Can Fungicides Help Manage Soybean Diseases?

(Northern Growing Regions)

Fungicides can be an extremely useful tool to protect soybean yield potential from fungal pathogens. However, determining when an application is warranted can be a difficult decision to make.

// What factors contribute to soybean disease risk?

The response to a foliar fungicide treatment will vary depending upon the presence of conditions that favor disease development and the susceptibility of the product, the effectiveness of the fungicide for managing the diseases, and the economic return comparing yield differences and costs of application. The higher the disease pressure, the more likely there will be an economic response to treatment. The disease triangle describes the three factors that are needed for disease to develop (Figure 1).

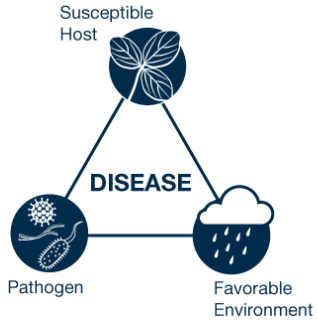

Figure 1. Disease only occurs when the pathogen is present with a susceptible host and the environment favors disease. The amount of time spent in conditions favorable for disease determines the severity of disease.

Soybean products - Soybean products can vary in their response to diseases like Septoria brown spot, Cercospora leaf blight, frogeye leaf spot, and white mold. When possible, especially on fields with a history of these diseases, resistant soybean products should be selected. Field history, crop rotation sequence, soybean product susceptibility, and scouting should all be used to help determine the need for a fungicide application.

Environmental conditions - Humid and wet conditions are most favorable for the development of disease. However, anytime soybean leaves are wet over an extended period, the plant is more vulnerable to diseases favored by these conditions. Irrigation can also increase the risk of disease.

Pathogen - Many pathogens overwinter in soybean stubble so continuous soybean cropping (especially with no-till practices) can create a conducive environment for disease inoculum to build up. When growing continuous soybeans, be aware of diseases present in the previous year and manage accordingly.

// What diseases are controlled by fungicides?

Before using a foliar fungicide, it is important to scout and determine the types of diseases present, as only fungal pathogens can be controlled by a fungicide and a fungicide that is effective against one fungal disease may not be effective against another fungal disease. Foliar fungicides help manage diseases such as anthracnose, Septoria brown spot, Cercospora leaf blight, and frogeye leaf spot, as well as others. Bacterial diseases, such as bacterial blight, and viral diseases are not controlled by fungicides.

Several fungal diseases are also not well-controlled by foliar fungicides due to the time of infection or where it occurs in the plant. For example, charcoal rot and sudden death syndrome can cause severe yield losses, but because infection occurs in the roots, foliar fungicides are not effective. White mold is another disease that requires precise timing for control by a fungicide.

// What is the best application timing for fungicide in soybean?

Weather conditions can help determine proper fungicide application timing in soybean. Response from a fungicide treatment may be best when conditions favor disease development and the soybean product is susceptible. If this type of environment is anticipated at the R3 growth stage, treatment with a fungicide may be warranted. Fungicide applications in soybeans are generally not needed in the early vegetative growth stages (VE through V6). Fungicide applications for late-season diseases are generally made between R3 and R5 (pod development stages). The pod-set through seed-fill stages (R3 through R6) are the most critical period to protect seed yield. Leaf loss can significantly reduce yield if diseases attack during early seed filling. Spraying fungicides after R6 is generally no longer necessary and not recommended. The length of time foliar fungicides are active ranges from 14 to 21 days. Delaro® is a recommended foliar fungicide available for

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soybeans. For more information about Delaro, please visit https://www.cropscience.bayer.us/products/fungicides/delaro/ and contact your retailer. The ideal application window for applying a fungicide is between the growth stages R2 and R5 (Figure 2). More than one fungicide application may be needed in environments with high disease pressure.

// What should be considered when deciding if a fungicide should be applied?

To determine if a fungicide application is warranted, consider the yield potential, soybean growth stage, the potential for additional development of disease, fungicide application cost, and the commodity price of soybean grain.

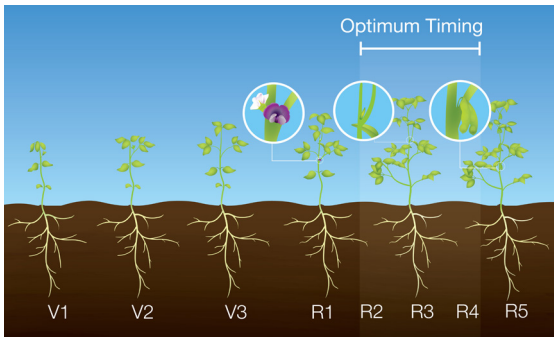

Figure 2. Soybean foliar fungicide application timing.

Certain field environments may lead to conditions that promote disease development and fungicide applications may be beneficial. Fields that are irrigated, have a history of disease, utilize continuous no-till production, have heavy dew, are protected from wind, and have little air circulation will often benefit from treatment with a fungicide. The important thing to remember is that fungicides are just another tool in the toolbox to be used as needed. Over-use of fungicides, particularly ones with the same mode of action, can lead to the development of disease resistance in pathogen populations.

// Should I also apply an insecticide at the same time as a fungicide application?

Disease and insect pressure vary by year and location. Insecticide applications to soybeans have also increased in recent years due to the presence of soybean aphid throughout most of the northern growing regions. Although tank mixing products is efficient from an application standpoint, precise timing is usually required for optimum effectiveness of one or both spray components. The application (spray) parameters, spray pressure (PSI), and volume (gallons per acre) for fungicides may also be different from those used for insecticide applications.

// What steps should I take to manage fungicide resistance?

Fungicide resistance prevention should also be considered in treatment decisions. The strobilurin class of fungicides, although very effective at controlling many diseases, is considered at high risk for resistance development in fungal species. Strobilurin resistance has already been documented in fungal species in other crops, and has recently been discovered in frogeye leaf spot in soybeans. Widespread indiscriminate use of fungicides increases the selection pressure on fungal pathogens, which can accelerate the development of resistance. Other disease management practices, such as crop rotation and planting resistant soybean products, should be used with fungicides with different modes of action as tools for effective soybean disease management.

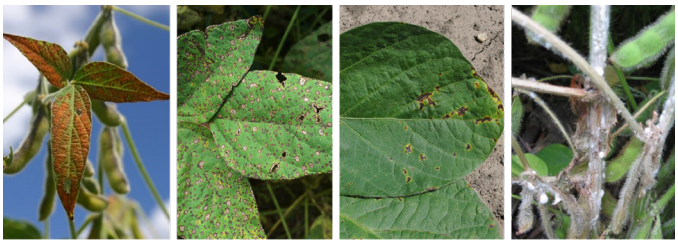

Figure 3. Disease symptoms of Cercospora leaf blight, frogeye leaf spot, Septoria brown spot, and white mold (Septoria brown spot image courtesy of Darin Eastburn, University of Illinois).

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(Sources Verified 7/10/19)

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