

PUBLICATIONS

1993

FIELD DAY REPORT - 1993

Texas A&M University Agricultural Research and Extension Center at Overton

**Texas Agricultural Experiment Station
Texas Agricultural Extension Service**

Overton, Texas

May 28, 1993

Research Center Technical Report 93-1

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EFFECTS OF MATERNAL AND SERVICE SIRE BREEDS ON CIRCULATING HORMONE CONCENTRATIONS BEFORE AND AFTER CALVING

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Background. Mechanisms influencing the postpartum interval have been studied very intensively; however, some mechanisms remain unclear. The breed of service sire has been implicated as a factor contributing to variability in gestation length, calf birth weight and milk yield and has been shown to influence various physiological and hormonal responses of the maternal unit. A portion of the variability in postpartum milk production is associated with breed of fetal sire which may be a consequence of alterations in hormonal production.

Prostaglandin $F_2\alpha$ is known to be involved in initiation of ovarian activity during the postpartum period. Prostaglandin $F_2\alpha$ is affected by several factors. First-calf Brahman cows had lower prostaglandin $F_2\alpha$ concentrations than mature Brahman cows, while cows which had female calves showed lower prostaglandin $F_2\alpha$ concentrations than those that had male calves. Also, breed of service sire has been shown to affect prostaglandin $F_2\alpha$ secretion during the early postpartum period. The objective of this study was to determine the effects of breed of dam and service sire upon prepartum and postpartum endocrine parameters.

Research Findings. Twenty Brahman (*Bos indicus*) and 20 Angus (*Bos taurus*) mature cows in which pregnancy was initiated by either Brahman or Angus bulls were utilized. All cows were maintained on Coastal bermudagrass hay, corn-soybean meal concentrate (3 kg/cow), with water and minerals available free choice. Cows were bled via tail venipuncture on days 28-34, 21-27, 14-20 and 7-13 prior to calving and daily from calving to day 7 after calving. Serum concentrations of progesterone (ng/ml), estrogens (pg/ml) and plasma 13,14 dihydro-15-keto prostaglandin $F_2\alpha$ (PGFM; pg/ml) were quantified using radioimmunoassay procedures.

On days 14-20 before calving progesterone concentrations were higher in cows bred to Brahman bulls than in cows bred to Angus bulls (10.2 ± 7 vs 7.1 ± 8). Cows pregnant with male calves had higher progesterone concentrations on days 14-20 before calving than cows pregnant with female calves (10.4 ± 9 vs 6.8 ± 7). On days 28-34 before calving Brahman cows had higher estrogen concentrations than Angus cows (195.4 ± 16.8 vs 135.9 ± 15.2). Cows bred to Angus bulls had higher estrogen concentrations than cows bred to Brahman bulls on days 7-13 (576.1 ± 40.3 vs 458.5 ± 36.7) and days 28-34 before calving (187.1 ± 18.1 vs 144.2 ± 13.7). Cows pregnant with male calves had higher estrogen concentrations on days 14-20 and 21-27 before calving than cows

pregnant with female calves (311.4 ± 20.3 vs 244.1 ± 17.2 and 233.2 ± 17.3 vs 176.1 ± 15.7 , respectively). Cows bred to Brahman bulls had higher ratios of progesterone to estrogen in the circulation than did cows bred to Angus bulls on days 7-13 and 14-20 before calving (22.7 ± 3.2 vs 11.9 ± 3.6 and 43.3 ± 4.0 vs 25.8 ± 4.5 , respectively). Brahman cows had higher PGFM concentrations on days .5, 1 and 2 after calving (2362.9 ± 327.9 vs 1482.8 ± 321.9 , 1960.0 ± 323.9 vs 931.6 ± 317.9 and 2254.8 ± 362.9 vs 1371.7 ± 356.0 , respectively). Cows bred to Angus bulls had higher PGFM concentrations on days 1 and 2 after calving than did cows bred to Brahman bulls (1996.0 ± 331.2 vs 895.6 ± 310.2 and 2437.2 ± 371.2 vs 1135.3 ± 347.6 , respectively). Cows producing female calves had higher PGFM concentrations at parturition than did cows producing male calves (8938.3 ± 896.4 vs 5470.5 ± 115.2). Hormonal profiles before and after parturition were influenced by both breed of dam and breed of service sire. Therefore, breed of service sire and breed of dam may influence postpartum reproductive performance in cattle.

Application. The findings of this study show that hormonal profiles before and after calving which control the duration of the postpartum interval are influenced by the breed of the cow and the breed of the service sire. Selection of these breeds may influence reproductive performance of the beef herd.