



Will Spring Tillage Help Me Reduce Disease in my Corn Field?

I have disease pressure in my continuous corn field. Will tilling under the residue prevent disease from spreading to nearby fields?

Some foliar corn diseases are reduced with tillage. However, disease inoculum builds when susceptible crops are planted in consecutive years. Allowing two to three years between susceptible hosts should give debris adequate weathering to decrease the viability of inoculum to cause disease.¹

Gibberella zeae is a corn ear rot fungus known to spread greater distances from the source of inoculum when abundant amounts of residue are present.² Acres already planned for corn after corn should use seed products with resistance to disease and protect young seedlings with seed treatment. In the case of *Gibberella*, even a small amount of residue can be the source of inoculum and result in significant disease spread with favorable environmental conditions.

The soil in my field with conservation tillage stays cool in the spring. Will that increase corn seedling diseases?

Whether caused by cold spring rains, snow melt, a mat of weeds, or crop residue, cool and wet soils can delay seedling growth. Slow-growing seedlings are exposed to soil-borne diseases for a longer period which increases their risk for disease. Seed treatments should be used consistently, along with hybrids tolerant to the diseases present.

Compared to neighboring conventionally tilled fields, I've seen an increase in foliar corn disease in my no-till fields. What management options do I have?

- Conservation tillage helps limit erosion and promotes soil health, but effective pest management in these fields can be difficult.

- No-till fields were reported to have higher levels of gray leaf spot compared to fields with any form of reduced tillage.³
- Surface residue has also been reported as leading to earlier and more severe infections of northern corn leaf blight (NCLB), southern leaf blight, and yellow blight.³
- Additional research on northern corn leaf blight severity evaluated the effect of (1) ridge-tillage: planting on a tillage ridge from the previous crop, (2) mulch-tillage: fall and spring cultivation – no moldboard plow, and (3) no-tillage management. Greater yields in ridge- and mulch-tillage plots were attributed to their lower northern corn leaf blight levels compared to the no-till plots.³ Although ridge-tillage leaves similar amounts of residue on the soil surface over winter, the use of furrow-openers on the planter are believed to reduce initial inoculum and early-onset of NCLB plant infections.

Corn diseases, including foliar pathogens, can be managed over the course of the growing season.

- Start by selecting seed products tolerant to disease and insects present in the field.
- Adjust planting equipment in the spring to clear debris, and plant into warm soil.
- Rotate crops with non-hosts and non-susceptible corn products.
- Scout and keep record of pest and disease hot spots.

Investing more time on disease management can save a grower expense and time. For example, conservation tillage corn fields may be more prone to eyespot, but this disease is usually rare and can be treated with in-season fungicide.¹

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I used primary tillage last fall to size and bury residue in a field with heavy Anthracnose pressure. Will that get rid of disease inoculum fast enough?

Anthracnose (*Colletotrichum graminicola*) survives on corn residue between seasons but competes poorly with other soil organisms.⁴ A North Carolina study showed *C. graminicola* was reduced to undetectable levels three months after corn stalk burial. Alternatively, leaving residue above the soil surface allowed *C. graminicola* to survive 10 months.⁵ Residue tilled and exposed to environmental conditions favoring rapid decomposition could reduce disease inoculum levels before planting. Consider soil temperature, moisture, and percent of residue left on the soil surface when assessing the effectiveness of residue burial for disease management.

Whether Anthracnose infection appeared as leaf blight or stalk rot may be the bigger question regarding tillage for management of this disease. Anthracnose stalk rot is not necessarily a result of leaf blight.⁴ Stalk rots regularly occur in response to plant stress during grain fill. While tillage may reduce the presence of *C. graminicola*, the right environmental conditions and a susceptible host could still increase incidence of stalk rots late in the growing season in the absence of foliar symptoms.

My corn field has a history of crown rot. Is that a disease I can reduce with tillage?

Crown rots are often caused by *Fusarium* species of fungi. Prevalent *Fusarium* species vary depending on environment. A study demonstrated that fall plowing resulted in increased *Fusarium* stalk rot compared to no-tillage.⁶ Because those results were attributed to rainfall, farmers should still consider between-row cultivation a crown rot management practice. Early in the growing season, stunted plants with living crowns can have soil built around crowns by utilizing between-row tillage to promote nodal root growth.⁷ Eliminate other early-season stresses where possible to protect plants from *Fusarium* infections.

I have compaction and drainage issues in my field, so I always prepare for planting with spring tillage to dry things out. Should I change this practice?

Poorly-drained soils often create seedbed environments that restrict root growth and cause poor seedling health. Compacted soils lack pore spaces necessary for water, nutrients, and root growth. Seedlings struggling in this environment are susceptible to early-season diseases. Even if corn stand counts show adequate emergence, diseases—especially crown rots, can infect early and show symptoms after pollination.

Soil compaction is not easily corrected. Avoiding further compaction by reducing traffic on soils at field capacity can help limit compaction. Spring is not the best time to alleviate deep compaction (deeper than 8 inches) with tools. However, cover crops like oilseed radishes have successfully broken through plow pans and compaction layers with their deep roots. Perennial crops like alfalfa are also good choices to alleviate compaction and break the disease cycle.⁸

Sources

¹ 2014. Corn tillage systems. University of Wisconsin Extension. <http://corn.agronomy.wisc.edu/Management/L007.aspx#Pest%20Control>.

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³ Pedersen, W.L. and Oldham, M.G. 1992. Effect of three tillage practices on development of northern corn leaf blight (*Exserohilum turcicum*) under continuous corn. *Plant Disease*. Vol. 76. Pgs. 1161-1164.

⁴ Jirak-Peterson, J.C. and Esker, P.D. 2011. Tillage, crop rotation, and hybrid effects on residue and corn anthracnose occurrence in Wisconsin. *Plant Disease*. Vol. 95. Pgs. 601-610.

⁵ Naylor, V.D. and Leonard, K.J. 1977. Survival of *Colletotrichum graminicola* in infected corn stalks in North Carolina. *Plant Disease Reporter*. Vol. 61. Pgs. 382-383.

⁶ Lipps, P.E. and Deep, I.W. 1991. Influence of tillage and crop rotation on yield, stalk rot, and recovery of *Fusarium* and *Trichoderma* spp. from corn. *Plant Disease*. Vol. 75. Pgs. 828-833.

⁷ Munkvold, G.P. 2002. Crown rot symptoms common in corn. Iowa State University. Integrated Crop Management News. 1720.

⁸ Wortmann, C.S. and Jasa, P.J. 2009. Management to minimize and reduce soil compaction. University of Nebraska - Lincoln 6896 <https://extensionpublications.unl.edu/assets/html/g896/build/g896.htm>.

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Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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