PURDUE UNIVERSITY

FACTS FOR FANCY FRUIT

Issue: 25-04
May 16, 2025

A Newsletter for Commercial and Advanced Amateur fruit growers.

In This Issue

Black Currant: Fruit set

Blackberry: bloom

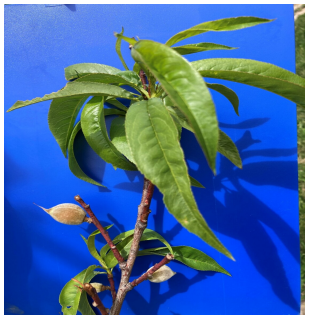
Pawpaw: Petal fall

Plum: Fruit set

Crop conditions

(Wil Brown-Grimm, wbrowngr@purdue.edu)

Hi! This week's crop conditions are looking quite good despite not having any significant rain recently. Most crops have set fruit and are progressing well. The grapes received their second spray this season on the 9th. This is a busy time here at Meigs as we make raised beds for our vegetable crops and prepare to plant.

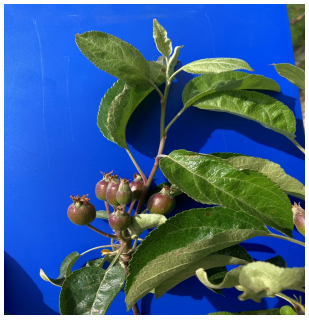


Peach: Fruit set

Apple (Rosalee): Fruit set

Pear: Fruit Set

Grapes: Pre-bloom



Apple (Pixie Crunch): Fruit Set

A Bit of Rain Coming Our Way

(Beth Hall, bhall@purdue.edu)

The last few weeks have been on the drier side, particularly for northwestern and west-central Indiana (Figure 1). While temperatures have been seasonal, they are still gradually increasing as we approach summer. Therefore, evapotranspiration rates are starting to increase. This has resulted in the U.S. Drought Monitor classifying much of northern Indiana as Abnormally Dry (D0) (Figure 2). Technically, this is not drought, but more a cautionary tale that conditions are drying. The National Weather Service is predicting around two inches of rain to fall across the western and southern parts of the state over the next seven days (Figure 3). A little over half of this will likely come at the end of this week, followed by a break for early next week, closing with another round of decent precipitation next Tuesday-Thursday. It is too early to know if this will be enough to eliminate the Abnormally Dry (D0) areas in our state, but it should not degrade things into official drought status.

Another thing that will help stave off drought is the national Climate Prediction Center is favoring below-normal temperatures for the last few weeks of May. There is no concern at this time for freezing temperatures, but it should keep temperatures pleasant with lower evapotranspiration rates. Climate outlooks for June are slightly favoring above-normal temperatures across Indiana with above-normal precipitation possible for our eastern counties. The 3-month (June-July-August) outlook is slightly favoring above-normal temperatures with no statistically significant guidance about precipitation.

Accumulated modified growing degree days (50°F/86°F) (MGDD) since April 15th (Figure 4) are running around 10-50 units above normal

(Figures 5). With the cooler climate outlooks for the rest of this month, expect that pattern of near-normal MGDD accumulations to continue.

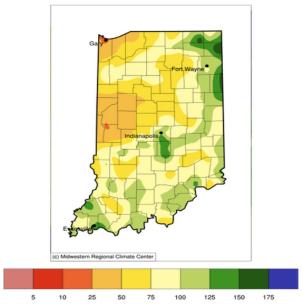


Figure 1. Precipitation from May 1 – 14, 2025 represented as a percentage of the 1991-2020 normal amounts for that period.

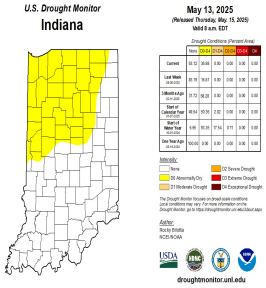


Figure 2. U.S. Drought Monitor status for conditions as of Tuesday, May 13, 2025.

Figure 3. 7-day precipitation total forecasted for May X-Y, 2025.

