Timing tillage for disease control

X. B. Yang
Iowa State University, xbyang@iastate.edu

Follow this and additional works at: http://lib.dr.iastate.edu/cropnews

Part of the Agricultural Science Commons, Agriculture Commons, Agronomy and Crop Sciences Commons, and the Plant Pathology Commons

Recommended Citation
http://lib.dr.iastate.edu/cropnews/1725

The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit https://crops.extension.iastate.edu/.
Timing tillage for disease control

Abstract
This season, Iowa soybean producers have been challenged by several disease problems and some problems may revisit in the next soybean crop if proper management is not applied. Although tillage has been considered a measure to reduce disease risk, not all diseases (for example, viral diseases with insect vectors) are lessened by tillage practices. Effectiveness of tillage in disease control varies depending on the biology of a disease. Knowing how tillage affects the occurrence of a disease can help minimize tillage efforts and achieve maximum control. This article discusses effects and timing of tillage measures for major soybean diseases this past growing season.

Keywords
Plant Pathology

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Plant Pathology
Timing tillage for disease control

This season, Iowa soybean producers have been challenged by several disease problems and some problems may revisit in the next soybean crop if proper management is not applied. Although tillage has been considered a measure to reduce disease risk, not all diseases (for example, viral diseases with insect vectors) are lessened by tillage practices. Effectiveness of tillage in disease control varies depending on the biology of a disease. Knowing how tillage affects the occurrence of a disease can help minimize tillage efforts and achieve maximum control. This article discusses effects and timing of tillage measures for major soybean diseases this past growing season.

Tillage effects

Tillage reduces disease risk mainly by

1. reducing disease inoculum by destroying infested residues,
2. physically separating a pathogen from soybean plants by burying the pathogen deep in soil, and
3. changing the soil conditions (for example, increasing temperature and reducing moisture).

Efficacy of each of effect depends on the biology of a disease and the timing of tillage application. Table 1 lists how tillage affects the major soybean diseases that occurred in the 2002 growing season.

Tillage is very effective in reducing risks of the foliar diseases frogeye leaf spot, Phomopsis, and Cercospora leaf spot (also called purple seed stain). Pathogens of these diseases have to survive on infested residues in the absence of soybean crops. Tillage helps decompose infested residues. The earlier a tillage operation is made, the more the pathogen population decreases. Operations after harvest of infested soybean crops provide better control than those made after rotating with corn if a 1-year corn-soybean rotation scheme is used.

Frogeye leaf spot caused by *Cercospora sojina*.
Tip blight caused by *Phomopsis*.

For sudden death syndrome (SDS), tillage or rotation with corn has no effect on pathogen survival. SDS pathogen infects seedlings when soil temperature is low and moisture is high. Tillage reduces disease risk by increasing the soil temperature and reducing moisture early in the season when infections take place. Therefore, tillage after corn rotation provides better control than operation right after harvest of an infested soybean crop for soybean-corn rotation.

*Phytophthora* does not have to survive on infested residues in the absence of soybean, although tillage can reduce pathogen density. However, the fungus survives in soil as oospores, one of which can produce numerous zoospores to infect soybean plants. Tillage reduces the risk of this disease mainly by separating the pathogen from soybean plants and by reducing soil moisture. Tillage right after harvest of an infested soybean crop may not be better than the one made after rotation with corn in terms of separating the fungus from soybean plants and reducing soil moisture.

Finally, there is no need to work on the entire field if a disease occurred only in portions of a field. Limited tillage on problematic areas instead of entire fields should be considered to reduce soil erosion and save energy.

**Table 1. Effect of tillage on soybean disease risk.**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Reduce Pathogen</th>
<th>Physical Separation</th>
<th>Via Soil Conditions</th>
<th>Tillage Effectiveness</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral diseases</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td>Frogeye leaf spot</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>After tdis harvest</td>
</tr>
<tr>
<td>Cercospora leaf spot</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>After tdis harvest</td>
</tr>
<tr>
<td>Phomopsis diseases</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>After tdis harvest</td>
</tr>
<tr>
<td>Sudden death</td>
<td>No</td>
<td>Unknown</td>
<td>Yes</td>
<td>Yes</td>
<td>After next corn</td>
</tr>
<tr>
<td>Phytophthora</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>After next corn</td>
</tr>
</tbody>
</table>
NA, not applicable.

This article originally appeared on pages 184-185 of the IC-488(22) -- October 21, 2002 issue.

Source URL:

Links: