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EFFECTS OF NIACIN[1] AND ASPIRIN ON SERUM PROLACTIN AND BODY TEMPERATURE OF HEIFERS FED ENDOPHYTE-INFECTED TALL FESCUE[2,3]

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Summary

Feeding niacin to cattle consuming endophyte (*Acremonium coenophialum*)-infected tall fescue elevated their serum prolactin concentrations to levels similar to those of heifers fed hay containing a low content of endophyte. Heifers fed high-endophyte hay, with or without aspirin, had lower serum prolactin concentrations than heifers fed low-endophyte fescue hay ($P < .1$). Compared to control cattle fed high-endophyte hay, neither niacin nor aspirin lowered morning or evening body temperatures during the period August 16 to September 4. Feeding aspirin did not lower body temperature or increase prolactin concentration in animals fed high-endophyte fescue forage. Some benefit was seen when niacin was added to the diet, as evidenced by higher ($P < .01$) prolactin concentrations; however body temperature was not lowered.

(Key words: Fescue, Niacin, Aspirin, Prolactin, Body Temperature.)

Introduction

Tall fescue is one of the most important cool-season grasses in the United States. Cattle grazing endophyte-infected fescue typically exhibit a number of symptoms, including reduced feed intake, weight gain, and milk production; higher rectal temperatures and respiratory rates; and reduced serum prolactin concentrations. The elevated body temperature appears to be due to an inability to dissipate body heat. Niacin has vasodilatory activity and can increase heat dissipation in some animal species. Aspirin reduces body temperature by inhibiting prostaglandin synthesis, so may also help alleviate the high body temperature induced by endophyte-infected fescue. Serum prolactin concentrations are much lower in cattle suffering endophyte toxicosis than in animals fed low-endophyte hay. This difference in serum prolactin concentration can be used as an indication of endophyte toxicosis.

Experimental Procedures

To evaluate niacin and aspirin as potential aids in minimizing the effects of endophyte toxicosis, 20 beef heifers, stratified by weight and previous treatment, were allotted to one of four treatments: low-endophyte fescue hay, (70%) endophyte-infected hay, endophyte-infected hay plus 2 gm of niacin daily, and endophyte-infected hay with 91 mg/lb body weight/day aspirin. All heifers were fed 4 lb of concentrate with or without the niacin or aspirin. Body temperatures were measured twice daily at 5:30 am and 3:30 pm, and blood

[1]Niacin (99% nicotinic acid) - Lonza Inc.

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samples were taken three times weekly from July 31 to September 4, 1990 for radioimmunoassay of serum prolactin concentrations. Data were analyzed for the entire trial and then separately for the period from August 16 through September 4, 1990 when the environmental temperature reached over 90°F on 16 of the 20 days and over 100°F on 7 days. Refer to Figure 1 for maximum daily environmental temperatures during the trial.

Results and Discussion

Neither aspirin nor niacin lowered morning or evening body temperatures from August 16 through September 4 of cattle fed high-endophyte fescue (Figure 2). Heifers fed niacin had evening body temperatures that were not different from those of low-endophyte fed heifers, but heifers receiving aspirin had higher evening temperatures than corresponding control heifers ($P < .05$). Heifers fed low-endophyte fescue had higher serum prolactin concentrations (Figure 3) than either the control heifers fed high-endophyte fescue or the heifers fed aspirin ($P < .05$). Heifers fed low-endophyte fescue and heifers fed high-endophyte fescue and niacin had similar serum prolactin concentrations.

Feeding aspirin had no effect on body temperature and serum prolactin concentration of heifers fed high-endophyte fescue forage. But feeding niacin tended to increase prolactin.

