

VEGETABLE CROPS HOTLINE

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



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Scheduling Fall and Winter Vegetable Production in High Tunnels, Revisited

(Liz Maynard, emaynard@purdue.edu, (219) 548-3674)

In April we announced a new bulletin “Scheduling Fall and Winter Vegetable Production in High Tunnels”, available from the Purdue Education store at

https://edustore.purdue.edu/item.asp?Item_Number=HO-330-W.

With the fall/winter high tunnel season underway we are now announcing it again. The publication brings together information collected on farms and research stations in Indiana and Ohio to provide detailed guidance on scheduling vegetable crops for winter high tunnel production. It includes a fillable scheduling form, a planting date scheduling guide, two scenarios with revenue projections, and charts and figures covering six crops. It aims to help farmers improve quality and yield and help them better match production and market demand.

The ‘fillable scheduling form’ should be especially useful if you haven’t found a good way to keep records of planting and harvest

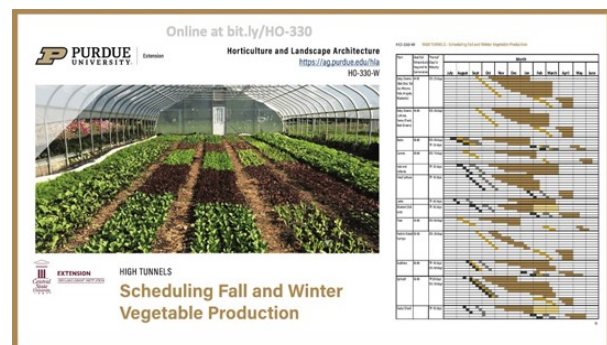
dates in your tunnels and like to use pencil and paper. Your records over time are an invaluable resource for fine-tuning planting schedules for the conditions at your farm.

Another bulletin relevant to the winter high tunnel season, Managing Environment in High Tunnels for Cool Season Vegetable Production, is also at the Education Store

https://edustore.purdue.edu/item.asp?Item_Number=HO-297-W.

A limited number of hard copies of these publications are available; please fill out this form to request one:

<https://bit.ly/HTPubs>.



A Look at the Freeze Date Tool from Midwestern Regional Climate Center

(Liz Maynard, emaynard@purdue.edu, (219) 548-3674)

The Midwestern Regional Climate Center recently released a [freeze date tool](#). It makes it easy to find historical temperature information that may help growers plan. This article provides a quick introduction to the tool.

Many readers are familiar with the average first fall frost and last spring frost dates, and the frost-free growing season between them; information that has been readily available for many years (e.g. see

<https://ag.purdue.edu/indiana-state-climate/freeze-frost-probability-growing-season-length/>). This new tool makes it easy to find that information for your particular county in the Midwest or Northeast, as well as across the entire region. The default map view provides several options for customizing the information presented. In Figure 1, the map shows the 10th percentile date for first fall 32°F freeze. In Marion County, Indiana, 1 in 10 years the first 32°F occurs before Oct. 3.

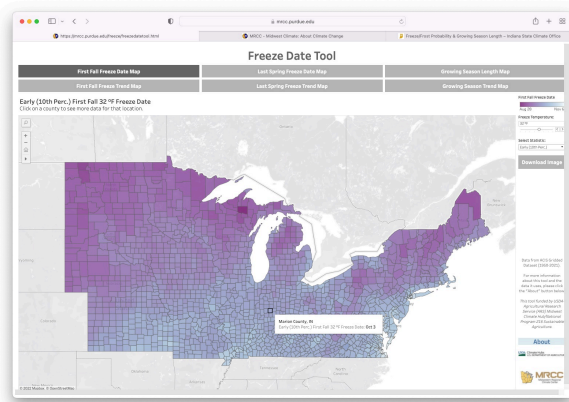


Figure 1. Early first fall 32°F freeze date (1 in 10 years). Source: Midwestern Regional Climate Center Freeze Date Tool, <https://mrcc.purdue.edu/freeze/freedatetool.html>.

