Affect of Crop Residue on Colonization and Survival of *Phoma sclerotioides*, the Causal Agent of Brown Root Rot of Alfalfa.

Deborah A. Samac[1,2], Carly Miyamoto[2], Jennifer E. Larsen[2], Lorilie Atkinson[3], Charla R. Hollingsworth[3], and Christopher D. Motteberg[3]
[1]USDA-ARS-Plant Science Research Unit; [2]Department of Plant Pathology, University of Minnesota, St. Paul, MN 55108; [3]University of Minnesota Northwest Research and Outreach Center, Crookston, MN 56716

Phoma sclerotioides causes brown root rot (BRR) of alfalfa, and root rot of other perennial legumes and some winter hardy grasses, including winter wheat (Larsen et al., 2007). It can survive as a saprophyte on crop debris so crop residues that support the fungus may increase the amount of inoculum in soil. Current management of BRR is based on crop rotation with spring-sown small grains. We grew seven crop species (alfalfa, canola, corn, oat, soybean, spring wheat, and winter wheat) in the greenhouse in field soil infested with *P. sclerotioides*. Crop debris was incorporated into the top 2 inches of soil and the pots were over wintered outside at two locations (St. Paul and Crookston, MN). In the spring we measured *P. sclerotioides* density in soil using a quantitative PCR assay. In both 2006 and 2007, density of the pathogen was highest in soil from pots with corn, soybean and canola. Density of the pathogen following alfalfa, winter wheat, spring wheat, and oat was similar to the fallow treatment. In separate experiments we measured colonization of stems, leaves, and roots of the same crops plus barley, hairy vetch, and winter rye by *P. sclerotiodes* under controlled conditions using six different isolates of the pathogen. The origin of the isolate, whether from alfalfa, perennial rye or winter wheat, did not affect colonization. A high level of colonization was observed in canola roots and leaf material from spring wheat, winter wheat, winter rye, and corn. Soybean roots supported the lowest amount of colonization. Results suggest that rotation to corn, soybean or canola will not reduce pathogen density on residues for subsequent host plant cultivation. Although colonization of spring wheat leaves was high, results suggest that this does not increase pathogen density in soil.

References

Larsen, J. E., Hollingsworth, C. R., Flor, J., Dornbusch, M. R., Simpson, N. L., and Samac, D. A. 2007. Distribution of *Phoma sclerotioides* on alfalfa and winter wheat crops in the North Central U.S. Plant Dis. 91:551-558.