

# VEGETABLE CROPS HOTLINE

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



Issue: 665  
August 29, 2019

## In This Issue

- [Welcome Dr. Stephen Meyers](#)
- [Downy Mildew of Watermelon was Observed in Indiana](#)
- [Wilting Cucurbits! What could it be?](#)
- [Sweet Corn Insect Observations](#)
- [Hover Flies](#)
- [National Farm Safety and Health Week, September 15-21, 2019](#)
- [Indiana Climate and Weather Report](#)
- [Upcoming Events](#)

## Welcome Dr. Stephen Meyers



Dr. Stephen Meyers

Earlier this month Dr. Stephen Meyers joined the faculty in the Department of Horticulture and Landscape Architecture as an Assistant Professor. His research and extension efforts will focus on weed management in specialty crops. Before returning to Purdue he served as an Associate Extension/Research Professor and Sweetpotato Extension Specialist with Mississippi State University where he conducted practical crop production, pest management, and

value-added research to address stakeholder concerns and needs. He also co-managed a 640 acre research station in North Mississippi that focused on sweetpotato, cotton, corn, and soybean research. Stephen grew up in Rensselaer, Indiana (Jasper County) and earned a Bachelor of Science degree from Purdue University in 2007 where he majored in Horticultural Production and Marketing and minored in Weed Science. Upon graduation, he pursued a M.S. and Ph.D. in Horticulture at North Carolina State University (2009 and 2012, respectively) conducting weed management research in numerous vegetable, small fruit, and tree fruit crops. Dr. Meyers will conduct research in weed biology, weed-crop interactions, herbicide tolerance, and integrated weed management strategies and provide the state's specialty crop producers with timely, research-based weed management recommendations. He looks forward to meeting the state's specialty crop producers and working collaboratively to address their weed-related concerns.

Dr. Meyers can be reached by email ([slmeyers@purdue.edu](mailto:slmeyers@purdue.edu)) or phone (765) 496-6540. Also, you can follow Dr. Meyers on Twitter (@stephenlmeyers).

## Downy Mildew of Watermelon was Observed in Indiana

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

Downy mildew of watermelon has been observed on watermelon in Knox County in southwestern Indiana. Downy mildew of cucurbits has also been reported in southwestern Michigan on the Indiana border and central Missouri. 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 because it requires living plant tissues. That means that the fungus-like organism that causes downy mildew 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.

On pumpkin and cucumber, downy mildew causes angular yellow lesions on leaves (Figure 1). Lesions on cantaloupe and watermelon tend to be diffuse and amorphous. On any host, the lesions may coalesce, producing large areas of diseased tissue that may turn brown. On wet mornings or after a rain, downy mildew lesions on the undersides of leaves may be covered with a dark “fuzz”— the result of spore production (Figure 2). Downy mildew does not cause lesions on stems or fruit.

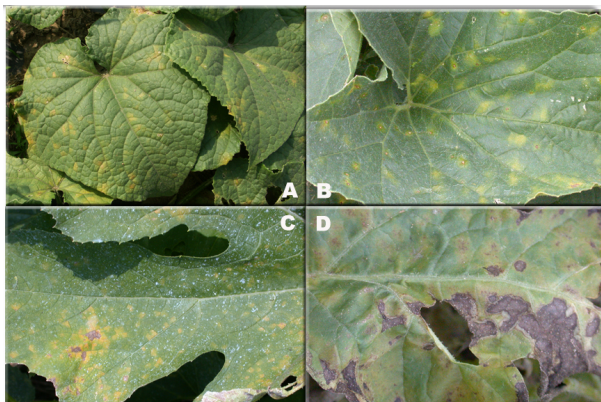


Figure 1. Downy mildew of (A) cucumber, (B) cantaloupe, (C) pumpkin, (D) watermelon.



Figure 2. Under moist conditions, downy mildew will cause a dark fuzzy growth on the bottom of leaf, as seen here for watermelon.

Wind can easily spread downy mildew spores to other leaves, nearby plants, and more distant fields. The fungus-like organism can rapidly multiply and affect large areas of a field when conditions are favorable—100 percent humidity for at least six hours, with temperatures between 59°F and 68°F.

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 alga. 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 decision of whether to apply fungicides for downy mildew of cucurbits depends on the value of the crop and how close the crop is to the final harvest. Since fruit are not directly affected, a crop that is within 2 weeks of harvest may not warrant a fungicide application. However, downy mildew can cause defoliation which in turn can decreased fruit size and quality in a crop that requires some time to mature.

*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®, Gavel®, Orondis Opti®, 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.

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.

More information about downy mildew of cucurbits can be found at this

link <https://www.extension.purdue.edu/extmedia/BP/BP-140-W.pdf>

---

## Wilting Cucurbits! What could it be?

(Liz Maynard, [emaynard@purdue.edu](mailto:emaynard@purdue.edu), (219) 548-3674), (Dan Egel, [egel@purdue.edu](mailto:egel@purdue.edu), (812) 886-0198) & (Laura Ingwell, [lingwell@purdue.edu](mailto:lingwell@purdue.edu), (765) 494-6167)

Winter squash – butternut, acorn, and kabocha – in our downy mildew sentinel plot at Pinney Purdue were showing some wilted and stunted plants by late July (Figure 1). They are easily pulled up, the stem breaking off at ground level, revealing a brown stringy decayed-looking stem base (Figure 2). Sometimes there is a little whitish or maybe pinkish mold on the stem. I cut open a kabocha squash to look for squash vine borer larva and found sap beetles that seemed to be



feeding inside the stem, but no vine borer (Figure 3). The sap beetles were clearly taking advantage of an opportunity, but not the cause of the wilt. Perhaps a borer had already come and gone. I used scotch tape to pick up some of the mold and put it on a slide to look at under the microscope. At 100X and 400X I saw among the particles of soil what I remember from my plant pathology class as 'banana spores' (Figure 4). These are typical of fusarium. I saw none of the lemon or football shaped spores of phytophthora. So my guess is that this is fusarium crown rot. To be certain, I would send a sample to the Plant and Pest Diagnostic Lab at Purdue, <https://ag.purdue.edu/btny/ppdl/Pages/default.aspx>. Information on management of diseases of pumpkins, including fusarium crown rot, is available in Purdue Extension Bulletin BP-17 <https://www.extension.purdue.edu/extmedia/BP/BP-17/BP-17.pdf>.



Figure 1. Wilted kabocha squash.



Figure 2. Base of stem of wilted kabocha squash, broken off and showing decay and white mold.



Figure 3. Inside of stem of wilted kabocha squash with sap beetle.

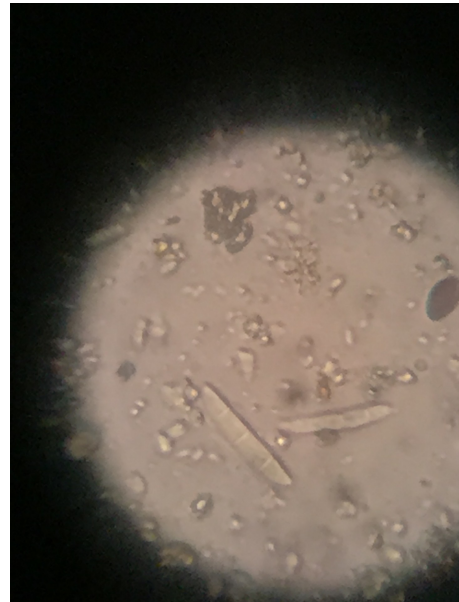


Figure 4. Spores from stem of wilted kabocha squash observed under microscope (400X). Spores are the larger elongated structures with horizontal segmentation visible.

