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Effects of rotation on soybean disease risk

X. B. Yang

Iowa State University, xbyang@iastate.edu

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Effects of rotation on soybean disease risk

Abstract

Rotation is an effective way to manage many soybean diseases because it breaks the disease cycle and lowers the amount of pathogen in a field. In the 2000 growing season in Iowa, several diseases occurred in soybean fields and some were prevalent. Many growers rotated these fields with corn in the 2001 growing season to reduce disease risk. Some growers may have continued planting soybean despite of the occurrence of diseases. These fields would return to soybean in the 2002 growing season.

Keywords

Plant Pathology

Disciplines

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INTEGRATED CROP MANAGEMENT

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Rotation is an effective way to manage many soybean diseases because it breaks the disease cycle and lowers the amount of pathogen in a field. In the 2000 growing season in Iowa, several diseases occurred in soybean fields and some were prevalent. Many growers rotated these fields with corn in the 2001 growing season to reduce disease risk. Some growers may have continued planting soybean despite of the occurrence of diseases. These fields would return to soybean in the 2002 growing season.

I have received questions on how to assess the risk of reoccurrence of certain diseases for infested fields that will return to soybean in the 2002 growing season. See the table for an analysis of the reoccurrence risk of diseases that were prevalent in some soybean fields in the 2000 season in Iowa.

From a disease management perspective, crop rotation generally reduces the amount of fungal pathogens in the soil or in soybean residues, although the impact of rotation varies from fungus to fungus. If soybean planting is continued with a susceptible variety, disease risk increases, except for bean pod mottle virus. For some diseases such as Phytophthora, 1-year corn–soybean rotation has little effect on pathogen survival because the fungus can survive in soil in the absence of soybean.

Tillage practices used in a rotation crop also affect survival of some pathogens. Use of tillage in rotation crop reduces the risk of a disease if its causal agent survives on or in soybean residues, such as frogeye leaf spot and top dieback because tillage increases the decomposition rate of crop residue. If the fungus survives in soil in the absence of a soybean crop, tillage would not accelerate the mortality of pathogenic fungi even if rotation is used.

Effects of 2001 farming practices on risk of 2002 soybean diseases.

	2001 Farming Practices			
Disease in 2000 Season	Rotation	Continuous Soybean	No-Till	Tillage
Bean pod mottle virus	No effect	No effect	No effect	No effect
Sudden death	Unknown	Increase	Unknown	Unknown
Phytophthora	No effect	Increase	Unknown	Reduce

Frogeye leaf spot	Reduce	Increase	No effect	Reduce
Seedling diseases	No effect	Increase	Unknown	Unknown
Top dieback	Reduce	Increase	No effect	Reduce

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