One feature of this tool that could make it especially useful for fall crop and high tunnel production is that you can choose temperatures below 28°F. First/last freeze dates have in the past typically been reported for 36°F, 32°F, and 28°F, which is useful for warm season vegetable crops in the field. For cool season and high tunnel crops, dates of colder temperatures are relevant. For example, row covers are often applied over winter crops in unheated tunnels when external temperatures drop below 25°F, and some producers add a second cover when temperatures go below 20°F. The need for supplemental heat in a high tunnel also depends on outside temperature. For example, row covers should be enough to protect a new tomato crop planted early in spring in an unheated high tunnel when the temperature drops below 32°F outside, but if it gets to 20°F supplemental heat would be needed. Of course, day-to-day decisions will be made based on the current conditions, but the historical trends help in planning. Knowing typical dates for colder temperatures can also help in predicting when less hardy cool season crops (e.g. lettuce, swiss chard) are likely to be killed or become unmarketable. As an example of a lower temperature threshold, Figure 2 shows the average date for the first fall 20°F freeze. In Marion County, that date is Nov. 24.

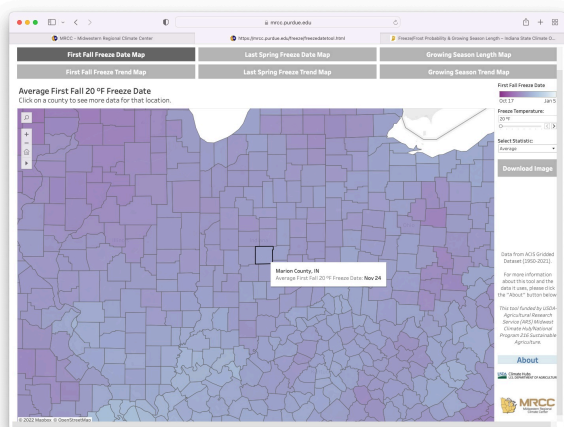


Figure 2. Average first fall 20°F freeze date. Source: Midwestern Regional Climate Center Freeze Date Tool, <https://mrcc.purdue.edu/freeze/freedatetool.html>.

The information in the tool is based on data from 1950-2021. You can find dates for each decade separately by choosing the 'Trend Map' option, clicking on the county of interest, and choosing

'Freezes by Decade.' Figure 3 shows the resulting graphs for each decade for the First Fall 20°F Freeze in Marion County, with the average date indicated by a dashed line. For the 2010's the average date in Nov. 26. The 'box and whiskers' plots provide additional information about the range of dates in each decade. If you prefer looking at tables, click on the 'Summary Stats Table' to see a summary of data for 1950-2021 for the location you have selected (Figure 4).



Figure 3. First fall 20°F freeze dates by decade in Marion County, Indiana. Source: Midwestern Regional Climate Center Freeze Date Tool, <https://mrcc.purdue.edu/freeze/freedatetool.html>.

This just scratches the surface of information accessible using this tool. I expect it to prove useful for vegetable growers in a variety of ways. Some uses will probably be immediate; others will take more time, research, and communication among growers, Extension, and researchers. If this article inspires you to explore the tool, I would be interested to hear how it, or it combined with additional information, could help in your vegetable operation.

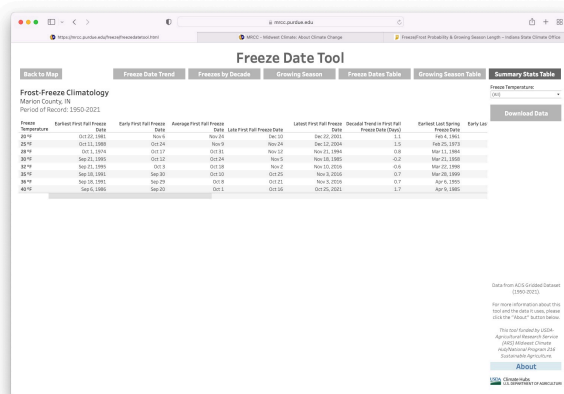


Figure 4. Frost-freeze climatology in Marion County, Indiana, 1950-2021. Source: Midwestern Regional Climate Center Freeze Date Tool, <https://mrcc.purdue.edu/freeze/freedatetool.html>.

