

Public Abstract

First Name:Sutham

Middle Name:

Last Name:Phurahong

Adviser's First Name:Peter

Adviser's Last Name:Motavalli

Co-Adviser's First Name:

Co-Adviser's Last Name:

Graduation Term:SS 2007

Department:Soil & Atmospheric Science

Degree:MS

Title:USE OF DIFFERENT SOURCES AND RATES OF FOLIAR POTASSIUM WITH GLYPHOSATE TO OVERCOME ENVIRONMENTAL- AND MANAGEMENT-INDUCED K DEFICIENCY IN SOYBEANS

Recently, potassium (K) deficiency in soybean production has been found often in Missouri and other Midwestern states. Some major reasons are the reduced amount of applied K fertilizer to soybean due to low commodity prices, the larger amount of K required by genetically modified crops, and the occurrence of periodic drought and soil compaction in the area. Postemergence application of foliar K fertilizer would have the potential advantage of increased flexibility for growers to respond to K deficiency that may occur during the growing season. The objectives of this research were to determine soybean response to several rates of different foliar K sources mixed with and without glyphosate under different types of soil, soil test K, soil water content, soil compaction and climatic conditions, and to evaluate use of the chlorophyll meter for quickly measuring plant K deficiency in the field.

Soybean growth response was initially assessed in the greenhouse due to applications of five foliar K fertilizer sources at four applications rates (0, 2.2, 9.0, and 17.9 kg K ha<sup>-1</sup>) mixed with or without glyphosate. In addition, the effects of differences in soil water-filled pore space and soil bulk density on soybean response to foliar K fertilization were also determined in the greenhouse. Two field experiments in Northeastern and Southeastern Missouri were also conducted in 2004 and 2005 to study the effects on soybean growth of several foliar K fertilizer sources applied at the V4 stage of development at four rates (0, 2.2, 8.9, and 17.9 kg K ha<sup>-1</sup>) with or without glyphosate.

Minimal leaf injury caused by applications of foliar K fertilizer sources mixed with glyphosate indicated the possibility of tank mixing. Soybean grain yield response to applications of foliar K fertilizers in the field experiments was inconsistent and generally not significant. The level of nutrients in soybean leaf tissue including potassium, phosphorus, magnesium, calcium, boron, zinc, sulfur, iron, and copper were little affected. No correlation between SPAD chlorophyll meter readings and total K content in the plant was found. Therefore, further research is needed to better assess other soil characteristics and environmental conditions affecting soybean response to foliar K fertilization.