

PUBLICATIONS

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

Research Center

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TOTAL SERUM ESTROGENS BEFORE AND
AFTER ESTRUS IN BRAHMAN, BRAHMAN X
HEREFORD AND HEREFORD HEIFERS

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SUMMARY

Estrogens are released from the follicles which develop on the ovarys. As the follicle develops, toward ovulation, estrogen release increases. A high point is reached which causes the cow to show behavioral estrus. This high point also causes the hypothalamus to release gonadotropin releasing hormone which in turn causes the pituitary gland to release luteinizing hormone which causes ovulation of the follicle. The high point in estrogens was found 24 hours before estrus in Brahman cows compared to 16 hours in Brahman x Hereford and 8 hours in Hereford cows. By 24 hours after estrus, Brahman were lowest, Brahman x Hereford intermediate, and Hereford cows were the highest in blood estrogens ($P < .05$). These data coincide with the timing found in the estrogen injection studies. These data show that Brahman cows have a different biological timing system compared to European cows.

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, 9 Brahman x Hereford and 9 Hereford 2-year old heifers. The heifers were kept in dry lots with sterile heat check bulls. Heat checks were made every 4 hours. Eight days after standing heat the heifers were examined by rectal palpation for corpora lutea. Serum estrogens were determined by radioimmunoassay procedures.

RESULTS

It was concluded that serum estrogens did not show significantly different concentrations from 72 hours through 8 hours before estrus (Figure 1). However, the highest estrogen concentrations for Brahman were found at 24 hours before estrus compared to 16 hours for Brahman x Hereford and 8 hours for Hereford cows. These data compare to the time from estrogen injection to estrus data, previously reported, of 19.3 hours from injection to first stance in

Brahman compared to 12.8 hours in Brahman x Hereford and 10.1 hours in Hereford cows. These data show that Brahman cows have a different biological timing system compared to European cows.

Serum estrogens were significantly lower ($P < .05$) in Brahman, intermediate in Brahman x Hereford and highest in Hereford cows by 24 hours after the onset of standing heat (Figure 2). These data support the finding that Brahman cows ovulate earlier after the beginning of standing heat than do European cows. As the estrogens are produced by the follicle, after it is ruptured (ovulation), the estrogen levels should decrease in the blood. This pattern is clearly shown in these data.