EPA Proposal to Cancel all uses of PCNB Fungicides

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

PCNB fungicides include Blocker 4F® and 10G®. PCNB is an acronym for the chemical pentachloronitrobenzene. In Indiana, PCNB fungicides are used for bottom rot, club root, and wirestem in brassica crops. Brassica crops for which PCNB products are

labeled for include: Broccoli, Brussels sprout, cabbage, cauliflower, collards, kale, kohlrabi, and mustard greens. Be sure to check the label for crops and directions.

The U.S. Environmental Protection Agency (EPA) is releasing a proposed final decision for pentachloronitrobenzene (PCNB) that proposes to cancel all registrations of this pesticide. This would include all the uses detailed in the paragraph above. Why? The EPA has identified risks of concern to fish, amphibians, aquatic invertebrates, aquatic plants, birds, reptiles, mammals, and bees. Unfortunately, PCNB's tend to bioaccumulate in the aquatic food chain. Also, the EPA has noted adverse effects on the thyroid and identified potential non-cancer risks of concern from PCNB exposure.

To comment on this proposed action, go to this link.

<https://www.regulations.gov/docket/EPA-HQ-OPP-2015-0348>. Once this link has been posted to the federal registry (which will presumably be soon), there will be 60 days to post comments.

Alternatives to PCNB fungicides include:

- For bottom rot, Endura®
- For club root, Omega®
- For wirestem, Cabrio® and Priaxor®.

These are all diseases of brassica crops. Again, check the label before all uses.

Applying Row Covers for Winter Protection in Plasticulture Strawberry Production

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

Row covers are used in plasticulture strawberry production for winter protection. There is also interest in using row covers to encourage fall growth. The different purposes of using row covers affect when farmers should consider applying the row covers, and what type of materials best meet these goals.

At Strawberry Chat on [Plasticulture production](#), Brad Bergefurd mentioned a major difference between plasticulture and matted row systems is that there may not be a true dormancy in plasticulture strawberry. Directly applying straw on top of plants for winter protection is not a good option in the plasticulture system. It suffocates the plants. Depending on the year, strawberries may stay green until Christmas.

Thick row covers (1.5 oz/yard² or thicker) are used for winter protection (Figure 1). They are also good for spring frost protection. But thick row covers do not have a good light transmission. Applying these row covers when plants are still green, and still having warm days (average temperatures above 50°F) ahead, sacrifices plant growth days. With this consideration, we have tended to delay applying row covers. In the past few years, we applied row covers close to Christmas in southern Indiana. By then, the plants are typically well-acclimatized and ready for the coldest period.



Figure 1. The strawberry field was covered with floating row covers (1.5 oz) for winter protection.

Fully hardened plants adapted to colder climates can withstand temperatures below -20°F. Plants grown in warmer climates, including cultivars typically grown in plasticulture systems, can not withstand temperatures lower than 10°F. Better protection provided if snow accumulates on the ground on the coldest days. We successfully used row covers for winter protection in one year with the lowest recorded ambient temperatures at -5°F. If lower temperatures are expected and without snow cover, straw may be added on top of the row covers for additional protection.

If cold temperatures come early when plants are actively growing, shall we consider temporarily applying row covers to protect the plants from damage? For non-acclimatized plants, leaves lose photosynthetic activity when they are exposed to temperatures between 20 to 23°F. And crowns may be killed when crown temperatures are at 27°F for 1 or 2 h. As I write this article, the forecasted minimum nighttime temperature was at 28°F in Vincennes, IN. It is not likely the temperatures would cause damage to leaves, and the soil is still warm enough to protect crowns. Considering this, we do not think it is necessary to apply row covers at this time. Actually, the light frost events are helpful to get plants ready for the winter.

