

Fungicide Resistance: Will It Happen In Corn Diseases?

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The simple answer: Almost certainly, it will happen. No one knows where or when it will happen, or how damaging it will be. However, the elements are in place for it to happen sooner or later. Some relevant facts:

- The best fungicides are also prone to resistance. The best fungicides against gray leaf spot and northern leaf blight are the strobilurin fungicides (also called “Q₀I fungicides”). This family of fungicides includes Headline®, Quadris®, and Evito®, as well as premixes that contain a strobilurin, such as Quilt®, Stratego®, Avaris®, and Headline® AMP. Unfortunately, strobilurin fungicides are known throughout the world as being prone to resistance development, and year after year, we see new cases of strobilurin resistance in the U.S. and around the world. The first case of resistance to strobilurin fungicides in Kentucky occurred eleven years ago, when a very destructive outbreak of a turfgrass disease caused severe damage to a “high-end” golf course in Lexington. Last year, Dr. Carl Bradley (University of Illinois) documented resistance to strobilurin fungicides in *Cercospora sojina*, the cause of frogeye leaf spot in soybean. He found resistant isolates in several states, including Kentucky. The other family of fungicides used commonly on corn is the *DMI fungicides* (also called “triazoles”). For decades, scientists have watched as fungi all over the world become incrementally more and more resistant to these fungicides. We’ve seen cases of DMI resistance in Kentucky, also.

- Fungicide use on the farm selects for resistance. Every time a producer sprays a strobilurin fungicide or a DMI fungicide, this puts selection pressure towards resistance. Every time. I’m not saying a catastrophe is looming. What I am saying is that every application of a strobilurin or a DMI moves the producer closer to the day when the resistant fungus is widespread and damaging in that field. It may happen this season; it may happen in 20 years. But every application moves that day closer and closer. In the opinion of most university pathologists, this is true even for the “plant health” applications. Even if disease levels are below threshold, some disease activity is usually pres-

ent in a field, so a fungicide application imposes selection pressure towards resistance even though the disease is present at levels too low to cause yield loss.

- The gray leaf spot fungus is closely related to other fungicide-resistant fungi. Gray leaf spot is caused by *Cercospora zea-maydis*. *Cercospora* fungi have a well-known history of developing resistance (sometimes very quickly) to a variety of fungicides on numerous crops. The latest Kentucky example was mentioned above: resistance to strobilurin fungicides in *Cercospora sojina*, the cause of frogeye leaf spot in soybean. Not only do *Cercospora* fungi seem to adapt to fungicides, but they are also wind-dispersed. So if your neighbor’s field develops resistance, those spores will easily make it to your field and beyond.

- Southern corn rust is a “promiscuous” disease. Because of the destructive nature of this disease, producers deep in the South understandably often use strobilurin and/or DMI fungicides. But that fungus doesn’t stay there: it blows northward on weather systems, so our inoculum in Kentucky has its origin in farms deep in the South, where it overwinters. So any fungicide resistance that develops in regions with heavy fungicide use may spread quickly to our part of the country.

So the risk for fungicide resistance in important corn diseases is quite real.

What can producers do about this? Some may not like this answer, but it is pretty simple: Use fungicides sparingly. Use them when they are likely to improve yield, stalk quality, and bottom line. Particularly important is to make applications based on disease risk, not on the uncertain possibility of “plant health” benefits. Also, use hybrid selection and rotation to reduce disease pressure.

There is no way to prevent resistance to strobilurins and DMIs, short of never using these fungicides. One can only hope to slow down the development of resistance. And the best way to do that is to minimize the use of the at-risk fungicides. There really is no other option. Δ

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