Science Societies

Fungicide fundamentals and insurance applications

Keeping in mind best practices in the midst of current market realities

By Matt Ernst

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Last year, in the Corn Belt, rising corn prices fueled producer willingness to make “insurance” fungicide applications to hedge against possible yield losses from foliar disease. Newer disease risks—especially tar spot—also spurred some producers toward a more aggressive spray program. Market realities mean that “insurance” fungicide applications are likely to continue in 2022. But crop costs and returns will change, and CCAs should help their producers keep in mind corn fungicide fundamentals—even when sky-high prices may impact decision-making more than disease management fundamentals.

Cropping practices vary by region, but agronomists we talked with across the Corn Belt agreed on this: More planes and helicopters applied corn fungicides in 2021. Rising corn prices fueled producer willingness to make “insurance” applications to hedge against possible yield losses from foliar disease. Newer disease risks—especially tar spot—also spurred some producers toward a more aggressive spray program to counteract yield risk.

Market realities mean that “insurance” fungicide applications are likely to continue in 2022. “Our standard research-based recommendation is always to scout fields and apply fungicides based on the presence of disease, also considering hybrid susceptibility and field history,” says Pierce Paul, Ohio State University Extension specialist in plant pathology. “But if corn is $6, even if you only get a three-bushel yield bump, the fungicide might pay for itself,” he says.

Severe tar spot pressure, as shown here, can lead to 20- to 60-bu yield loss, on average, according to Darcy Telenko, Purdue University. Photo courtesy of Darcy Telenko.

New crop corn futures (December 2022 contracts) eclipsed the $6 mark in late February and March, meaning there will probably be plenty of “insurance” fungicide applications in 2022. “High grain prices mean nobody tends to follow the standard recommendation for corn fungicides,” Paul says.

But crop costs and returns will change, and CCAs should help their producers keep in mind corn fungicide fundamentals—even when sky-high prices may impact decision-making more than disease management fundamentals. In light of 2022 production and market realities, here are some reminders of the best practices for managing corn fungicides.

Hybrid Selection and Field History

Year in and year out, hybrid resistance is one of the best foliar disease guards. “In most cases, if the hybrid is resistant to a certain disease, then you probably don’t want to apply a fungicide for that disease,” Paul says. “But I don’t know of any hybrid resistant to every disease. So you still have to scout and make a decision from there.”

Factoring in hybrid resistance could be a big help in seasons like 2021—and 2022—when supply chain woes have limited availability of some inputs. Field history and topography are also known before planting. “So if you have a susceptible hybrid and field conditions favorable to disease pressure, like river bottom ground or continuous corn, you probably will want to apply that fungicide,” Paul says.

Application Timing

Disease resistance also helps producers manage uncertainty around application timing says Kiersten Wise. The University of Kentucky Extension plant pathologist is based in western Kentucky where southern rust is the foremost foliar disease. “We encourage farmers to use hybrids less susceptible to southern rust,” she says. “You may still need a fungicide application, but your yield loss won’t be as great if your timing is off or you couldn’t get the fungicide on.”

Application of a product with multiple fungicide classes at tasseling (VT) is the “gold standard,” says Wise, lead author of a Crop Protection Network report summarizing foliar fungicide timing and fungicide class on corn yield response in 13 U.S. states and Ontario. “Over a decade of research shows VT is a very effective fungicide application timing in terms of disease control for a broad spectrum of fungal diseases on corn,” she says. “Past research also showed VT timing was most likely to see a positive yield response.”

Since disease pressure and product formulations change, similar multi-state trials are underway to evaluate alternative timings. Data from 2020–2021, to be released this

year, will compare VT with a late blister/milk (R2/R3) application. Ongoing trials are comparing VT with pre-tassel applications in response to producer requests. Updates will be released on the Crop Protection Network website (**https://cropprotectionnetwork.org/**).

Multiple Applications and Newer Diseases

Newer diseases (think tar spot) also bring yield risks. “With severe tar spot pressure, we are going to see 20- to 60-bushel yield loss, on average. I’ve seen up to 50% yield loss in northern Indiana,” says Darcy Telenko, Purdue University Extension plant pathologist.

Even in areas where tar spot is established, Telenko says producers and CCAs need to remember the basics: whether the disease is (or has been) present in the field and whether the pressure is likely great enough to cause economically significant yield loss.

Telenko says that the single-application rule is still generally true for northern Indiana. “Even for tar spot, it is the rare year that a dual application will pay off,” she says. Last year was that rare year. “Tar spot was confirmed in Indiana July 3, 2021. So the first application for tar spot at a late vegetative stage with a second application three weeks later might have gotten the yield return to pay for that second application,” she says.

Telenko points out that that disease management is never a perfect science in the field. “Producers always have constraints, from weather to what fungicides they were able to order in the fall,” she notes. Producers and CCAs can “fact check” product and application recommendations against the known research to determine whether the additional investment will pay off.