One of the cucumber plants in the downy mildew plot was wilting as well. Cucumbers in another area were also wilting, and some of the muskmelon vines are wilting too. We had heavy pressure from striped cucumber beetles, and this is most likely bacterial wilt; the disease they transmit, which replicates in the xylem, clogging water movement and leading to wilt. In one of the plants we performed the classic test of looking for strings of bacteria-laden sap between two cut edges of stem, and found them. A much younger Dan Egel shows how to do the test in this video:

<https://www.youtube.com/watch?v=dt8HLco12kM>.

Pumpkins in the no-till demonstration and in conventional plots were showing yellowing on lower leaves as well as wilting. These plants have not received much irrigation, so



they probably experienced some drought stress. There could be squash vine borer larvae in some of the plants; the moths were seen in the area in early July. To check for squash vine borer, look for a hole near the base of the stem. Usually there is some mushy yellowish frass (insect poop) coming out of the hole when the vine borer is present. If there is a hole, cut open the stem of the plant and look for the dark-headed white larva that may get over an inch long. See Vegetable Crops Hotline issue 651 '[What's Eating My Squash](#)' for more information and images of squash vine borer.

For images and more information about striped cucumber beetle, squash vine borer, and other insect pests of cucurbits see Purdue Extension Bulletin E-30 <https://extension.entm.purdue.edu/publications/E-30/E-30.html>.

For all three of these issues—fusarium crown rot, bacterial wilt, and squash vine borer—once the problem occurs there is little chance of 'cure' for the affected plant. Identifying the problem will provide information that may help you protect other plants in the crop, and plan for preventive practices to reduce problems in future years.

---

## Sweet Corn Insect Observations

(Liz Maynard, [emaynard@purdue.edu](mailto:emaynard@purdue.edu), (219) 548-3674) & (Laura Ingwell, [lingwell@purdue.edu](mailto:lingwell@purdue.edu), (765) 494-6167)

The sweet corn variety plots at Pinney Purdue provide a good chance to observe sweet corn insects. In late July I observed two caterpillars that surprised me. The first was European Corn Borer (ECB), in the tassel where they are often found (Figures 1 & 2). It was a surprise because I have seen many fewer of these in the sweet corn plots in recent years. I understand from the entomologists that it is due to the widespread use of Bt field corn that has resulted in much lower populations of ECB. The week of Aug. 19 I observed an ECB egg mass on a flag leaf and a young larva on the ear (Figures 3 & 4).



Figure 1. European corn borer on leaf and tassel of sweet corn where it was found in late July.



Figure 2. European corn borer and tassel where it was found. Note sap beetle at lower right.



Figure 3. European corn borer larva on sweet corn ear observed Aug. 23, 2019.



Figure 4. Egg mass of European corn borer on flag leaf of sweet corn.

The second late July observation was a corn earworm (CEW)—the insect itself is not surprising, but it was in the tassel! (Figures 5-8). I have previously only seen them in ears. The sweet corn had just begun to silk, and based on



trap counts, there had been large flights of CEW the previous few weeks, so probably there was no silk available for egg-laying when the egg for this larva was laid. Due to delayed plantings we have been getting reports of CEW in places where they are not commonly found, a result of asynchrony of the pest with the preferred host most likely.



Figure 5. Holes in upper leaves alert scout to possible caterpillar in tassel.



Figure 6. Peeling away leaves shows frass and feeding.



Figure 7. More frass and feeding in the tassel; much more than expected from an ECB.



Figure 8. Corn earworm found in the tassel.

For information on managing sweet corn pests, refer to the Purdue Extension Bulletins E-31 about CEW <https://extension.entm.purdue.edu/publications/E-31/E-31.html>, and E-98 about all sweet corn insect pests <https://extension.entm.purdue.edu/publications/E-98/E-98.html>. And don't forget to check the CEW trap counts <https://extension.entm.purdue.edu/cornearworm/index.html> mentioned by Dr. Ingwell in a previous article <https://vegcropshotline.org/article/corn-earworm-trapping-is-underway/>.

