

# **Evaluation Of The Charolais As Straightbred And Crossbred For Beef Production In South Central Florida**

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## **Introduction**

Breed differences in production traits of beef cattle afford cattlemen the opportunity to select for characteristics best suited to their environmental conditions. Improvement in beef production is achieved both by utilizing additive breed effects and by capitalizing on heterosis through combining breeds for specific goals.

The typical Charolais is a big, long-bodied, heavily muscled, fast growing animal. Mature bulls usually weigh from 2,000 to 2,500 pounds and mature cows weigh 1,250 to 1,600 pounds, depending on conditions.

Recognizing the desirable production traits of the breed, researchers in Florida initiated a program to explore the breed's value for beef production under south central Florida conditions. This research began in 1960 at the Agricultural Research Center (ARC), Ona, Florida, with the purchase of 1/2 Charolais - 1/2 Brahman and 3/4 Charolais - 1/4 Brahman females and the loan of a Charolais bull which was used also on Brahman and Shorthorn cows owned by the center. A formal project, evaluating the Charolais, Brahman, and Angus breeds, was initiated in 1963. The Charolais cows used in comparison with other breeds were high grades, most being descendants from the foundation 3/4 Charolais cows and Charolais bulls.

The objective of this report is to present research data on performance of the Charolais breed as observed under south central Florida conditions.

## Herd Management

Herds were maintained on improved grass pastures, mostly Pangola digitgrass (*Digitaria decumbens* Stent.) moderately fertilized, and the cows were supplemented with approximately 5 pounds of a mixture containing either citrus meal or citrus pulp and cottonseed meal (4:1 ratio) or 5 pounds of cane molasses per head per day for 60 to 90 days during late winter and early spring. The breeding season was restricted to 106 days (March 15 to June 30, 1960-62) and 90 days (March 10 to June 10 1963-66 and March 1 to June 1, 1967-73). All calves were weaned at the same time in late August or early September.

## Reproduction

Reproduction generally is considered to be one of the most important criteria used in evaluating beef cattle. The measure of reproduction which is of major interest to the producer, and the one of major economic value, is weaning rate. This reflects pregnancy rate in the cows and survival rate of the calves.

Research was conducted to evaluate reproductive performance of Charolais when straightbred and when crossed with the Brahman and Angus breeds. Results showed Charolais cows to compare favorably with cows of these breeds for both pregnancy rate and calf survival (Table 1). Pregnancy rates were similar for Charolais and Brahman cows, being 81.1% and 82.5%, respectively, whereas Angus cows, which were introduced to the station in 1962, had a rate of only 73.7%. The low pregnancy rate of Angus cows indicated their lack of adaptability to the existing environmental conditions.

Calf survival from birth to weaning is an important factor affecting net reproductive efficiency. Results showed a 96.1% survival rate for calves from Charolais cows compared with 86.5% and 99.6%, respectively, for Angus and Brahman.

Researchers in Missouri (Sagebiel *et al.* 1969) found Charolais-sired crossbred calves to have higher dystocia scores than either Angus or Hereford-sired calves. Crossbred calves born to Angus cows had higher dystocia scores than crossbred calves from Hereford and Charolais cows. Frequencies of difficult births in Angus heifers mated to Charolais, Hereford and Angus bulls were 58%, 36%, and 11% respectively. Correlation

coefficients between birthweight, expressed as percent of cow weight, and dystocia score were .41 for Angus, .30 for Herford and .24 for Charolais, indicating that some dystocia occurs with large calves relative to cow size. Montana researchers (Pahnish *et al.* 1969) reported no heterosis for birthweight of F<sup>1</sup> Angus x Charolais calves, while reciprocal F<sup>1</sup> Charolais x Angus calves showed heterosis levels of 4.6% and 5.1%, respectively, for males and females. Birthweight of straightbred Angus calves averaged 70 pounds compared to 84 pounds for F<sup>1</sup> Charolais x Angus calves, a 20% increase. These studies showed survival rate to be influenced by size or birthweight of calves relative to cow size. Calving difficulties can result from average breed effect or heterosis in birthweight of calf and is more likely to occur by breeding bulls of larger breeds to cows of smaller breeds. The Missouri and Montana results may explain partially the low survival rate (86.5%) of Charolais x Angus calves (Table 1).

