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Tar Spot of Corn: Fungicide Management

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Introduction

Tar spot is an emerging corn disease that has caused increasing concern among growers throughout the Mid-Atlantic region. The disease, caused by the fungus *Phyllachora maydis*, was first identified in the United States in 2015 and has continued to spread into new production areas. Tar spot was detected in Virginia for the first time in the northern Shenandoah Valley in 2022 and has since been confirmed in Shenandoah, Rockingham, and Augusta counties as of 2025.

Although the disease does not occur every year or in every field, favorable weather conditions, including extended periods of leaf wetness, high humidity, and moderate temperatures, can lead to rapid disease development. Under severe pressure, tar spot has been associated with substantial yield losses, ranging from 20–60 bushels per acre, with losses exceeding 50 percent in highly susceptible hybrids and favorable disease environments. In addition to yield reductions, tar spot can negatively affect grain quality by reducing kernel size and test weight and increasing grain moisture at harvest. Elevated grain moisture can increase drying costs and delay harvest, while reduced test weight may result in dockage at the elevator. Severe infections can also accelerate plant senescence and increase the risk of stalk lodging, further complicating harvest operations (Crop Protection Network, 2023).

Fungicide management can be an essential tool in the toolbox to help reduce disease severity and protect yield and grain quality when tar spot develops, particularly in fields with a history of the disease or when weather conditions favor infection.

Life Cycle and Identification

Tar spot is most easily identified by the presence of small, raised, black structures called stromata that develop on corn leaves (Figure 1). These stromata resemble flecks of tar or black paint splatter and cannot be scraped off the leaf surface with a fingernail. Lesions are often visible on the upper leaf surface first but may also occur on the underside of leaves, leaf sheaths, and husks as the disease progresses.

Tar spot is sometimes confused with other foliar diseases or leaf blemishes. Insect frass, dirt, or residue can often be rubbed off the leaf surface, whereas tar spot stromata are embedded in the leaf tissue. Common foliar diseases such as gray leaf spot or southern rust produce lesions that are typically tan, gray, or orange and are not raised or shiny, whereas tar spot has raised black structures that can look like “fish-eye” halos. Accurate identification and confirmation are critical due to look-alikes and the differences in management strategies among foliar diseases (Telenko, 2025). If you are unsure, contact your local extension office to submit a sample and confirm.

Figure 1. Tar spot on corn leaf found in Rockingham County, VA, in 2025. (Rosemary Life, Virginia Cooperative Extension)

Environmental Conditions Favoring Tar Spot

Tar spot development is strongly influenced by weather conditions. Research has shown that cool to moderate temperatures, frequent rainfall, extended periods of leaf wetness, and high relative humidity favor spore release, dispersal, and infection by *Phyllachora maydis* (Check et al., 2025).

It is most likely to develop when cool temperatures and prolonged leaf wetness occur together. Research has shown that disease development is favored when daytime temperatures range from 60–70°F and relative humidity remains above 75% for extended periods (Crop Protection Network, 2020).

In addition to temperature and humidity, leaf wetness duration is critical for tar spot infection. At least 7 hours of continuous moisture on corn leaves from rainfall, fog, dew, or persistently high humidity is typically required for infection to occur. These conditions allow the fungus to germinate and penetrate leaf tissue.

Corn grown under irrigation is often at greater risk of tar spot because irrigation can significantly increase the time leaves remain wet, particularly when irrigation overlaps with cool, humid weather. Fields with dense canopies, limited air movement, or frequent irrigation during cooler periods may therefore experience higher disease pressure (Crop Protection Network, 2020).

Disease Forecasting and Monitoring Tools

Several tools developed by the Crop Protection Network (CPN) can help growers and crop advisors monitor tar spot activity and assess disease risk during the growing season.

The Crop Lookout disease monitoring map tracks emerging crop disease issues across the United States in real time, including reports of tar spot. This interactive map allows users to view where tar spot has been confirmed and how disease activity is changing throughout the season. Visit the Crop Lookout disease monitoring map (https://cropprotectionnetwork.org/crop-lookout-landing) to explore current observations and reported disease trends.

