

KANSAS SOYBEAN COMMISSION QUARTERLY REPORT OF PROGRESS

Principal Investigators: Sassenrath, G.F. – Southeast Agricultural Research Center
Little, C. – Plant Pathology
Roozeboom, K. – Agronomy
Shoup, D. – Southeast Area Extension Center

Title: “Soybean production systems to control charcoal rot and other soil-borne diseases”

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Department Heads: Lyle Lomas, Gary Pierzynski, John Leslie, J.D. McNutt

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Previous research sponsored by the Kansas Soybean Commission demonstrated that a high-glucosinolate mustard with biofumigant properties (Mighty Mustard Pacific Gold, Johnny’s Select Seed) reduces *M. phaseolina* population levels in soil and in soybean plants. The research in this new proposal builds on the previous results by developing management practices that incorporate use of mustard as a cover crop in soybean production systems, included double-cropped soybeans. The mustard cover crop will be tested for its impact on soil health, fungal disease presence, and soybean growth and yield.

The mustard seed was planted in late March at two locations: Columbus, KS and Ashland Bottoms, KS, when soil temperatures were consistently above 50 F. The mustard seed germinated well

(Figure 1). The mustard grew till bloom, and then was killed with herbicide. Four different treatments were implemented to test the potential impact of mustard biomass on charcoal rot fungus prior to planting the soybean seeds: planting directly into the standing mustard plants; rolling the mustard plants; mowing the mustard plants; and disking the mustard plants. A fifth control plot had no mustard cover crop. All plots were planted with an early maturing cultivar, AG4135.



Figure 1. Mustard growing as a cover crop at Ashland Bottoms to test alternative methods of charcoal rot control. Photo by K. Roozeboom

Soil samples were collected after implementing the cover crop residue management treatments. Second soil samples were taken in the fall at the same time that soybean plant samples were taken at the R7-8 stage. The numbers of colony forming units (CFU’s) will be measured in the plant and soil samples at the Department of Plant Pathology at Kansas State University. Additional samples were used to determine soil microbial activity with the phospholipid fatty acid assay (PLFA). Soybean yields will be measured in each plot at harvest.

A second experiment tested the efficacy of mustard in wheat to control charcoal rot in double-cropped soybeans. Soil and plant samples for that study will be taken when the soybeans are at the R7-8 stage, and number of colony forming units measured. Soybean yield will be measured at maturity.