In the next article, we will discuss growing degree days and current crop status, and lead to the discussion of whether additional protection is needed to encourage fall growth.

Plasticulture Strawberry Crop Status: Are Additional Protections Needed to Encourage Fall Growth?

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

I have heard concerns about the size of strawberry plants this year. To provide a timely update of crop status, we created a [blog site](#) where there will be frequent updates of plasticulture strawberry status across Indiana. If you are interested in learning the current crop status, please visit this site <https://www.purdue.edu/hla/sites/guan/blog/>. We saw a large variation in plant sizes at different locations; production systems, weather conditions, cultivars, and other environmental and management factors likely to influence plant growth.

Growing degree day (GDD) is a good tool to understand temperature influence on plant growth at different locations and in different years. Using the modified growing degree day tool from Purdue [Mesonet Data Hub](#), we compared the modified growing degree days from Sep 1 to Oct 17 in the past three years at Southwest Purdue Ag Center. The up-to-date accumulative GDD in 2022 was similar in 2020, but it was fewer than that in the same period in 2021 (Figure 1). We also compared accumulated GDD at three Purdue Ag Centers in Indiana, there was about a 200 GDD difference between southern and northern IN since Sep 1, 2022 (Figure 2).

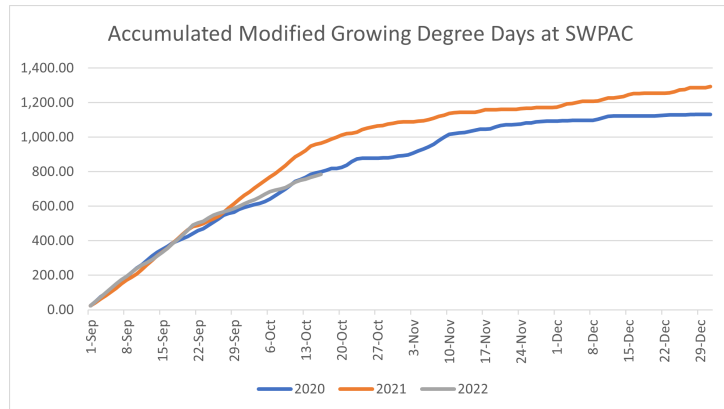


Figure 1. Accumulated modified growing degree days at SWPAC in the past three years.

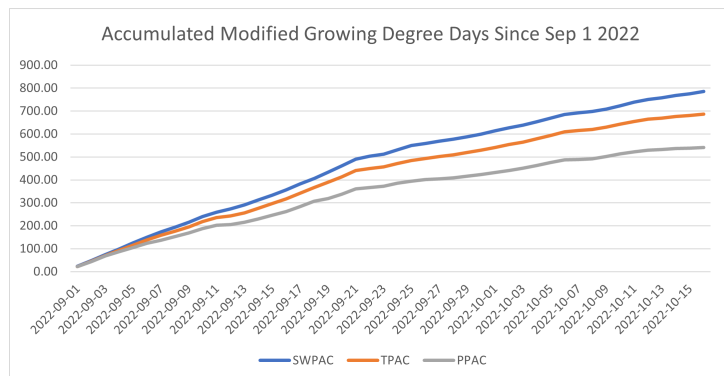


Figure 2. Accumulated modified growing degree days at Southwest Purdue Ag Center (SWPAC, Vincennes IN), Throckmorton-Purdue Agricultural Center (TPAC, Lafayette, IN), and Pinney Purdue Ag Center (PPAC, Wanatah, IN) since Sep 1 2022.

Flower initiation happens in the crown. Crown size at the end of fall largely determines spring yield potential. Crown growth and development is best at temperatures above 50°F. As temperatures may drop quickly, do additional environmental protection increase plant growth? At SWAPC, we have observed the plant size differences of strawberries grown inside the high tunnel and grown in the open field. The additional accumulated GDD provided by high tunnels has led to faster plant growth.

