VEGETABLE CROPS HOTLINE

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

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In This Issue

- Southern Rust on Sweet Corn in Indiana
- Bacterial Spot of Pumpkin
- Downy Mildew of Cucurbits in Michigan
- 2020 Indiana Small Farm Conference Call for Proposals
- Indiana Pesticide Clean Sweep Project
- How have YOU Built Your Business to Burst through Barriers?
- Upcoming Events

Southern Rust on Sweet Corn in Indiana

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

This article is modified from Darcy Telenko's article about field corn in a recent Purdue Pest and Crop newsletter.

Southern rust of corn is normally a disease of tropical areas. During summer months, however, the fungus which causes southern rust, *Puccinia polysora*, may move into Indiana or other Midwestern states. Southern rust has officially been confirmed in Posey and Vigo County. If you think you have this disease contact me or submit a sample to the PPDL **https://ag.purdue.edu/btny/ppdl/Pages/Submit-A-Sample.aspx**

Southern rust pustules generally tend to occur on the upper surface of the leaf, and produce chlorotic symptoms on the underside of the leaf (Figure 1). These pustules rupture the leaf surface and are orange to tan in color. They are circular to oval in shape. We are seeing a lot of common rust as well and both diseases could be present on a leaf.

Figure 1. Southern rust pustules on corn leaf. Pustules generally form and erupt on upper surface. (Photo by A. Sisson, Iowa State University).

Common rust will form pustules on both sides of the leaf. In addition, common rust pustules tend to be spread out across the leaf, and less densely clustered. Common rust pustules have a brick red to brown coloration and may be more elongated than southern rust pustules.

Check out the southern rust publication for more images of southern rust and other diseases that might mimic it. This publication also has good information on determining when a fungicide application will be beneficial. The publication is at following link: **https://crop-protection-network.s3.amazonaws.com/publications/cpn-2009-southern-rust.pdf.**

The fungus that causes southern rust requires a living host plant to survive. Thus, the fungus does not overwinter in Indiana and instead must be blown into the state. When conditions favor rust development, the disease may become severe in a short period. A new rust pustule can develop from an infection in just 9 days and each rust pustule can produce rust spores for about 8 days.

Infection by the southern rust fungus can take place after about 6 hours of leaf wetness. Therefore, dew can often provide sufficient leaf wetness. Southern rust is favored by high relative humidity and temperatures around 80°F.

Young leaves are more susceptible than mature leaves, so the development stage at the onset of southern rust will affect disease development. Other factors affecting disease severity are the susceptibility of the hybrid and the length of time weather conditions favor disease development.

Southern rust can cause yield loss since the causal fungus competes with the plant for nutrients. Rust pustules also rupture the leaves surface which may cause water loss. In severe cases, yield losses of up to 45% have been recorded.

While a few field corn hybrids possess resistance genes to southern rust, sweet corn hybrids are almost universally susceptible. Foliar fungicides can be effective at slowing the progress of southern rust. For field corn, fungicide applications when southern rust is detected after the milk stage are seldom economically beneficial. Therefore, late planted sweet corn is more likely to require fungicide applications.

Fungicide information for sweet corn may be found in the **Midwest Vegetable Production Guide for Commercial Growers** (ID-56) **mwveguide.org**. Several fungicides are listed; contact me for more information.

Bacterial Spot of Pumpkin

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

I have observed this disease in scattered commercial pumpkin and squash fields across Indiana.

Symptoms: Bacterial spot causes ⅛-¼ inch angular leaf lesions that are white to light brown in color (Figure 1). These leaf lesions may be accompanied by yellowing (chlorosis). The more important symptom are the lesions on fruit that are scabby to raised, round and a light brown in color. These lesions are often less than ⅛ inch in diameter and do not extend into the surface of the fruit. However, lesions may become secondarily infected in which case lesions can become an inch or more in diameter. Such lesions may grow into the flesh of the fruit (Figure 2). Any type of fruit lesion can ruin the marketability of the fruit.

Figure 1. Bacterial spot can cause mostly light colored angular lesions on pumpkin leaves.

Figure 2. Bacterial spot of pumpkin can cause necrotic lesions on pumpkin fruit. The larger lesion has probably been infected with a secondary fungus.

Biology: Leaf lesions, while unimportant economically, are important in diagnosing bacterial spot before fruit is present. This head start allows growers to begin preventive measures. The idea behind such measures is to slow the spread of leaf lesions in which the bacteria survive and grow. Fruit lesions often begin when bacteria splash from the leaf to the fruit. Fruit remain susceptible to lesions of bacterial spot until about 14 days post pollination.

