

# VEGETABLE CROPS HOTLINE

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



Issue 619 - August 18, 2016

## In This Issue

- [Cucurbit Downy Mildew Found in Indiana](#)
- [Corn Earworm](#)
- [What's Causing My Water Test Results to Change?](#)
- [Temperature and Light Intensity in a High Tunnel Covered with 30% Black Shade Cloth](#)
- [High Tunnel Evaluation of Vertically-Grown Cantaloupe and Galia Melon Varieties and the Development of Best Production Practices for Indiana](#)
- [The 2017 North Central Region - Sustainable Agriculture Research Calls for Proposals are Now Open](#)
- [Pollinator Survey](#)
- [Upcoming Events](#)

## Cucurbit Downy Mildew Found in Indiana

(Dan Egel, [egel@purdue.edu](mailto:egel@purdue.edu), (812) 886-0198)

Cucurbit downy mildew has been observed on cucumber and cantaloupe near Wanatah, in La Porte County, Indiana. Downy mildew has also been confirmed on cucumber in St. Joseph County Michigan, just northeast of Elkhart, Indiana as well as on processing pumpkin in central Illinois. Downy mildew of cucurbits has also been reported in southern and central Kentucky and north-central Ohio. All cucurbit growers in Indiana should be scouting and 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.

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: Forum<sup>®</sup>, Gavel<sup>®</sup>, Orondis Opti<sup>®</sup>, Orondis Gold<sup>®</sup>, Orondis Ultra<sup>®</sup>, Ranman<sup>®</sup>, Revus<sup>®</sup>, Zampro<sup>®</sup> and Zing<sup>®</sup>. 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.

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.

This article

<https://vegcropshotline.org/article/pumpkin-disease-management-steps/> has photos of downy mildew of pumpkin. Below, find a photo of downy mildew of cucumber. Note that the yellow lesions are scattered across the leaf, not concentrated on the edge of the leaf. As mentioned in the article linked above, under moist conditions the underside of the lesions will have the dark, fuzzy growth of the fungus-like organism that causes downy mildew.



Figure 1: Downy mildew of cucumber can be recognized by the yellow lesions scattered across the leaf. Downy mildew of cucurbits has been reported in Indiana.

## Corn Earworm

(Rick Foster, [fosterre@purdue.edu](mailto:fosterre@purdue.edu), (765) 494-9572)

After a season of relatively low corn earworm activity, pheromone trap catches have taken a dramatic turn upward, especially in the northern half of the state. Catches of 100-200 moths per night in

the trap are not uncommon currently. Keep in mind that the threshold for treatment is 10 moths per night, so these catches would be 10-20X the threshold. At this point, growers with late sweet corn should be beginning treating when about 30-50% of the plants are showing silks. Sprays should be applied every 2-3 days until silks turn brown. It takes 3 days for eggs to hatch so a reasonable question would be, why spray every 2 days? Really what it becomes at this point is a numbers game. Even the best insecticide applied at the highest rate with excellent coverage will not provide 100% control. When counts are near the threshold the number of escapes is relatively low and tolerable. When you multiply the number of hatching eggs by 10 or 20-fold, the number of escapes is likely increased by a similar amount and that becomes intolerable. Spraying a little more frequently will help to reduce the number of escapes. The best products we have seen in our trials, since the development of resistance to the pyrethroids, are Coragen®, Radiant®, and Belt®. If you use the high rate of these products, and you should, you cannot stick to a single product because of limitations on the total amount that can be used per acre per season. So that means you will need more than one of these products. Some growers have asked if tank mixing a pyrethroid is useful during this late surge of activity. While I wouldn't recommend that during the early season, I think that may be beneficial now because the pyrethroids will provide control of earworms that do not exhibit resistance.

---

## What's Causing My Water Test Results to Change?

(Scott Monroe, [jsmonroe@purdue.edu](mailto:jsmonroe@purdue.edu), (812) 886-0198)

I have recently received calls from growers who use surface water to irrigate produce crops. Their concern was that the results of their current water tests were very different from their last tests and that levels of indicator organisms appeared to have increased dramatically.

Ponds and lakes that are used for irrigation can be very dynamic. Research has shown that levels of indicator organisms can change dramatically in a very short time. Because surface water is open to the environment and unprotected, changes in temperature and weather can affect ponds and lakes. During the spring and autumn seasons, ponds and lakes undergo inversions, stirring up sediments that have settled on the bottom of the pond. Rainfall can also cause bottom sediments to be stirred up. Bottom sediments may contain any number of materials. Soil particles from runoff are one of the primary components. Decaying bits of plant and animal debris may also be found in bottom sediments. These sediments can also contain indicator organisms such as coliforms or generic *E. coli*. When ponds and lakes experience a change in climate or large amounts of rainfall, all the material found in the bottom sediments, including indicator organisms, is stirred up. Water samples collected during these time periods may have test results that indicate elevated levels of indicator organisms.