For open-field production, low tunnel or row covers may be used to increase growth.

We explored using low tunnels to extend the fall growth in the past few years. We installed the low tunnels using a mechanical transplanter low tunnel layer in early Oct. The low tunnel layer set hoops 4.5' apart and covered with 1 mil perforated clear plastic. Low tunnel plastic was removed in Dec before covering the plants with a floating row cover. We explored the system for three

strawberry seasons (Figure 3). In the 2019-20 season, a significant yield increase was achieved with low tunnels, but the yield of the best cultivars was under 1 lb/plant even using low tunnels. Deer damage happened in September before installing low tunnels delayed plant growth. This [article](#) describes that story. We did not see a yield increase using low tunnels in the 2020-21 and 2021-22 seasons. In both seasons, plugs were planted at the end of Aug. and fall was relatively warm. Most plants' yields were above 1 lb/plant; satisfied yields were achieved without using low tunnels.



Figure 3. Low tunnel was installed with a mechanical transplanter low tunnel layer.

A few critical factors farmers should consider in using the additional protection in the fall. First, both low tunnel or floating row covers increased temperature fluctuations and delayed the process of plant acclimatization. As a result, plants may be more susceptible to winter damage if unseasonably cold temperatures happen while plants are still actively growing (see the above article for more information). Second, using additional protection, mainly row covers, increases relative humidity. High relative humidity plus warm temperatures increase disease potential. A study in North Carolina found more gray mold fruit on plants covered with row covers in the fall. The study suggested a strict spray program must be implemented to minimize disease losses if row covers were used. Third, a thinner row cover that allows better light transmission should be considered if one chooses to use row covers in the fall.

In short, additional protection can increase plant growth, but one should balance the extra cost, increased risks of other factors, with a potential yield increase when deciding on using additional protection to encourage fall growth in plasticulture strawberries.

Brrrr, that was Cold!

(Beth Hall, hall556@purdue.edu)

Chance for above-normal precipitation in about 2 weeks, but for this time of the year, that doesn't mean much.

Freezing temperatures and even some snow fell in Indiana earlier this week forcing us to accept that winter is coming. Figure 1 shows how much colder than normal those minimum temperatures got early Tuesday, October 18th. Was this a new

record for the earliest freeze (defined at 32°F) in Indiana? Not quite. While the average dates of the first freeze range from October 11th in northern Indiana to October 28th in southern Indiana, the record earliest dates (going back to 1950) range from September 17th to October 1st for those respective northern and southern regions (see the Midwestern Regional Climate Center's Freeze Date Tool [<https://mrcc.purdue.edu/freeze/freeze-date-tool.html>] for more information). In other words, this year's first freeze of the winter season may have occurred earlier than usual in many locations (some areas of Indiana are still waiting), but it was not record breaking. If you are not quite ready to fully embrace winter and are defiantly resisting pulling out those winter clothes, you are in luck. High temperatures in the 70s are expected to return by this weekend and should stick around for a while. The temperature outlooks continue to favor above-normal conditions into early November.

Average Minimum Temperature (°F): Departure from 1991-2020 Normals
October 18, 2022 to October 18, 2022

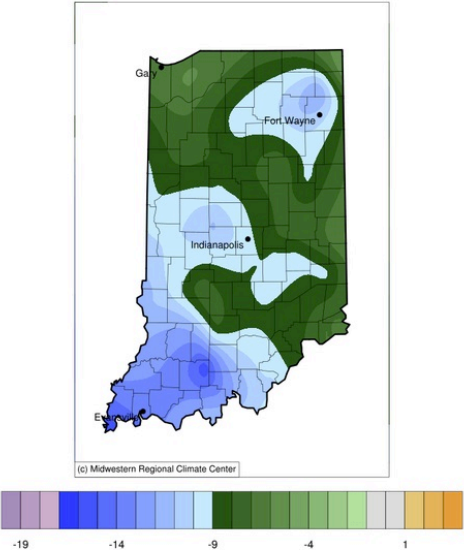


Figure 1. Minimum temperature departures from normal observed the morning (~8AM LT) of 18 October 2022 representing data collected since the morning (~8AM LT) of 17 October 2022. Actual minimum temperature values were between 30°F and 35°F across most of the state.