Management: Foliar applications of a copper product, usually copper hydroxide or copper sulfate, should be applied once the leaf lesions of bacterial spot have been confirmed or when pumpkin plants have reached the bush stage if the disease threatens. That is, don't wait to start copper applications if one expects bacterial spot to occur either because of field history or some other factor. Applications of a copper product are more likely to be more effective if applied with a mancozeb product. Dithane® and Manzate® are mancozeb products that are labeled on pumpkins.

Another product that is labeled for bacterial spot of pumpkins is Actigard®. Actigard® is a product that 'tells' the plant it is under attack. The active ingredient itself is not active against any fungus or bacterium. Instead, it starts the plant's defense system. So, in the case of bacterial spot, we would hope it sends a signal to the plant to start producing plant compounds that help slow the disease. There is data to support the use of Actigard®. Otherwise, it wouldn't be labeled. However, Actigard® can also lower yields if applied when the plant is under stress. That's why there are specific restrictions on the label. For example, only apply Actigard® to healthy plants and do not apply more than 8 oz. per acre per year. Actigard® is labeled for pumpkins for bacterial spot and angular leaf spot as well as other diseases: powdery mildew, downy mildew, bacterial fruit blotch, etc. But I would use it only for bacterial spot and angular leaf spot. If you decide to use Actigard® for bacterial spot, Apply Actigard® once at two weeks before first female flower and again at first female flower.

All the fungicides in the world, however, will not reduce bacterial spot problems if there has not been proper crop rotation. After a pumpkin crop, growers should keep fields out of cucurbits from 3-4 years. This is, perhaps, the most important management decision for bacterial spot.

The literature on the seed borne nature of the bacterial spot pathogen is not clear. However, it makes sense not to save seed from pumpkins that were grown in a field with bacterial spot. Closely monitor seedlings for symptoms of bacterial spot.

I will be happy to answer any questions about bacterial leaf spot of pumpkins or any of the compounds mentioned.

Downy Mildew of Cucurbits in Michigan

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

Cucurbit downy mildew has been observed on cucumber in the southwest corner of Michigan, just across the border from La Porte County and LaGrange Counties, Indiana. All cucurbit growers in Indiana should be scouting for downy mildew. Cucurbit growers in northern Indiana should be managing for downy mildew.

The organism that causes downy mildew of cucurbits doesn't overwinter in Indiana. It has to be blown in every year. It is common for downy mildew to start the season in the Gulf States and migrate north with the cucurbit crops. Downy mildew apparently overwinters in northern Michigan/southern Ontario in greenhouses where cucumbers are grown year round. Therefore, downy mildew is often found in Michigan before it is found in Indiana. In most years, the downy mildew fungus will blow from southern Michigan to Ohio before it tracks south.

Many cucumber varieties have some resistance to downy mildew. For susceptible cucumber varieties or other types of cucurbits, specialized systemic fungicides will help to reduce the severity of downy mildew. Unfortunately, many of the most effective systemic fungicides for downy mildew are not effective on our more common cucurbit diseases. This is because the organism that causes downy mildew, *Pseudoperonospora cubensis*, is not really a fungus at all. *P. cubensis* is more closely related to a brown algae. This fungus-like organism is related to the organism that causes Phytophthora blight (*Phytophthora capsici*). Therefore, many of the same fungicides that are effective against downy mildew are also effective against Phytophthora blight.

The Midwest Vegetable Production Guide for Commercial Growers lists several products that will help to slow the progress of downy mildew of cucurbits. Among the products listed as likely to be effective against downy mildew include: Elumin®, Forum®, Gavel®, Orondis Opti®, Orondis Gold®, Orondis Ultra®, Ranman®, Zampro® and Zing®. Be sure to check the label for the re-entry interval, the pre-harvest interval, the FRAC group and other important information. Always alternate FRAC groups.

An extension bulletin that describes downy mildew in more detail can be found at https://www.extension.purdue.edu/extmedia/BP/BP-140-W.pdf

One other item of interest: Downy mildew of cucurbits is not caused by the same organism which causes downy mildew of soybeans. Therefore, downy mildew of soybeans will not spread to the pumpkin field immediately adjacent.

Below, find a photo of downy mildew of cucumber. Note that the yellow lesions are not concentrated on the edge of the leaf. (Figure 1) Under moist conditions the underside of the lesions will have the dark, fuzzy growth of the fungus-like organism that causes downy mildew (Figure 2).

