

# Update On Use Of Strobilurin Fungicides In Corn

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Strobilurin fungicides are highly effective for controlling a number of diseases in corn and other crops. They also are known to sometimes have certain growth-regulating effects which often can have positive consequences. Headline®, Quadris®, and Evito® are strobilurin-based products. There also are several pre-mix fungicide products that contain a strobilurin fungicide as one of the two active ingredients. Examples include Stratego®, Quilt®, Priaxor® Xemium®, Avaris®, and Headline AMP®.

Virtually all plant pathologists agree that these fungicides are valuable for controlling certain diseases of corn, such as gray leaf spot, northern leaf blight, and southern rust. However, there has been some disagreement about how and when to use strobilurin fungicides in corn crops. This brief article provides a short evaluation, and it is based on continuing and fruitful research and communication among scientists in both industry and in the public domain.

Based on an assessment of the state of the science on these products in corn, here are key points:

**1. Disease risk is still the best indicator of the likelihood of economic benefit from a fungicide application.** See Figure 1 for an

as readily as in important diseases of other crops. The three corn diseases for which fungicides can be of particular value in Kentucky are gray leaf spot, northern leaf blight, and southern rust. The good news for producers is that the fungi that cause these diseases all possess a “genetic quirk” that interferes with the development of mutants with high levels of resistance. If a fungus possess that particular genetic quirk and a mutation occurs that can give it a high level of resistance, that mutation is actually lethal. Yes, the fungus “commits suicide” by mutating to high resistance to the strobilurin fungicides. Pretty slick! But while that is the good news, there still is some risk from repeated use of these fungicides against foliar diseases of corn, for the following reasons.

a. We don’t know if that genetic quirk exists in all field populations of these fungi.

b. This genetic quirk does not prevent the development of moderate levels of resistance to strobilurins, only high levels of resistance.

#### Crop response under low disease

A key issue that still remains poorly resolved is crop response to strobilurin fungicides when disease pressure is minimal. There is no question that application of a strobilurin fungicide can sometimes result in a yield increase in corn under low disease pressure. On some occasions, these yield increases can be as large as

## Climbing the “Probability Ladder” for Foliar Diseases of Corn

### Factors that increase risk of disease-related losses

- Susceptible hybrid
- Continuous corn
- No-till
- Late planting
- High yield potential
- Disease activity at tasseling
- Disease-favorable weather
- Irrigation
- Field history of disease



overview of risk factors. If you are considering using a fungicide on some of a farm’s acreage, it makes sense to apply them to fields were the highest risk.

**2. Research results seem to converge on VT/R1 (tasseling/silking) as the best time to make such an application.** Applying the fungicide at this time generally maximizes the disease control benefit, and possibly the same is true for the growth-promoting benefits. There is some “buzz” happening about the potential yield benefit of sequential applications of fungicides in corn in selected situations. These circumstances may include fields being “pushed” agronomically (inputs and plant populations, etc.) to maximize yields. The data supporting such recommendations are not actually public, to our knowledge. Public research thus far doesn’t show a meaningful benefit to the two-application approach, so for now, we question the application of two or more fungicide sprays to corn in our region. We’ll keep an open mind on this topic and watch for a body of solid evidence that justifies the two-application approach. In the meantime, we encourage producers to exercise skepticism about sequential applications. Try leaving a couple untreated strips when making the first application. The “sequential application” strategy says that the yield on strips treated only at VT/R1 will be significantly lower than where two applications were made. See if it turns out that way on your farm.

**3. There is some concern about the risk of fungicide resistance.** The strobilurin fungicides are widely known by scientists to generally have a moderate to high risk for development of resistance. Consider frogeye leaf spot in soybeans. Dr. Carl Bradley of the University of Illinois has reported strobilurin-resistant strains of *Cercospora sojina* (the fungus that causes soybean frogeye leaf spot) in eight states, including Kentucky. Follow-up research by Don Hershman has found that over half of the Kentucky isolates of *C. sojina* tested thus far were resistant to strobilurins. Will resistance develop in important corn pathogens? In our opinion, it seems likely, although probably not

20+ bushels. The problem is that these increases do not seem consistent or predictable.

A legitimate question is, are small-plot trials able to adequately measure the physiological benefits of strobilurin fungicides? It seems like a simple question, but answering this has proven extremely challenging. Research to date suggests that, in fact, there are some limitations to small-plot designs. This topic can get complex really quickly, so we’ll just make a few points:

• Variability may be increased in some small-plot designs. Having results from numerous trials should help to overcome this limitation, but not completely.

• The average “yield bump” obtained from a strobilurin fungicide in a small-plot design may be slightly off, but in our trials, this difference appears to be small to even non-existent. Some industry trials suggest a larger difference exists than in our trials.

We’ll keep an open mind about this issue of small-plot trials vs. on-farm strips, although we suspect that this question will not be resolved in our lifetimes. We wish research would continue to address this question of how to best evaluate fungicides. That way, we would be able to provide producers with the best scientific assessments possible. However, such studies are difficult to conduct, and funding for them is nonexistent. Therefore, we expect this important line of applied research to be at a standstill.

#### Summary

Research still seems to indicate that the best use of fungicides in corn is as single application at VT/R1 in fields with significant disease risk. But beyond this, weighing the costs and benefits of fungicide use in corn still is complicated, even after years of field research.

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