Precipitation continues to be well below normal across Indiana. Figure 2 shows how much precipitation has fallen across the state compared to what normally occurs over the past 30 days. Except for far northern Indiana, most of the state has received less than 25% of the typical amount for this time of year. This translates to the entire state being categorized as at least *Abnormally Dry* (D0 in the U.S. Drought Monitor) with several locations intensifying to the *Moderate Drought* (D1) stage (Figure 3). Climate outlooks for the rest of October are mixed with probabilities favoring above-normal precipitation over the next 6-10-day period, but near normal after that. Unfortunately, what is “normal” for this time of year is not a lot, so conditions are expected to remain on the drier side for a while.

Accumulated Precipitation (in): Percent of 1991-2020 Normals
September 20, 2022 to October 19, 2022

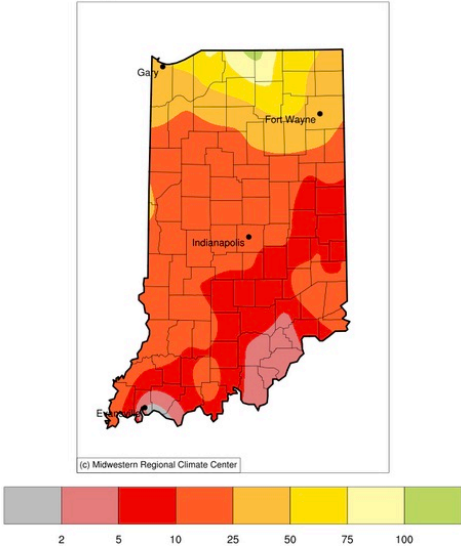


Figure 2. Precipitation represented as the percentage of normal amounts that have occurred between 20 September and 19 October. For example, red-orange shading indicates that the amount of precipitation that occurred during that period in 2022 was only 10%-25% of what typically fell during that same time period from 1991-2020.

U.S. Drought Monitor
Indiana

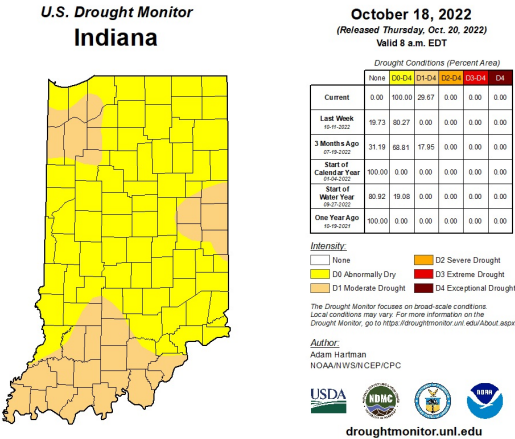


Figure 3. U.S. Drought Monitor for data through October 18, 2022.

With freezing temperatures knocking at our doors, the growing season is coming to a close. Figures 4 and 5 show the latest modified growing degree-day accumulations for April 15 through October 19th including this year's comparison to what is normal.

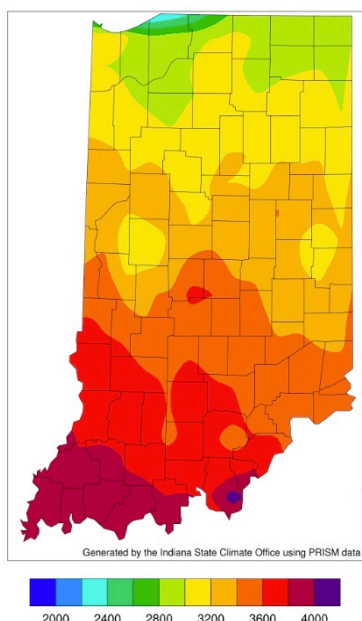


Figure 4. Modified growing degree day (50°F / 86°F) accumulation from April 15-October 19, 2022.

