VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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In This Issue

Anthracnose of Garlic a New Disease to Indiana

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Earlier this summer, sunken lesions were observed on garlic scapes on a small farm in east central Indiana. Lesions started out a cream or tan color (Figure 1), however under rainy or humid conditions, spore production caused lesions to turn orange (Figure 2). Larger lesions resulted in the collapse of the scapes. It is estimated that 45 to 50 percent of scapes were affected. Lesions ranged from ¼ to ½ inch long. Samples of these scapes were sent to the Purdue Plant and Pest Diagnostic Laboratory in West Lafayette where they were diagnosed as anthracnose of garlic, a new disease to Indiana.

Figure 1. Anthracnose of garlic, a new disease to Indiana, may cause sunken, orange lesions on scapes.

Figure 2. A close up of an anthracnose lesion of garlic.

This new disease is caused by the fungus *Colletotrichum fiorinae*. This fungus has also been reported on elephant garlic in New York. Reports from New York suggest that onion is unaffected. In the US, *C. fioriniae* has also been reported as an Apple post-harvest decay, causing bitter rot on pear and anthracnose on cherry tomato.

The fungus that causes anthracnose of garlic may survive on crop residue in the soil from a previous garlic crop. If small lesions exist on bulbils used for propagation, the disease may be spread. Rainy weather may splash the spores from plant to plant.

Crop rotation that does not include garlic relatives should reduce the inoculum and thus disease severity. Bulbils used for propagation may harbor the disease. It is not clear what fungicides may be effective. However, products that are labeled and effective against Alternaria purple blight of onion may be effective against anthracnose.

Anthracnose of garlic does not seem to affect bulbs. However, scapes are sometimes removed for consumption; such yield may be reduced. The disease will negatively affect bulbil production for propagation.

Variety Selection is Important for Managing Cucumber Powdery Mildew in High Tunnels

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Powdery mildew is particularly severe in high tunnel and greenhouse growing conditions (Figure 1). It affects a wide range of crops including tomatoes and cucumbers. In addition to using synthetic fungicides to control this disease in high tunnels, we found powdery mildew on cucumbers can also be effectively controlled through variety selection and intensive plant pruning.

Figure 1. Powdery mildew on cucumbers grown in a high tunnel.

Cucumber cultivars grown in high tunnels are parthenocarpic. Most of these cultivars are marketed as powdery mildew resistance. However, there are actually a wide range of different levels of resistance existed among parthenocarpic cultivars. In our trials, we found Japanese type cucumbers, especially cultivar Tasty Jade, was very susceptible to powdery mildew; Taurus was less susceptible than Tasty Jade, but much more susceptible compared to most Beit alpha (or mini) type, long English (or Dutch greenhouse) type and American slicer cucumbers. Comparing three long English cultivars in our evaluation, Kalunga was more susceptible compared to Camaro and Tyria. Among six Beit alpha cultivars, Jawell was more susceptible than Katrina, Socrates, Manny, Manar and Picolino. The four American slicer type cultivars Corinto, Lisboa, Alcazar and Sweet Success were relatively more resistant to this disease.

As a rule of thumb, powdery mildew shows up on the older leaves first. These leaves often no longer have significant contributions to plant growth and fruit production. If old leaves can be removed in a timely manner, the spread of this disease can be greatly delayed, especially on varieties that are less susceptible to powdery mildew. With an intensive pruning system (plants were trellised in a one leader system, older leaves were pruned weekly, leaving about 15 of the youngest leaves for fruit production), powdery mildew can be effectively controlled on most cucumber cultivars.

Although a variety may be listed as resistant, it is important to understand that cucumber resistance to powdery mildew is controlled by multiple genes, and is environmentally dependent. It was known that for some cultivars that show resistance to powdery mildew under high-temperature conditions, may loss resistance when grown in greenhouses from winter to spring. In those cases, controlling this disease with fungicide spray may be more effective.

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Fungicides and Lesions

(Dan Egel, egel@purdue.edu, (812) 886-0198)

Vegetable growers are used to scouting for pests such as spider mites and aphids. Growers have come to recognize the yellow leaves caused by spider mites and the curled leaves caused by aphids. Growers understand that even after spider mites and aphids are dead, the symptoms of the damage may remain on the affected leaves.

Whereas, a leaf distorted by aphids remains distorted even after the aphids are dead, a leaf with symptoms of a foliar disease such as anthracnose of watermelon or early blight of tomato typically contains viable spores even after repeated fungicide applications. So, what is the purpose of fungicide applications?

Contact fungicide applications with active ingredients such as chlorothalonil (e.g., Bravo®, Echo®, Equus®, Initiate®) or mancozeb (e.g, Dithane®, Manzate®, Roper®, Penncozeb®) are used to coat the surface of the leaf so that when spores land on a leaf, they are neutralized. While it is true that a contact fungicide may kill spores on the surface of a lesion, the fungus in the interior of the lesion typically remains alive. Products with copper are more effective against bacterial diseases than fungal diseases.

Systemic fungicides will move within a leaf. Some products may move from one side of a leaf to another. Other products may move a half inch or so in the direction of the growing tip of the plant. Some systemic fungicides will move into a small lesion before it starts to produce spores or even shortly after the lesion begins to produce spores. Large, easily visible lesions, however, are not likely to have the pathogenic fungus completely eliminated from the lesion.

When one looks at a lesion, the observed brown, necrotic lesion is where the fungal pathogen has begun to kill the tissue. If one had magic glasses, it would be possible to see

that the fungus most likely extends beyond the lesion to parts of the leaf that aren't brown yet. It is possible that an effective systemic fungicide may begin to act on the fungus from the edge of a lesion. In this way, the size of the effective lesion may be reduced. However, most visible lesions will still retain viable pathogen spores.