Increases in levels of indicator organisms generally follow a large

rainfall event. Not only are bottom sediments stirred up by the rainfall, but runoff from neighboring farms, fields, and pastures can also introduce additional material into the water. Fortunately, we seldom need to irrigate immediately after a large rainfall event, as soils are usually saturated. Over time, sediments will settle back to the bottom of the pond and the water will clarify. Growers who are using surface water and see elevated levels of indicator organisms in their water test results should do the following:

1. Immediately survey the watershed surrounding your irrigation water source. In particular, look for new potential sources for contamination. Has livestock been pastured for the summer in areas that drain into the pond? Has anything changed in the watershed since the last test? These are questions to ask as you survey the areas surrounding your irrigation water source.
2. If no new sources of potential contamination can be found, check to see if the water source experienced any rainfall event just prior to testing.
3. Make sure irrigation intakes are elevated. Drawing water from the bottom of the water source will stir up sediments and cause them to be taken into the irrigation system. Ideally, intake lines should be located in deeper water and at least 18 inches off the bottom of the water source. If shallower water is used, intakes should be between the surface of the water and the bottom.
4. Wait at least 2-3 days after a rainfall event before irrigating. This will give the water time to clarify and allow sediments to start to settle back to the bottom.
5. Collect an additional water sample and submit for testing as close to irrigating as possible. This will give a more accurate assessment of the water that is going to the crop after sediments have started to settle.
6. Drip irrigation will prevent splashing and, in many cases, will prevent water from contacting the edible portion of the crop. This will help to reduce the risk of contamination from irrigation water regardless of test results.
7. If additional test results indicate that levels of indicator organisms are not decreasing, growers should try to locate an alternative source of irrigation water.

If you have questions or issues concerning your irrigation water, feel free to contact me at the Southwest Purdue Agricultural Center at (812) 886-0198 or on my mobile phone at (765) 427-9910.

---

## Temperature and Light Intensity in a High Tunnel Covered with 30% Black Shade Cloth

(Wenjing Guan, [guan40@purdue.edu](mailto:guan40@purdue.edu), (812) 886-0198)

We have discussed the pros and cons of using shade cloth for growing high tunnel tomatoes in this article <https://vegcropshotline.org/article/whether-to-put-shade-cloth-on-high-tunnel-tomatoes/>

Shade cloth helps with reducing temperatures inside the high tunnel. But it also reduces light intensity that is essential for photosynthesis. To better understand to what extent can temperature and light reduced with a shade cloth applied on top of a high tunnel, We did a comparison this summer at Southwest Purdue Agricultural Center, Vincennes, IN, with one high tunnel applied with 30% black shade cloth, and the adjacent one did not (Figure 1). The following figures (Figure 2 and 3) illustrate how temperature and light levels in the high tunnel were affected by the shade cloth in a typical sunny (July 23) and a cloudy day (July 2).



Figure 1. A 30% black shade cloth was added to one of the high tunnels

On both days, about 10 degree difference of maximal temperatures were observed between the two tunnels. On the sunny day of July 23, the highest temperature recorded in the high tunnel without shade cloth was 119 °F, while the highest temperature in the high tunnel with shade cloth was 109 °F. On the cloudy day of July 2, maximal temperature in high tunnels without and with shade clothes were 97 °F and 88 °F, respectively. On both days, shade cloth did not affect the night temperatures. The difference of light intensities varied dramatically during the day. When light intensity was high (above 6,000 lum/ft<sup>2</sup>), the shade cloth reduced light intensity more than 60%, even though the shade cloth used in this case was marketed as 30% shade. During cloudy period, for example in the afternoon of July 2, light reduction was around 30%.

We applied the shade cloth in middle June without taking it off throughout the summer. We observed less yellow-shoulder tomatoes compared with the previous years. However, extended internode of tomato plants indicate the plants are suffering from light stress. In addition, the extended shoot length increase plant height. We need to tie the tomatoes (determinate type) more frequently to prevent them falling down. With this observations, we suggest growers using shade cloth with caution. Only use shade cloth with moderate shade levels (30% or less), and if it is possible, apply it in the days when maximal temperature is above 90 °F and take them off when temperature drops.

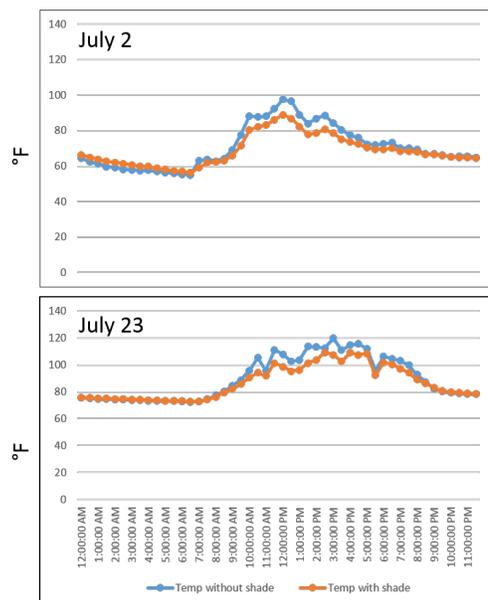


Figure 1. Temperatures in high tunnel with and without shade in a typical sunny and a cloudy day in the summer 2016.

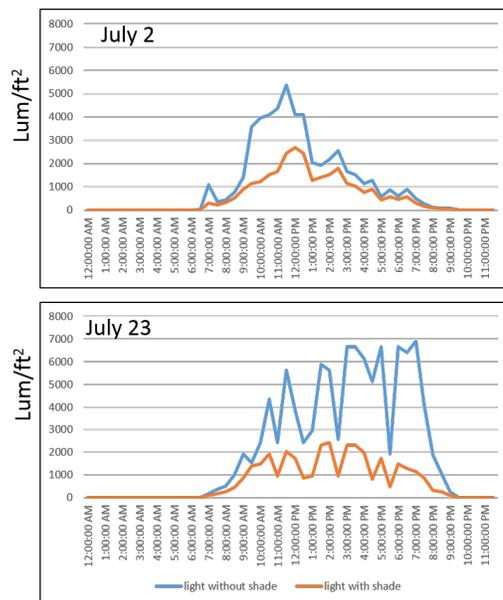


Figure 2. Light intensity in high tunnels with and without shade cloth in a typical cloudy (July 2) and a sunny day (July 23) in the summer 2016.

## High Tunnel Evaluation of Vertically-Grown Cantaloupe and Galia Melon Varieties and the Development of Best Production Practices for Indiana

(Petrus Langenhoven, [plangenh@purdue.edu](mailto:plangenh@purdue.edu), (765) 496-7955)

Indiana is a very important player in the domestic melon market. The total acreage planted in Indiana peaked in 1997 at 3,600 acres. In that year the total production was 455,000 cwt with an average income of \$16.00 per cwt. The total farm value of

production was \$7,280,000 (\$2,022 per acre). Yield has increased since 1997 from 130 cwt per acre to more than 200 cwt per acre in 2014. The Indiana melon growers have lost a significant share of the melon market since the 2011 and 2012 food borne illness outbreaks. Compared to 2011, the acreage planted and production in 2015 decreased by 900 acres and 52% (300,000 cwt), respectively.

### **Quick Facts about Indiana Cantaloupe**

- Transplant Production: March/April
- Planting Season: April – June
- Harvest Season: June – Sept.
- Plant Population (2.5 ft. x 6 ft.): 2,904 plants per acre
- Total acres planted: 2,100 acres (2013), 1,900 acres (2014), 1,800 acres (2015)
- U.S. ranking in 2015: 4<sup>th</sup> in terms of production
- Yield: 230, 220 and 160 cwt per acre in 2013, 2014 and 2015, respectively
- Average price per melon: \$0.70 – \$1.10
- Value of production in 2013: \$11,500,000 (\$5,476 per acre)
- Value of production in 2014: \$5,980,000 (\$3,147 per acre)
- Value of production in 2015: \$7,616,000 (\$4,231 per acre)
- Production (cwt) 2013: 460,000 (\$25.00 per cwt)
- Production (cwt) 2014: 396,000 (\$15.10 per cwt)
- Production (cwt) 2015: 272,000 (\$28.00 per cwt)

\*Sources:

-USDA National Agriculture Statistics Service.

-Melon Production in Southwestern Indiana. Scott Monroe, Food Safety Educator, Purdue Extension

-Vegetables. 2015 Summary. USDA National Agriculture Statistics Service. February 2016



Figure 1. Melons planted at Meig's in coconut coir slabs (May 10, 2016)

The decrease in acreage and market share, and the associated risk of food borne illness made me think of possible solutions that can be used to increase farm income and market share for Indiana growers. During the past summer I initiated research that aims to diversify the product range of Indiana melon growers (Figure 1). All research activities are focused on the development of a unique market segment for Indiana melon growers, targeting

the development of a market that requires smaller fruit (personalized melons) of very high quality. The research will demonstrate that through the use of high tunnels or greenhouses growers will be able to get melons earlier on the market and increase yield while keeping quality undeniably high. Initially the research will focus on variety evaluations in soil or soilless production systems in high tunnels, where the plants are trellised vertically (Figure 2). Growing melons vertically has been done very successfully in Spain, South Africa and other parts of the world. Between 1998 and 2008 Dr. Daniel Cantliffe and other collaborators from University of Florida also looked into the vertical production of Galia-type melons in passive ventilated greenhouses in North-Central Florida. The research will aim to establish the best production practices for high tunnel and greenhouse growers in Indiana. It will also look at the suitability of other melon types i.e. Charentais, Italian netted, fully netted cantaloupe's and sutured cantaloupes. Important criteria for variety selection include (1) high brix, good color, flavor and firmness; (2) fruit with exceptional nutritional value; (3) long shelf life (transport well) and (4) weight in the range of 2-4 lbs. Furthermore, an agricultural production economist will do a complete life cycle analysis to determine the profitability of the proposed production system.



Figure 2: Melons 4 weeks after transplanting

During May 2016 trials were planted at the HLA Plant Growth Facility on campus (greenhouse), at Meig's Farm which is part of the Throckmorton Purdue Agriculture Center (high tunnel), and at the Purdue Student farm (high tunnel). Enza Zaden provided germplasm for the variety trial. Eight varieties, of which six have never been grown in the U.S. before, are being evaluated (Figure 3 and 4). On campus and at Meig's plants were grown with hydroponic techniques in soilless medium culture using coconut coir as substrate. At the Student Farm plants were grown in the soil. Plant, yield and quality data were collected and are now being analyzed. Several issues were encountered throughout the growing season of which powdery mildew and bacterial wilt were the biggest challenges. I will share some of the preliminary results of the trials in forthcoming issues.



Figure 3: Tirreno, an Italian netted variety, orange flesh color



Figure 4: Magnificenza, another Italian netted variety, orange flesh color

share project results. Sustainable agriculture is good for the environment, profitable, and socially responsible. Projects should emphasize research or education/demonstration.

There are three types of competitive grants: individual grants (\$7,500 maximum), team of two grants for two farmers/ranchers from separate operations who are working together (\$15,000 maximum), and group grants for three or more farmers/ranchers from separate operations who are working together (\$22,500 maximum).

NCR-SARE will be accepting online submissions for the Farmer Rancher Grant Program. More information about the online submission system can be found in the call for proposals.

Interested applicants can find the call for proposals online as well as useful information for completing a proposal at <http://www.northcentralsare.org/Grants/Our-Grant-Programs/Farmer-Rancher-Grant-Program> You can find more information about sustainable agriculture at <http://www.sare.org/>.

Proposals are due on December 8, 2016 at 4 P.M. CST.

If you have questions about the Farmer Rancher grant program or just want to discuss a project that you might have in mind I am always happy to discuss these with you at your convenience. Feel free to contact me - Roy Ballard, Purdue Extension Educator, ANR Hancock County and Indiana SARE Coordinator- by calling (317) 462-1113 or by e-mail at [rballard@purdue.edu](mailto:rballard@purdue.edu) .

Potential applicants should also contact me if they need a hard copy or an email version of the call for proposals. Revisions are made to calls for proposals each year, which means it is crucial to use the most recent call for proposals and application.

I will be scheduling a FREE webinar to discuss this grant and others in more detail in the next month. Please know if you would like to participate.

---

## Pollinator Survey

(Wenjing Guan, [guan40@purdue.edu](mailto:guan40@purdue.edu), (812) 886-0198)

Important Input Needed! *Clear Choices Clean Water*, in cooperation with the Office of the Indiana State Chemist and the Purdue Pesticides Program, is conducting a survey to guide state-wide pollinator protection efforts. How does this impact you? More than 1/3 of all plants or plant products consumed by humans are dependent on insects for pollination. Please help impact future protection efforts by participating today. The first 500 respondents get a FREE 2-ounce bottle of local honey!

The pollinator survey is at

<https://www.surveymonkey.com/r/pollinate>

This information is adapted from official announcement of the survey.

---

---

## The 2017 North Central Region - Sustainable Agriculture Research Calls for Proposals are Now Open

(Roy W Ballard, [rballard@purdue.edu](mailto:rballard@purdue.edu), (317) 462-1113)

Farmers and ranchers in the North Central region are invited to submit grant proposals to explore sustainable agriculture solutions to problems on the farm or ranch. Proposals should show how farmers and ranchers plan to use their own innovative ideas to explore sustainable agriculture options and how they will

# Upcoming Events

(Wenjing Guan, [guan40@purdue.edu](mailto:guan40@purdue.edu), (812) 886-0198)

## High Tunnel Tour at SWPAC

*Date:* August 22, 2016 7:00 P.M. to 8:30 P.M. (EST)

*Location:* Southwest Purdue Agricultural Center, 4369 North Purdue Road, Vincennes, IN 47591

Please join us for a high tunnel tour at the Southwest Purdue Ag Center. You will learn about high tunnel tomato diseases and management, end of season field sanitation, potential of grafting in high tunnel tomato production, use of shade cloth and sprayer calibration.

*Please feel free to bring samples for disease identification.*

The tour is free, to register please call (812) 886-0198. *If you need transportation, please let us know.* For more information please contact Dan Egel at [egel@purdue.edu](mailto:egel@purdue.edu) or Wenjing Guan at [guan40@purdue.edu](mailto:guan40@purdue.edu).

## Beginning Farmer Southeast Regional Workshop

*Date:* August 20, 2016, noon -7:30 P.M. (EST)

*Location:* Purdue Polytechnic-New Albany, 3000 Technology Ave, New Albany, IN 47150

The workshop will cover a wide range of topics including high tunnel and hoop houses, food safety, vegetable production, pricing products, beginning farmer resources and beekeeping. A southern style barbecue will be provided. The workshop is free, register online at the Purdue Extension Education Store ([https://edustore.purdue.edu/wk\\_rules.asp?itemID=22539](https://edustore.purdue.edu/wk_rules.asp?itemID=22539)) or call (765) 494-6795.

It is the policy of the Purdue University Cooperative Extension Service that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue is an Affirmative Action Institution. This material may be available in alternative formats. 1-888-EXT-INFO Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.

## Illinois Pumpkin Field Day

*Date:* August 31, 2016, 10:00 A.M. (CST)

*Location:* Ewing Demonstration Center, 16132 N. Ewing Rd; Ewing, IL 62836

Topics include variety selection, disease, and weed management, marketing and overall crop management. Registration will open at 9 A.M., with the welcome starting at 10 A.M. 2016 Illinois Pumpkin Field Day is free to the public and lunch is included. Registration is required, please register by calling (618) 687-1727 or online at <https://web.extension.illinois.edu/registration/?RegistrationID=14998> by Friday, August 26, 2016.

## Beginning Farmer Tour

*Date:* September 29, 2016

*Location:* [River Ridge Farm](#), Roann, IN.

This four-season farm produces vegetables and small fruits. The tour will include information about operating an on-farm store, farm-to-school, and four-season growing. The tour will be 9 A.M. - 3:30 P.M. (EST). Lunch will be served. The tours are free, but registration is required. Registration at [https://mdc.itap.purdue.edu/wk\\_rules.asp?itemID=22368](https://mdc.itap.purdue.edu/wk_rules.asp?itemID=22368)

## 7<sup>th</sup> National Small Farm Conference

*Date:* September 20-22, 2016

*Location:* Virginia Beach Convention Center, Virginia Beach, VA

More information about the conference can be found at <http://www.vsu.edu/nationalsmallfarmconference/>

Vegetable Crops Hotline © Purdue University - [vegcropshotline.org](http://vegcropshotline.org)

Editor: Wenjing Guan - 4369 N. Purdue Road Vincennes, IN 47591 | (812) 886-0198 | [guan40@purdue.edu](mailto:guan40@purdue.edu)

# Southwest Purdue Ag Center (SWPAC)

4369 N. Purdue Road Vincennes, IN 47591

Monday August 22, 2016

## High Tunnel Tour

7:00 PM – 8:30 PM (EST)

Topics to be covered:

- High tunnel tomato diseases and management
- End of season field sanitation
- Potential of grafting in high tunnel tomato production
- Use of shade cloth
- Sprayer calibration

*Please feel free to bring samples for disease identification*

Tour is free, to register please call:

Southwest Purdue Ag Center

(812) 886-0198

If you need transportation or more information please contact:  
Dan Egel (egel@purdue.edu) or Wenjing Guan (guan40@purdue.edu)

