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Alternatives to tillage for soybean disease management

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Alternatives to tillage for soybean disease management

Abstract

In the 1999 growing season, sudden death syndrome and Phytophthora caused damage in some soybean fields. These fields may return to soybean next year after a 1-year rotation with corn. Often, tillage would be considered as a major management option to reduce disease risk. Because of lack of precipitation this year, use of tillage may not be wise in terms of preserving soil moisture. Other methods should be selected as alternatives for disease management for the following soybean diseases.

Keywords

Plant Pathology

Disciplines

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INTEGRATED CROP MANAGEMENT

Alternatives to tillage for soybean disease management

In the 1999 growing season, sudden death syndrome and Phytophthora caused damage in some soybean fields. These fields may return to soybean next year after a 1-year rotation with corn. Often, tillage would be considered as a major management option to reduce disease risk. Because of lack of precipitation this year, use of tillage may not be wise in terms of preserving soil moisture. Other methods should be selected as alternatives for disease management for the following soybean diseases.

For **sudden death syndrome (SDS)** management, delaying planting can result in a control level similar to that of using tillage. The SDS fungus prefers cool soil for infection. Early planting increases disease risk, which has been the case this growing season. Tillage reduces infection of this disease because it helps increase soil temperature in the planting season. By moving planting dates a week or two after regular early planting dates, effects similar to those of tillage on soil temperatures can be achieved. Another option is to select a variety tolerant to SDS. Information on varieties tolerant to this disease should be available in November.

Phytophthora mainly causes stand establishment problems in Iowa. In fields with high disease risk, tillage is effective to reduce the risk. Alternatives to tillage for managing this disease include the use of seed treatment or selection of resistant varieties. If you have experienced Phytophthora damping-off on varieties with the Rps-1k gene, variety selection would probably not be successful. Seed treatments with Apron should be the choice. If the Rps-1k gene is still effective in your farm, use varieties with this gene.

White mold was a production problem to some producers this growing season in northeastern Iowa. Tillage affects the disease in several ways because the white mold fungus produces sclerotia for overwintering. Sclerotia can survive in deep soil up to 7 years and only sclerotia within 2 inches from soil surface germinate and produce spores to infect soybean. Burying infested residues by mold-board plow can prevent the germination of the sclerotia. However, mold-board plow is a short-term fix and may not be consistent because subsequent cultivation and tillage would bring sclerotia up to the surface. Under no-till, a large portion of the sclerotia germinate under corn planting, which reduces the risk when soybean is planted. Recent research from Iowa State University shows that in long-run, no-till results in a smaller white mold risk compared with conventional tillage.

Soybean cyst nematode cannot be managed by doing tillage. Tillage operations can spread the disease within and between fields. No-till fields are less likely to become infested. Once a field is infested, tillage spreads the nematode around and allows it to reproduce faster. There may be a risk to ridge tillage because SCN populations can build up in the plant rows, which are in the same place year after year. Crop rotation and resistant varieties are the keys for

SCN management.

Bean pod mottle virus has been prevalent in Iowa recently. However, tillage has no effect on this disease because virus-carrying bean leaf beetles overwinter in woody areas and grassland.

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