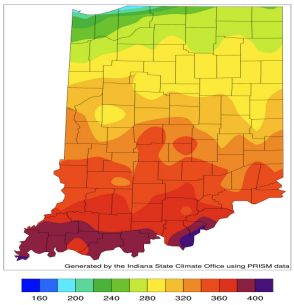


Figure 4. Modified growing degree day (50°F / 86°F) accumulation from April 15 – May 14, 2025.

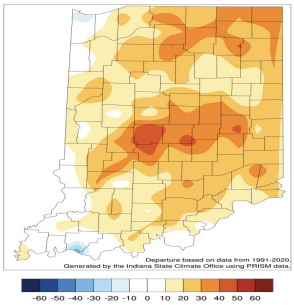


Figure 5. Modified growing degree day (50°F / 86°F) accumulation from April 15-May 8, 2025, represented as the departure from the 1991-2020 climatological average.

Spring temperatures

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

I've been plotting growing degree days for Lafayette for the last 15 years or so. This year we continue to track earlier than usual. This is a trend that seems to be continuing each year. See Figure 1.

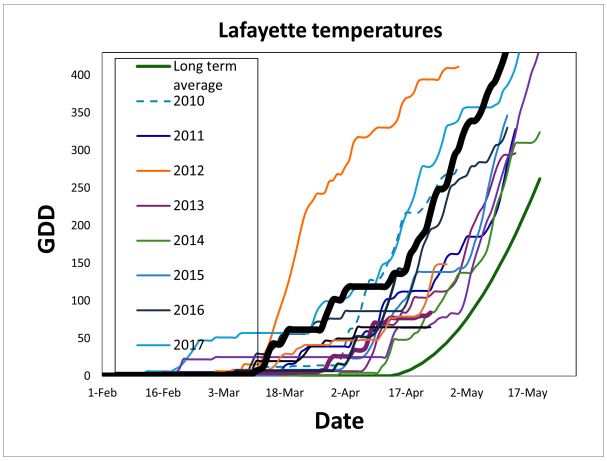


Figure 1. Spring temperature accumulation in Lafayette, IN over the last 15 years.

If you want to look at data more closely related to your location, the Indiana State Climate Office has the data freely available online:

https://ag.purdue.edu/indiana-state-climate/data/

New EPA Requirement for Pesticide Application

(Miranda Purcell, mrpurcel@purdue.edu)

The EPA is enacting new requirements for agricultural pesticide applicators. An increasing number of pesticide labels require applicators to utilize an online system called Bulletins Live! Two to determine if additional pesticide use limitations are required to protect threatened or

endangered species or habitat based on 1) application location 2) pesticide product and 3) application month. This is used to limit restrictions to geographic and time-specific uses and to avoid blanket restrictions.

If the use of Bulletins Live! Two is required for a specific pesticide, it will be indicated on the label under the Environmental hazards section. It would then be required to follow pesticide use limitations generated by Bulletins Live! Two in addition to those found on the label. The bulletins produced are documents that describe any additional pesticide used limitations based on the proposed application details. Applicators may check Bulletins Live! Two up to 6 months in advance of the application. It is encouraged to print and/or save the bulletins along with pesticide records. Compliance is the applicators responsibility.

To generate a bulletin:

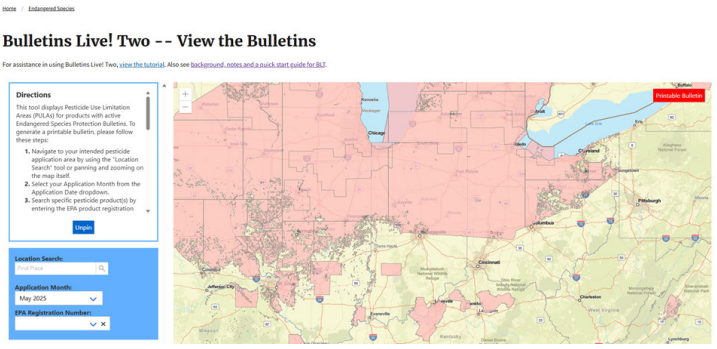
Step 1: Access the Bulletins Live! Two website: https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins

Step 2: Navigate to intended pesticide application area by using 'Location Search' tool or by zooming in on the map

