

PROGRESS REPORT FOR 2004

TO THE MISSOURI FERTILIZER/AG LIME ADVISORY BOARD FOR THE FERTILIZER/LIME PROJECT TITLED

THE INFLUENCE OF LIMING ACID SOILS ON PLANT AVAILABLE PHOSPHORUS, MAGNESIUM, AND ALUMINUM LEVELS IN TALL FESCUE

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The project was initiated in the late summer and early fall with the selection of the field plots at Southwest Research Center at Mt. Vernon and the Bradford research and Extension Center in Columbia. At each location, established tall fescue stands were assessed for suitability relative to pH; Bray PI; Bray PII; neutralizable acidity; and other regular soil test components via analysis through the Missouri Soil Testing Laboratory. Those areas that exhibited suitable soil site attributes were fertilized with 100 lbs N/A as well as maintenance P and K via soil test assessment. Plots with dimensions of 10 ft by 25 ft with a 10 ft border were delineated at each location with each treatment replicated 6 times (plot diagrams attached). The early season forage was cut and removed from the established stand, then calcitic and dolomitic limestone treatments were applied at the rates of 0X, 1/2X, 1X, and 2X of the soil test recommendation based on the Woodruff Buffer. Soil test values, fertilizer treatments, and lime applications for plots at each location are provided in the following table.

<u>Parameter</u>	<u>Location</u>	
Soil	<u>Bradford</u> Mexico	<u>Mt Vernon</u> Gerald
	<u>SOIL TEST VALUES</u>	
Phosphorus (lbs/A)	7.6	32.2
Potassium (lbs/A)	150	154
Calcium (lbs/A)	3007	1968
Magnesium (lbs/A)	497.7	158
pH-salt	5.2	5.1
N.A. (meq/100g)	3.8	3.9
CEC (meq/100g)	13.6	9.7
Organic Matter	3.0	2.4
	<u>FERTILIZER AND LIME APPLICATIONS</u>	
N (lbs/A)	100	100
P ₂ O ₅ (lbs/A)	62.5	65
K ₂ O (lbs/A)	225	230
Limestone (1X recommendation)		
Dolomite ENM=467 (T/A)	1.734	1.927
Calcite ENM=417 (T/A)	1.942	2.158

Composite soil samples for each individual plot were collected and archived to provide baseline extractable Aluminum (Al) levels by KCl and LaCl₂ extraction before the treatments were applied and will be used to compare to annual Al levels as the project progresses.

OBJECTIVES FOR YEAR TWO

The objectives of year two will parallel those of the main objectives of the project are to determine: 1.) the influence of calcitic and dolomitic aglime on the release and uptake of "fixed" phosphorus for use by tall fescue and, 2.) the influence of these liming materials on the availability and uptake of magnesium and aluminum for tall fescue. To accomplish these objectives, starting in January, collared leaves will be sampled monthly for calcium (Ca), Magnesium (Mg), Potassium (K), Phosphorus (P), and Al analysis. Additionally, soil samples for each plot will be taken in the summer to assess for Bray PI, Bray PII, pH, total fixed P, exchangeable Mg and Al, and Al speciation by KCl and LaCl₂ extraction. Also, mid-June and fall harvest yields will be taken.