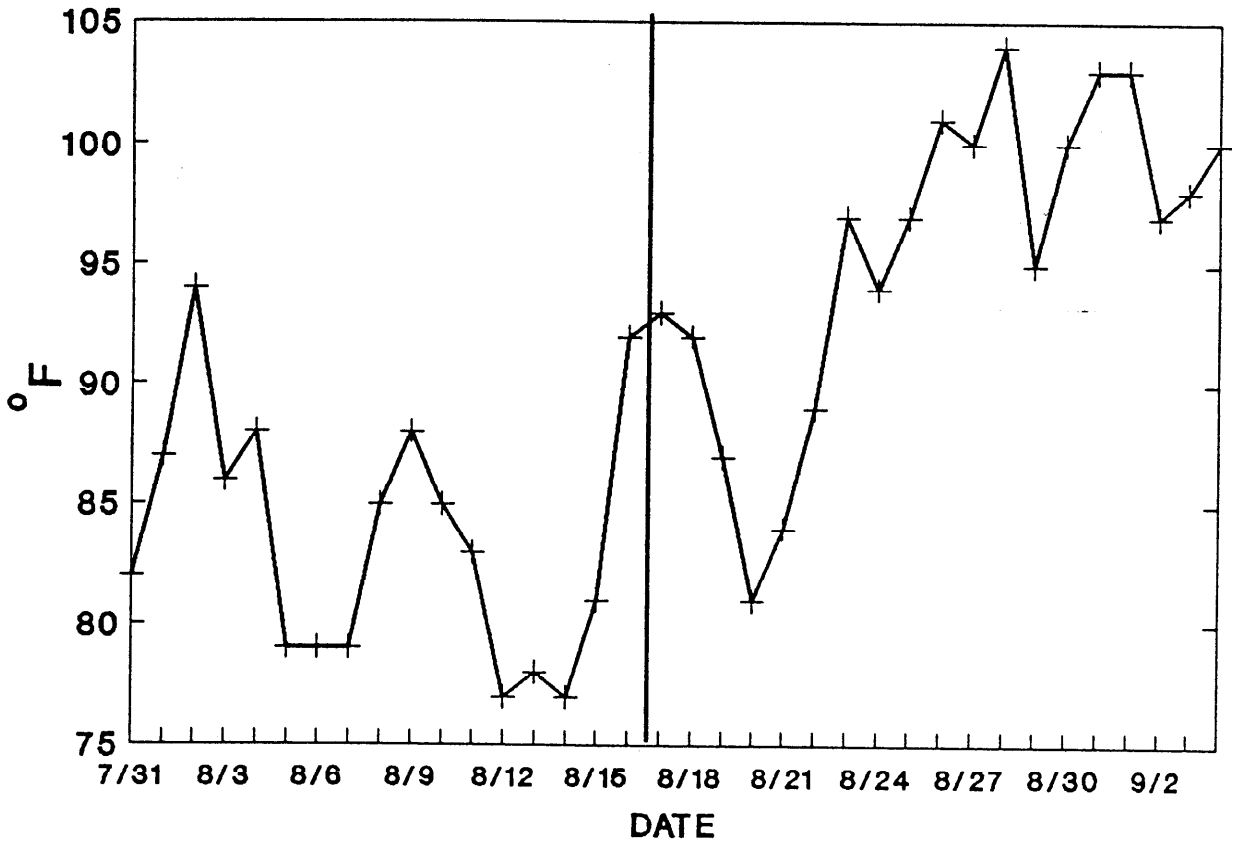

Figure 1. Plot of Maximum Daily Environmental Temperatures for the Experimental Period July 31 through September 4, 1990. (Note especially the period of high daily temperature from August 16 through September 4).

