# GESTATION LENGTH AND BIRTH WEIGHT DIFFERENCES OF CALVES BORN TO 0, 1/4, AND 1/2 BLOOD BRAHMAN FALL- AND SPRING-CALVING COWS BRED TO SALERS AND LIMOUSIN SIRES

G. E. Selk[1] and D. S. Buchanan[2]

## Story in Brief

Records of 414 gestations and live births (242 spring and 172 fall) from cows of five crossbred cow groups were analyzed for differences in gestation length and birth weight. The cows were all multiparous and ranged in age from four to seven years. Cow breed groups were: 1) 1/2 Hereford x 1/2 Angus; 2) 1/4 Brahman x 1/2 Hereford x 1/4 Angus; 3) 1/4 Brahman x 1/2 Angus x 1/4 Hereford; 4) 1/2 Brahman x 1/2 Angus; and 5) 1/2 Brahman x 1/2 Hereford, respectively. Cows were bred artificially to either Salers or Limousin bulls. The last breeding date was used to calculate gestation length. Sex of the calf, calving season, sire breed and dam breed and all two-way interactions were evaluated. Bull calves were heavier at birth than heifers (82.2 lb vs 77.9 lb) and longer in gestation length (286.0 days vs 284.8 days). Group 5 (1/2 Hereford x 1/2 Brahman) cows had greater gestation lengths than any other breed group (284.9 days, 284.1 days, 285.2 days, 284.9 days, and 287.9 days, for Groups 1, 2, 3, 4, and 5, respectively). Fall-calving cows delivered smaller birth weight calves (77.7 lb) than spring-calving cows (82.2 lb) but gestation length was not affected by season. Limousin-sired calves were heavier than Salers-sired calves (81.0 lb vs 79.1 lb) and required a slightly longer gestation (285.9 days vs 284.8 days). The partial correlation of gestation length and birth weight was r = .34. Brahman x Hereford crossbred cows had greater gestation length than other crosses evaluated and consequently fewer available days to become rebred to maintain a twelve month calving interval.

(Key Words: Gestation Length, Birth Weight, Crossbred Cow, Calving Season.)

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[1]Assistant Professor [2]Professor

## Introduction

Gestation length and birth weight are traits that influence the reproductive performance of beef cattle. Lengthy gestations decrease the days available for postpartum recovery and rebreeding in those herds that strive for a 365-day calving interval. Heavy birth weights have been noted as the primary cause of dystocia in cattle (Morrison et al., 1985). Together, these two traits could have adverse effects on the reproductive performance of beef herds. Long gestation lengths and heavy birth weight calves that result in dystocia will cause extended postpartum anestrus or recovery and relatively fewer days to accomplish the necessary uterine involution. The result could be a slower return to estrus and longer calving interval or a lower calf crop the following year.

Scientific estimates of gestation lengths and birth weights of different beef and dairy breeds of cattle were reviewed in 1965 (Anderson and Plum). In that review, the reported estimates of these traits in Angus and Hereford cattle were made prior to 1962. Angus gestations were reported to require a mean of 279 days and mean birth weight was 60.9 lb. Hereford gestations lasted 285 days and mean birth weights for straightbred Hereford calves was reported at 76 lb. By contrast, the 1982 USDA Meat Animal Research Center (MARC) Report (Gregory et al., 1982) listed the gestation length of 3,129 Angus calves born to Angus parents at 285.4 days and the corresponding birth weight of 80.9 lb. In the same report 2,440 Hereford calves were gestated for 288.6 days and weighed 86.2 lb at birth. Changes in cattle type over the last 50 years may have influenced birth weight and gestation length. In that period of time, many different breeds have been introduced into the United States beef system. Brahman crossbred cattle are popular in many of the Gulf Coast and Southwestern States. Brahman-sired calves had gestation lengths estimated at 291 days in the MARC report. The effect of lengthy gestations on year-to-year calving intervals was emphasized by Bourdon and Brinks (1983) when they reported an increase in calving interval of 1.17 days for each day increase in gestation length. Little, however, is known of the gestation lengths and birth weights to be expected from Brahman crossbred cows bred to terminal sires. In addition, very little information about the differences in birth weight and gestation length in fall-calving cattle vs spring-calving cattle is available. Therefore, data from fall- and spring-calving cows of five different crosses in two years were analyzed to help answer some of these questions.

## Materials and Methods

Records of 414 gestations from multiparous four to seven year old cows were analyzed. The cows were in five different breed groups:

Group 1--1/2 Angus x 1/2 Hereford
Group 2--1/4 Brahman x 1/4 Angus x 1/2 Hereford
Group 3--1/4 Brahman x 1/4 Hereford x 1/2 Angus
Group 4--1/2 Brahman x 1/2 Angus
Group 5--1/2 Brahman x 1/2 Hereford

Half of each breed group were randomly mated artificially to one of five Salers sires, and half of each breed group were mated to one of five Limousin sires. Birth weights, birth dates, and sex of calf were recorded as soon as the calf was found, and within 24 h of birth. Gestation length was defined as the number of days from the last recorded date of artificial insemination to the date of birth. The very few gestations in excess of 300 days were considered as mis-recorded breeding dates and were adjusted back into a normal range by subtracting either 21 or 42 days (the estimated length of one or two estrous cycles).

