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Changes in disease occurrence in Iowa

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Changes in disease occurrence in Iowa

Abstract

A warm winter this year has generated discussion on the effects of climate on disease occurrence. At the 1998 Iowa State University ICM Conference, we discussed how diseases favored by cool temperatures may become less important, whereas warm-temperature diseases may increase in future years. At this year's ICM Conference, there were numerous comments and questions about new soybean diseases becoming increasingly important to production. Changes in disease occurrence have provided new challenges in disease management practices.

Keywords

Plant Pathology

Disciplines

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INTEGRATED CROP MANAGEMENT

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Although scientists are debating the causes of global warming, one consequence of changing climate is changes in pest occurrence, according to a report by Columbia University, Harvard University, and Iowa State University. For example, bean pod mottle virus of soybean mainly caused damage in southern states before the 1970s, but now this virus has become a major production problem in Iowa. Warmer winters favor the survival of bean leaf beetles, the vectors of bean pod mottle virus.

Range expansion has been reported for other southern diseases, such as southern death syndrome and more recently, frogeye leaf spot. Phomopsis/Diaporthe disease complex also has reemerged as a major production concern in Iowa recently. In contrast, the occurrence of cool-temperature soybean diseases that used to be major production problems, such as brown stem rot and white mold, are less prevalent.



Mottled leaves caused by viral infection.

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In addition to climatic change, changes in diseases also can be the result of farming practices or germplasm, or a combination of climate change, farming practices, and germplasm. If the warming temperatures are a result of a cyclic change in climate, cool-temperature diseases may return.

Changes in disease occurrence will impact disease management practices. It is important to focus on early detection of new disease problems in a crop field. In the past 2 years, Iowa growers have reported severe outbreaks of frogeye leaf spot in fields of 50-70 acres. The pathogen causing this disease can be airborne and it survives in soybean residues in the absence of a soybean crop. Outbreaks of frogeye leaf spot in such large fields indicated that the disease had been introduced in a previous soybean crop and had gone undetected. If the

disease is detected at an early stage, measures can be taken to avoid yield losses.

Changes in diseases also suggest a consideration of using resistant varieties to prevent these new diseases from becoming established in fields. If several diseases, including old and new disease problems, are concerns for a specific field, focus on a disease(s) that was significant in the last soybean crop. The probability of reoccurrence of a fungal disease is determined by weather conditions in a growing season and by the amount of a pathogen carried over from previous seasons. If a fungal disease has not been seen in a field for two soybean crops in soybean-corn rotation, the amount of inoculum in that field would be too low to cause an outbreak even with favorable weather, unless occurrence of the disease was missed in a growing season. If insects are vectors of a disease, such as for bean pod mottle virus or bacterial wilt of corn, the possibility of outbreaks is determined, in part, by the population of the overwintering pathogen-carrying insects.

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[1] <http://www.ent.iastate.edu/imagegal/plantpath/soybean/bpmv/bpmvleaf.html>

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