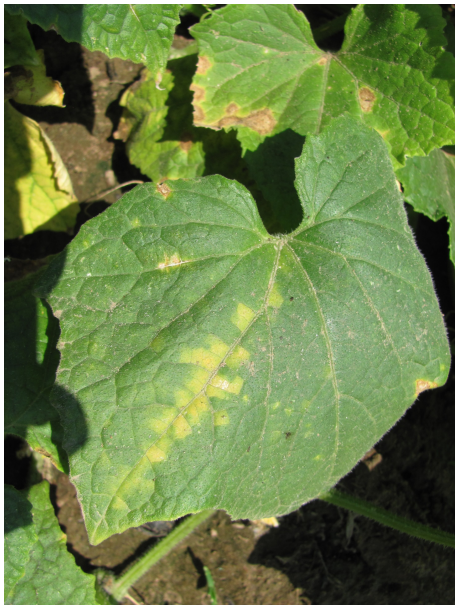


Figure 1. Downy mildew of cucumber can be recognized by the yellow angular lesions on the top of the leaf.

Figure 2. Downy mildew of cucumber causes a fungal-like growth on the underside of the leaves in moist conditions. (Photo by L. Maynard).

2020 Indiana Small Farm Conference Call for Proposals

(Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

The 2020 Indiana SFC is coming March 5-7, 2020, in Danville, Indiana. We are now accepting proposals for oral presentations, workshops, tours and posters. The deadline to submit is Friday, August 30, 2019. Attendees are interested in practical knowledge that can be applied to their operations to increase the environmental sustainability and economic viability of their businesses.

This is the premier conference in Indiana where small farmers of all kinds have opportunities to network with fellow Indiana farmers and learn about advancements relevant to their operations, **this is what makes the Indiana SFC special**. We hope you'll consider submitting a proposal to present next year and share your knowledge, passion, and innovation with others!

This is an open call to **farmers**, **educators**, **researchers**, and other **agricultural professionals** or **stakeholders** in the small-

farm space. Vegetable production, livestock (grazed, urban, etc.), food safety, marketing, value-added products, farm viability and land access are all topics of interest to attendees. If you would like to share about strategies that have been successful on your farm, we want to hear from you! Farmer to farmer knowledge sharing is something we pride ourselves in.

All proposals should cover:

- Timely, practical farming content
- Best practices
- Successes and failures, and / or
- Research relevant to the small-scale and diversified farming community

The link below includes detailed information about the proposal process and our session / workshop formats. Please read **all of this information** prior to submitting your proposal; our planning committee treats completed applications as confirmation that you have read, understood, and agreed to this information.

Get Detailed Information and Submit Your Proposal HERE

Questions? Contact Laura Ingwell at **lingwell@purdue.edu** or (765) 494-6167.

Indiana Pesticide Clean Sweep Project

WHAT: An Indiana Pesticide Clean Sweep Project designed to collect and dispose of suspended, canceled, banned, unusable, opened, unopened or just unwanted pesticides (weed killers, insecticides, rodenticides, fungicides, miticides, etc.) is being sponsored by the Office of Indiana State Chemist (OISC). This disposal service is free of charge up to 250 pounds per participant. Over 250 pounds there will be a $2.00 per pound charge. This is a great opportunity for you to legally dispose of unwanted products at little or no cost.

WHO: All public and private schools, golf courses, nurseries, farmers, ag dealers, cities, towns, municipalities and county units of government or others receiving this notice are eligible to participate.

WHEN: 9:00 a.m. to 3:00 p.m., Local Time

WHERE: August 13, 2019: Monroe County Fairgrounds in Bloomington, IN

August 14, 2019: East Side Park/Daviess County 4-H Building in Washington, IN

August 15, 2019: Shelby County Fairgrounds in Shelbyville, IN

August 20, 2019: LaPorte County Fairgrounds in LaPorte, IN

August 21, 2019: Huntington County Fairgrounds in Huntington, IN

August 22, 2019: Hendricks County Fairgrounds in Danville, IN

HOW: Complete the Pesticide Clean Sweep Planning Form to the best of your ability. Mail, fax or e-mail the completed form to Garret Creason at (765) 494-4331 or gcreaso@purdue.edu no later than Monday, August 1, 2019. Then bring your labeled, leak free and safe to transport containers to the collection site. DO NOT mix materials. In case of an emergency, you should bring with you a list of products you are carrying and a contact phone number. Clean Sweep details (PDF) Clean Sweep Form (PDF)

***NOTE:** OISC reserves the right to cancel this Pesticide Clean Sweep Project if there is not adequate demand. Participants submitting the Clean Sweep Planning Form by August 1, 2019 will be contacted immediately if cancellation is necessary.