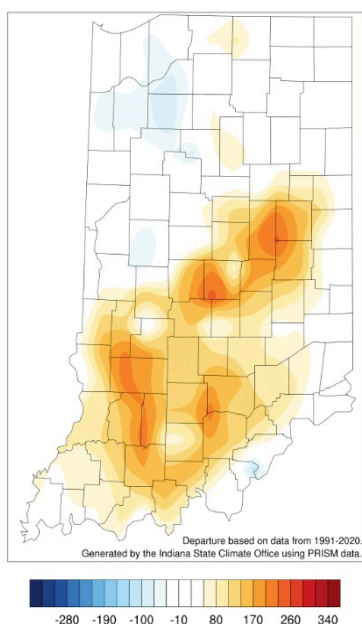


Figure 5. Modified growing degree day (50°F / 86°F) accumulation from April 15-October 19, 2022, represented as the departure from the 1991-2020 climatological average.

Veteran Farmer Webinar Series

Register for Veteran Farmer Webinar Series.

October registration

link: https://purdue.ca1.qualtrics.com/jfe/form/SV_3NS6mjFCjEPXJs

November registration

link: https://purdue.ca1.qualtrics.com/jfe/form/SV_eWdvzeeMGy6ouR8

More information about the Webinar Series can be found at <https://extension.purdue.edu/food-safety-for-military-veteran-farmers/upcoming-events.html>

Veteran Farmer Webinar Series

Funded by the USDA NIFA Grant

October Session

October 5th | 4pm est
How to Safely Prepare Products in Your Home Kitchen:
Sanitation and Good Manufacturing Practice Basics

October 26th | 4pm est
Pest Prevention Tips to "Close the Barn Door Before the Horse Bolts"

For those participants that complete the pre and post survey:
As a token of our gratitude, you will be entered into a drawing for a \$50 e-gift card with an estimated 1/10 chance of winning!

Study Information
Title: Qualitative Assessment of Food Perception and Practices Among Farmers
IRB Protocol Number: 181002180
Principal Investigator: Dr. Yachua Feng
Contact: stoll6@purdue.edu

Register for free [HERE](#):

Veteran Farmer Webinar Series

Funded by the USDA NIFA Grant

November Session

November 2nd | 4pm est
Farm Safety Record Keeping
Best Practices

November 9th | 4pm est
Navigating the Value-Added Food Product Space – Food Safety Considerations for New Entrepreneurs

November 16th | 4pm est
Farm Audits- An Introduction for Beginners

For those participants that complete the pre and post survey:
As a token of our gratitude, you will be entered into a drawing for a \$50 e-gift card with an estimated 1/10 chance of winning!

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Register for free [HERE](#):

Southwest Melon and Vegetable Growers Winter Technical Meeting – Important Discussion about Future of SWIM

(Dan Egel, egel@purdue.edu, (812) 886-0198) & (Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

The dinner meeting will take place on November 29, 2022. We will discuss the future of the Southwest Melon and Vegetable Growers Association and have a presentation about the 2022 watermelon variety trials. The portion of the meeting concerning SWIM future will begin at 5 pm. Dinner will be served at 6 pm. The variety trial presentation by Dr. Wenjing Guan will begin immediately after dinner. The meeting will be held at the Vincennes University Agricultural Center, 4207 North Purdue Road, Vincennes, IN. This is the same building in which the Purdue University Food Safety Hub is located. The building faces US 41. To RSVP for the meeting, call (812) 886-0198 or email joynerb@purdue.edu. To

attend the meeting, one must be a member of SWIM or join at the meeting for \$15 which will include dinner and one calendar year membership.