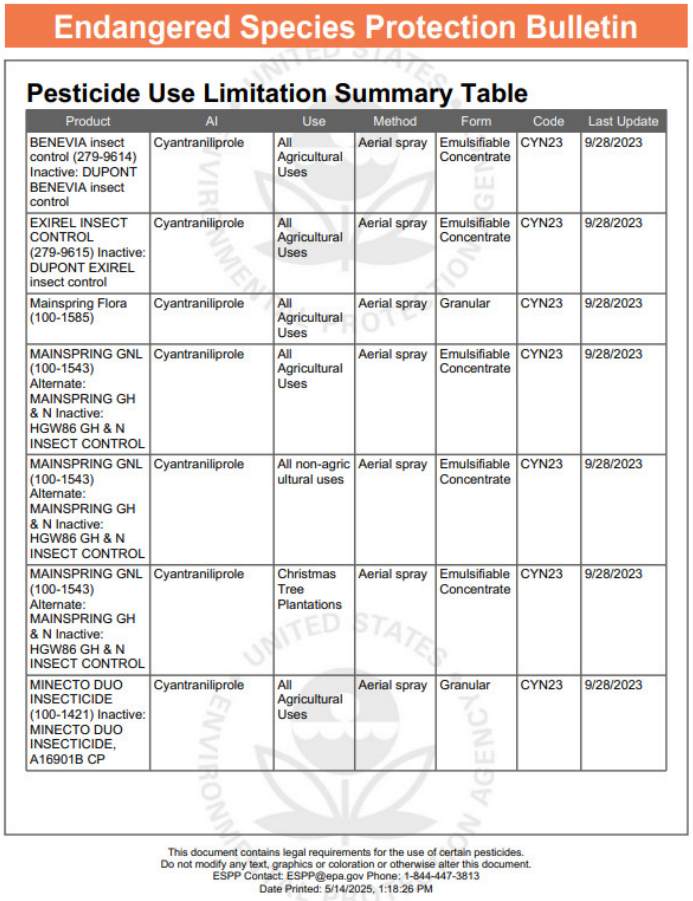
Step 3: Select your application month from the dropdown

Step 4: Search specific pesticide products by entering the EPA product registration number

Step 5: Based on if there is a Pesticide Use Limitation Area (PULA) associated with the product(s), click on the 'Printable Bulletin' button in the top right hand corner to generate a printable bulletin in PDF format which can be printed or saved



Bulletins Live! Two website, accessed May 14, 2025.



Endangered Species Protection Bulletin

Pesticide Use Limitation Summary Table

Product	AI	Use	Method	Form	Code	Last Update
BENEVIA insect control (279-9614) Inactive: DUPONT BENEVIA insect control	Cyantraniliprole	All Agricultural Uses	Aerial spray	Emulsifiable Concentrate	CYN23	9/28/2023
EXIREL INSECT CONTROL (279-9615) Inactive: DUPONT EXIREL insect control	Cyantraniliprole	All Agricultural Uses	Aerial spray	Emulsifiable Concentrate	CYN23	9/28/2023
Mainspring Flora (100-1585)	Cyantraniliprole	All Agricultural Uses	Aerial spray	Granular	CYN23	9/28/2023
MAINSPRING GNL (100-1543) Alternate: MAINSPRING GH & N Inactive: HGW86 GH & N INSECT CONTROL	Cyantraniliprole	All Agricultural Uses	Aerial spray	Emulsifiable Concentrate	CYN23	9/28/2023
MAINSPRING GNL (100-1543) Alternate: MAINSPRING GH & N Inactive: HGW86 GH & N INSECT CONTROL	Cyantraniliprole	All non-agricultural uses	Aerial spray	Emulsifiable Concentrate	CYN23	9/28/2023
MAINSPRING GNL (100-1543) Alternate: MAINSPRING GH & N Inactive: HGW86 GH & N INSECT CONTROL	Cyantraniliprole	Christmas Tree Plantations	Aerial spray	Emulsifiable Concentrate	CYN23	9/28/2023
MINECTO DUO INSECTICIDE (100-1421) Inactive: MINECTO DUO INSECTICIDE, A16901B CP	Cyantraniliprole	All Agricultural Uses	Aerial spray	Granular	CYN23	9/28/2023

This document contains legal requirements for the use of certain pesticides.
Do not modify any text, graphics or coloration or otherwise alter this document.
ESPP Contact: ESPP@epa.gov Phone: 1-844-447-3813
Date Printed: 5/14/2025, 1:18:26 PM

Example of Bulletins Live! Two Summary Table for PULA ID: 87, accessed May 14, 2025

Want to learn more?

