PRODUCER'S ROUND Table

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SMARTLIC® SUPPLEMENTS

Volume 5

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SMARTLIC SUPPLEMENTATION OF FESCUE FORAGES

The Fescue Problem

Tall fescue (Festuca arundinacea) is a grass raised throughout the Midwest and southern United States. It was first identified in 1931 in Kentucky, evaluated at the University of Kentucky, and released in 1943 as "Kentucky 31." Today, tall fescue accounts for over 40 million acres of pasture and forage land in the United States. Tall fescue is insect and nematode resistant, tolerates poor soil and climatic conditions well, and has a relatively long growing season. Most tall fescue is infected with a fungal endophyte, *Neotyphodium coenophialum*. This fungus produces an alkaloid toxin (ergovaline) that is toxic to cattle when they consume infected forages. Ergovaline decreases normal blood flow to peripheral tissues, such as the ears, tail, hooves and the uterus. Poor blood flow to the extremities interferes with the animal's ability to dissipate body heat, so they resort to other means of regulating body temperature, such as wading in ponds, congregating in shaded areas, and most importantly—by eating less. Cattle affected by fescue toxicity generally have low feed intake, decreased growth rate, and poor reproductive performance. In extreme situations, sloughing of hooves, tails and ears can occur, as well as abortions in bred cows and heifers. The economic impact of fescue toxicity or fescue foot is significant, costing the livestock industry tens of millions of dollars each year.

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FESCUE TRIAL

Feeding SmartLic supplements with endophyte-infected fescue

The economic impact of fescue toxicity or fescue foot is significant, costing the livestock industry tens of millions of dollars each year.

A trial was conducted at Kansas State University to determine if supplementing cattle with ***SmartLic***® low-moisture blocks reduced the negative effect of fescue toxicosis. Thirty (30) cross-bred heifers weighing an average of 707 lb were randomly allotted to one of three treatments;

1) **Basal diet -** coarsely chopped prairie hay plus salt with no Fescue seed.
2) **Basal diet w/fescue seed -** basal diet plus salt and 2.2 lb per head daily of Fescue seed.
3) **Basal diet w/fescue seed & NE-22 -** basal diet plus salt and 2.2 lb of Fescue seed and 0.75 lb of ***SmartLic* NE-22.**

Calves were fed their respective diets for a 14-day adaptation period followed by a 4-day collection period. All treatment groups, with the exception of the cattle fed the basal diet, received 2.2 lb/head of endophyte infected fescue seed daily. Fescue seed served as the source of ergovaline toxin. Measurements were ergovaline content of feces, body surface temperature and daily feed intake. Following the adaptation period, thermographic images, rectal body temperature and fecal samples were taken on three consecutive days.

Cattle were thermally imaged using a short-wave length infrared radiometer to determine changes in heat dissipation due to Fescue toxicosis. Mean daily ambient temperature at the time of imaging was 85°F. Thermographic images provided a visual representation of heat dissipation from the animal's body surface in the form of a color spectrum. The color spectra were digitally analyzed to characterize changes in heat dissipation from the extremities. Cooler temperatures appeared as blue or green in the color spectrum and indicate poor blood circulation. Infrared (IR) signals from the infrared camera were recorded digitally and analyzed to determine differences in heat dissipation patterns among treatments. Fecal samples from each animal were composited over the three-day sampling period, frozen, and stored for subsequent analysis of ergovaline content.

RESULTS

Dry matter intake was reduced 0.9 lb by feeding Fescue seed containing ergovaline (Figure 1). Fescue toxicosis reduces blood flow to the body surface and extremities of animals, reducing the animal's ability to dissipate heat of metabolism. As body core temperature increases, feed intake is decreased leading to reduced weight gain, poor feed conversion and reduced reproductive performance. Fescue challenged heifers fed ***SmartLic* NE-22** consumed 11.8% more feed (14.3 vs. 12.79 lb) than the positive control cattle challenged with ergovaline and 4.5% more feed intake (14.3 vs. 13.9 lb) than the heifers fed the negative control ration. These results suggested that supplementing the fescue challenged heifers with ***SmartLic* NE-22** eliminated the effect ergovaline had on feed intake of the challenged cattle.

Not surprisingly, the ***SmartLic* NE-22** supplemented cattle also had higher dry matter intake (DMI) than the cattle fed the basal diet. Numerous trials have consistently shown that feeding ***SmartLic*** supplements to livestock results in increased feed intake, as well as increase feed digestibility and animal performance. Digestible feed intakes are typically increased by an average 33.6% (Figure 2).

