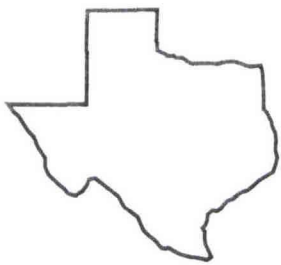
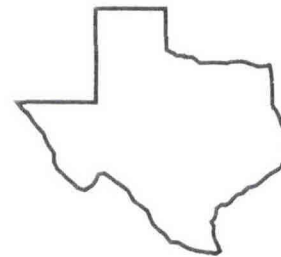
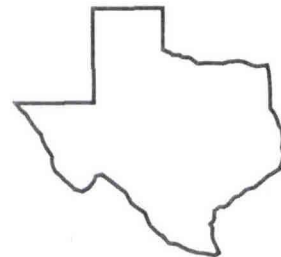
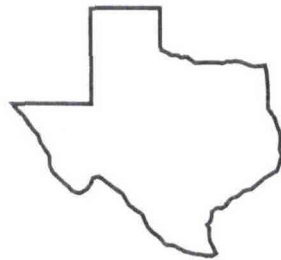


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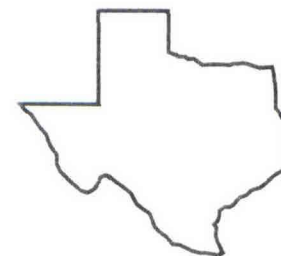
1994



Texas Agricultural Experiment Station
Texas Agricultural Extension Service
The Texas A&M University System



Overton Field Day Report - 1994



**1994
Research Center
Technical
Report**

No. 94-1

REPRODUCTIVE CHARACTERISTICS IN BRAHMAN HEIFERS FOLLOWING EXPOSURE TO GUAJILLO PLANT TOXIN- OR ACTH- INDUCED STRESS

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Background. Animals exposed to many kinds of stressors may suffer from impaired reproductive function. This is thought to result from the negative interactions of stress hormones with reproductive hormones. The purpose of this research was to characterize hormonal and reproductive responses of heifers that had been exposed to either a stress-inducing plant toxin, or to external ACTH. Previous research has revealed that cortisol, adrenaline and noradrenaline can become elevated, with a concurrent suppression of LH (a reproductive hormone), in sheep that are exposed to the guajillo plant toxin. Guajillo is a common brush species found in South and Southwest Texas. It is often browsed by cattle, sheep, goats and wildlife. The physiological responses which we observed may have implications for many livestock producers regardless of geographic region. Thirty-three Brahman heifers were given superovulation drugs for 4 days. During this period they were also dosed 2X per day with either the guajillo plant toxin (NMP), ACTH, or with saline (control). They were observed for standing heat and bred A.I. Seven days later embryos were collected. Stress response was measured by blood cortisol concentrations. Reproductive responses were measured by ultrasonic examination of the follicles (eggs) developing on the ovaries, expression of standing heat, ovulation (progesterone), and embryo production and quality.

Research Findings. As a result of handling and mild restraint in the squeeze chute, increases in cortisol occurred across all treatment groups. These increases were several fold greater in heifers that received either ACTH or NMP, indicating a stress response above that produced by handling alone (Figure 1). On the ovary there were fewer medium sized follicles produced on days 2 and 3 for NMP heifers and on day 4 for ACTH heifers. Total follicle production was unaffected by treatment. Despite the presence of numerous follicles, fewer heifers in the NMP group either expressed heat, ovulated, or had normal ovarian function following ovulation (Table 1). Likely this was caused by stress-induced cortisol release causing suppression of LH. Neither embryo production nor quality were affected by treatments. These treatments (stressors) appeared to most affect those events immediately preceding or following ovulation, and not events associated with conception and early embryo viability. A greater exposure to these or other stressors might also have affected conception and pregnancy maintenance as well.

Application. Stress is a very broad term used to describe a variety of internal and

external challenges to the animal's system. Types of stressors might include improper handling or hauling, or severe weather conditions. Generally, these results suggest that animals under stress have elevated cortisol. This in turn may produce adverse effects upon reproductive function. Specifically, these results indicate that overconsumption of guajillo plant toxins can induce a stress response which negatively affects reproductive processes. Conditions such as drought or overgrazing of native pastures will often force livestock to consume large quantities of potentially toxic plants.

Table 1. Frequency of reproductive abnormalities in heifers exposed to CONTROL- ACTH- or NMP-induced stress.

<u>CONTROL</u>	<u>ACTH</u>	<u>NMP</u>
0/10	1/12	5/12

Figure 1. Cortisol response to treatment and handling.

