Tillage alternatives for corn disease management

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Abstract
Now that harvest is coming to a fast close, producers are thinking about fall tillage practices. I have seen quite a few cornfields that have already been chiseled. Fall tillage marks the beginning of disease management practices for 2001. Most disease management tactics are performed before the crop is planted, and include planning for rotation, tillage, and variety selection. The most immediate decision is whether fall tillage is appropriate for managing disease problems.

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Tillage alternatives for corn disease management

Now that harvest is coming to a fast close, producers are thinking about fall tillage practices. I have seen quite a few cornfields that have already been chiseled. Fall tillage marks the beginning of disease management practices for 2001. Most disease management tactics are performed before the crop is planted, and include planning for rotation, tillage, and variety selection. The most immediate decision is whether fall tillage is appropriate for managing disease problems. Although tillage can reduce the risk of certain diseases by burying crop residue, the need for lowering disease risk must be weighed against other factors, such as soil conservation, soil moisture conservation, and production cost-control. In many cases, there are other tactics that can be used to manage residue-born diseases while still using conservation tillage practices.

Many corn and soybean pathogens survive in crop residue, and therefore their populations can be reduced by tillage operations. In buried residue, pathogens must compete with soil microorganisms for use of their food source (the residue), which is often rapidly decomposed. Pathogen survival also is reduced because of direct attack by antagonistic soil microorganisms. On the surface, residue lasts longer, and the pathogens in the residue also last longer. Fall tillage is typically more effective than spring tillage because the residue is buried for a longer duration before planting. Pathogen survival is usually shortest if residue is completely buried. However, partial burying by chopping, diskimg, or chiseling also is beneficial. It is feasible to perform tillage that reduces pathogen survival and still leaves enough residue to retard soil erosion.

This article outlines the effects of tillage on some of the important corn diseases. Check ISU Extension publications for more information on the effects of tillage on specific corn diseases.

Seedling diseases or damping-off

Tillage can reduce these diseases by allowing the soil to warm and dry quickly. Spring tillage is as effective as fall tillage. Zone or ridge-tillage are good options for providing disease control while maintaining residue cover. Planting date also can be adjusted to minimize seedling diseases in fields with extensive residue cover.

Leaf diseases

Tillage reduces the severity of most of these diseases, but the two most prevalent ones in 2000, rust and Stewart’s wilt, are not affected by tillage. For gray leaf spot and eyespot, crop rotation and partially resistant hybrids are helpful in conservation tillage.
Stalk rots

Stalk rot management can be complex, but tillage does not consistently reduce stalk rots. In dry years, tillage can sometimes increase stalk rot problems by increasing moisture stress on the plants. When stalk rots occur as a result of stress from a leaf disease, however, there is a benefit to tillage resulting from the reduced leaf disease severity. See ISU Extension publication IPM 50, Corn Stalk Rots in Iowa, for details on stalk rot management.

Ear rots

Tillage can reduce the occurrence of some ear rots (Gibberella, Diplodia) but not others (Fusarium, Aspergillus). Again, crop rotation and partially resistant hybrids are options. Fusarium ear rot is the most common and it is not affected by rotation and tillage because the airborne spores are common in agricultural fields. Control of second-generation European corn borers is the most important way to reduce Fusarium ear rot in Iowa.

There are many factors that influence tillage decisions, and everyone must decide on priorities for individual fields. In fields that had serious disease problems in 2000, disease management for 2001 should be a high priority. Fall tillage reduces the risk of many diseases in any field, but the disease risks must be weighed against the disadvantages of tillage (such as soil erosion). In many fields, diseases can be well managed by other means, particularly resistance and rotation.

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