Figure 1. Total Feed Intake

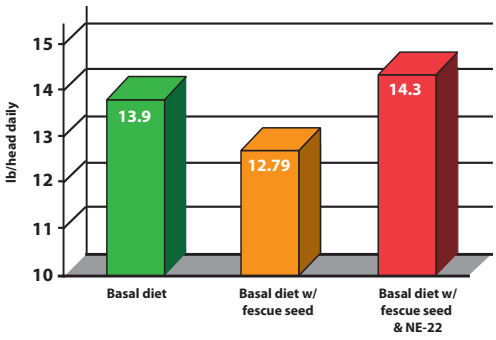
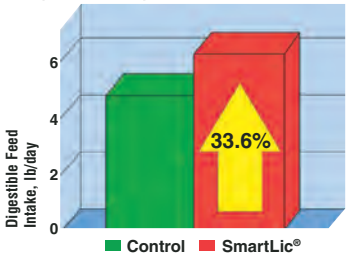


Figure 2. Digestible Feed Intake



SmartLic research has demonstrated that supplementation with ***SmartLic*** blocks effectively improves forage utilization and cattle performance. Supplementing with ***SmartLic*** supplements provides essential nutrients that will improve the utilization of low quality forages. Supplementing growing heifers with ***SmartLic*** supplement resulted in increased feed intakes, greater metabolic activity and reduced the effects of Fescue toxicosis.

Figure 3. Infrared Surface Temperatures

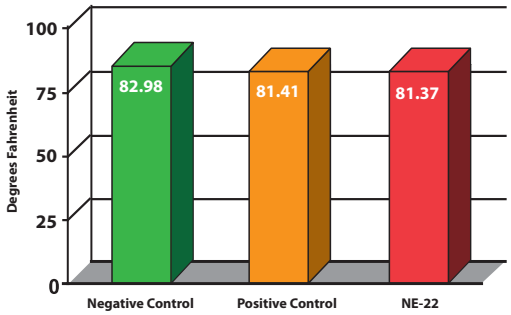
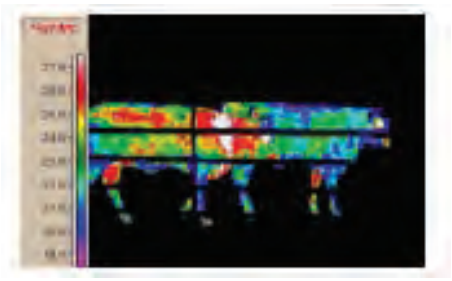


Figure 4. Thermographic Image



In spite of differences in feed intake, body surface temperatures were similar among treatments. When taken in conjunction with feed intake data, these data show that cattle fed the infected fescue seed had to decrease feed intake to maintain normal body surface temperatures. When cattle were fed the blocks, feed intake was restored with no negative effect on body surface temperature.

IMPLICATIONS

Cattlemen and veterinarians report that cattle grazing infected Fescue grass seek shade and water in an attempt to cool themselves and reduce heat stress. This stress reduces the grazing activity and grass consumed by the cattle. Cattle have less energy, protein and minerals available for maintaining body condition, weight gain, reproduction and milk production, resulting in overall poor performance and lost profit. This trial shows that when cattle are under "stress," supplementing with ***SmartLic* NE-22** allowed the cattle to overcome a Fescue seed challenge. Based on this research and numerous other trials and field studies, feeding SmartLic supplements improves feed intake and feed utilization when cattle are stressed from inadequate or imbalanced nutrition, environmental extremes and health challenges. The nutrients provided by ***SmartLic*** supplements, the consistent manufacturing process and how cattle must consume ***SmartLic*** results in improved rumen function that cattlemen see as improved performance and appearance. The licking of ***SmartLic*** by cattle not only provides essential nutrients to the rumen microbes but also increases salivation that buffers the rumen and provides a stable rumen pH. This in turn increases bacterial and protozoal numbers and activity in the rumen resulting in increased digestion and utilization of feedstuffs consumed by cattle. More rumen microbes produce not only more energy but more microbial protein – protein that can be used to meet the animal's requirement for lean tissue gain, milk production, reproduction and immune response. Enhanced microbial digestion increases the rate of passage of feed through the digestive tract allowing the animal to consume more feed explaining why stressed cattle spend more time eating when supplemented with ***SmartLic***. This increased *digestible feed intake* provides the energy, protein, minerals and other nutrients required for improved production, reproduction and immune response. This is the ***SmartLic Advantage*** that bottom line equals more profit.

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