Ideally, producers would purchase and apply a fungicide after frequent scouting has shown evidence that such a decision is warranted. But the reality on the ground—especially with escalated commodity prices and supply chain snags—is that many producers are going to make advance decisions. Photo by Dave Reede/agefotostock.

Plant pathologists and research agronomists also recommend some simple on-farm research with check rows. Side-by-side yield comparison, where fungicides are applied and not applied, can quantify just how big a revenue bump is occurring.

And it's always important to calculate the true costs and returns. The 13-state analysis previously mentioned showed a 60% chance of recouping a $28/ac fungicide cost (in 2015–2016) if corn was $5/bu.

Costs and returns—and available product formulations—have since changed. But the established research reinforces the need to demonstrate the true returns from any yield bump that may be attributed to fungicides.

The same strategies for protecting grain yields (scouting, field history, disease presence, and weather) apply when chopping the crop for silage where forage quality and fermentation demand high foliar quality. Like grain yields, not all disease pressure is equal when it comes to silage yield impacts. "Tar spot can overtake a field in a week, really chewing up a silage crop," says Ohio State's Pierce Paul.

Aerial Application

This article was in part prompted by eastern Corn Belt agronomists noticing an uptick in aerial applications in 2021. This was apparently due to southern applicators skipping some regions, moving more quickly north, to fit in more acres. "Unless you had access

to a local aerial applicator, availability was not good. We struggled to get aerial applicators across Kentucky in 2021," says Kiersten Wise.

The pros and cons of aerial versus ground application are well known. Aerial application gets the product into the field regardless of the corn height or ground wetness, and coverage is faster—a plus for diseases that spread quickly. Although aerial application is a little more expensive—around $2/ac more than ground application, according to custom farming rate surveys from Iowa and Indiana—the total cost is often comparable to ground application because of differences in product rates.

Managing risk can come down to control, and ground application can give the producer more control—especially when the producer owns the rig or has a good relationship with the applicator. Many experts prefer the coverage from a ground rig. "You spray right over the top, and the fungicide gets into the canopy. The volume that you apply with a highboy is probably a little higher than what is flown on, so you get better coverage," Paul notes.

Ground application of fungicides can give the producer more control—especially when the producer owns the rig or has a good relationship with the applicator. Many experts prefer the coverage from a ground rig. Photo by Dave Reede/agefotostock.

Relying on a custom applicator—whether in the sky or on the ground—can create timing challenges. "I have seen growers that booked the aerial applications, and the pressure from tar spot was earlier than expected," says Purdue's Telenko. "That meant the well-timed application didn't go out when it needed to."

Disease Resistance

Upping fungicide applications for foliar disease can also create a concern for diseases developing resistance to certain active ingredients. While the top corn fungicides are rated high risk in terms of disease resistance, most fungicides are two- or three-way mixtures between products in Group 3 (DMI triazoles), Group 7 (SDHI), and Group 11 (QoI strobilurins).

Using a mixture of two or three products is a good thing. "The risk of developing disease resistance is much lower when you work with mixtures rather than one single active ingredient," Paul says. But best management practices should still be followed. "Even when it's a mixture, I maintain you fundamentally increase the risk of resistance if you apply a fungicide that scouting shows is not warranted," he says.

Telenko recommends using similar caution with multiple fungicide applications. "Yes, multiple applications may provide increased protection during a year when tar spot starts early—I just don't want to condone that much fungicide going out unless we know that the additional protection is needed," she says.

The Crop Protection Network updated its side-by-side comparison of fungicide efficacy for control of corn diseases in February 2022. That chart is available at **https://bit.ly/3KfwtOo**.

Beyond the Ear

Crop observers say that the foliar disease management realities seen in corn—more advanced aerial bookings, "insurance" applications, etc.—are also showing up in soybeans. This was perhaps more true in the eastern Corn Belt in 2021, as an unusually dry summer in Iowa kept frogeye leaf spot and Septoria brown spot at "very low levels at all locations," according to the Iowa State University fungicide trial report for soybeans.

But the reality on the ground—especially with escalated commodity prices and supply chain snags—is that many producers are going to make advance decisions. “In the ideal world, you’d scout frequently. Then when you see something, or when conditions are favorable for a disease, you’d go purchase your product, line up your applicator, and get that product on right then,” says Kiersten Wise.

But both in and outside Midwest cornfields, the world is not ideal in 2022. “The reality is to get fungicide, you have to have reserved it—maybe in October. And then you have to have a good relationship with your applicators, and they have to be available to you when you need to apply it. So you might have to make that application reservation ahead of time,” Wise says. “And a lot of times, especially if the money is already spent—you’re going to go through and apply the fungicide in hopes of protecting yield.”

The takeaway for CCAs is to help keep producers from falling into habits that bypass sound science and set up spending patterns that will be unprofitable with different prices. “What helps in a year like 2022 is that corn prices are high,” Wise says. When prices are lower, if application costs are the same or higher, ignoring best management application practices is likely to be far less forgiving on a producer’s bottom line.

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