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Use of strobilurins in Iowa

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Use of strobilurins in Iowa

Abstract

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Keywords

Agronomy, Plant Pathology

Disciplines

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Use of strobilurins in Iowa

by *Palle Pedersen, Department of Agronomy*

Iowa isn't a state where we see a lot of foliar pathogens. Every year we see foliar pathogens in soybeans; however, many of these diseases typically have minimal or uneconomic impacts on yield. For that reason, use of foliar fungicides hasn't been necessary in Iowa. The recent discovery of Asian soybean rust, a potential threat to soybean producers in the United States, has increased the interest of using foliar fungicides as a preventive control method for managing Asian soybean rust.

Strobilurins are a fungicide group with a preventive mode of action frequently used worldwide. Strobilurins are produced by several basidiomycetes and belong to the E-beta-methoxyacrylate group of antibiotics and inhibit mitochondrial respiration by blocking electron transfer at the cytochrome-bc1 complex. In addition to its direct effect on the fungus, it has been found to induce nonfungicidal physiological changes in wheat and tobacco, including darker green appearance of the leaves, delayed leaf senescence, increased stress tolerance, plant biomass, and grain yield. The higher yields in crops that result from the use of strobilurins in absence of disease were attributed to the ability of strobilurins to increase nitrate reductase in the plant.

The possibility of an Asian soybean rust epidemic in Iowa, or major crop loss from another foliar disease, is a direct threat to the Iowa farmer. Although many soybean producers in the state believe that applying strobilurins in the absence of foliar diseases will safeguard against crop loss, it is not known if this application is necessary or more important, if it is profitable. In a normal growing season, Iowa does not experience foliar diseases that cause major or significant yield loss. At this time, soybean producers are looking for ways to protect their crop from Asian soybean rust and other diseases that are moving north, while also improving plant health and yields. Strobilurins seem to be the choice for a fungicide; it is known from use with other crops, such as wheat and tobacco, that they could improve seed fill, which will improve grain composition and yield. Little information, however, exists on the use of strobilurins on soybean, but application of strobilurins on soybean may increase yield and grain composition in the absence of foliar diseases.

Research was therefore initiated in Iowa in 2005 to investigate the use of strobilurins on soybean in the absence of foliar disease. Four varieties and different fungicide treatments were applied at R1, R3, and R5 in a replicated trial. A few foliar pathogens were observed at low severity with the most predominant one being bacterial blight, which cannot be managed using a fungicide, and Septoria brown spot. Fungicide treatments did not

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influence grain yield, grain composition, or any other variables measured except seed size, when a strobilurin was applied at R3. Two similar experiments were conducted in 2004; one resulted in a significant yield increase with the use of a fungicide.

Based on the last two years of research in Iowa, consistent yield increases haven't been found using foliar fungicides, and we haven't been able to measure any physiological differences on soybean using a strobilurin in absence of disease either. There have been cases where we have seen an increase in seed size, but that hasn't contributed to an increase in yield since the seed number was then reduced. Most of us have seen visual differences in the field after application of a fungicide because the sprayed areas are darker in color than the nonsprayed areas. However, the visual color difference doesn't mean higher yields. Many did a strip trial on their farm in 2005, and based on my knowledge, the average yield increase was approximately 2-3 bu/acre, which wouldn't have paid for the product and the application. Inconsistency exists, however, and there is much to learn on the use of fungicides and how they fit into our production system in Iowa. Research will continue in 2006 on the use of fungicides in Iowa.

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