In addition, the Crop Risk Assessment Tool for corn diseases provides a weather-based estimate of tar spot risk. This tool uses site-specific, gridded weather data from the IBM Environmental Intelligence Suite to evaluate conditions that favor disease development. Users can select their location to see whether recent and forecasted weather conditions indicate an increased risk for tar spot. Access the Crop Risk Assessment Tool for corn diseases (https://cropprotectionnetwork.org/crop-disease-forecasting) to evaluate tar spot risk for your area.

While these tools can help inform scouting priorities and management decisions, they should be used alongside regular field scouting and knowledge of field history to guide fungicide timing and other management practices.

Cultural Practices for Tar Spot Management

Crop rotation can influence tar spot risk, as *Phyllachora maydis* survives in overwintered infected corn residue. Fields planted with continuous corn generally have a higher risk of tar spot development than fields rotated with soybean or other non-host crops. Studies have shown increased disease severity in continuous corn systems compared with rotated systems, particularly when favorable weather conditions occur (as mentioned earlier in this publication) (Schneider et al., 2025; Bish, 2024).

While rotation alone will not eliminate the risk of tar spot, it can reduce the amount of fungus present in a field. It should be considered part of an integrated disease management strategy. Be aware that the tar spot fungus can move from nearby infected fields even when crop rotation in your own field is followed.

Hybrid Resistance and Yield Impacts

More recent research has confirmed that hybrids with improved tolerance can reduce disease severity and improve yield stability, particularly when combined with timely fungicide applications (Miranda et al., 2025; Goodnight et al., 2025).

Hybrid resistance plays an important role in managing tar spot, although no commercially available corn hybrids are considered fully resistant. University hybrid trials conducted across Illinois, Indiana, Michigan, and Wisconsin showed substantial differences in how hybrids respond to tar spot infection. These trials demonstrated that yield loss increased with disease severity, with estimated losses ranging from approximately 0.3 to 1.4 bushels per acre for each 1% increase in tar spot severity. This wide range highlights the variability in hybrid susceptibility and tolerance.

Field observations from Telenko et al. (2019) research also suggest that hybrid maturity influences both disease severity and yield loss. Hybrids were grouped into two relative maturity categories, 92–106 days and 107–114 days, with tar spot severity evaluated on the ear leaf near corn growth stage maturity (R5–R6). Preliminary analyses showed that yield loss increased more rapidly in later-maturing hybrids. For every 1% increase in tar spot severity on the ear leaf, yield losses averaged 0.48 bushels per acre in the earlier maturity group and 0.83 bushels per acre in the later maturity group.

These relationships help explain the significant yield reductions reported by growers in the Midwest during severe outbreaks. Fields with 40–50% tar spot severity on the ear leaf by R5–R6 were estimated to experience yield losses ranging from approximately 17 to nearly 39 bushels per acre, which aligns with grower reports of losses between 20 and 60 bushels per acre in heavily affected areas.

While hybrid resistance alone will not prevent tar spot, selecting hybrids with lower susceptibility or greater tolerance can reduce yield risk, particularly in fields with a history of tar spot or in environments favorable for disease development. Hybrid selection should be considered an important component of an integrated tar spot management strategy, alongside timely scouting and, when appropriate, fungicide use (Telenko et al., 2019).

Fungicide Application and Timing

Fungicides can play an important role in managing tar spot when disease risk is elevated, but successful use depends on selecting appropriate products, applying them at the correct time, and weighing potential economic return. Product selection, application timing across corn growth stages, and return-on-investment considerations all influence whether fungicide applications effectively manage disease and protect yield.

Fungicide Products and Modes of Actions

Fungicides are an effective tool for managing tar spot when applied appropriately. Multi-state efficacy trials have shown that fungicides containing multiple modes of action, particularly combinations of FRAC Code 11 quinone outside inhibitors (QoI), FRAC Code 3 demethylation inhibitors (DMI), and FRAC Code 7 succinate dehydrogenase inhibitors (SDHI), provide the most consistent disease control and yield protection (Goodnight et al., 2024; Telenko et al., 2022).

