

VEGETABLE CROPS HOTLINE

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



Issue: 708
July 14, 2022

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Bacterial Speck of Tomato

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

The following is an article in one of a series about bacterial diseases of tomato. Previously, articles about bacterial canker and bacterial spot have been featured here. The next article will be about general management methods for bacterial diseases of tomato.

Bacterial speck causes lesions on all above ground portions of the tomato, in a similar fashion to bacterial spot. Lesions tend to be round and water-soaked under moist conditions. Lesions on fruit are rarely more than 1/20 of an inch in diameter, making them usually smaller than lesions of bacterial spot (Figure 1). Mature lesions of bacterial speck tend to have chlorotic (yellow) halos around each lesion (Figure 2) in contrast to lesions of bacterial spot which tend to be associated with chlorosis only when present in sufficient numbers.



Figure 1: Lesions of bacterial speck on tomato fruit.

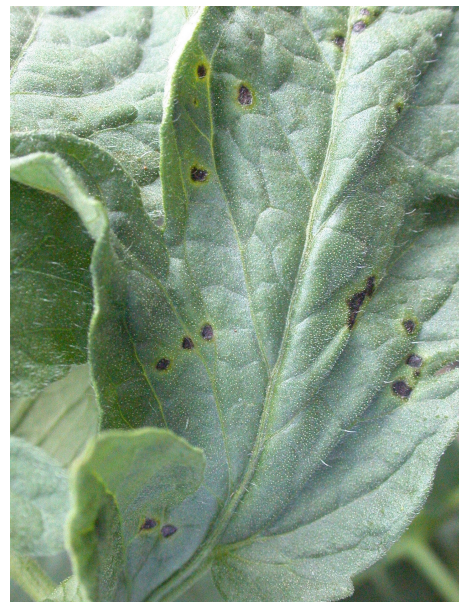


Figure 2: Lesions of bacterial speck on tomato tend to be surrounded by a yellow margin.

The optimum temperatures for bacterial speck are from 64-75°F. This is in contrast with the relatively warm temperature optimum for bacterial spot of 75-86°F. Thus, bacterial speck is often more active early in the season, whereas bacterial spot is more active later in the season.

The pathogen that causes bacterial speck also survives for a time on crop residue and on surfaces such as wooden stakes and transplant trays. Therefore, crop rotations of 2-3 years and field and greenhouse sanitation are part of the management recommendations.

Copper products may help to lessen the populations of the bacterial speck pathogen on leaf surfaces and slow the spread the disease from plant to plant. Actigard® is labeled for bacterial speck; use should be similar to that on bacterial spot. Products that may be used in some organically certified situations include LifeGuard®, Regalia® and Serenade Opti®.

The fungicide Tanos® has shown some efficacy against bacterial spot; use should concentrate on applications which will also treat possible fungal diseases.

If bacterial spot of tomato is typically a problem in your production, consider a variety that has host resistance.

Irrigation Demonstration Update — PPAC July 11

(Liz Maynard, emaynard@purdue.edu, (219) 548-3674) & (Christian Charlson, ccharls@purdue.edu)

At Pinney Purdue (PPAC) 1.66 inches of rain fell June 25 through July 11. The potential evapotranspiration (PET) over the period was 2.79 inches. Estimates for water use by the crops are lower than potential evapotranspiration because it is only 5 weeks after transplanting. For tomatoes, estimated water use was 2.01 inches, and for watermelons, 1.60 inches. The water use by tomatoes is not expected to equal the PET until next week. For watermelons, the maximum water use is expected in two weeks, when crop use is estimated to reach 90% of PET.

Both tomato and watermelon plants are in the early stages of first fruit growth. Plants are still actively increasing in size and setting more fruit. The earliest tomato fruit range in size from less than ½ inch to golf-ball size; watermelon fruit are from 1 to 5 inches long. Eggplant flowers are just starting to open. On pepper plants, the first fruit has just set on the largest plants. There are no clear differences in plant size, appearance, or fruit set in the different irrigation treatments. Watermelon plants in the unirrigated row look a little smaller, but they have appeared that beginning soon after transplanting, before irrigation began.

