FROGEYE LEAF SPOT

Soybean Diseases






Overview

Frogeye Leaf Spot (FLS) is the most important foliar disease of soybean, especially in the southern U.S. The disease has been occurring more frequently in northern soybean-growing areas and has increasingly suppressed soybean yields in the northern U.S. in recent years.

FLS is caused by the fungus *Cercospora sojina*. Young soybean leaves are most susceptible, while older leaves tend to be more resistant. Leaf symptoms are first noticeable after plants begin to bloom. Infection occurs during warm, humid weather with cloudy days and frequent rain. When these conditions persist, infection can spread from leaves to pods, seeds, and stems.

The pathogen survives between growing seasons on soybean residue in the field and can survive on seeds in storage. When planted, infected seed may give rise to infected seedlings.

Scouting

Scout for FLS when soybean plants begin to bloom. Scout in at least one area for each 10 acres of the field. Disease incidence and severity can be highly variable from field to field,

and even within a field, due to environmental conditions. For example, disease will likely be more severe on the west side of a north-south oriented fence row with tall trees or wooded area because the trees provide early morning shade that can increase the amount of drying time for leaves wetted by dew, rain, or overhead irrigation.

Symptoms

- FLS appears as circular, tan to gray spots on the leaves, surrounded by very pronounced dark purple margins. They are most often the size of the end of a pencil eraser, about ¼ inch in diameter. Smaller lesions can coalesce into larger lesions.
- When disease pressure is high on susceptible varieties, spots can also be found on the stems, pods, and seeds. Lesions on pods are circular to elongate and slightly sunken, with a reddish-brown color. As pod lesions age, they become brown to light gray with narrow dark-brown borders. The pathogen can penetrate through the pod wall and infect the developing seeds.
- Symptoms on seeds appear as conspicuous light to dark gray or brown areas that can range from specks to large blotches covering the entire seed coat, and the seed coat may crack or flake.

Management

Assessing the risks:

- Frogeye Leaf Spot develops and spreads during warm, cloudy, humid weather when rain is frequent. Spores (called conidia) are carried by wind or rain and the disease can spread rapidly under these conditions. This disease will be rare when the weather is dry and hot.
- Young expanding leaves are highly susceptible while fully expanded leaves are more resistant to infection. Even with artificial inoculation under ideal conditions, lesions seldom develop on fully expanded leaves.
- The frogeye leaf spot pathogen survives in infected seeds or in soybean residue. The fungus can survive in soybean residue until the residue completely decomposes.
- Seed infection is common. The germination rate of infected seed may be reduced, and the resulting seedlings are usually weak. Spores produced on the cotyledons of infected seedlings are the main source of inoculum for the leaf phase of the disease.

The disease is best managed using varieties with the Rcs 3 source of resistance, which has maintained its effectiveness against currently known U.S populations of *C. sojina*.

In fields where very high levels of disease develop, burying residue and/or using crop rotation become very important. *C. sojina* is known to overwinter in some North Central

states and planting soybeans back into infested residue increases the chance of an epidemic occurring the following season if environmental conditions are favorable. Where tillage is used, residue should be fully buried.

If residue cannot be buried, then rotating out of soybean for at least two years will help reduce risk. It is not yet known how many years the pathogen can survive on residue, but soybeans should not be planted for at least one year and then a resistant variety should be used.

When FLS lesions are found on plants prior to growth stage R3, fungicide applications may be useful on susceptible varieties, however, specific thresholds have not been set. Fungicide efficacy is entirely dependent on the occurrence of weather conditions that continue to favor infection and lesion development.

Fungicides
Research has shown that the FLS pathogen can begin to develop resistance to Group 11 strobilurin fungicides (QoI) after just a single application. Group 3 triazole (DMI) type fungicides alone or in combination with a strobilurin fungicide should be used. See Fungicide Efficacy for Control of Soybean Foliar Diseases for the latest product and efficacy ratings for FLS management. Fungicide applications are most effective when made during the R3 to R5 growth stages.

Distribution

Frogeye Leaf Spot, *Crop Protection Network*, CPN 1017, 2016,

Frogeye Leaf Spot (video), University of Tennessee

Frogeye Leaf Spot Identification and Management (video), University of Nebraska

Fungicide Efficacy for Control of Soybean Foliar Diseases, *Crop Protection Network*, CPN-1019, updated annually

Resources

An Overview of Frogeye Leaf Spot
Crop Protection Network
https://cropprotectionnetwork.org/publications/an-overview-of-frogeye-leaf-spot

Frogeye Leaf Spot
Purdue University, 2006

https://soybeanresearchinfo.com/wp-content/uploads/2019/03/frogeye_purdue.pdf

Frogeye Leaf Spot
University of Wisconsin
https://fyi.extension.wisc.edu/fieldcroppathology/soybean_pests_diseases/frogeye-leaf-spot/

Frogeye Leaf Spot
University of Minnesota, 2018
https://extension.umn.edu/pest-management/frogeye-leaf-spot-soybean

Frogeye Leaf Spot of Soybean
Ohio State University, 2010
https://ohioline.osu.edu/factsheet/AC-53

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