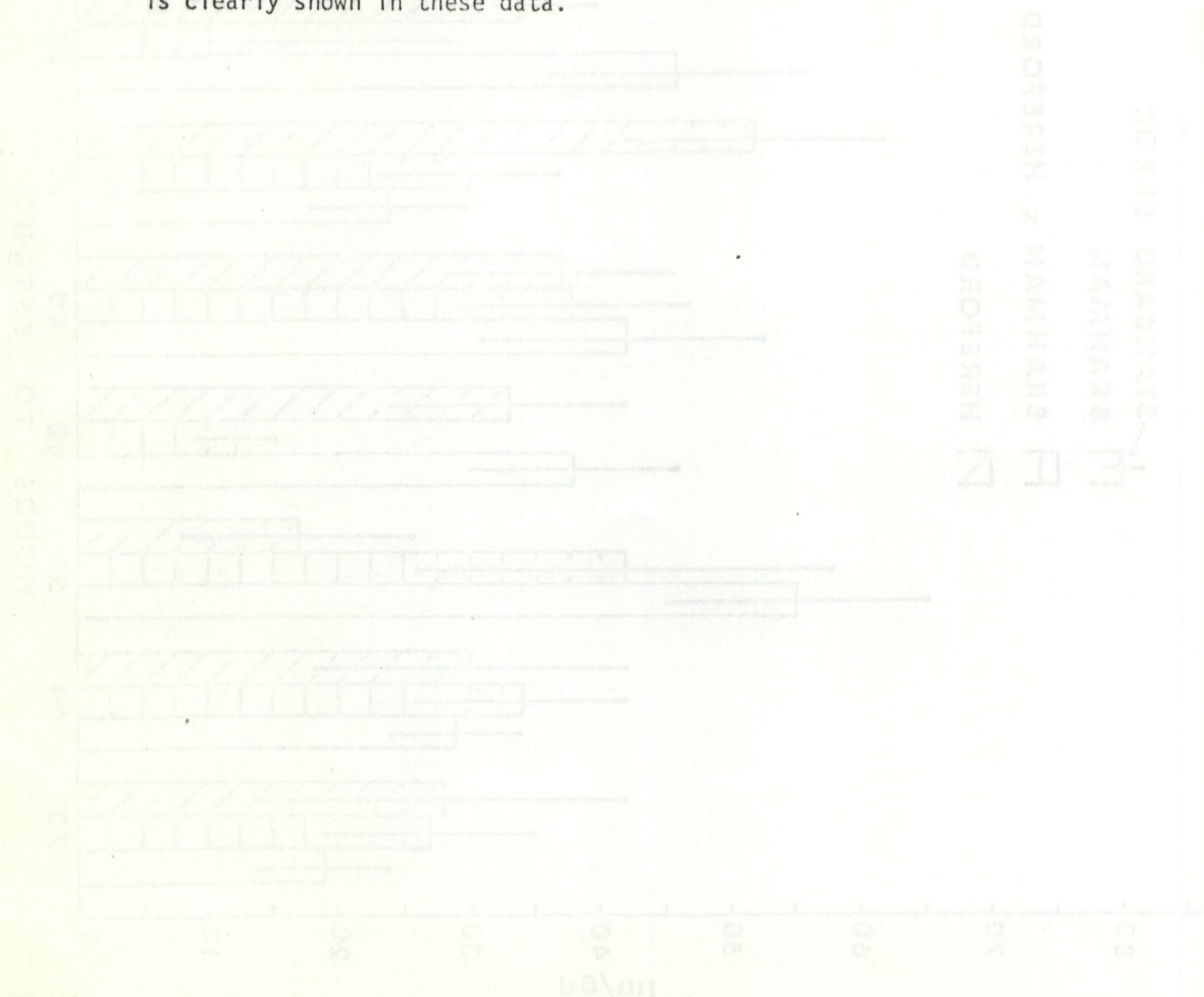


Figure 1. Total serum estrogens before estrus.