Michigan State University Extension is hosting a **webinar on May 22** that will provide details on the new requirements and show live demonstrations of using the Bulletins Live! Two website. There are two timeslots available: **12pm and 6pm**. This webinar is free, but registration is required. Register here: https://www.canr.msu.edu/events/bulletins-live-two-

webinar?utm_source=cc&utm_medium=email&utm_campaign=extensiondigests

Resources:
EPA Bulletins Live! Two tutorial:
https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins
Endangered Species Protection Bulletins:
https://www.epa.gov/endangered-species/endangered-species-protection-bulletins
Fruit growers need to be aware of significant pesticide label changes:
https://www.canr.msu.edu/news/fruit-growers-need-to-be-aware-of-significant-pesticide-label-changes

Critical Period for Disease Management in Grapes

(Miranda Purcell, mrpurcel@purdue.edu)

The most important time of the year for fruit disease control in grapes is from pre-bloom to 4-5 weeks past fruit set. The potential for fruit infection drops significantly 4-5 weeks post-bloom. Important diseases to control during this time include black rot, downy mildew and powdery mildew. Fruit of the most commonly planted varieties is resistant to black rot, downy mildew and powdery mildew, but rachises (stems) and leaves remain susceptible. Therefore, protection against these fungal pathogens is required throughout the growing season for these parts of the plant.

A list of recommended products can be found in The Midwest Fruit Pest Management Guide. It is important to get good coverage in the fruit zone. Also, beware that downy and powdery mildew pathogens are especially prone to fungicide resistance, so avoid back-to-back applications of any one systemic fungicide class (i.e. FRAC 3, 7 or 11).

Update on Mancozeb Use in Grapes

(Miranda Purcell, mrpurcel@purdue.edu)

Mancozeb can still be used in grapes during the 2025 growing season. However, the EPA has proposed to cancel the use of mancozeb in grapes in the future.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is conducting a re-registration review of many multi-site fungicides, including ziram, thiram, captan and now mancozeb. The proposed cancellation is due to concerns about post-application worker health hazards. The proposed cancellation applies to mancozeb use in grapes but not other fruit crops because of specific activities in grapevine production, including tying/training, hand harvesting and leaf pulling, that require different REIs (re-entry intervals). The EPA is required to conduct a cost-benefit “BEAD” analysis, which involves assessing the benefits of its use and taking into consideration how growers make pest control decisions. This includes reviewing mancozeb use data, patterns and target pests. They will also take into consideration the biological and economic impacts of using alternative pest control strategies. This methodology relies on data from university extension services, USDA, grower surveys, public comments and professional knowledge. The public comment period was conducted in Fall 2024 and is currently undergoing the review process. The EPA plants to release an interim decision in late 2025 at the earliest. An update will be provided once available.

More information on the EPA mancozeb proposal can be found here:
https://cals.cornell.edu/news/2024/08/cornell-grape-pathologist-releases-urgent-update-epa-

Performance of Strawberries on Black vs. White Plastic Mulches in Indiana

(Wenjing Guan, guan40@purdue.edu), (Stephen Meyers, slmeyers@purdue.edu) & (Jeanine Arana, jcordone@purdue.edu)

From 2022-2024, we evaluated the performance 15 strawberry cultivars grown in plasticulture system using black and white-on-black plastic mulches (Figure 1) at two locations: Southwest Purdue Agricultural Center in Vincennes, IN (USDA hardiness zone 6b), and Meigs Purdue Agricultural Center in Lafayette, IN (USDA hardiness zone 6a).

Figure 1. 'Camarosa' strawberry grown in black (left) and white-on-black (right) plastic mulches at Lafayette, IN on October 13, 2022 (Photo credit: Jeanine Arana).