The Corn Disease Working Group (2026) has a Corn Foliar Fungicide Efficacy Guide (https://cropprotectionnetwork.org/publications/fungicide-efficacy-for-control-of-corn-diseases) that summarizes research-based ratings of fungicide performance against multiple corn foliar diseases, including tar spot. These ratings allow growers and consultants to compare products based on relative efficacy rather than relying on product names alone. In general, products that include two or more effective modes of action receive higher efficacy ratings for tar spot management than single-mode-of-action products. Using these ratings can help guide fungicide selection, support resistance management decisions, and improve the likelihood of effective disease control under moderate-to-high disease pressure.

Application Timing

Fungicide application timing is critical for effective tar spot management. Research across multiple states has shown that applications made between VT (tasseling) (Figure 2A) and R3 (milk) (Figure 2B) growth stages are generally the most effective for reducing disease severity and protecting yield (Waibel et al., 2025; Schneider et al., 2025).

Figure 2. (A) VT (tasseling) growth stage of corn. (Iowa State University Extension)

Figure 2. (B) R3 (milk) growth stage of corn. (Iowa State University Extension)

In high-risk situations, including fields with a history of tar spot or when favorable weather conditions persist, earlier applications around VT may provide the greatest benefit. Later applications can still reduce disease severity but may provide less yield protection if the disease is already well established. Economic return studies have shown that fungicide applications are most likely to be profitable when disease pressure is moderate to high and applications are well timed (Ross et al., 2024).

Fungicides applied at planting, including seed treatments or in-furrow applications, have not consistently reduced tar spot severity or improved yield and should not be relied upon as a primary management tool (McFeaters et al., 2025).

Integrating Fungicides and ROI Considerations

Fungicides should be used as part of an integrated disease management strategy that includes hybrid selection, crop rotation, field scouting, and weather monitoring. Applying fungicides when tar spot risk is low may not result in an economic return, particularly if disease development is limited or absent. Conversely, fungicide applications made after substantial disease development may reduce disease severity but may not adequately protect yield or offset application costs (Table 1).

Studies evaluating the economic outcomes of foliar fungicide applications have shown that return on investment is most likely when applications are made under moderate-to-high tar spot risk and are timed appropriately, such as from VT through early reproductive growth stages (Ross et al., 2024). These findings highlight the importance of using fungicides based on the risk of disease rather than applying them too early or waiting until disease is already present.

Using disease forecasting tools, scouting fields regularly, and accounting for field-specific risk factors, including hybrid susceptibility, cropping history, and current and forecasted weather conditions, can improve fungicide decision-making and increase the likelihood of both effective disease management and positive economic returns (Chilvers, 2025).

Table 1. Fungicide ROI Timing for Tar Spot

Corn Growth Stage When Tar Spot is First Detected	Possible Benefit from Spraying	Comments
Late Vegetative	Rarely, consult extension specialist before spraying	Scout fields and monitor disease progress, may need a second spray
VT/R1 (Tasseling/Silking)	Yes	May need a second spray
R2 (Blister)	Yes	Less likely to need a second spray
R3 (Milk)	Yes	No second spray needed
R4 (Dough)	Maybe, with severe disease pressure	No second spray needed
R5 (Dent)	No	No second spray needed
R6 (Black layer)	No	No second spray needed

Source: Benefits from applying fungicides based on when tar spot is detected in the corn growth stage given by the Crop Protection Network.

Key Takeaways

Tar Spot is an emerging disease in corn in Virginia, and its presence can vary from year to year depending on weather conditions. Some key takeaways to help producers (Telenko et al., 2025):

- Scouting is critical
- Use resistant hybrids
- Fungicides can work, but there will still be some disease presence
- Fungicide application timing is critical
- Understand your ROI with 1x vs 2x fungicide applications
- Utilize multiple modes of action with fungicide applications
- Use management tools from Crop Protection Network specifically for tar spot disease:
  - Crop Risk Assessment Tool (https://cropprotectionnetwork.org/crop-disease-forecasting)
  - Fungicide ROI Calculator (https://cropprotectionnetwork.org/roi-calculators)
  - Fungicide Efficacy Tool (https://cropprotectionnetwork.org/fungicide-efficacy-tool)
  - Severity Estimation Tool (https://cropprotectionnetwork.org/severity-estimation-tool-landing)

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