We installed a flow meter in the irrigation system last week. That gave us the ability to measure the amount of water applied, and to compare it to estimates based on the drip tape specifications. The drip tape specifications are 0.45 gallons per minute per 100 ft. at a pressure of 8 lbs. per square inch (PSI), or 27 gallons per hour (gph). We don't have a pressure gauge in the drip tape itself, but there is a

gauge downstream of the flow meter and just before the filter and automatic timer. During the few irrigations since the flow meter was installed, we have found that when the pressure gauge reads 15 PSI, we apply at least 25% more than the tape specifications at 8 PSI, or at least 34 gph per hundred feet. At a pressure of 10 PSI, we apply about 20% less, or 22 gph. When operating at 12 PSI, the gallons reported by the meter match the estimate based on the drip tape specifications, or 27 gph. The flow meter will help us apply the desired amount of water.

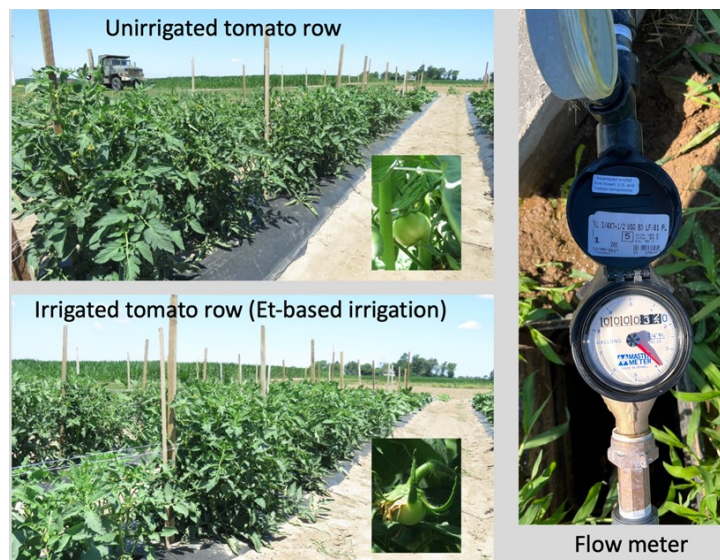


Figure 1. Unirrigated and irrigated tomatoes on July 12 in Pinney Purdue Ag Center irrigation demonstration (left) and flow meter installed in irrigation manifold (right).

More information about this demonstration can be found in the previous newsletter [article](#)

Funding for project *Improve Drip Irrigation Management for Vegetables and Melon Production in Indiana* was made possible by the Indiana State Department of Agriculture through grant A337-22-SCBG-21-003. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the ISDA.

Irrigation Demonstration Update — SWPAC July 13

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198) & (Emerson Luna Espinoza, elunaesp@purdue.edu)

After planting on May 16, we only received 1.4 inches of rain in June. The early-setting tomatoes on plants grown on the unirrigated bed had more than 40% fruit blossom end rot (BER) (recorded on June 23). It was 3% on plants grown in a bed that received 17 irrigation events in June and 10% on plants grown in a bed that received 13 irrigation events. We removed all BER fruit on June 27, but more fruit developed BER since then, mainly on the unirrigated bed. We observed BER at every stage of fruit development when the drought

continues, from recently setting fruit to fruit turning color (Figure 1).



Figure 1. Tomato fruit shows BER symptoms after it has reached its full size.

A large amount of unmarketable pepper fruit was observed. Surprisingly, all the irrigation treatments had significant numbers of unmarketable fruit, although the bed that was irrigated the most frequently (17 irrigation events in June) had fewer unmarketable peppers than the unirrigated bed and less frequently irrigated bed (13 irrigation events in June). The article 'Unmarketable Bell Peppers' discusses the potential factors causing the symptoms.

Cantaloupe harvest started on July 11. More fruit were harvested from irrigated beds than the unirrigated beds. All the ripened cantaloupe fruit are marketable. The first harvest of tomato, pepper and eggplant will also be this week.

From July 7 to July 9, we received 2.91 inches of rain that replenished the unirrigated bed' soil. Volumetric water content at 12" depth on the unirrigated bed raised from around 0.11 to 0.15 (11% to 15%), providing plants with available water in the shallow soils (Figure 2). However, the water may be depleted quickly considering the current water content was only about 60% of water content at field capacity (around 0.25 v/v). Since soil water contents on the irrigated beds at 12" depth were close to field capacity before the heavy rainfall occurred, the rain only slightly increased water content at 12" depth. Water from the precipitation likely moved to row middles and into deep soils.