The third insect I observed was a bee collecting pollen from the tassel (Figure 9). This was a good reminder that managing insects is a compromise between avoiding unacceptable damage to the crop and protecting beneficial and non-damaging insects from harm. Purdue Extension Bulletin POL-2 <https://extension.entm.purdue.edu/publications/POL-2/POL-2.html> provides solid information for vegetable and fruit farmers about protecting pollinators.





Figure 9. Bee collecting pollen from sweet corn tassel.

## Hover Flies

(Larry Bledsoe, [lbledsoe@purdue.edu](mailto:lbledsoe@purdue.edu), (765) 494-8324), (Laura Ingwell, [lingwell@purdue.edu](mailto:lingwell@purdue.edu), (765) 494-6167), (Christian Krupke, [ckrupke@purdue.edu](mailto:ckrupke@purdue.edu), (765) 494-4912), (Elizabeth Long, [eylong@purdue.edu](mailto:eylong@purdue.edu), (765) 796-1918), (John Obermeyer, [obe@purdue.edu](mailto:obe@purdue.edu)) & (Clifford Sadof, [csador@purdue.edu](mailto:csador@purdue.edu), (765) 494-5983)

Recently we have received reports of swarms of hover flies (aka syrphid flies) around Indiana and wanted to take the opportunity to tell you a bit about this curious insect (Figure 1). Adult hover flies can sometimes be mistaken for bees or wasps, because they look a lot like them! Some people refer to hover flies as “sweat flies” or “sweat bees,” but these insects are actually quite different from bees.



Figure 1. Adult syrphid (hover) flies congregating on this gentleman's cap. Photo by John Obermeyer,

Hover flies belong to the Order Diptera, or the true flies. The most abundant group at this time of year belong to the genus *Toxomerus*, which feed on pollen (Figure 2) rather than other soft-bodied insects, like aphids. Hover flies are typically lighter in color, have a characteristic abdomen-

bobbing behavior, and cannot sting at all – in fact, they are harmless. Sweat bees, on the other hand, are typically dark or metallic in color, smaller than common bees and do have stingers. Both hover flies and sweat bees can be a minor nuisance. They are attracted to us by moisture and salts they get by lapping up our sweat.



Figure 2. Syrphid flies on sweet corn tassel. Photo by John Obermeyer.

In corn fields and other flowering crops, you will likely find the larval form of this insect (Figure 3), a small, rather plain-looking maggot, feeding in leaf axils and other areas where pollen collects. Be advised that the larvae are not pests, as they do not damage the crop. Rather, they are taking advantage of an abundance of pollen. This holds true for other flowering crops as well. As corn continues to mature at a more staggered rate than usual this year (a result of the wet spring and delayed/sporadic planting), you may continue to see these insects. Just remember they are not pests and cannot sting you, they just might be a bit bothersome *hovering* around you in large numbers!



Figure 3. Syrphid fly larvae (highlighted in yellow) and detached corn anthers. Photo by John Obermeyer.

## National Farm Safety and Health Week, September 15-21, 2019

(Bill Field, [field@purdue.edu](mailto:field@purdue.edu))

The theme for this year's National Farm Safety and Health Week is **“Shift Farm Safety into High Gear.”**

There will be a series of daily webinars during the week that



can be reached at [www.necasag.org](http://www.necasag.org). Topics, presenters, and times are as follows:

Monday, September 16

- **Understanding the Tractor Factor @ 12:00 - 1:00 pm CDT**

*Presenter: Aaron Yoder, PhD, Associate Professor, University of Nebraska Medical Center (Purdue Graduate)*

- **Ergonomic Safety for Farm Women @ 2:00 - 3:00 pm CDT**

*Presenter: Charlotte Halverson, RN, BSN, COHN-S, Clinical Director, AgriSafe Network*

