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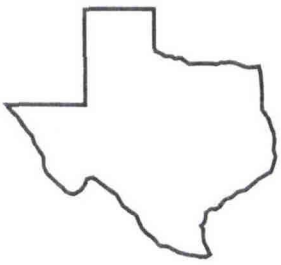

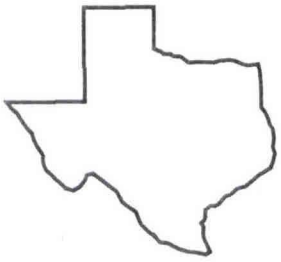

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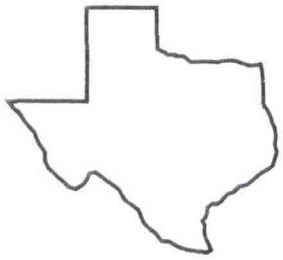

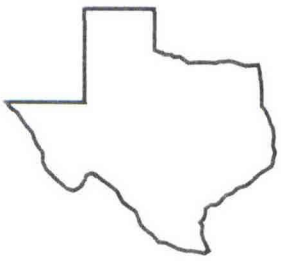

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ENDOCRINE AND OVARIAN RESPONSES IN CATTLE SUPEROVULATED WITH TWO DIFFERENT FSH PREPARATIONS

H. F. Rodriguez, D. A. Neuendorff, A. W. Lewis
and R. D. Randel

Background. Over the last two decades embryo transfer and related technologies have become useful tools for enhancing genetic progress in cattle. However, current superovulation methods for production of high quality embryos from superior donor cows can only offer limited results. Both the quantity and quality of collected embryos are highly variable making it very difficult to predict the magnitude and quality of such responses. More predictable yields of transferable embryos derived from improvements in superovulation methods offer potential for reduction in the costs of embryo transfer. Previous research has shown that factors such as breed type and potency of the FSH preparation may influence ovarian response. In Bos Indicus cattle, limited data are available with regard to endocrine changes during treatment with exogenous FSH and the impact of FSH on follicular growth, embryo recovery and viability rates remains uncertain. The objective of this study was to examine endocrine dynamics and ovarian morphologic changes in Angus and Brahman cows superovulated with two commercial FSH preparations.

Research Findings. Superovulation (SOV) was induced in 24 mature Brahman (B) and Angus (A) range cows using two commercially available FSH preparations (FSH-P, Schering, Kenilworth, NJ and Superov, Ausa International, Tyler, TX). Based on estrus detection and ultrasound examination of the ovaries B or A cows (n=6) were randomly alloted to each treatment on day 9 of the estrous cycle (estrus=day 0). Ultrasound scannings were performed beginning on day 1 of SOV until day of induced estrus. Basal follicle populations and presence of a corpus luteum were determined prior to treatment. Total numbers of large (> 8.0 mm), medium (4.0 - 7.9 mm) and small (< 4.0 mm) follicles were determined daily. In Treatment (Trt) 1 Superov was administered intramuscularly (IM) on a daily 25 unit dose over a 3-day period for a total of 75 NIH FSH units. Luteolysis and estrus were induced by administration of 25 and 15 mg PGF2α (Lutalyse, Upjohn, Kalamazoo, MI) at 48 and 60 hr, respectively after initiation of SOV. In Trt 2 FSH-P was administered IM (28 mg) on a decreasing dose schedule (5,4,3,2 mg, twice daily). Luteolysis and estrus were induced by administration of 25 and 15 mg PGF2α at 60 and 72 hr, respectively after beginning treatment. Blood samples were collected by tail vein puncture once daily prior to SOV and at 6-hr intervals during treatment; plasma was recovered after centrifugation for RIA analysis of cortisol and progesterone concentrations. Data reported here

encompass the SOV period from day 1 to day 3. During this period mean plasma cortisol concentrations were greater (P<.04) in A as compared to of B cows (36.91 $\pm$ 4.17 vs. 13.73 $\pm$ 4.38 ng/ml, respectively). On day 3 of SOV cortisol concentrations were 42.86 $\pm$ 6.54 ng/ml in A and 17.74 $\pm$ 6.9 ng/ml in B cows (P<.04). Temperament and handling stress were likely to have caused the increase in cortisol concentrations in A cows. In both breeds progesterone (P4) concentrations increased with time on treatment (P<.001); however, the magnitude of the increase did not differ between the two treatments during the interval examined (P>.10; Fig. 1). Six hr after the initiation of treatments P4 concentrations were higher (P<.01) in B cows than in A cows (10.37 $\pm$ .72 and 8.59 $\pm$ .69 ng/ml, respectively) but no differences were detected on P4 profiles by breed, FSH type or their interaction during the SOV treatment. No differences by treatment or breed type were noted with regard to numbers of large and small follicles (P>.25). Both time on treatment and breed type, however, affected the number of medium size follicles (P<.0001 and P<.09, respectively). Total number of follicles increased over time (P<.09) and was influenced by an interaction between type of FSH preparation and breed (P<.002), Fig. 2.

Figure 1.

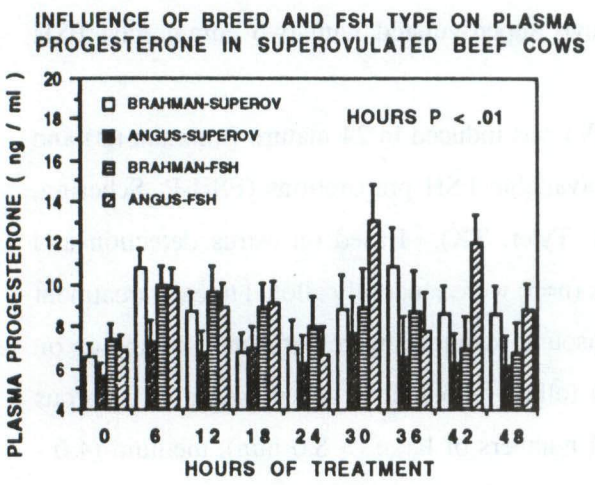
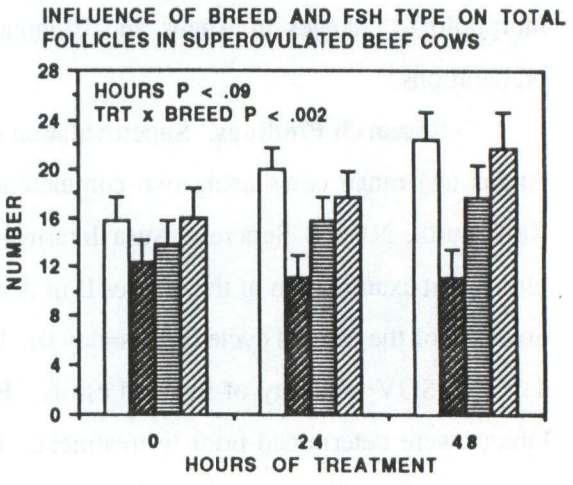


Figure 2.



Application. Superovulatory responses in terms of follicular numbers were affected by stress in the Angus cows. A similar increase in P4 concentrations was noted when using either FSH type in Angus and Brahman cows. Variable amounts of LH activity in different FSH batches may be responsible for some P4 increase noted during superovulation. Because progesterone profiles were similar in cows treated with FSH-P and Superov these data suggest that the two preparations had similar amounts of LH activity which may be detrimental to the superovulatory response.