

Agronomy Newsletter: January 2020

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Tar Spot in Corn

In comparison to common foliar diseases in corn such as Grey Leaf Spot and Northern Corn Leaf Blight, Tar Spot is a brand new fungal disease in the corn belt. The disease causing pathogen originates from Mexico, where corn was originally adapted from its wild relative. It was first observed in the U.S. in 2015 in Northwest IN and Northeast IL. It was originally thought that it would not be able to survive the harsh winters we experience in the U.S., but it now appears to be

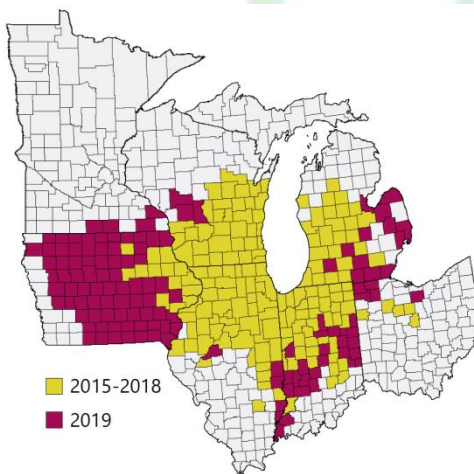


Figure 1. Counties with confirmed incidence of tar spot prior to 2019 and new confirmations during 2019 (as of 10-21-19) showing the expanding range of disease incidence (Corn ipmPIPE, 2019; Pioneer agronomist observations).

overwintering and spreading each year. It has since spread across much of northern Indiana and Illinois, southern Wisconsin and Michigan, and much of Iowa (Figure 1). In 2018, severe yield losses (up to 30%) were observed during an outbreak prompting universities and seed companies to learn as much as possible about the disease cycle and possible control options.

The symptoms of tar spot are relatively straightforward. Small black speckled lesions appear on leaves (Figure 2). The lesions appear to be stuck on the leaf and don't rub off when scratched or rubbed. Ideal weather conditions for development are moderate temperatures (60-70 degrees), high humidity, and 7+ hours of dew at night. The environment it favors often leads to infestation late in the growing season after many growers are willing to make a fungicide application.



Figure 2. A corn leaf with tar spot symptoms.

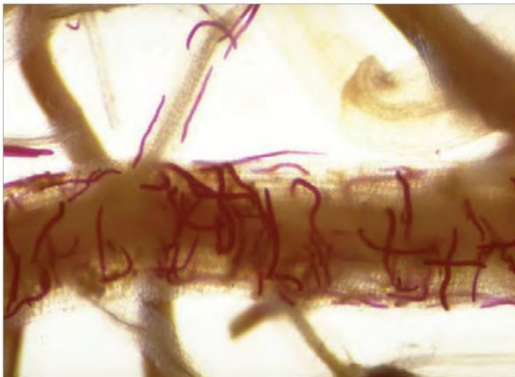
One challenge with a new disease is that Pioneer breeders have never screened our hybrids and inbreds for resistance to tar spot. Since the disease originates from the same area as our earliest corn, there is still a range of native tolerance to it. Our breeders and agronomists are making an extra effort to observe how our current lineup handles Tar Spot pressure. Within several years, we will have a disease rating much like we

do for Grey Leaf Spot or Northern Corn Leaf Blight. Some Pioneer hybrids appear to have excellent resistance to the disease, including P1197AM and P0825AM, while some appear to just be average to slightly below average.

While it may seem straightforward that a fungicide should help control this disease, up until the last several years, none of the fungicides currently on the market had been tested for their control of Tar Spot. This left many wondering which products had the best control, and when the best timing is to spray. At this point it is too early to make any blanket recommendations about how to control this disease, but there are currently many studies showing promise that a fungicide application can control Tar Spot. However, the best timing and products remain to be seen.