Tuesday, September 17

- **A Research Update from the Agricultural Health Study: Recent Findings, Current Work, and Future Plans @ 12:00 - 1:00 pm CDT**

*Presenter: Christine G. Parks, MSPH, PhD, Staff Scientist, Epidemiology Branch National Institute of Environmental Health Studies*

- **Safety Sensitivity of Opioid Use in High Hazardous Industries Such as Agriculture @ 2:00 - 3:00 pm CDT**

*Presenters: Heather Lyons-Burney, Pharm.D., Clinical Assistant Professor, Division of Pharmacy Practice and Administration, UMKS School of Pharmacy at MSU; Ann Marie Butler Kemp, MD, Professor and Associate Director Family Medicine Residency Program Associate Professor Clinical Pharmacy, USCIS Civil Surgeon, University of Mississippi Medical Center; and Charlotte Halverson, RN, COHN-S, Clinical Director AgriSafe Network*

Wednesday, September 18

- **Safeguarding Children and Youth who Live, Work and Play on Farms and Ranches @ 12:00 - 1:00 pm CDT**

*Presenter: Melissa Ploeckelman, Outreach Specialist, National Children's Center for Rural and Agricultural Health and Safety*

- **Exploring the Invest in Your Health Trainer Exchange @ 2:00 - 3:00 pm CDT**

*Presenter - Natalie Roy, MPH, Executive Director, AgriSafe Network*

Thursday, September 19

- **Hazard Communication Standards @ 12:00 - 1:00 pm CDT**

*Presenter: Dan Neenan, MBA, Paramedic, Director, National Education Center for Agricultural Safety*

Friday, September 20

- **Reducing the Risk of Adverse Pregnancy Outcomes for Perinatal Illness for Female Ag Producers @ 12:00 - 1:00 pm CDT**

*Presenter - Knesha Rose-Davison, MPH, Communications Director, AgriSafe Network*

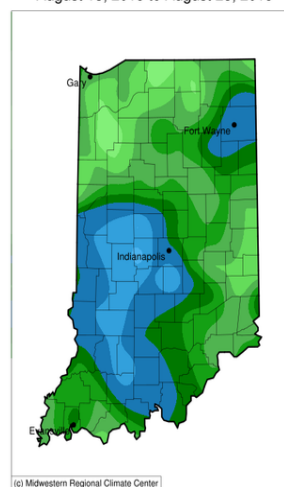
---

## Indiana Climate and Weather Report

*(Beth Hall, hall556@purdue.edu)*

The big story this week was the much-needed rain throughout most of Indiana that fell on Monday (August 19<sup>th</sup>). Since August 15<sup>th</sup>, this brought up to 5" of precipitation throughout west-central, southwest, and northwest Indiana (Figure 1). This was 2"-4" above normal for the past 2 weeks (Figure 2)! However, as we transition into September and hope temperatures stay warm to accelerate plant growth and catch up from a late-planting spring, climate outlooks are predicting higher probabilities for below-normal temperatures. Precipitation amounts are predicted to be neither above- or below normal for the first week of September, but should shift to higher probabilities of above-normal precipitation by the second week. Abnormally dry conditions continue throughout the state, but have not intensified. Where there was less rain earlier this week, relative soil moisture within the 10-40 cm depth remains below normal (Figure 3).

**Accumulated Precipitation (in)**  
August 15, 2019 to August 28, 2019



0.01 0.1 0.25 0.5 1 1.5 2 2.5 3 4 5 6 8  
Stations from the following networks used: WBAN, COOP, FAA, GHEN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Midwest Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 8/28/2019 2:43:20 PM CDT

Figure 1.