Soil volumetric water content of tomato/pepper/eggplant beds with and without irrigation

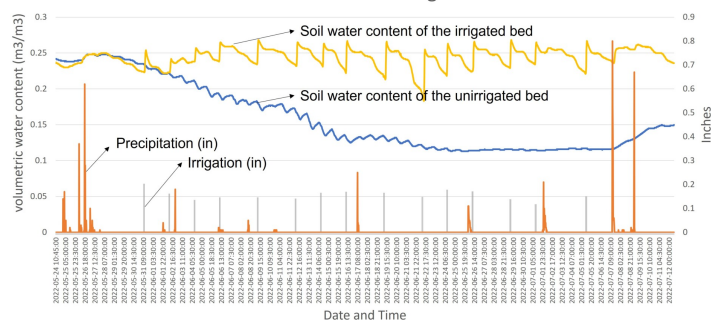


Figure 2. Soil volumetric water content of tomato/pepper/eggplant beds with and without irrigation

More information about this demonstration can be found in the previous newsletter [article](#)

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Unmarketable Bell Peppers

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

We observed a large amount of unmarketable pepper fruit hanging on the plants during on-farm visits and at the research farms recently. Damage appears on the sides or at the bottom of the fruit (Figure 1). The symptoms that occur at the fruit bottom are similar to tomato blossom end rot (BER), a plant physiological disorder known to be associated with inadequate translocation of calcium to developing fruit. This phenomenon is often caused by an uneven supply of water.



Figure 1. Various forms of unmarketable bell pepper fruit.

However, we noticed the occurrence of unmarketable pepper fruit is not as closely associated with water supply as BER in tomatoes is. In our irrigation demonstration plot, there was a significant amount of unmarketable pepper fruit on plants that received the same amount of irrigation as tomato plants that had minimal BER. Other factors might cause the fruit to be unmarketable. Here, we discuss how temperature and light cause pepper sunburn (sunscauld), another important plant physiological disorder that results in unmarketable

pepper fruit.

The fruit sunscalds are caused by two factors. One is the high temperature at the fruit surface that exceeds the threshold for damage. Some literature suggests the threshold temperatures for peppers are about 100-105 °F. It is likely the temperature threshold at the fruit surface was reached in the very hot days in June. Excessive light is another factor causing the damage. When plants receive excessive light, a chlorophyll molecule transfers the excess light energy and produces toxic molecules (singlet oxygen, superoxide and peroxide) that cause cell death.

The combined effects of high temperature and excessive light cause pepper sunscald that at least partially contributes to the unmarketable fruit we have observed. Sunscald symptom is first shown as a loss of pigmentation. It results in browning or bleaching on the exposed side, the discoloration becomes necrotic as the symptom progresses. As initial symptoms of both pepper sunscald and BER involve discoloration, and damage caused by BER can extend to the sides of the pepper fruit, I found it is not always easy to separate damage caused by the two physiological disorders.

However, one difference between the two physiological disorders is that BER may develop throughout the entire process of fruit development, while susceptibility to sunscald differs at the different fruit development stages. The mature-green pepper is more susceptible to sunscald than immature green peppers, and red peppers are the least susceptible to sunscald.

Regardless, both BER and sunscald cause pepper fruit to be unmarketable. In dry and hot conditions, evenly supplying water, and applying moderate shading is helpful in increasing bell pepper fruit marketability.

Isolated Heavy Rainfall, but Drying Continues

(Austin Pearson, pearsona@purdue.edu, (765) 675-1177)