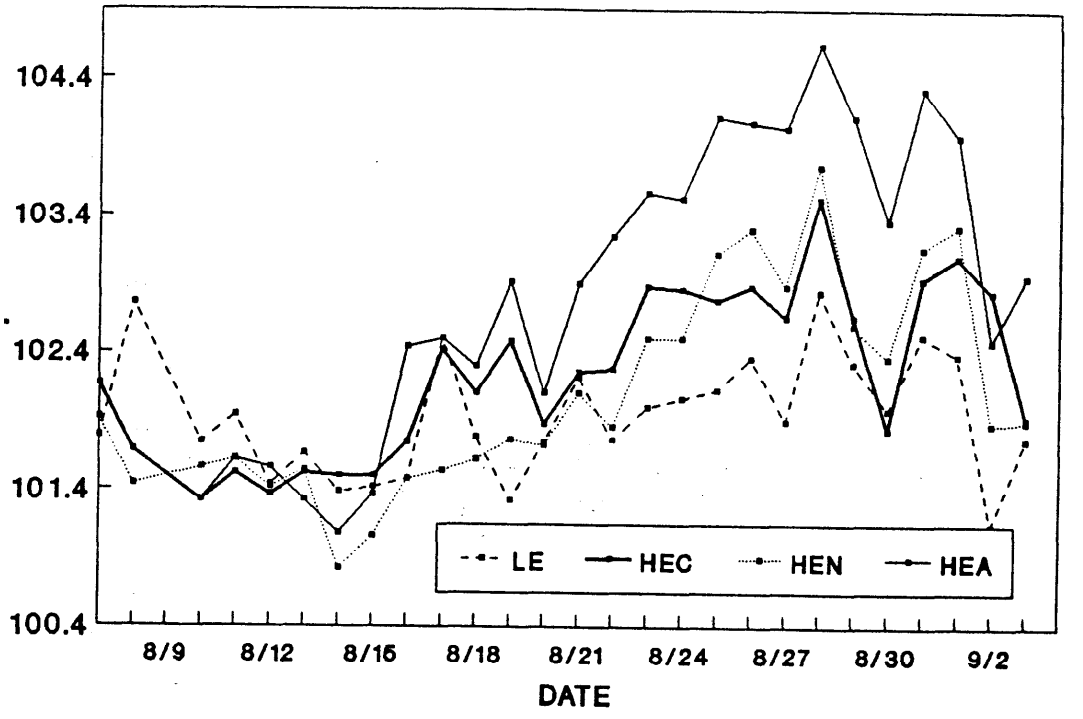

Figure 2. **Daily Body Temperatures of Heifers from August 7 through September 4, 1990. LE - low-endophyte hay; HEC - high-endophyte hay, control; HEA - high-endophyte hay supplemented with aspirin; HEN - high endophyte hay supplemented with niacin.**

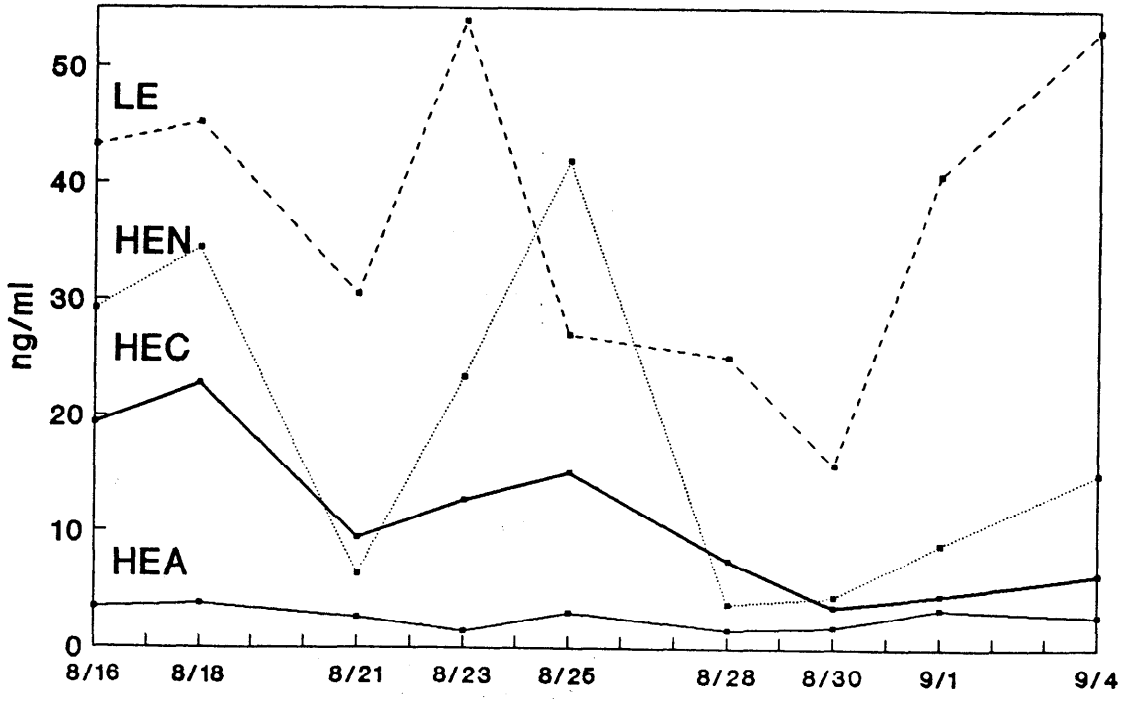

Figure 3. **Serum Prolactin Concentrations of Heifers from August 16 through September 4, 1990. See Figure 2 for treatment abbreviations.**