Statistical analysis was performed by analysis of variance with breed group of dam, breed of sire, sex of calf, and season of birth as the main sources of variation tested for both gestation length and birth weight. All possible two-way interactions were also examined. Nonsignificant interactions were removed and included in the error term. Partial correlation of birth weight and gestation length were calculated with the above sources of variation removed. Least squares means are reported and were considered different only if there was a significant main effect in the analysis of variance.

## Results and Discussion

The least squares means for gestation length and birth weight across all five cow breed groups are presented in Table 1. Fall born calves were lighter in birth weight but gestation length was identical for both fall and spring born calves. Fall born calves have gestated during hotter months, perhaps resulting in reduced nutrients reaching the conceptus. Blood flow patterns in hot weather dictate that more of the dam's blood is shunted to extremities to dissipate heat. Salers-sired calves were slightly smaller at birth and had a shorter gestation length than Limousin-sired calves. As expected, heifer calves had a lighter mean birth weight and shorter gestation length than bull calves. However, in this data set there was an unexpected and unexplained interaction for cow breed group by sex of calf for birth weight. The bull calves born to the Brahman x Angus cows were not different in birth weight than the heifer calves born to the same breed type. Table 2 is a presentation of the mean birth weights for the five cow groups by sex of calf.

Gestation lengths for the different cow breed groups are presented in Table 3. All breed groups were similar in gestation length except for 1/2 Brahman x 1/2 Hereford cows which had a significantly longer gestation length. Any

**Table 1. Least squares means for gestation length and birth weights across all cow breed groups for fall vs spring born calves, Limousin vs Salers sired calves, and heifer vs bull calves.[a]**

| Group | Gestation length (days) | Birth weight (lb) |
|---|---|---|
| Fall-born | 285.4 | 77.7[b] |
| Spring-born | 285.4 | 82.2[c] |
| Heifers | 284.8 | 77.9[b] |
| Bulls | 286.0 | 82.2[c] |
| Salers-sired | 284.8[b] | 79.1[b] |
| Limousin-sired | 286.0[c] | 81.0[c] |

[a] Cow breed group x sex interaction was found.
[b,c] Means in the same row with different superscripts differ (P<.05).

**Table 2. Least squares means of birth weights (lb) of calves born to cows of five breed groups by sex of calf.**

| Breed group[a]* | Bull calves | Heifer calves |
|---|---|---|
| 1/2 H X 1/2 A | 84.2[b] | 77.3[d] |
| 1/4 B X 1/2 H X 1/4 A | 81.9[b] | 77.8[bd] |
| 1/4 B X 1/2 A X 1/4 H | 84.6[b] | 80.4[bd] |
| 1/2 B X 1/2 A | 75.5[c] | 77.8[cd] |
| 1/2 B X 1/2 H | 84.9[b] | 76.8[d] |

[a] H=Hereford, A=Angus, B=Brahman.
[b,c,d] Means in the same row with different superscripts differ (P<.05).

overall increase in gestation length will reduce the number of days available for the cow to repair her reproductive tract, return to estrus, and rebreed for the subsequent year's calf crop. The partial correlation between birth weight and gestation length in this study is r = 0.34. This means that longer gestation cows tend to have heavier birth weights. Heavy birth weights are considered the major factor causing dystocia in cattle (Morrison et al., 1985). Although there

**Table 3. Least squares means of gestation length (days) of calves born to cows of five breed groups.**

| Breed group[a] | Gestation length (days) |
|---|---|
| 1/2 H X 1/2 A | 284.9[b] |
| 1/4 B X 1/2 H X 1/4 A | 284.1[b] |
| 1/4 B X 1/2 A X 1/4 H | 285.3[b] |
| 1/2 B X 1/2 A | 284.8[b] |
| 1/2 B X 1/2 H | 287.7[c] |

[a] H=Hereford, A=Angus, B=Brahman.
[b,c] Means in the same row with different superscripts differ (P<.05).

was a very low incidence of dystocia in this study, (presumably because only four to seven year old cows were included) this relationship may become important in some herds. Increased gestation length causing increased birth weight could, in turn, increase dystocia. An increase in dystocia has been linked to longer anestrus in beef cows (Brinks et al., 1973). This longer anestrus compounded by the long gestation could result in poor reproductive performance due to slow return to estrus or lowered rebreeding rates. By using the factor reported by Bourdon and Brinks (1983), the 2.9 day increase in gestation length causes a 3.4 day (1.17 x 2.9 days) increase in the year-to-year calving interval. Over the lifetime of individual cows, those with longer gestation lengths would eventually have a calving date nearly a month later than counterparts with shorter average gestation lengths.

## Literature Cited


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