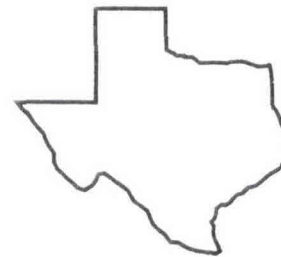
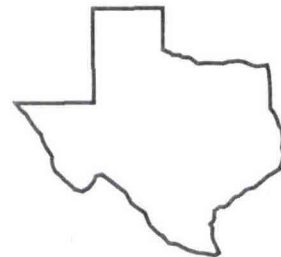


# **PUBLICATIONS**

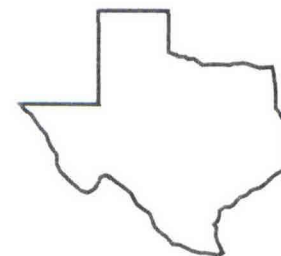
**1994**



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**

---

## CORTISOL RESPONSE TO ACUTE STRESSORS IN MALE ANGORA GOATS CONSUMING GUAJILLO (*Acacia berlandieri*)

H. R. Vera-Avila, R. D. Randel, T.D.A. Forbes and B. B. Carpenter

**Background.** Grazing ruminants, particularly browsers, when maintained on rangelands with shrub-dominated vegetation are exposed to consumption of physiologically active compounds such as phenolic amines, which are present in many browse species such as guajillo (*Acacia berlandieri*). Over consumption of guajillo can cause leg paralysis in sheep and goats, a condition called "guajillo wobbles" that in severe cases is fatal. The phenolic amine N-methyl- $\beta$ -phenethylamine (NMPEA) was found to be the toxic compound inducing this condition, presumably due to overstimulation of the sympathetic system which as part of the nervous system is also related with the adaptative response to stress. It has been demonstrated that in wethers, acute administration of NMPEA alone or in combination with tyramine (another phenolic amine present in guajillo) was able to increase the release of the stress related hormones cortisol and noradrenaline. It is known that although the adaptative response to stress, indicated by the stress related hormones, is essential for survival, its chronic stimulation can affect not only the stress response itself but apparently also growth, reproductive and immune functions. Therefore, the goal of this study was to determine the potential of relatively long term guajillo consumption, to affect the response to acute stressors, due presumably to chronic exposure to the phenolic amines present in this shrub.

**Research Findings.** Twenty-four male Angora goats between 8-10 months of age were randomly distributed by weight in 2 groups: C (maintained in pens under controlled feeding conditions without guajillo) and GUA (grazing pastures with high guajillo content). After 10 days and through 66 days they were subjected at 2 week intervals to 2 acute stressors, transportation stress (TRANS) and electroejaculation (ELEC). Blood was collected before and after each acute stressor and analyzed for cortisol. The difference between pre- and post-stressor cortisol concentrations was considered to be cortisol response (CR). None of the 24 animals showed symptoms of "guajillo wobbles" throughout the experiment. However, CR to both stressors was noticeably affected by guajillo consumption. There was a significant ( $P < 0.01$ ) group/time interaction on CR to TRANS, a decrease in both groups between 10 and 24 days was observed. After that, CR was maintained stable in C and continued decreasing in GUA in which it was less than C after 38 days and was severely reduced at 66 days. CR to ELEC was diminished in both groups compared with TRANS and remained stable across time in each group but tended to be

less in GUA compared with C in all cases ( $P < 0.05$ ). CR to TRANS and ELEC are depicted in Figures 1 and 2, respectively.

**Application.** These results indicate that the system that controls the adaptive response to stress can be significantly altered in animals grazing guajillo prior to acute toxicity development. The strong relationship of the stress response with important productive functions such as growth and reproduction, points out the possibility that guajillo may impair those functions as a subclinical effect.

FIGURE 1. CORTISOL RESPONSE TO TRANSPORTATION

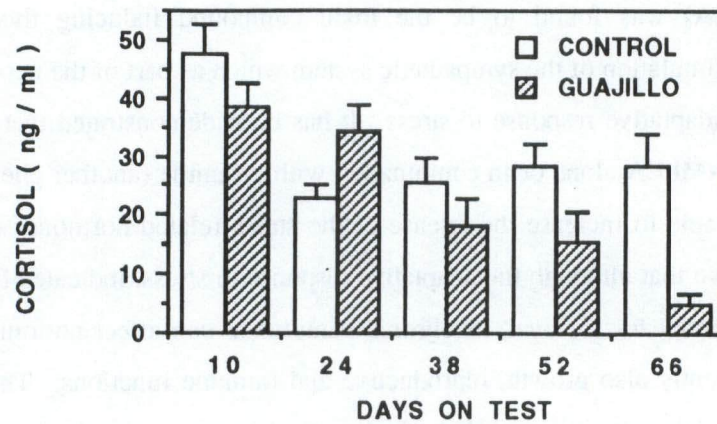


FIGURE 2. CORTISOL RESPONSE TO ELECTROEJACULATION

