

## Tar Spot Q&A

### What you'll Learn

- How and when tar spot arrived
- The impacts it has on corn
- How to manage tar spot
- What to expect in the future

### What is Tar Spot?

Tar spot is a fungal disease in corn caused by *Phyllachora maydis*. The disease causes black specks to form on the leaves.

In Mexico and Central America, where the disease was discovered, it is referred to as the Tar Spot Complex because of the involvement of a second pathogen found on plants with the disease in that region.

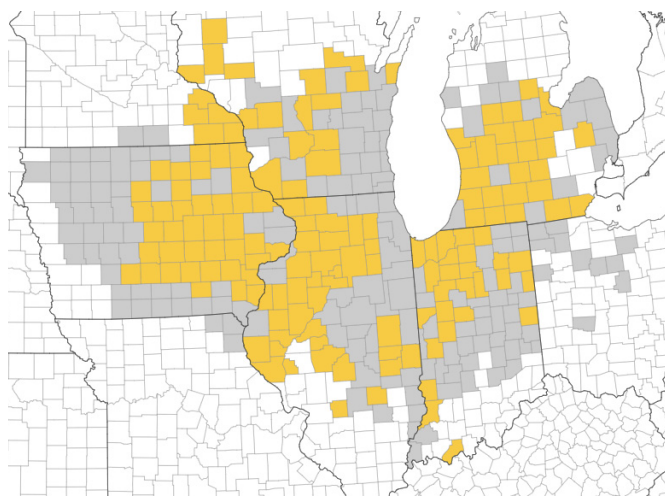
The additional pathogen, *Monographella maydis*, has been thought to be responsible for the “fish eye” symptoms that coalesce and cause greater leaf tissue loss. However, the second pathogen has not been confirmed in the United States.

### Q. When and how did tar spot get to the United States?

A. One theory is that a tropical storm from the Gulf of Mexico in 2015 deposited wind-blown spores to northern Illinois and northern Indiana.

### Q. Where can it be found?

A. Tar spot has been confirmed across a widespread area of eastern Iowa, central and northern Illinois, southern Wisconsin, northern and central Indiana, southern Michigan, northwest Ohio, and southern Florida (Figure 1).



**Legend:** ■ Positive ■ Found in previous years

**Figure 1. A map of current and previous tar spot infected areas as of September 2020.**

**Source:** <https://corn.ipmPIPE.org/tarspot-2/>

### Q. What conditions favor tar spot development?

A. Where favorable environmental conditions that promote infection and disease development are cool (59-70°F), humid conditions (85% relative humidity) with long periods of leaf wetness (greater than 7 hours). Wind-driven rain and storms can spread spores of the pathogen to new plants and fields. Additional research is needed to further understand conditions favorable for disease development in the United States.

### Q. What are the impacts of tar spot?

A. Like other foliar diseases, the impact of tar spot depends on how early infection occurs and the severity of the infection. Severely-infected

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leaves at grain fill can limit sugar availability resulting in an inability to completely fill ears prior to black layer and an overall loss in kernel weight and yield. When photosynthesis is reduced because of a loss of leaf area, stalks may be cannibalized for sugars, which results in poor standability and lodging. Even in areas where tar spot is present, many fields may not have yield loss because the disease came in late or symptoms did not develop to levels that affect yield. The presence of tar spot does not necessarily indicate a reduction in yield. Yields in fields with tar spot may be reduced by many other stress factors, such as gray leaf spot, reduced fertility, or loss of stalk integrity. In some areas, tar spot can be seen progressing in the corn canopy on dead plant tissue following other disease infection or nutrient stress. Maintaining plant health throughout the season

by reducing stress from lack of nutrients or from other pathogen infection may help reduce risk of yield loss.

### **Q. How does tar spot start and spread?**

A. The tar spot fungus appears to overwinter in infested crop debris, although the exact means of how the fungus overwinters, and the exact way it infects, are not known. Wind-blown or splashing rain likely moves fungal spores from crop debris onto the leaves of the new corn crop, which then becomes infected.

Research from Mexico suggests that the incubation period (the time it takes from infection to visible lesions) may be as long as 40 days. Observations in the United States suggest that this period may be only 12 to 15 days under certain circumstances. Like other corn diseases, such as rust, gray leaf spot



**Figure 2. Tar spot is a fungal disease that appears as a series of black spots containing spores on corn leaves (A and B). Depending on the date of infection, the spores may proliferate on the plant's leaves and cause reduced photosynthesis (C), which can lead to stalk cannibalization and poor standability (D).**



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and northern leaf blight, tar spot is polycyclic, meaning that it can produce many generations of spores and infect the crop multiple times within the same season.