**Table 1. Reproductive performance of Charolais, Angus, and Brahman Cows when bred to Charolais bulls.**

| Breed of cow | No. matings | Pregnancy rate % | Survival rate % | Weaning rate% |
|--------------|-------------|------------------|-----------------|---------------|
| Charolais    | 136         | 81.1             | 96.1            | 77.9          |
| Angus        | 112         | 73.7             | 86.5            | 63.8          |
| Brahman      | 121         | 82.5             | 99.6            | 82.2          |

Weaning rate is the most important measurement of reproduction. The weaning rate for Charolais was 77.9% compared to 63.8% for Angus and 82.2% for Brahman (Table 1). Thus Charolais cows when straightbred had a higher weaning rate than Angus cows mated to Charolais bulls. However, Brahman cows mated to Charolais bulls weaned more calves per 100 cows than did either of the other two breeds. This was due to slightly higher pregnancy and survival rates for Brahman cows than for Charolais.

## Weaning Traits of Calves

Calf weaning weight is an extremely important economic trait, and in conjunction with reproduction determines total cow productivity. Weaning weight is influenced by milk production of the cow and genetic growth potential of the calf.

Initial research involved breeding Charolais bulls to Brahman, Shorthorn, Charolais-Brahman, and Charolais-Shorthorn cross females. The objective was to determine how the Charolais combined with other breeds and the effect the percentage of Charolais breed composition had on productivity. Results from the initial six years of work on weaning weight are given in Table 2.

Earlier research by Peacock *et al.* (1960) showed that when either Shorthorn or Brahman breeding exceeded 3/4 in the off weaning weight was depressed. Results from research with Charolais showed the same trend, however, a relatively high weaning weight was obtained even when Charolais breeding exceeded the 3/4 level. These results indicated large additive breed effects for size in the Charolais breed associated with acceptable adaptability.

**Table 2. Weaning weight and adjusted 205-day weight of calves sired by Charolais bulls from Brahman, Shorthorn, Charolais x Shorthorn, and Charolais x Brahman cows.**

| Breed of calf                           | No. calves | Weaning wt., lbs. | Adjusted 205-day wt., lbs. |
|---|------------|-------------------|----------------------------|
| 15/16<br>Charolais -<br>1/16<br>Brahman | 21         | 544               | 511                        |
| 7/8<br>Charolais -<br>1/8 Brahman       | 41         | 537               | 516                        |
| 3/4<br>Charolais -<br>1/4 Brahman       | 33         | 590               | 526                        |
| 1/2<br>Charolais -<br>1/2 Brahman       | 45         | 506               | 489                        |
| 3/4<br>Charolais -<br>1/4<br>Shorthorn  | 13         | 485               | 432                        |
| 1/2<br>Charolais -<br>1/2<br>Shorthorn  | 29         | 455               | 409                        |

Complementary breed combinations for weaning weight also were expressed in this study. Data in Table 2 clearly show a superiority of Charolais-Brahman dams over Charolais-Shorthorn dams. The heaviest weaning weights were obtained from mating F<sup>1</sup> Charolais x Brahman cows to Charolais bulls to combine the good maternal performance of the dam with a calf having good growth potential.

Research also was conducted with Charolais, Angus, and Brahman to evaluate combining abilities of the three breeds. Eleven years of data comparing the productivity of Charolais, Angus, and Brahman cows when bred to Charolais bulls are presented in Table 3.

**Table 3. Weaning traits of calves and production per cow of Charolais, Angus, and Brahman cows when bred to Charolais bulls.**

| Breed of cow     | No. calves | Condition score <sup>1</sup> | Weaning weight | Adjusted 205-day weight | Annual production/cow |
|------------------|------------|------------------------------|----------------|-------------------------|-----------------------|
| ----- lbs. ----- |            |                              |                |                         |                       |
| Charolais        | 107        | 9.4                          | 519            | 486                     | 404                   |
| Angus            | 72         | 9.7                          | 450            | 405                     | 287                   |
| Brahman          | 99         | 9.7                          | 506            | 472                     | 416                   |

<sup>1</sup> 9, Low Good; 10, Good.

Condition score of calves from Charolais cows (9.4) was slightly lower than for F<sup>1</sup> calves (9.7) from Angus and Brahman cows. Weaning weights of calves were highest for pure Charolais (519 pounds). Weight of hybrid calves from Brahman cows (506 pounds) was next in order, with calves from Angus cows being lowest (450 pounds). Franke *et al.* (1975), from analyzing records (1960 to 1972) of the Beef Cattle Improvement Association in Florida herds, found the Charolais to wean at the heaviest weight of all breeds studied. Mean weaning weights adjusted to 205 days of age were 402, 405, 507, 392, and 455 pounds for the Angus, Brahman, Charolais, Hereford and Santa Gertrudis, respectively.

