Use of Alternate Forages for Alleviating Tall Fescue Toxicosis in Growing Beef Cattle


Introduction:
Tall fescue is a drought and pest resistant cool-season forage found throughout a wide distribution across the United States and is the predominant forage specie in the eastern United States. Much of the positive drought and pest persistence characteristics that make tall fescue attractive from an agronomic standpoint are derived from the plant’s mutually symbiotic relationship with multiple species of endophytic fungus. Traditional cultivars of tall fescue (Kentucky-31) include an ergot alkaloid producing endophyte (E+) that cause vasoconstriction, having detrimental effects on an animal’s ability to maintain thermal regulation. The loss of control over thermal regulation causes changes in cattle grazing behavior, resulting in losses of performance. The combination of these observed symptoms are known as fescue toxicity and is common in cattle grazing fescue in the warmest parts of the year (July and August). Over the last several decades, improvements in fescue breeding have resulted in the release of cultivars containing non-ergot producing endophytes, known as novel endophyte containing tall fescue (NE). It has been shown that cattle grazing NE fescue have improved performance over those consuming E+ varieties with the desirable agronomic characteristics of E+ maintained. The costs and time associated with pasture renovation has thus far been prohibitive for the widespread establishment of NE fescues varieties.

This trial is to be conducted at Dixon Springs Ag. Research Center (DSAC) where cattle are typically grazed on established pastures consisting of E+ fescue, making them susceptible to fescue toxicosis. The proposed treatments for this trial are management strategies designed to alleviate the negative effects of fescue toxicity in growing beef cattle. One treatment to be included in this study will be to graze cattle on E+ fescue early and then switch cattle to NE fescue pastures later in the summer. Another method that has been utilized to alleviate the effects of fescue toxicity is the use of warm-season annual forages when fescue quality is at its lowest in mid-late summer (July and August). The warm season annual varieties that are to be evaluated in this study are crabgrass and brown midrib sorghum-sudangrass. A positive control of NE fescue and a negative control of E+ fescue are also to be used in this study.
Materials and Methods:

This study will utilize five grazing treatments with two replicates of each treatment per year. Weaned steer calves approximately 8 months of age will be used to evaluate the proposed grazing treatments. Each year of this study is to be divided into two periods. Period 1 will run from approximately May 1 to June 30, with period 2 being approximately July 1 through August 31. The proposed treatments are:

1. E+, negative control of endophyte infected fescue
2. NE, positive control on novel endophyte infected fescue
3. E+/NE, grazing E+ during period 1 and NE during period 2
4. SS, grazing E+ in period 1 and brown midrib sorghum-sudangrass hybrid during period 2
5. CG, grazing E+ in period 1 and crabgrass during period 2

Each replicate will consist of 8 acre pastures that will then be subdivided into six smaller paddocks. Shade and water are to be provided for all pastures. Rotational grazing will be used for all treatments. Cattle would be rotated every five days for a total of two rotations through a pasture each period. SS treatment will utilize a brown midrib sorghum-sudangrass hybrid. The CG treatment will utilize crabgrass during period 2. Calves will be used as put and take animals to maintain similar grazing pressure across all treatments. For each replicate, 6 calves will be used as tester animals. At the beginning of period 1, calves are to be maintained on a common pasture and then double-weighed on consecutive days for an initial weight. Calves are to be comingled in similar pastures and then double-weighed on consecutive days between periods 1 and 2 as well as at the conclusion of grazing in August for mid-trial and final weights respectively. Animal weight will also be taken at the midpoint of each grazing period.

In order to characterize thermal stress and grazing behavior of tester animals, respiration rate will be measured for cattle grazing each treatment at the midpoint of each period. Also to characterize cattle grazing behavior, pedometers are to be used to estimate the activity level of animals in each grazing treatment at the midpoint of each grazing period.

Blood will be taken at the initiation of study, the midpoint of each grazing period and at the conclusion of study to be analyzed for serum prolactin levels. Depressed serum prolactin levels are used as an indicator for fescue toxicosis. At each weigh and bleed point, hair coat scores for tester animals will also be taken as a measure of potential heat stress.