for a cow's lifetime in the herd.

Among two-breed rotation cows, the Hereford-Brahman combination produced 369 pounds of weaning weight per cow exposed and 1,356 pounds of cumulative calf weaning weight over a cow's lifetime and

Table 1. Weaning weight per cow exposed and cumulative weaning weight per cow exposed over her lifetime in the herd

Mating system and breed type	No. of calves	Weaning weight per cow exposed, lb	Cumulative weaning weight per cow exposed, lb
Mating system			
Straightbred cows	1,221	276	887
Two-breed rotation cows	970	350	1,313
Three-breed rotation cows	1,073	404	1,489
Four-breed rotation cows	338	389	1,219
Straightbred			
Angus	352	297	932
Brahman	247	197	641
Charolais	312	352	1,155
Hereford	310	258	822
Two-breed rotation cows			
Angus-Brahman	302	338	1,307
Charolais-Brahman	310	344	1,276
Hereford-Brahman	358	369	1,356
Three-breed rotation cows			
Angus-Brahman-Charolais	340	391	1,466
Angus-Brahman-Hereford	391	414	1,550
Brahman-Charolais-Hereford	342	406	1,451
Four-breed rotation cows			
Angus-Brahman-Charolais-Hereford	338	389	1,468
Overall average	3,602	342	1,219

were more productive than other two-breed combinations ($P < .05$). Charolais-Brahman cows ranked second for weaning weight per cow exposed (344 pounds), but last for cumulative calf weaning weight per cow over her lifetime. Angus-Brahman rotation cows stayed longer in the herd, although they weaned less pounds of calf per cow exposed than Charolais-Brahman rotation cows.

The Angus-Brahman-Hereford three-

breed rotation combination had a higher weaning weight per cow exposed and higher cumulative calf weaning weight than Angus-Brahman-Charolais or Brahman-Charolais-Hereford rotation cows ($P < .05$) or the four-breed rotation combination ($P < .05$).

We previously reported that the Angus-Brahman-Charolais and the Brahman-Charolais-Hereford three-breed rotation and the four-breed rotation combination calves had larger average daily gains and actual

weaning weights than the Angus-Brahman-Hereford three-breed rotation combination. Therefore, fertility of the Angus-Brahman-Hereford three-breed rotation group was high enough so that it weaned more pounds of calf per cow exposed and had a greater cumulative calf weaning weight. This is a clear example of the importance of fertility in evaluating differences among mating systems.

When fertility is considered in cow productivity, rotation combinations including Angus, Brahman and Hereford appear to have an advantage. Consideration of the annual cost per cow in the herd along with the pounds of calf weaned and resources necessary to handle the rotation system are necessary to determine which of these mating systems and breed combinations will be best for a commercial cow-calf operation in Louisiana.