Calf production per cow was slightly higher for Brahman cows (416 pounds) than for Charolais (404 pounds), whereas Angus were the lowest at 287 pounds (Table 3). The change in rank of the Charolais and Brahman cows for weaning weight of calves and production per cow was due to a slightly higher pregnancy rate in Brahman cows and higher survival rate of calves from Brahman cows (Table I), emphasizing the importance of pregnancy and calf survival on cow production. Data from this study support the earlier study, indicating large additive effects for growth in the Charolais breed. This characteristic shows good complementarity with the excellent maternal ability of the Brahman cow.

## Feedlot Performance and Carcass Characteristics

Feedlot performance and carcass data were obtained by full-feeding weanling steer calves in the feedlot for 178 days. Final feedlot weights were determined by adjusting final weight to a 60% chilled dressing percentage for all breeds. The adjustment was made by dividing chilled carcass weight by .60. Results are presented in Table 4.

**Table 4. Feedlot performance and carcass characteristics of Charolais, Charolais x Angus, and Charolais x Brahman steers.**

|                                  | Charolais | C x A | C x B |
|----------------------------------|-----------|-------|-------|
| No. of Steers                    | 19        | 23    | 21    |
| Days on feed                     | 178       | 178   | 178   |
| Beginning wt., lbs.              | 591       | 499   | 554   |
| Adj. final wt., lbs <sup>1</sup> | 990       | 897   | 967   |
| Adj. daily gain, lbs.            | 2.24      | 2.24  | 2.32  |
| Chilled carcass wt., lbs         | 594       | 538   | 580   |
| Dressing percent, %              | 61.90     | 61.97 | 62.58 |
| Federal grade                    | Good      | Good+ | Good  |
| Fat over eye, in.                | 0.22      | 0.29  | 0.28  |
| Ribeye area, sq.in.              | 11.83     | 10.4  | 10.51 |
| Est. yield, %                    | 52.13     | 50.91 | 50.80 |

<sup>1</sup>Chilled carcass wt. / 0.60 = Adj. final wt.

Daily gain in the feedlot were similar, being 2.24, 2.24, and 2.32 pounds respectively for Charolais, first cross Charolais x Angus, and Charolais x Brahman steers. Federal carcass grade (old) was highest for the Charolais x Angus steers at High Good compared to U.S. Good for carcass of the Charolais and Charolais x Brahman, expressing the superiority of the Angus breed for carcass quality.

Charolais carcasses had the least amount of fat over the eye, largest ribeye area, and the largest estimated percent yield of wholesale cuts of the three breed groups. Measurements of these traits were similar for the Charolais x Angus and Charolais x Brahman carcasses.

## Summary and Conclusion

Calving rates of Charolais, Angus and Brahman cows bred to Charolais bulls were 81.1%, 73.7%, and 82.5% respectively, with corresponding survival rates of 96.1%, 86.5%, and 99.6%. Breeding Charolais bulls to Angus cows resulted in a lower pregnancy rate in the cows and a lower survival rate of calves. Higher weaning weights were obtained by Charolais x Brahman combinations than Charolais x Shorthorn or Charolais x Angus. Adjusted 205-day weaning weights from grading up from pure Brahman were 489 pounds for the F<sup>1</sup> Charolais x Brahman, 526 pounds for 3/4 Charolais - 1/4 Brahman, 516 pounds for 7/8 Charolais-1 /8 Brahman, and 511 pounds for 15/16 Charolais-1/16 Brahman. Adjusted 205-day weights were 409 pounds for the F<sup>1</sup> Charolais x Shorthorn and 432 pounds for 3/4 Charolais - 1/4 Shorthorn calves.

Weaning weights and 205-day weights for calves produced, and annual production per cow for Charolais, Angus, and Brahman cows bred to Charolais bulls were: 519, 450, and 506 pounds; 485, 405, and 472 pounds; and 404, 287, and 416 pounds, respectively.

Feedlot daily gains, federal quality grade, fat over the ribeye, and estimated yield for Charolais, Charolais x Angus, and Charolais x Brahman steers, respectively, were 2.24, 2.24, and 2.32 pounds; U.S. Good, High Good, and U.S. Good; .22, .29, and .28 inches and 52.13, 50.91, and 50.80%.

The large additive breed effects of the Charolais for growth, heterosis for maternal components in the F<sup>1</sup> Charolais x Brahman cow, and carcass quality of the Angus offer the producer alternative emphases in his production goals. Caution should be exercised in crossing Charolais bulls on Angus cows in order to minimize calving problems.

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