PUBLICATIONS

1980

Texas A&M University Agricultural Research and Extension Center at Overton • 1980

Interrelationship of Endocrine and Physiological Events During the Estrous Cycle in Brahman Cattle

Research Center

TECHNICAL REPORT NO. 80-2

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SERUM PROGESTERONE LEVELS DURING THE ESTROUS CYCLE IN BRAHMAN, BRAHMAN X HEREFORD AND HEREFORD HEIFERS

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SUMMARY

Progesterone, the hormone responsible for maintaining pregnancy, was lower in Brahman and Brahman x Hereford than in Hereford heifers from day 2 through day 11 after standing heat. This lowered level of the pregnancy maintaining hormone could partially explain lowered conception rates in Brahman cattle.

OBJECTIVES

As we had previously found that the corpus luteum (CL) was smaller and contained less total progesterone in Brahman than in Hereford heifers this research was designed to look at the blood levels of progesterone during the estrous cycle in Brahman, Brahman x Hereford and Hereford heifers.

PROCEDURE

Eight Brahman, 10 Brahman x Hereford and 11 Hereford two year old virgin heifers were bled daily from days 2 through 16 after standing heat. Blood serum samples were assayed for progesterone by radioimmunoassay procedures.

The data was broken into two parts for analysis. One part is the period from day 2 through 11 after heat and the other day 10 through day 4 before the next standing heat.

RESULTS

Serum progesterone levels increased significantly ($P<0.005$) from day 2 through day 11 after heat in all breed types (Table 1). Brahman and Brahman x Hereford heifers were lower in serum progesterone ($P<0.01$) than Hereford heifers during the period from 2 through 11 days after estrus. This fits in with the smaller corpus luteum in Brahman heifers and the lowered progesterone content of corpora lutea from both Brahman and Brahman x Hereford heifers compared to Hereford heifers.

During the period 10 to 4 days before the next heat Brahman and Brahman x Hereford cattle tended to maintain higher progesterone levels than did Herefords in relation to the highest level reached by each breed. This was shown by a significant ($P<0.01$) breed x period interaction (Table 2).

The function of the corpus luteum in Brahman and Brahman x Hereford cows is different from that of Hereford cows. This indicates that most estrous synchronization treatments need to be modified to fit Brahman cattle, if they are to be very successful in Brahman cattle.

The smaller corpus luteum, lower amount of progesterone per corpus luteum and lower level of blood serum progesterone all fit together indicating that function of the corpus luteum may be a limiting factor on conception and pregnancy in Brahman cattle.

TABLE 1. SERUM PROGESTERONE LEVELS FOLLOWING STANDING HEAT (ng/ml ± standard error)

DAY	BRAHMAN	BRAHMAN X HEREFORD	HEREFORD
2	1.0±0.3	0.7±0.2	1.4±0.3
3	1.3±0.5	0.8±0.2	2.3±0.8
4	1.5±0.4	1.2±0.4	3.4±0.8
5	2.6±0.7	2.0±0.4	3.7±1.0
6	2.2±0.6	2.0±0.4	5.9±1.5
7	3.3±1.7	2.2±0.4	5.8±1.4
8	3.9±2.0	3.0±0.5	4.7±1.4
9	4.4±1.6	3.5±0.7	7.4±2.9
10	4.4±1.5	3.6±0.6	5.9±2.0
11	4.8±1.9	3.7±0.6	7.0±2.4

TABLE 2. SERUM PROGESTERONE LEVELS DAYS 10 TO 4 BEFORE HEAT (ng/ml ± standard error)

DAYS	BRAHMAN	BRAHMAN X HEREFORD	HEREFORD
10	4.4±1.9	4.1±0.6	7.7±2.7
9	5.2±1.4	3.6±0.7	4.5±1.9
8	4.8±1.4	3.9±0.5	3.0±0.4
7	5.0±1.9	5.5±0.7	2.5±0.3
6	4.0±0.9	3.8±0.8	3.1±0.4
5	2.7±0.8	4.5±0.5	3.4±0.6
4	2.6±0.4	4.7±1.0	3.9±0.8