Strawberries were harvested for two seasons. Plug plants were used in the study and were transplanted on September 7, 2022, at the Vincennes location and on September 8, 2022, at the Lafayette location. The trial ended after the second years' harvest in June 2024.

During the experimental period, the monthly average temperatures at the Vincennes location were 1.4 to 5.0 °F higher than that at the Lafayette location. The soil type at the Vincennes location is an Alvin fine sandy loam, while the soil at the Lafayette location is a mix of the Toronto silt loam and Millbrook silt loam complex and Drummer silty clay loam.

In this article, we summarize the effects of plastic mulch color on strawberry performance over two harvest seasons and offer insights to help guide the choice between black and white plastic mulch for plasticulture strawberry production in Indiana.

Study Findings

The effects of mulch color varied by year and location, though trends were generally consistent across cultivars. In 2023, the yields at both locations were negatively impacted by frost damage, with particularly severe losses at the Lafayette site.

Fruit production — At the Vincennes location in 2023, plants grown on black plastic mulch produced significantly higher yields (average across 15 cultivars: 0.69 lbs/plant) than those on white plastic mulch (0.56 lbs/plant). No significant difference was observed at the Lafayette location, likely due to the extent of frost damage. In 2024, yields were higher on black plastic mulch (0.92 lbs/plant) than on white plastic mulch (0.63 lbs/plant) at the Lafayette location. However, the trend reversed in the second year harvest at Vincennes, where plants grown on white plastic mulch yielded more (1.07 lbs/plant) than those on black plastic mulch (0.91 lbs/plant).

At the Lafayette location, fruit harvested from plants grown on black plastic mulch were consistently larger in both years compared to those from white plastic mulch. No significant differences in fruit size were observed at the Vincennes location.

Earlier harvests (by approximately 7–10 days) were observed on black plastic mulch during the first year in Vincennes and the second year in Lafayette. This effect was not seen during the

second year at the Vincennes site.

When combining yield data from both years, black plastic mulch produced significantly higher yields than white plastic mulch at the Lafayette location (1.16 vs. 0.84 lbs/plant). In Vincennes, opposing trends across the two years resulted in similar total yields between mulch types: 1.63 lbs/plant on white plastic and 1.60 lbs/plant on black plastic.

Plant survival — Prior to the second year's harvest, plant survival at the Vincennes site was lower on black plastic (76%) compared to that on white plastic mulch (84%). The lower plant survival was likely due to greater heat and drought stress the plants faced on black plastic during the summer following the first harvest. In Lafayette, overall survival was higher (93%), with no significant difference between mulch types.

Runner development — Across both locations and cultivars, plants grown on white plastic mulch consistently produced more runner biomass during the summer following the first harvest compared to those grown on black plastic mulch.

Factors to Consider When Choosing Between Black and White Plastic Mulches for Strawberry Production

If maximizing yield is the top priority, black plastic mulch may be the preferred option. Plasticulture strawberry yield is largely determined by the number of branch crowns, which develop primarily in the fall. Black plastic mulch led to higher soil temperature compared to white plastic mulch, creating more favorable conditions for branch crown formation, and potentially resulting in higher yields the following spring.

However, there is likely a threshold for the number of branch crowns that can support optimal yields, which may be influenced by factors such as cultivars and fertilizer input. Once this limit is reached, additional crown development may not translate into increased yield. This may help explain the results observed in the second year's harvest at the Vincennes location.

Runner production is undesirable in plasticulture systems. To prevent daughter plants from establishing, runners need to be removed promptly during the summer following the first year's harvest. Plants grown on white plastic mulch tend to produce more runner biomass, which may increase the labor required for runner removal.

One advantage of using white plastic mulch over black is its ability to keep the soil surface cooler. This can be particularly beneficial in situations where ripe fruit remains on the mulch for an extended period before harvest, such as in u-pick operations. Additionally, the cooler soil temperatures may enhance plant survival during the summer following the first year's harvest—especially in soils with lower water-holding capacity, which tend to heat up more and impose greater water stress on crops during hot, dry conditions.