The June 2022 state average precipitation was 2.42 inches below the 1991-2020 normal, which ended up being the 14th driest on record. High heat and reduced precipitation led to the rapid intensification of abnormally dry and moderate drought conditions in the state. As of July 13, July precipitation had continued to be very isolated (Figure 1). Northeastern Indiana experienced rainfall totals ranging from 2-4 inches, which was 150-300 percent of the 1991-2020 normal (Figure 2). Reports of flash flooding at the Fort Wayne Children's Zoo occurred on Tuesday, July 5. Heavy rainfall also fell in southwestern Indiana, where 2-4 inches was recorded. Parts of Sullivan, Greene, Davies, Martin and Lawrence counties received 3-4 inches of rain. As

for everyone else, lighter precipitation totals (0.5-1.5 inches) were not enough to reduce drought stress. Much of central Indiana received less than 75 percent of the 1991-2020 normal precipitation and isolated locations received less than 25 percent of normal. The US Drought Monitor map released on July 7 reflects conditions through July 5, and therefore, excludes the most recent rainfall (Figure 3). Over 94 percent of the state was experiencing either abnormally dry (D0) or moderate drought (D1) conditions in this release. A new Drought Monitor map will be released on Thursday, July 14 at 8:00 am Eastern Daylight Time.

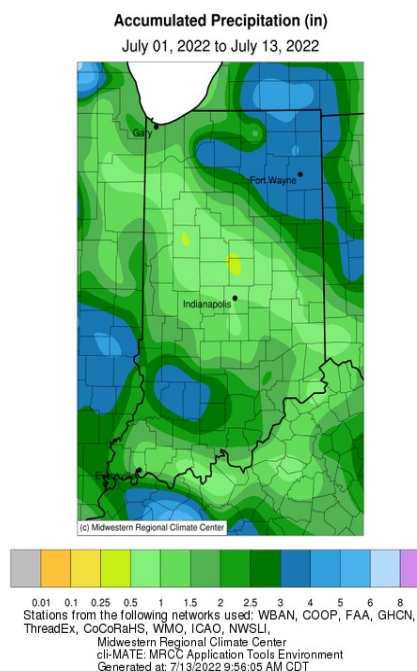


Figure 1. Accumulated precipitation (inches) from July 1-13, 2022.

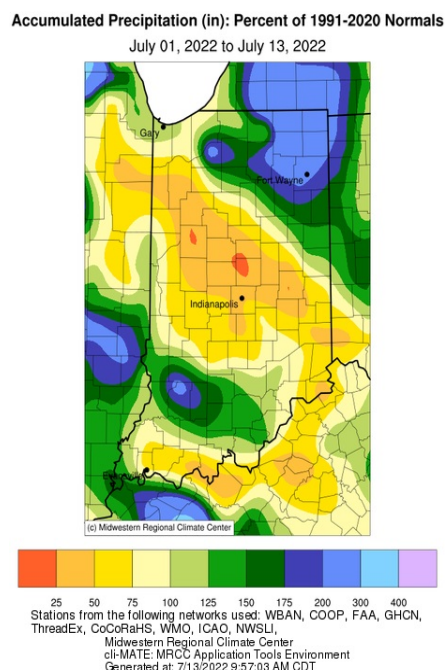


Figure 2. Accumulated precipitation from July 1-13, 2022, represented as the percentage of what normally fell during that period from 1991-2020.

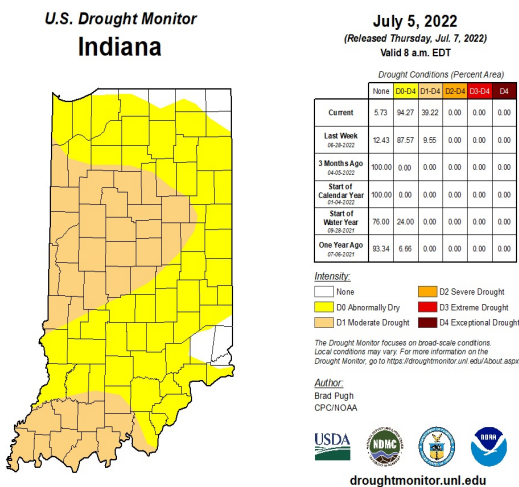


Figure 3. Indiana US Drought Monitor released July 7, 2022.

Eleven Indiana weather stations recorded over 100°F temperatures during the first week of July. Patoka Lake, located in Dubois County, recorded a maximum temperature of 104°F on July 6. On July 7, the oppressive temperatures retreated south, leaving behind more seasonable conditions in the northern part of the state. As of July 13, month-to-date temperatures still averaged 1-3°F above normal for much of central and southern Indiana. Isolated locations in central and southern Indiana were in excess of 3°F above normal. Modified Growing Degree Day (MGDD) accumulations since April 15 (Figure 4) were above the 1991-2020 normal, which was directly tied to the above normal temperatures. The highest departures were observed in central Indiana, where many locations were over 100 MGDDs ahead of normal (Figure 5).