How have YOU Built Your Business to Burst through Barriers?

(Elizabeth Alexander, alean42@purdue.edu)

We know as a business owner, your time is valuable and in short supply, but if you can please spare 15 minutes to answer a few questions, we would like to invite you to participate in a Purdue Agricultural Sciences Education and Communication study entitled “Obstacles Encountered and Overcome by Indiana Entrepreneurs in Niche Agricultural Markets.” We are interested in the experiences of small business owners who market agricultural products directly to consumers and seek their insight on business resources, processes, and achievements. All responses will be kept confidential and will be used for a graduate research thesis to further research and support local agricultural businesses.

The survey can be found and completed at this link: https://purdue.ca1.qualtrics.com/jfe/form/SV_5bh6sFdN66hHiPH

Upcoming Events

Vegetable Field Day at Pinny Purdue Ag Center

Date: Aug. 13, 5:00 pm CDT.

Location: Pinney Purdue Ag Center. 11402 S. County Line Rd., Wanatah, IN 46390. Just north of US 30 between LaPorte and Porter Counties

The public and those who raise vegetables commercially or as a hobby are invited to a vegetable and high tunnel field day on Tuesday, August 13, at Pinney Purdue Ag Center (PAC), 11402 South County Line Road, Wanatah. This Purdue Extension program begins at 5:00 pm CDT.

Participants will hear some presentations from Purdue specialists then can choose a track on vegetable production or utilizing fresh vegetables. Laura Ingwell, Purdue Extension entomologist, will provide tips on organic insect management and will discuss the melon pollinator research project she is overseeing at Pinney PAC. Liz Maynard, Purdue Extension commercial vegetable specialist, will review and demonstrate the benefits of biodegradable plastic mulch for use with vegetables.

On the vegetable production track, Liz will discuss tips for raising pumpkins using cover crops and a no-till system. She will also review the traits of a number of sweet corn varieties planted at Pinney PAC. Laura will discuss extending the growing season with the use of high tunnels and will have tips on insect management when using this technique.

For those interested more in enjoying the raised vegetables in a meal, folks can follow the track that will discuss raising heirloom vegetables, showing off the heirloom vegetable garden that was planted for Pinney PAC's centennial year in 2019. Annetta Jones, Purdue Extension educator from Porter County, will share some of her garden fresh recipes and how best to harvest and use fresh vegetables in meals.

Credits have been approved for private (PARP) and commercial (CCH) applicators. Crop advisers can also get continuing education units for attending the program. Please bring your license with you and $10 for PARP credit.

A meal that includes taste testing varieties of sweet corn will follow the educational program. Those interested are asked to register for the program by Tuesday, August 6th, by emailing nikky@purdue.edu or calling the Porter County Extension office at (219) 465-3555 or the La Porte County Extension office at (219) 324-9407. There will be a **$5 registration fee** collected at the door (**cash or check only**). Those 18 and younger are free with an accompanying adult.

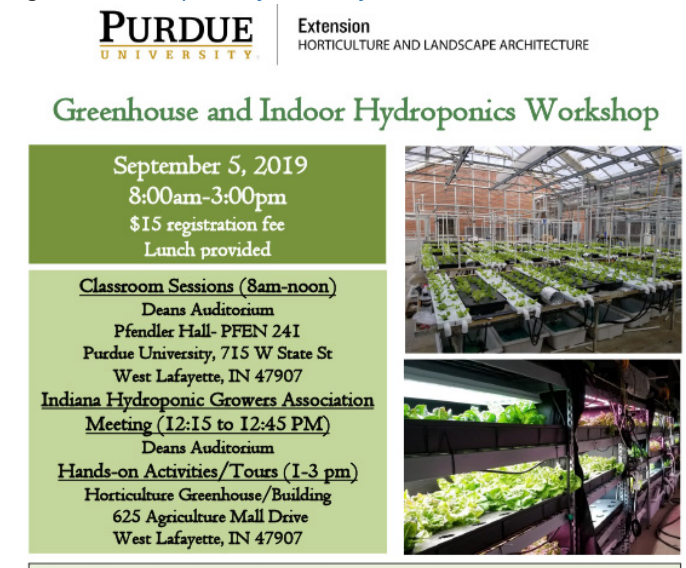
Greenhouse and Indoor Hydroponics Workshop

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

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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