Frost damage is one of the major challenges in plasticulture strawberry production in Indiana. For fields without overhead irrigation, floating row covers must be readily available and deployed promptly when frost or freeze events occur during the critical flowering period. Using white plastic mulch may help delay flowering compared to black plastic mulch, potentially reducing frost risk to some extent.

However, this strategy does not guarantee reduced risk, as late frost events can still occur as late as May in southern Indiana. In some cases, we observed that frost caused more damage to later-blooming plants than to earlier-blooming ones, as the early bloomers had

already set fruit by the time the frost occurred. To better mitigate frost damage, we recommend consistently implementing frost protection measures whenever there is a risk and strategically spreading peak bloom timing—either by planting cultivars with different bloom periods, using a combination of black and white plastic mulches, or using straws for winter protection.

A detailed discussion of the cultivar evaluation results will be provided in a forthcoming article.

Introducing the Fourlined plant bug (Poecilocapus lineatus)

(Laura Ingwell, lingwell@purdue.edu)

Last week I had the wonderful opportunity to visit a local grower who installed an insectary strip adjacent to their high tunnel last year. They will be hosting a field day in June, so I wanted to take a sneak peek and see how the plants (and insects) were doing. The plants are progressing well, a mix of wildflowers, grasses and sedges. Some were even flowering! I was surprised (and stumped) to find some necrotic leaves, especially near the growing tips, on some of the flowers. My NRCS colleagues told me the flowers were in the mint family, so when I first suspected Harlequin bugs, I was a bit confused because I know they have a strong preference for brassica plants but can feed on others.

With my photos in hand (thank you cell phone!) I went on the hunt to figure out what this insect was causing the necrotic tissue damage. As it turns out, this was a new one for me! It is called the Fourlined plant bug! A name that basically described the brightly colored adult that is black with four bright green vertical lines along its back and some red near its head. What I saw were the nymphal stages, little red 'true bugs'. This insect belongs to the Order Hemiptera, which we call the true bugs and most often have piercing-sucking mouthparts; think aphids, plant hoppers, leaf hoppers, stink bugs, etc.

The feeding damage caused by the Fourlined plant bug results in white-grey spots on the leaf surface, resembling plant pathogens such as fungal infections. In some cases where heavy feeding occurs the spots can coalesce and result in larger necrotic spots or crinkling leaves.

This insect goes through egg-nymph-adult life stages. Eggs are laid on foliage in fall and overwinter. In the spring the eggs hatch and the nymphs are present, dropping to the soil when disturbed. Adults eventually arise, after 3-6 weeks, and are winged. They will fly away when disturbed. There is only one generation per year, and the adults can be found feeding through late July.

The Fourlined plant bug has a wide host range, feeding on over 250 species of plants. They are most seen on herbaceous perennials, herbs such as mint and basil, zinnia, marigold, currants, gooseberries and peppers. This is not an insect that I often encounter in food production. If you are struggling with managing this insect, I suggest sending a sample to the PPDL to confirm identification and get tailored recommendations.

Figure 1: Fourlined plant bug adult on soybean. Photo by John Obermeyer.

Figure 2: Fourlined plant bug nymph. Photo by Laura Ingwell.

Figure 3: Necrotic spots caused by Fourlined plant bug feeding. Photo by Laura Ingwell.

Chemical thinning

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

The window for chemical thinning is rapidly closing in many parts of the state. Carbaryl can be effective up to 20 mm fruit diameter. After this stage, options become limited and we're in a "rescue thinning" approach. Below is some information from Penn State University on rescue thinning options:

Rescue Thinning Options – 20mm and Above

Ethrel® is a rescue thinner that thins fruit right up to 25 mm after which it becomes ineffective. Ideally, Ethrel® works well when applied at temperatures between 70-80 ˚F. 80 ˚F+ temperatures could cause excessive thinning. Ethrel® could be combined with 1 pint of Sevin® and two pints of a surfactant such as Regulaid® (per 100 gallons). Ethrel® use rates for different varieties has been established by researchers Autio and Cowgill (*F-129R: Late-season "Rescue" Thinning with Ethephon*). Use the following concentrations, in 100 gallons of dilute spray, by variety:

- McIntosh and Macoun, 200 to 300 parts per million (ppm) (0.7 to 1 pt)
- Spur-type Delicious and Fuji, 300 to 375 ppm (1.0 to 1.5 pt)
- Golden Delicious, Rome Beauty, and August varieties, 120 ppm (0.4 pt)
- Gala, Cameo, and GoldRush, 225 ppm (0.75 pt)
- Enterprise™, 150 ppm (0.5 pt)
- Jonagold, 150 to 225 ppm (0.5 to 0.75 pt)

From: Fruit Times, Penn. State University. Authors Shan Kumar, Lindsay Brown, Daniel Weber and Donald Seifrit.

Southwest Purdue Agriculture Center Field Day Set for June 26

(Wenjing Guan, guan40@purdue.edu)

The Southwest Purdue Agricultural Center (SWPAC) is one of the eight Purdue Agricultural Centers located across Indiana. What makes SWPAC unique is its location in the heart of Indiana's watermelon-growing region—home to

one of the state's most significant specialty crop industries. In addition to watermelon and cantaloupe, southern Indiana is known for its diverse fruit and vegetable production, along with a strong presence of agronomic crops. As farming practices advance and industry needs change, research and Extension priorities at SWPAC continue to evolve to meet those demands.

The SWPAC Field Day offers a valuable opportunity to see these changes firsthand. It's an event for anyone passionate about agriculture and eager to learn more about how our food is produced and how production practices are adapting.

During the field day, participants will tour the research plots and hear presentations on a variety of topics, including:

- Winter canola production and market potential
- Sorghum as an alternative crop across Indiana
- Enhancing seed quality traits in cowpeas
- Using drones for pesticide application
- Pollinator health and the use of pollenizers in watermelon production
- Resilient agriculture and Purdue's initiative to implement these practices
- High tunnel tomato production and a cut flower research initiative
- Evaluation of synthetic and biological fungicides for watermelon and tomato production
- Recent updates on field crop diseases
- Changes in food safety regulations and new research projects related to food safety
- The Diverse Corn Belt project

Additionally, Dr. Fred Whitford will deliver a special presentation, "*Horsepower on the Farm: From Hay-Powered Horses to Gas-Powered Tractors*" sharing the fascinating story of how agriculture has evolved over the years.

The SWPAC Field Day is free to attend, and lunch will be provided, thanks to the support of our generous sponsors!

For more event details, please refer to the flyer. To register, visit https://tinyurl.com/2025SWPACFieldDay or call 812-886-0198

Indiana Hort. Society summer meeting

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

I want to remind everyone that the summer meeting will be held Wednesday July 9 at Chandler's Orchard and Country Market:

https://www.chandlersorchard.com

The orchard and market are located in Fillmore, IN, just a little west of Indianapolis

All are welcome to join us for an orchard tour and discussion of all things fruit, from growing to marketing. Plan to join us for an enjoyable day of learning and networking with fellow growers.

Upcoming Events

(Miranda Purcell, mrpurcel@purdue.edu)

Bulletins Live! Two Webinar
Thursday, May 22nd 12-1pm or 6-7pm
https://www.canr.msu.edu/events/bulletins-live-two-webinar?utm_source=cc&utm_medium=email&utm_campaign=extensiondigests

Veterans Grape Planting Workshop
Tuesday, June 3rd
The Rejoicing Vine Winery Indianapolis, IN
https://vetsinfarming.wildapricot.org/event-6136107

Southwest Purdue Ag Center Field Day
Thursday, July 26th
Southwest Purdue Ag Center Vincennes, IN
https://vegcropshotline.org/article/southwest-purdue-agriculture-center-field-day-june-26-2025/#:~:text=Southwest%20Purdue%20Agriculture%20Center%20Field,Purdue%20University%20Vegetable%20Crops%20Hotline

Indiana Horticulture Society Field Day
Wednesday, July 9th
Chandler's Orchard & Country Market Fillmore, Indiana

Purdue Small Farm Education Field Day
Thursday, July 24th
Purdue Student Farm West Lafayette, IN
https://ag.purdue.edu/events/department/hla/2025/07/purdue-small-farm-education-field-day.html

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