Growing Degree Day (50 F / 86 F) Accumulation
April 15 - July 12, 2022

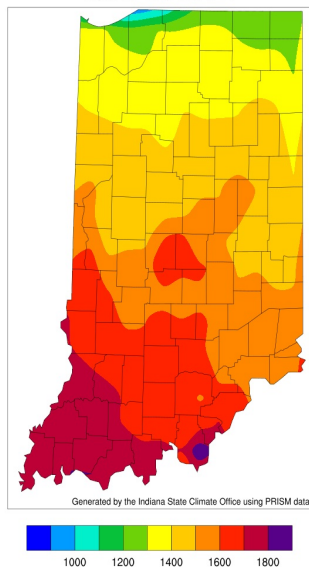


Figure 4. Modified Growing Degree Day (MGDD) (50°F/86°F) accumulation from April 15-July 12, 2022.

Growing Degree Day (50 F / 86 F) Departure From Average
April 15 - July 12, 2022

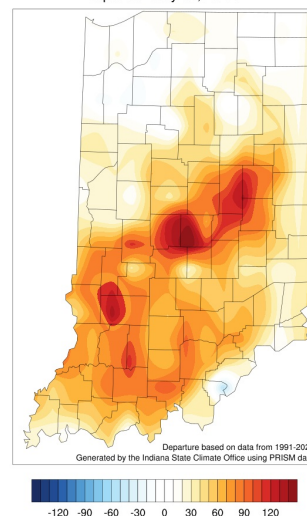


Figure 5. Modified Growing Degree Day (MGDD) (50°F/86°F) accumulation from April 15-July 12, 2022, represented as the departure from the 1991-2020 climatological average.

Limited rain chances are in the forecast through the next week and appear to be very isolated in nature. The Climate Prediction Center's 6-10-day and 8-14-day forecasts are in agreement with elevated chances of above normal temperatures and below normal precipitation. Continued drought stress is expected and Indiana will likely see a continued deterioration of conditions. The Indiana State Climate Office recently added drought resources to their [website](#), which include a National Weather Service Drought Dashboard, Midwestern Regional Climate Center Midwest Climate Watch, the National Integrated Drought Information System resource page for Indiana, the U.S. Drought Monitor, Purdue Extension's 'The Kernel', and the IN-PREPARED drought page. Should you have any questions or input on local conditions, please email the Indiana State Climate Office (in-sco@purdue.edu).

Strawberry Chat July—Weed Control and Insect Pest Management

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198) & (Miranda Purcell, mrpurcel@purdue.edu)

We discussed insect pests and weed control during renovation in the July episode. Our special guests are Drs. Stephen Meyers, Samantha Willden, and Mr. David Doud. Steve and Sam are researchers from Purdue. Steve is the weed scientist in the Horticulture department; Sam is a postdoc researcher in the entomology department. David is the owner of David Doud's Countyline Orchard in Wabash, IN, and has over 30 years of experience in growing strawberries in a matted row system. You will hear researchers' and growers' opinions on these important

topics.

Strawberry Chat in Aug. will focus on Plasticulture production. The live event will be held on Aug. 10, 12:00-1:00 pm EST. Register at https://purdue-edu.zoom.us/j/9H1y6U_w4XnKGogWqql4ao

Previous episodes of Strawberry Chat are available at <https://anchor.fm/strawberrychat>

Purdue Fruit, Veg Hemp Field Day July 21

Purdue Fruit, Veg & Hemp Field Day will be held at Meigs Purdue Ag Center (9101 S 100 E, Lafayette, IN 47909) on July 21, 2022.

Register the event <https://tinyurl.com/ypfubpkp>

If you have any questions about this event, please contact Petrus Langenhoven at (765)

496-7955, plangenh@purdue.edu or Lori Jolly-Brown (765)

494-1296, ljollybr@purdue.edu.

