ELEMENTAL CONCENTRATION CHANGES IN SOIL AND STOCKPILED TALL FESCUE LEAVES AFTER LIMING

Elizabeth J. Hamilton

Drs. Randall Miles and Dale Blevins, Advisors

ABSTRACT

Tall fescue (*Festuca arundinacea* Schreb.) is the dominant forage in Missouri and grows primarily on acidic soils that possess little plant available phosphorus (P). Little is known about the effects of lime on the elemental concentrations of stockpiled tall fescue. Others have predicted that liming will increase P and decrease aluminum (Al) availability to plants in the types of soils used in this study.

Study sites were located at the University of Missouri's Southwest Center (SWC) and Bradford Research and Extension Center (BREC). Calcitic and dolomitic limestone were applied at 0x, 1/2x, 1x and 2x the recommended soil test rate. Forage was harvested for yield. Tall fescue leaves were harvested monthly throughout the stockpiling season, and soil samples were taken at the end of the study. Both leaves and soil were analyzed form element concentrations.

The two year total forage harvest yield was increased by limestone application at SWC; however, no consistent trends were observed at BREC. Following liming, leaf potassium (K), nitrogen (N), boron (B), and manganese (Mn) concentrations decreased while leaf Ca, molybdenum (Mo), and sodium (Na) concentrations increased with liming. Leaf P, Al, iron (Fe), zinc (Zn), and copper (Cu) concentrations were relatively unaltered. Additionally, leaf Mg concentrations decreased in calcitic treatments but increased with the application of dolomitic lime.

As a result of the changes in leaf K, Mg, and Ca concentrations, the grass tetany ratio of leaves from limed plots decreased.

For the most part, changes in leaf concentrations of the elements mirrored changes in soil test concentrations following liming. Soil pH_{CaCl2} values were increased while neutralizable acidity, exchanangeable K, and extractable Mn decreased with increasing rates of limestone. Calcitic limestone increased soil test Ca and had little effect on Mg whereas dolomitic limestone increased soil test Mg and only slightly increased soil test Ca. Soil cation exchange capacity decreased with limestone at SWC. Soil organic matter, Bray I P, Bray II P, Zn, Cu, and Fe showed little effect of limestone application.

Liming two acidic Missouri soils changed many soil chemical properties and consequently the elemental concentrations of stockpiled tall fescue leaves changed, which should improve the nutritional value of tall fescue as a forage for beef cattle.