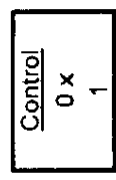
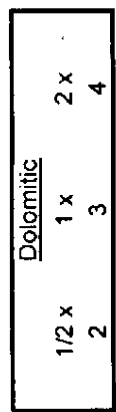
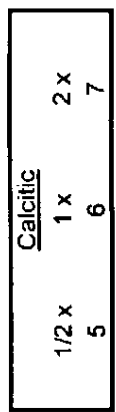
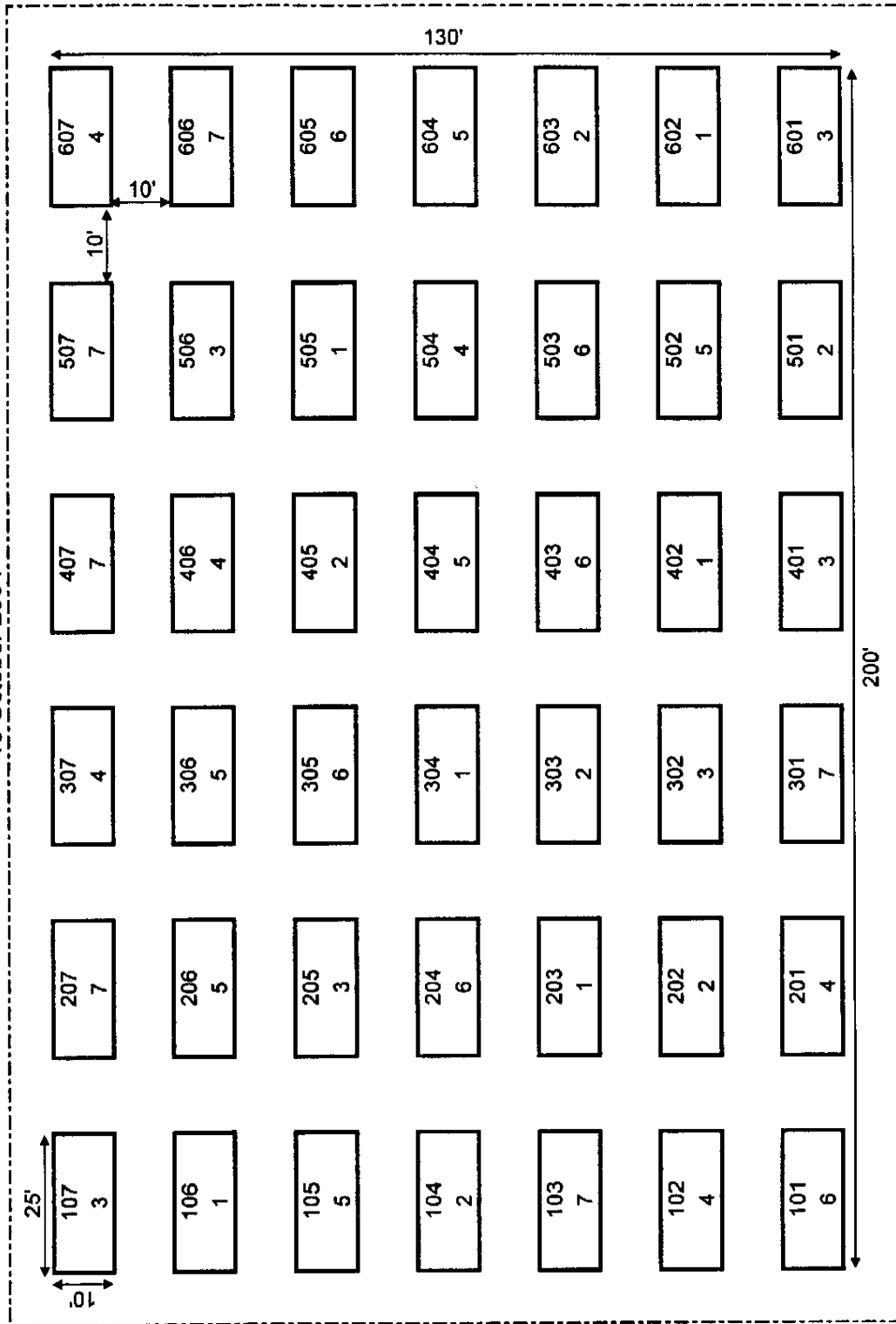
BUDGET

Because the initial field delineation for the plots was somewhat delayed and a graduate student, Elizabeth Hamilton, started on the project in September, the original budgeted monies for 2005 (year 2) and that remaining for 2004 is needed to fulfill the objectives of the project. This carryover of the year one (2004) budget is requested because many of the field sampling and laboratory analyses that were projected to be in late 2004 will now be performed in early 2005 along with many of the major analysis for 2005 which were projected in the original proposal. The total requested for 2005 in the original budget was \$30,325 partitioned as follows: \$18,500 for a 50% Research Assistant with \$4,625 for benefits as well as \$2,000 for part-time student labor, \$4,000 for supplies, and \$1,200 for travel. It is expected that much of the budgeted monies for 2004 such as part-time student labor (\$2,000), supplies (\$4,000), and travel (\$1,200) will be used to provide the analysis and assessment of the soil and plant samples.

Lime Study Plot Layout

Mt. Vernon

15 October 2004



Lime Study Plot Layout

Bradford

5 October 2004