Corn Nematodes and Pioneer Lumialza Seed Treatment

Nematodes have been gaining attention as a yield limiting pest in soybeans the last several years. This raises the question about what kind of effect they are having on our corn. Nematodes are an often overlooked and misunderstood pest in farming. They are microscopic, and often their damage resembles other stresses such as drought and nutrient deficiencies. When damage is severe enough, root damage and pruning can be visible. Their damage was often overlooked in the past, but the ability to sample and diagnose has shed more light on what they are capable of.



Lance nematodes feeding on a root. Photo courtesy of Greg Tylka, Iowa State University.

There are over 50 species of nematodes known to feed on corn, but there are 7 primary species that are most prevalent. They are as follows: Sting, Needle, Lance, Stubby-Root, Root-Knot, Dagger, and Lesion Nematodes. These seven are the focus of much of the research being done currently on nematode damage on corn.

A 2018 Pioneer corn nematode population survey of 67 sample locations across the corn belt showed that 48% of locations had moderate to high populations. Pioneer is being proactive in the fight against nematodes by introducing Lumialza seed treatment. Lumialza is a biological seed treatment new for 2020. As a biological, it grows along with the roots creating a bio-barrier protecting them from nematodes. It is also able to paralyze juvenile nematodes, rendering them incapable of feeding. Lumialza has activity against all seven of the species listed above. Two unique capabilities of Lumialza compared to other industry offerings are the area of control and the duration of control. Since it is a biological, its area of protection grows as the roots grow, encompassing the entire root mass. Its protection also lasts for more than 80 days over that entire zone. In Pioneer testing over the 67 sample locations in the previously mentioned study, Lumialza provided a 6.7 bu/acre advantage in the moderate-high populations, and a 3.7 bu/acre advantage in the low populations.

Fungicides: How They Work and Important Considerations

Fungicide use in crop production has become increasingly popular in the last several years. While more and more growers are using them, some don't understand the ins and outs of how exactly they work. Not all fungicides simply kill a fungus when it comes in contact. Fungicides should be treated

in our mind much like we think of herbicides. Some fungicides are more active against certain diseases, some are contact and others are systemic, and some kill the fungus while others prevent it from reproducing.

There are two main groups of fungicides on the market right now, QoI Strobilurins and DMI Triazoles. The names refer to the modes of action that these groups utilize. QoI Strobilurins (Approach, Headline) inhibit mitochondrial respiration, cutting off energy production to the fungi eventually causing death. They are effective on germinating spores of fungi. DMI Triazoles (Tilt, Folicur) interfere with cell membrane development causing abnormal growth and eventually death. Common fungicide premix products on the market use a combination of these different modes of action, much like we do when we use a herbicide premix.

It is important to remember that fungicides are not a one size fits all solution. Keep in mind the disease that needs controlled when choosing a fungicide. If control of Grey Leaf Spot and Northern Corn Leaf Blight is the goal, check labels to make sure the fungicide you are choosing has good control of those diseases. If Frogeye Leaf Spot infests your soybean field, check that your fungicide controls it. There have been several cases in the last year or two where a retailer recommended a certain fungicide for Frogeye control even though the label showed poor control of that disease. This would be comparable to spraying 2,4-D when you have a grass problem. Just as it is important to mix herbicide modes of action, it is equally important to follow the same practices with fungicides. Not only will this give you multiple ways of controlling diseases, but it will also help prevent resistance. Fungus are able to develop resistance much like weeds are, and spraying the same mode of action year after year may render a fungicide useless in the same way Roundup is in the herbicide world.

New World Record Corn Yield!

The results from the 2019 National Corn Growers Association corn yield contest are in, and David Hula from Virginia has set a new world record for corn yield. With Pioneer P1197AM planted at 52,000 plants per acre Hula reached **616.2 bu/acre**. He has shown to be an innovator and forward thinker when it come to trying new things and pushing the limits of corn yield potential. If you are wondering whether this 10 acre field was profitable for him, he was quoted in an article that his net revenue was nearly \$1,000/acre. He gives a great deal of credit to working closely with his Pioneer salesman, but ultimately he knows who is in control. Hula stated, "Everyone thinks we have this magic piece of dirt. We don't. It takes a team of folks and God's favor."

