

INTEGRATED CROP MANAGEMENT

Fungicide resistance and race test for *Phytophthora*

The *Phytophthora* fungi undergo changes when production practices are used against them for a long time. These changes can sometimes make current control measures ineffective. Recently, there are two types of changes to be aware of in *Phytophthora*: 1) effectiveness of fungicide treatments, and 2) race shift, which often is followed by producers asking, What new races occur in my soybean fields? This article addresses these issues.

Fungicide resistance

Ineffectiveness of a chemical treatment can be due to common causes such as a lower rate or incorrect application of the chemical to seeds. Another possibility is new resistance of the fungus to the chemical if the fungicide has been used in fields for a long time. Some observations from other states indicate that *Phytophthora* may have developed resistance to metalaxyl, a fungicide that has been used to control *Phytophthora* for decades. Resistance of *Phytophthora* to this chemical has been reported in other crops. Currently, plant pathologists in the north central states are investigating how widespread resistance may be in soybean production.

If you are a long-time metalaxyl user and are noticing ineffectiveness of your fungicide applications, you may encounter fungicide-resistant *Phytophthora* after excluding other possible causes. To manage this problem, consider the use of other chemicals such as mefenoxam, a relatively new chemical for *Phytophthora* control.

Race test

The Rps-1k gene has been used for a long time to manage *Phytophthora*, and changes in populations of the fungus have been found in many fields because this gene is no longer effective.

Recently, some sources suggest testing *Phytophthora* races in a field that has a *Phytophthora* problem and there are requests from producers to test races. However, it is impractical to test *Phytophthora* races when your soybean had *Phytophthora* problems because available race testing procedures are not designed for field diagnosis. Such procedures take several months to complete because there are many steps in the test: isolation of the fungus from soil and plants, purification of the fungus, increasing the amount of inoculum, and challenging the plants with the fungus in a greenhouse. Each step is a separate experiment that must be conducted in the laboratory or greenhouse, making the test for individual production fields unrealistically costly.

Practically, if you find severe *Phytophthora* infection in a field with Rps-1k soybean plants, the infection already means that this gene is no longer effective in that field. Other measures should be taken. One recommendation is to use seed treatment together with the selection of a variety with very good tolerance. Seed treatment can protect the plants from Phytophthra attacks in the seedling phase and reduce root rot risk after the seedling stage.

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