History of SWIM and background about the discussion will be mailed to all current and SWIM members. If you do not receive the mailing but are interested in learning more about the grower association, please contact Barb Joyner (joynerb@purdue.edu; (812) 886-0198).

At the Nov. 29 meeting, members will vote for the future of SWIM. It is critical to have as many current and previous SWIM members present at this meeting as possible so that a clear consensus can be reached. If you are associated with SWIM, please plan to attend this meeting if at all possible.

Specialty Crops Applicator Program in Washington County on December 1, 2022

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

There will be a Specialty Crops Applicator Program on Thursday, December 1, 2022 from 6 to 8 p.m. Eastern Time at the Washington County Government Building, 806 Martinsburg Road, Salem, IN. Participants will earn PARP credit. CCH credit has been applied for. The program is free. Bring \$10 for PARP credit, cash or check only. RSVP requested by Monday November 28; (812) 883-4601 or dhowellw@purdue.edu.

Presentations will be:

- Everything you wanted to know about fungicides but were afraid to ask-Dan Egel, Extension Plant Pathologist, Southwest Purdue Ag Program.
- Manure Handling on and near produce farms-Richard Beckort, Jackson County ANR Educator.

For more information-

- Richard Beckort-Jackson County- rbeckort@purdue.edu; (812) 358-6101
- Ophelia Davis-Lawrence County- odavis@purdue.edu; (812) 275-4623
- Danielle Walker-Washington County- dhowellw@purdue.edu; (812) 883-4601
- Dan Egel-SW Purdue Ag Center- egel@purdue.edu; (812) 886-0198

Private Applicator Permit

OISC will mail renewal notices this week to all pesticide applicators with expiration of Dec. 31, 2022.

Programs approved for credit are listed on PARP Event site: <https://ppp.purdue.edu/private-applicators/recertification-parp/parp-events/>

Only 2 PARPs in one year. Private applicators must have attended at least 1 PARP prior to 2022. If not, They will need to pass the certification exam.

If you have questions, please contact the local extension office <https://extension.purdue.edu/>

Southwest Melon and Vegetable Growers Association Annual Meeting will be January 20, 2023

(Dan Egel, egel@purdue.edu, (812) 886-0198) & (Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

The Southwest Melon and Vegetable Grower Association will have their Annual meeting in association with the Illiana Watermelon Association (IWA) on January 20, 2023 in French Lick, IN. Note that this is an earlier date than the meeting usually takes place. PARP and CCH credit will be applied for. The meeting agenda has not been developed; please contact Dan Egel or Wenjing Guan with meeting ideas. Be sure to note down this early date for the SWIM annual meeting.

2023 Indiana Horticultural Conference Registration to Open in November

(Stephen Meyers, slmeyers@purdue.edu, (765) 496-6540)

Purdue University will host the 2023 Indiana Horticulture Conference at the Beck Agricultural Center, West Lafayette, IN on Jan.23 and 24. Registration will open in November 2022 and close one week before the event. Educational tracks will include vegetable production, small fruit, tree fruit, apples for beginners, food safety, controlled environment, farming basics, and business and marketing. Additional events will include a networking happy hour, poster session, apple cider contest, and silent auction. Two grower listening sessions with the Purdue Soil to Market Project (<https://ag.purdue.edu/department/agecon/extension/soiltomarket.html>) will also take place at the conference. The conference is open to anyone in the vegetable and fruit production industry in Indiana and beyond and will have content for all levels of experience. Pesticide applicator credits will be available. To learn more about attending or sponsoring the conference, visit <https://www.indianahortconference.org/> or contact Stephen Meyers (slmeyers@purdue.edu) or Lori Jolly-Brown (ljollybr@purdue.edu).



2023 Indiana Small Farm Conference Save the Date

Indiana Small Farms Conference for 2023 has been scheduled for March 2-3 at the Hendricks County Fairgrounds in Danville, IN.

If you would like to present or nominate someone to present at SFC click on the link below:



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