Comparing and Contrasting Xtend and Enlist E3 Soybeans

In the past year there has been much talk about the new Enlist E3 soybean trait. It comes as a new option for effective herbicide control of tough weeds with the ability to spray glufosinate (Liberty), a new 2,4-D Choline formulation, and Roundup. It is an exciting system that will become very useful when fighting herbicide resistant weeds. However, there has been some confusion in the countryside about the similarities and differences of the Enlist and Xtend soybean programs.

Aside from both soybeans being resistant to glyphosate, the similarities end there. It is important to note that 2,4-D and Dicamba are not interchangeable. Spraying 2,4-D on Xtend beans will kill them, and likewise spraying a dicamba formulation on or ahead of Enlist beans will also kill them. Another key difference is the setback restrictions for Enlist. There is a 30 ft. downwind buffer to a

sensitive crop, compared to 110-220 ft. for Xtend. The chart below shows some important information regarding each herbicide system.

FACTOR	ENLIST DUO	XTENDIMAX /FEXAPAN	ENGENIA
Herbicide formulations	Glyphosate + 2,4-D (Coxex D)	Dicamba (DGA salt+VaporGrip®)	Dicamba (BAPMA salt)
GPA	10 to 15 GPA	≥ 10 GPA	≥ 10 GPA
Nozzle types	23 on label	www.xtendimaxapplicationrequirements.com www.fexapanapplicationrequirements.dupont.com	www.engeniatankmix.com
Droplet category ^a	Coarse to extremely coarse	Extremely coarse to ultra-coarse	Extremely coarse to ultra-coarse
Tank mixtures	With ACCase herbicides www.enlisttankmix.com	www.xtendimaxapplicationrequirements.com www.fexapanapplicationrequirements.dupont.com	www.engeniatankmix.com
Wind speed	< 15 MPH	3 to 10 mph (optimal) 10 to 15 mph if all other application requirements are met	0-15 MPH, ensure inversion conditions not present
Sprayer speed	Not applicable	< 15 MPH	< 15 MPH
Boom height above canopy	Nozzle manufacturer recommendation	Not to exceed 24"	< 24"
Environment	30 ft downwind buffer; DO NOT APPLY when wind is blowing toward adjacent commercial-grown fruiting vegetables	110 to 220 ft downwind buffer depending on application rate; DO NOT APPLY when wind is blowing toward adjacent commercial-grown, dicamba-sensitive crop	110 ft downwind buffer; DO NOT APPLY when wind is blowing in the direction of a neighboring specialty crop
Weed size	3 - 6"	< 4"	< 4"
Tank rinsing	Triple rinse	Triple rinse	Triple rinse
Tank cleaner	May be used	Yes	Yes

Product Spotlight: P0720AM and P28A42X:

P0720AM:

- Exciting new 107 day hybrid
- Brings tremendous top end yield potential packaged with superior stress tolerance
- Above average stress emergence, and excellent stalks and roots
- Below average Grey Leaf Spot tolerance is only watchout
- Excellent drydown for 107 day maturity
- In 2019 IMPACT testing across IN, OH, and IL it carried a 3+ bu/acre advantage over P0825AM and an 11+ bu/acre advantage over P0574AM

P28A42X:

- New 2.8 maturity variety for 2020
- Highest yielding group 2 soybean in our lineup
- Packaged high yields with excellent standability and a solid overall agronomic package
- A consistent yield leader over the last 3 years, with a 4.3 bu/acre advantage vs. all competitors in over 100 comparisons
- In 60 comparisons in 2019 it had a 3.3 bu/acre advantage over P29A25X, and showed greater top end yield potential while out yielding it at all yield levels