Accumulated Precipitation (in): Departure from 1981-2010 Normals  
August 15, 2019 to August 28, 2019

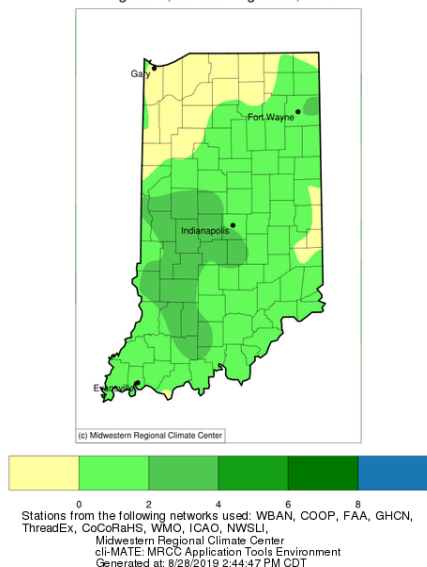


Figure 2.

10–40 cm Relative Soil Moisture (available water; %) valid 00z 28 Aug 2019  
Precipitation in previous hour (1,2,5,10,15,20,25 mm contours)

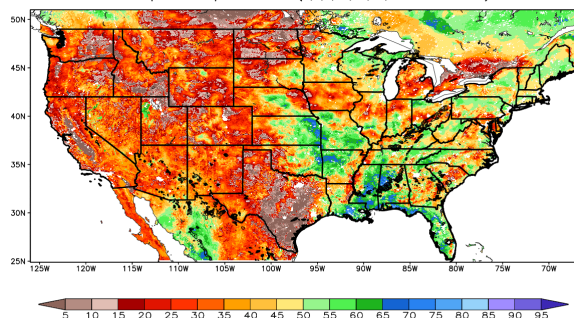


Figure 3.

## Upcoming Events

### 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>

**PURDUE**  
UNIVERSITY

Extension  
HORTICULTURE AND LANDSCAPE ARCHITECTURE

### Greenhouse and Indoor Hydroponics Workshop

September 5, 2019  
8:00am-3:00pm  
\$15 registration fee  
Lunch provided

#### Classroom Sessions (8am-noon)

Deans Auditorium  
Pfendler Hall- PFEN 241  
Purdue University, 715 W State St  
West Lafayette, IN 47907

#### Indiana Hydroponic Growers Association

Meeting (12:15 to 12:45 PM)

Deans Auditorium

#### Hands-on Activities/Tours (1-3 pm)

Horticulture Greenhouse/Building  
625 Agriculture Mall Drive  
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.

Register here:

<https://tinyurl.com/yxm5ttb9>

Registration closes August 20, 2019

Questions? Contact Lori Jolly-Brown  
[ljollybr@purdue.edu](mailto:ljollybr@purdue.edu), 765-494-1296 or  
Dr. Krishna Nemali, [knemali@purdue.edu](mailto:knemali@purdue.edu)

Workshop sponsored by:

**PURDUE** Extension  
HORTICULTURE AND LANDSCAPE ARCHITECTURE



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 University 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.

### Northwest Indiana Food Council 2019 FarmHop: Local Farm Tour

**Date:** September 21, 2019, 9 am to 4 pm Central Time

**Location:** Valparaiso or Gary, IN

**Valparaiso, IN departure** – This widely diverse tour will take you to a lively family farm with nearly 600 egg-laying chickens; an organic tilapia farm; a biodynamic farm producing vegetables, fruits, and flowers; and a homestead with incredible diversity including fruit production, heritage breed animals, and value-added products.

**Gary, IN departure** – See several thriving urban farms with unique solutions for community food access, a beautiful aquaponics system, an urban farmstead with exotic plants and medicinal garden and a church changing the face of farming with an abundant supply of homegrown produce!

Tickets are only \$20 for adults or \$10 for kids 12 and under and include a locally-sourced lunch! Plus, adult ticketholders will receive an added bonuses.

Register at: <https://farmhop2019.eventbrite.com> or call (219) 313-8828.

It is the policy of the Purdue University 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.

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

Editor: Wenjing Guan | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907 | (812) 886-0198