How do I know this? Because when I take a leaf with a lesion of, say, anthracnose of watermelon into the lab, I can often see spores being produced on the surface of the lesion. Sometimes, it is necessary to incubate the lesion in a humid plastic bag overnight before the spores become visible. In addition, I can easily isolate the spores from the lesion onto a Petri dish. Often these leaves have had repeated fungicide applications.

The purpose of fungicide applications is to slow down the spread of the disease primarily by protecting healthy green tissue. We know that without fungicides, the disease may, under conducive conditions, cause severe economic loss to the grower. However, fungicides are unlikely to cause the fungus in a lesion to be completely killed in the same way that an insecticide will kill an insect.

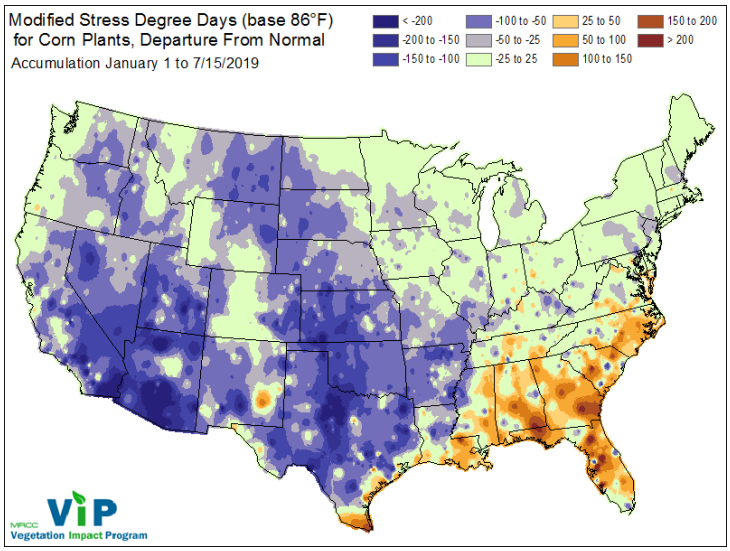
Much the same can be said of bacterial lesions. The bacteria in a lesion of bacterial spot of tomato, for example, are not likely to be completely killed by copper applications. The purpose of copper applications is to slow down the spread of bacterial spot. In fact, most copper applications are on the surface of the plant only.

The purpose of this article is not to discourage growers. However, it is helpful to know how fungicides help to slow down foliar diseases, even if it is not possible to kill all the pathogenic fungi in a field. Cultural management techniques like crop rotation and regular preventative fungicide applications will help to reduce disease pressure. In the case of cantaloupe and watermelon, the weather-based disease-forecasting program **MELCAST** will help growers to apply fungicides when they are most needed.

Indiana Climate and Weather Report

(Beth Hall, hall556@purdue.edu)

While the remnants of Hurricane Barry brought some much-needed precipitation to the state, the next few weeks look to be on the dry side. Temperatures are also expected to be warmer than normal, so heat stress may become an issue for plants and animals. The Midwestern Regional Climate Center's (MRCC) Vegetation Impact Program (VIP) provides a modified stress degree-day (mSDD) tool (https://mrcc.illinois.edu/VIP/indexSDD.html) for corn plants that accumulates degree-day units when temperatures exceed 86°F. Modified SDD departures indicate most of Indiana to be near normal (Figure 1), however, excessive heat is in the forecast so mSDDs are expected to accumulate quickly.



Drought-like conditions are developing, particularly in northern Indiana. While the excessive spring and early-summer rains saturated soils, the sudden dryness is causing some stress where plant roots were not able to deeply establish. These changing weather conditions could leave plants more susceptible to external stresses from pests and diseases.

Fun Fact: Indiana experiences an average of 7-14 days with a Heat Index greater than or equal to 90°F and 3-7 days with a Heat Index greater than or equal to 100°F (source: MRCC Heat Index Climatologies; https://mrcc.illinois.edu/clim/heatIndex/index.jsp) So far in 2019, the Indianapolis weather station has recorded 14 days with a Heat Index over 90°F and 2 days with a Heat Index at or above 100°F.

Upcoming Events

Small Farm Education Field Day at Purdue Student Farm

Date: August 1, 2019

Location: Purdue Student Farm, West Lafayette, IN 47907

The Purdue Student Farm is proud to announce its second annual Small Farm Education Field Day. The event is packed with educational sessions during the morning, followed by a tour and hands-on experiences on the farm. Topics of discussion throughout the day include basic planning tools for a sustainable small farm operation, testing and restoring soils in urban and peri-urban systems, scheduling crops in high tunnels, using different cover crops to build your soil, calculating profits and return on investment using enterprise budgets and food safety plants for small growers and

gardeners. During the afternoon there will be a rototiller versus power harrow, high tunnel tomato and sweet pepper production, leaf mold composting, vegetable wash station design, and solar dryer demonstrations.

Registration fee is $20.

Register here https://purdue.ca1.qualtrics.com/jfe/form/SV_3qQfl05iryF3COp

Registration closes July 29, 2019.

Greenhouse and Indoor Hydroponics Workshop

Date: September 5, 2019 8:00am-3:00pm

Location: Pfendler Hall- PFEN 241, Purdue University, 715 W State St. West Lafayette, IN 47907

You will learn about best varieties, nutrient recipes, production systems, artificial lighting and temperature needs for hydroponic lettuce produced in greenhouses and indoors. Attendees will tour our latest state-of-the-art greenhouse and indoor hydroponic facilities and experience many hands-on activities. Registration fee is $15.

Register here https://tinyurl.com/yxm5ttb9

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