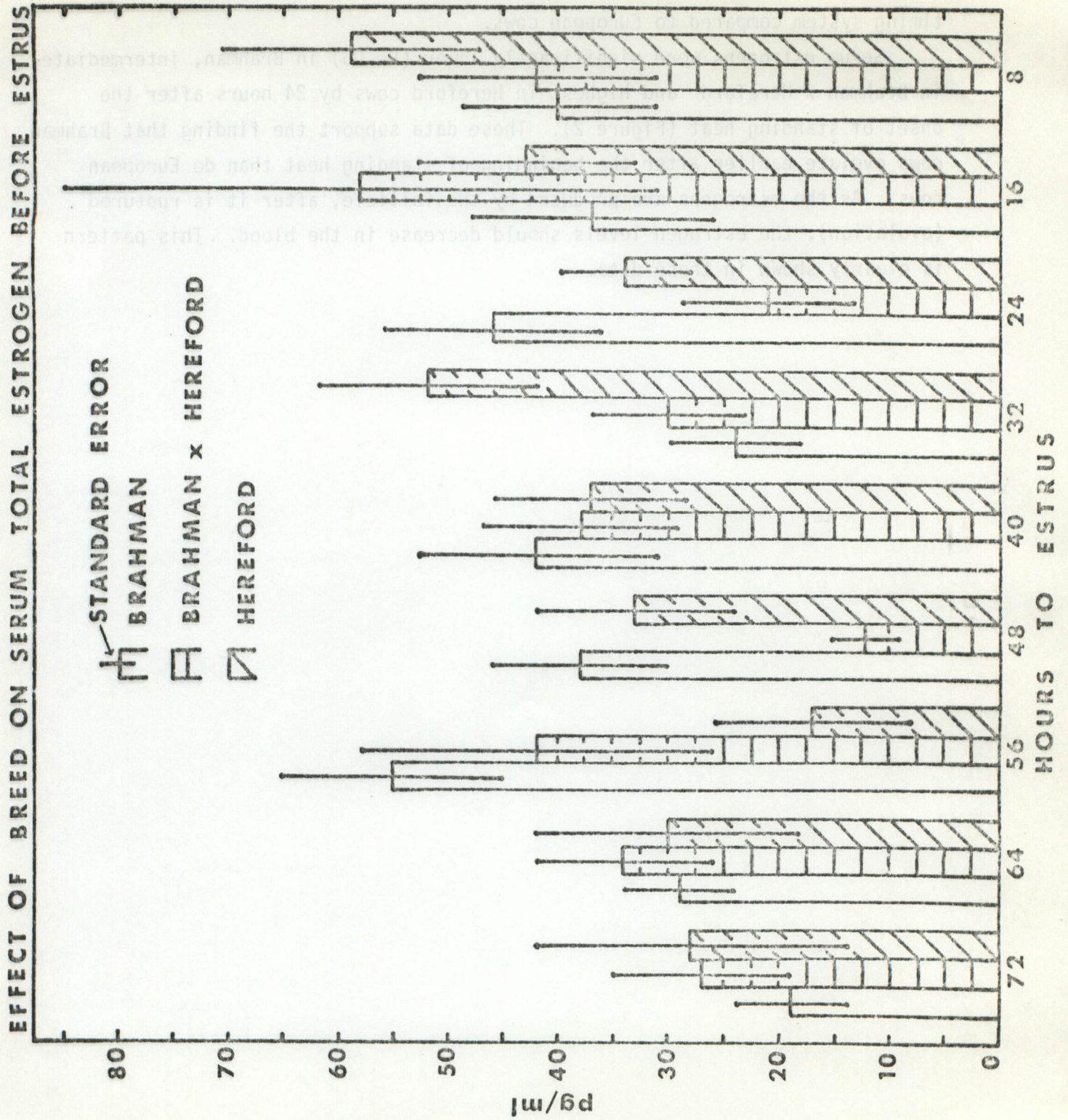
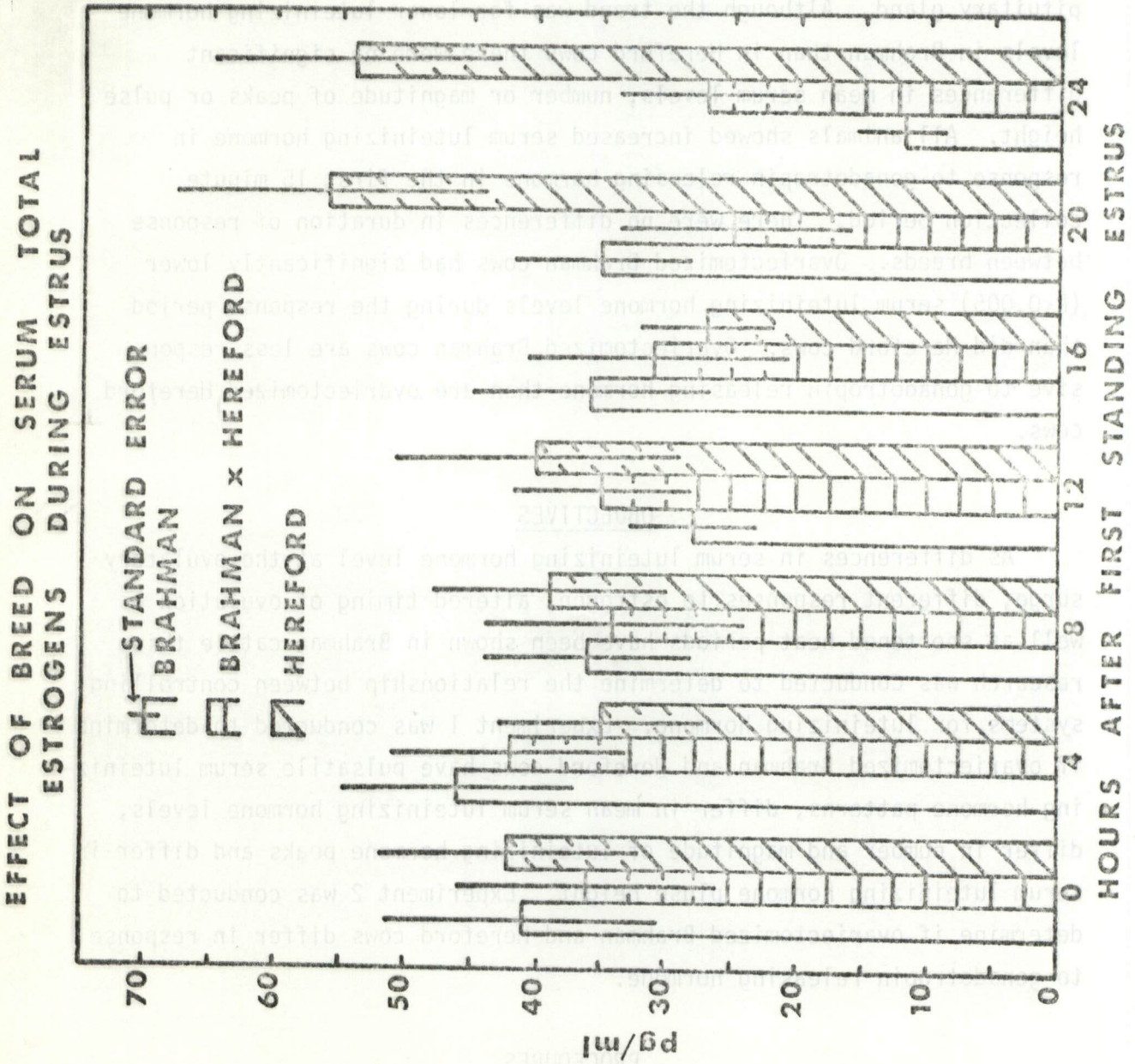


Figure 2. Total serum estrogens after estrus.

SUMMARY

Luteinizing hormone is released in pulsatile rhythms from the



In Experiment 1 twelve long term ovariectomized cows, 6 Brahman and 6 Hereford, were sampled every 15 minutes for a period of 4 hours. Blood samples were assayed for serum luteinizing hormone levels by radio-