

Disease Management with Fungicides for Corn and Soybean

Fungicides should be properly timed based on crop growth stage and potential for disease development.

What to Consider

Application of a fungicide could reduce foliar diseases depending on corn and soybean product resistance and disease pressure. The development and effectiveness of chemistries with multiple modes of action has contributed to the increased use of fungicides in corn and soybean. The Strobilurin fungicides are effective at controlling multiple diseases, are locally systemic, and have the ability to block spore germination and host penetration when applied prior to disease establishment. Triazoles are also broad spectrum fungicides with xylem (upward) movement and are able to inhibit cell membrane synthesis of the pathogen.

Contributing Factors in Corn

- Products susceptible or moderately susceptible to diseases should be monitored before tasseling.
- Because many foliar diseases survive on corn residue and begin producing spores when wet weather favors disease development, scouting fields in a continuous corn rotation is important, as well as scouting no-till or reduced tillage fields.
- Fields with greater than 35 percent residue and with a history of foliar disease should be scouted.¹
- Moderate temperatures and humid weather conditions at vegetative growth stages and during grain fill can increase common rust and northern corn leaf blight.
- Warm and humid weather favors gray leaf spot, and Southern rust and other fungal diseases that can be managed with fungicides.

Table 1. Factors that increase risk for disease development in corn and soybean.

Corn	Soybean
Susceptible corn product	Susceptible or early maturing product
Disease activity prior to and at tasseling	Disease activity in field
Disease-favorable weather	Disease-favorable weather
Irrigation	Irrigation
Field history of disease and lodging	Historical disease problems in field
Late planting	Early planting
High plant population and/or yield potential	Dense crop canopy; high yield potential
Continuous corn, no-till corn	Continuous soybean, especially in no-till systems

Source: Hershman, D.E., Vincelli, P., and Kaiser, C.A. 2011. Foliar fungicide use in corn and soybean. University of Kentucky. PPFS-GEN-12.

Scouting. Fungicides may work better at preventing rather than curing disease. Some lesions can take up to two weeks to become visible after infection. Therefore, scouting when weather conditions favor disease development is important.

Fungicides are generally considered effective for 21 days for two reasons:

- 1) fungicides degrade or are lost from leaf surfaces and
- 2) new unprotected leaf growth occurs after application.²

For these reasons, timing is important to help maximize potential activity of the fungicide. If fungicide application is warranted, generally the greatest benefit comes from a single application at tasseling (VT) through silking (R1) growth stages.² Always read and follow label directions.

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Scouting for lesions at stages early enough to prevent substantial infection of ear leaves helps establish timing for an economical fungicide treatment. The ear leaf and leaves higher on corn plants should be protected from disease because they contribute the most energy supplied during grain fill.¹ A general disease treatment guideline may be to spray when disease symptoms have developed on the third leaf below the ear leaf, or on leaves above that, on 50 percent of the plants during the tasseling stage.³

Contributing Factors in Soybeans

- Anthracnose, Cercospora leaf blight, brown spot, frogeye leaf spot, and soybean rust may be managed with a timely fungicide treatment.
- Depending on disease and weather conditions, a relatively early fungicide application at R2.5 (full flower) growth stage may have yield benefit over fungicide applications at R4 (full pod) growth stage.⁴

Fungicide applications for white mold or sclerotinia stem rot requires different timing as infection first occurs at R1 growth

stage, or the initiation of flowering. Therefore, an additional application may be necessary at a later growth stage to control other fungal pathogens. Fungicide applications made prior to the R1 (beginning flower) growth stage, or after the R6 (full seed) growth stage are often not economical.⁵ Uncontrolled disease can lead to potential yield loss from premature leaf drop.⁶

Weather conditions can also help guide fungicide timing in soybean. Response from fungicide treatments are most often beneficial in the absence of host resistance and when conditions favor disease development are anticipated at R3 growth stage. Subsequent fungicide applications may be needed in environments with high disease pressure.

Summary

Foliar fungicides may be warranted with high disease pressure, stressful conditions, and susceptible seed products. Scouting fields for crop growth stage and disease symptoms is important as crops get closer to reproductive growth stages. Protection of leaf area is important for maintaining yield potential.



Figure 1. Soybean plant during full flower (R2) growth stage.

Figure 2. Soybean plant during beginning pod (R3) growth stage.

Figure 3. Soybean pods during the full pod (R4) growth stage.

Photos used with permission from Iowa State University Extension and Outreach from the publication *Soybean Growth and Development*, PM 1945. Original publication date: 2004

Sources:

¹ Mueller, D. and Roberston, A. 2008. Preventative vs. curative fungicides. Iowa State University. Integrated Crop Management News.

² Hershman, D.E., Vincelli, P., and Kaiser, C.A. 2011. Foliar fungicide use in corn and soybean. University of Kentucky. PPFS-GEN-12.

³ Robertson, A., Abendroth, L., and Elmore, R. 2007. Yield responsiveness of corn to foliar fungicide application in Iowa. www.agronext.iastate.edu.

⁴ Bohner, H. 2014. What is the correct time to apply foliar fungicides to soybeans? Crop Talk. www.omafra.gov.on.ca.

⁵ Mueller, D., Robertson, A., and Pedersen, P. 2006. Asian soybean rust management strategies. Iowa State University. PM2028.

⁶ Navi, S.S. 2014. Efficacy tests of foliar fungicides on soybean diseases and yield during 2012 and 2013 growing seasons in Northeast Iowa. Iowa State University.

Web sources verified 4/17/18

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