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

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THE SERUM LUTEINIZING HORMONE SURGE AND PROGESTERONE LEVELS NEAR ESTRUS IN BRAHMAN COMPARED TO BRAHMAN X HEREFORD AND HEREFORD HEIFERS

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SUMMARY

Brahman cattle were found to have a lower surge of luteinizing hormone (the surge of this hormone causes the egg to be shed from the ovary) than Brahman x Hereford cows who were lower than Herefords ($P<0.025$). The duration of the luteinizing hormone surge was the shortest for Brahman (18.5±0.7 hours) followed by Brahman x Hereford (20.8±1.3 hours) and the longest for Hereford cows (22.9±1.7 hours). Progesterone levels from 48 hours before heat through 24 hours after heat were not different between breeds. The lower luteinizing hormone surge could cause some failure to ovulate and could be responsible for the reports in other research of more heat periods without ovulation in Brahman cattle.

OBJECTIVES

Previous research has shown that Brahman cattle tend to have more heat periods that are not accompanied by shedding the egg from the ovary than are found in European cattle. As the level of progesterone affects the onset of standing heat and the luteinizing hormone surge causes the egg to be shed from the ovary this research was undertaken to determine the relative differences in serum progesterone and luteinizing hormone levels near heat in Brahman, Brahman x Hereford and Hereford heifers.

PROCEDURES

Blood samples were collected at 8 hour intervals from day 16 after heat through the next heat and at 4 hour intervals from heat through 24 hours after heat from 8 Brahman, 8 Brahman x Hereford and 8 Hereford heifers. The heifers were kept in drylots with sterile heat check bulls. Heat checks were made every 4 hours. Eight days after standing heat the cows were examined by rectal palpation for corpora lutea. Serum luteinizing hormone and progesterone levels were determined by radioimmunoassay procedures.

RESULTS

Progesterone levels did not differ between breeds from 48 hours before standing heat through 24 hours after standing heat (Figure 1). Progesterone levels therefore do not seem to be responsible for failure of Brahman cows to shed the egg or for short duration of standing heat.

The luteinizing hormone surge was lower ($P<0.005$) in Brahman, intermediate in Brahman x Hereford and highest in Hereford heifers (Figure 2). Time from the beginning of heat to the surge was 2.0±1.3 hours in Brahman, 3.0±1.0 hours in Brahman x Hereford and 6.5±1.8 hours in Hereford heifers. The duration of the surge was 18.5±0.7 hours in Brahman, 20.8±1.3 hours in Brahman x Hereford and 22.9±1.7 hours in Hereford heifers. The area under the luteinizing hormone surge was 268.5±18.4 in Brahman, 314.7±26.4 in Brahman x Hereford and 353.6±30.2 units in Hereford heifers.

The luteinizing hormone surge was lower, shorter and of less total size by any measurement in Brahman than Brahman x Hereford, which was in turn lower, shorter and smaller than in Hereford heifers.

Figure 2. The luteinizing hormone surge.