2022 Purdue Fruit, Veg, and Hemp Field Day

THURSDAY JULY 21, 2022
Purdue Meigs Ag Center
9101 S 100 E, Lafayette, IN 47909

REGISTER:
<https://tinyurl.com/ypfubpkp>

PRESENTED BY: 

SCHEDULE

Registration
7:30 - 8:30 am

Field Demonstrations
8:30 am - 12:00 pm

Lunch
12:00 - 1:00 pm

FIELD DEMONSTRATIONS

- ☐ Cold Hardy Grape Varieties for Indiana
- ☐ Managing Caterpillars with Homeowner Products on Swiss Chard and Collard Green Varieties
- ☐ Cannabinoid Hemp Variety Trial / Hemp Propagation Study
- ☐ Planting Vegetables into Cover Crops
- ☐ Vegetable Weed Management Research
- ☐ Apple Disease Management and IR4 Trial
- ☐ Botrytis Management in Peony
- ☐ Row Covers for Insect Management on Leafy Greens
- ☐ Sweetcorn Insect Management
- ☐ Mite Management in High Tunnel Cucumbers
- ☐ Two-system Approach to Vegetable Farming
- ☐ Management of Dwarf Apple Trees

CONTACT Lori Jolly-Brown • Telephone: 765-494-1296 • ljollybr@purdue.edu

Purdue Small Farm Education Field Day July 29

The annual Purdue Small Farm Education Field Day will be presented on July 29th from 9 am - 12 pm at the Purdue Student Farm, West Lafayette.

Register the event https://purdue.ca1.qualtrics.com/jfe/form/SV_25gK2j29sF7Is9o

If you have any questions about this event, please contact Petrus Langenhoven at (765)

496-7955, plangenh@purdue.edu or Lori Jolly-Brown (765)

494-1296, ljollybr@purdue.edu.

Small Farm Education Field Day

FIELD DAY JULY 29

In-person at Purdue Student Farm

www.purdue.edu/hla/sites/studentfarm/events/

PRESENTED BY: The Purdue Student Farm



PURDUE UNIVERSITY

Horticulture and Landscape Architecture

Pinney Purdue Vegetable Field Day - Aug. 9, 2022

The Pinney Purdue Vegetable Field Day/Twilight Meeting will be held August 9, 2022, 5 to 8 p.m. Central time (6 to 9 p.m. Eastern time) at 11402 S. County Line Road, Wanatah, IN.

The evening program will feature plot tours for farmers and for homeowners featuring topics of irrigation, sweet corn, pumpkins, dry beans, equipment, preserving produce, soil health and cover crops. A detailed program is available here <https://extension.purdue.edu/events/county/porter/2022/08/pinney-purdue-vegetable-field-day.html>. Dinner will be provided. Please register at puext.in/Veg/Evening2022.

For ag professionals and educators a similar program will be held 2 to 4 p.m. Central time (3 to 5 p.m. Eastern time). Separate registration is required.

For more information contact Nikky Witkowski at (219) 465-3555 or nikky@purdue.edu.

PINNEY PURDUE VEGETABLE FIELD DAY

WHEN
August 9, 2022
5-8pm CDT

WHERE
Pinney Purdue Ag Center
11402 S County Line Rd
Wanatah, IN 46390

Sign Up Here:

<https://puext.in/VegEvening2022>



Funding for Irrigation Demonstration was made possible by the Indiana State Department of Agriculture through grant IGG-277. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the ISDA.



Purdue University is an equal opportunity/equal access/affirmative action institution.

TOPICS COVERED

Vegetable Farmers

Ashley Adair: *Are dry beans an option for Indiana Farmers?*

Stephen Meyers and Jeanine Arana: *Weed Management in No-Till Pumpkins*

Wenjing Guan and Lyndon Kelley: *Drip Irrigation Equipment and Scheduling*

Marian Rodriguez-Soto and Tatiana Gill: *High Tunnels and Cover Crops*

Laura Ingwell: *Sweet Corn Insect Management*

**Pesticide Credits Will be Available*

Vegetable Gardeners

Annetta Jones: *Preserving Your Produce*

Phil Woolery: *Cover Crops in Gardens*

Nikky Witkowski: *Irrigation Options for Home Vegetables*

Liz Maynard: *Sweet Corn: USDA Variety Trueness Test*

Laura Ingwell: *Sweet Corn Insect Management*

Other Information

Dinner will be provided with signup and topics will overlap. For more information, contact Nikky Witkowski at (219)-465-3555 or email nikky@purdue.edu

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