## ***Q. Do infected fields have the second pathogen?***

A. *Monographella maydis* has not been detected in any submitted samples of tar spot in the United States. However, 2018 observations indicate that the secondary fungus is not required to cause damage to yield potential.

*P. maydis* alone can cause yield loss under favorable environmental conditions. Farmers should monitor fields to help track this disease and determine if management tactics are warranted.

## ***Q. Does tar spot overwinter here?***

A. Because symptoms have been observed in the same areas since 2015, it appears that the fungus is overwintering rather than being reintroduced from Mexico or Central America each year. However, more research is needed to learn how it overwinters, where it does so, if it survives on other alternative hosts, etc.

## **MANAGEMENT**

## ***Q. Are there differences in corn product resistance to tar spot?***

A. While there are no corn products grown in the U.S. Corn Belt that are known to have high levels of resistance to tar spot, there appear to be slight differences among products in levels of susceptibility. Most U.S. corn products from all companies appear to be relatively susceptible to tar spot, but only a few products appear to have slightly less severe symptoms.

Comparing corn product reactions to tar spot, or any disease in isolation, can be tricky. Multiple side-by-side comparisons in fields

with uniform levels of disease pressure are best suited for comparing product reactions. Comparing levels of infection between products in different fields may not be accurate. The severity of symptoms can depend on when the infection occurred, the quantity of tar spot fungus that overwintered in infested corn debris in a field, fungicide applications, infection in neighboring fields, and uneven levels of tar spot infection throughout a field can also complicate comparisons.

## ***Q. Does rotation help manage tar spot?***

A. Rotation should not make tar spot worse, but it may not provide much control. Because the fungus appears to overwinter in infested debris, avoiding that inoculum early in the season should be beneficial depending on how much inoculum can move in from other sources (e.g., neighboring fields) and how far the spores spread. Based on the widespread occurrence of tar spot in 2018, the fungus appears to spread rapidly over long distances when weather is favorable. In years with less favorable weather, rotation or management of infested debris may be of more value in limiting the development of tar spot.

## ***Q. Do fungicides help control the disease?***

A. The overall assessment is that fields treated with a fungicide are better than those without. However, some fields sprayed with a fungicide still suffered some yield loss and standability concerns. It is unclear whether these applications were too late, too early, or simply not frequent enough to control the disease. It is possible with a new pathogen in combination with susceptible germplasm and ideal disease conditions, one application could simply not be enough. Farmers, retailers and seed companies regularly work with products that have respectable tolerance to many foliar

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diseases. With low tolerance to a disease, very susceptible crops have historically required multiple fungicide applications to prevent yield loss. The combination of fungicides with more tolerant products will likely be the best means of help in the near term.

Delaro® is a recommended foliar fungicide available for corn. For more information about Delaro, please visit <https://www.cropscience.bayer.us/products/fungicides/delaro> and contact your retailer. Fungicide application should begin when disease first appears and continue at 7- to 14-day intervals as long as environmental conditions persist that favor continued disease development. More than one fungicide application may be needed in environments with high disease pressure.

## **Q. Will we have tar spot again next year?**

A. Tar spot has occurred in northern Illinois and Indiana each year since it was first discovered in 2015. Levels of severity have varied depending on weather and other factors. Infection of future corn crops by tar spot will largely depend on favorable weather conditions for the development of the disease. We are monitoring current and historical weather conditions to

better understand risk and frequency of possible occurrence, particularly in the affected states of Illinois, Indiana, Iowa, Michigan, Ohio and Wisconsin.

## **Sources (verified 9/15/20)**

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<http://cropprotectionnetwork.org>.

Telenko, D., and Creswell, T. August 2019. Diseases of corn Tar Spot. BP-90-W. Botany and Plant Pathology. Purdue Extension. <http://extension.purdue.edu>.

Paul P., Dalia F., and Silva L. 2019. Tar Spot of Corn in Ohio Again this 2019. 2019-35. C.O.R.N. Newsletter. Ohio State University Extension. <https://agcrops.osu.edu/>.

## **Legal Statements**

**ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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