

# VEGETABLE CROPS HOTLINE

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

## In This Issue

- From the Editor's Desk
- Adapting and Planning for Farm Businesses in Uncertain Times
- Digital Farm Records – Easy Conversion from Notebook
- Grafted Tomatoes for High Tunnel Production
- Optogen®- a New Herbicide Available in Select Vegetables and Strawberry
- Insects Traps as a Monitoring Tool
- Selecting Vegetable Varieties for your Farm
- Low Temperatures in December Hurt January and February Markets
- What is Purdue Extension?
- News from the Office of Indiana State Chemist and Seed Commissioner
- Sustainable Agriculture Research and Education (SARE) News
- Indiana Natural Resources Conservation Services News
- Warm, Wet Spring Predicted for Indiana
- Career Opportunity at Purdue Extension – Food Systems Coordinator
- Indiana Small Farms Conference, March 2-3
- Indiana Vegetable Growers Association Annual Meeting

## From the Editor's Desk

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

Welcome to the [Vegetable Crops Hotline](#) (VCH), Purdue Extension's exclusive newsletter for people in the business of growing vegetables. As things might change from year to year, so did the newsletter editorship. In December 2023, Wenjing Guan handed the role over to Petrus Langenhoven. "Wenjing, I think I am safe to say that on behalf of all our readers and contributors, I would like to thank you for your service as Editor."

Let me introduce myself. I am Petrus Langenhoven, a horticulture and hydroponic crop specialist in Purdue's Department of Horticulture and Landscape Architecture. I love working with vegetable and mint growers in Indiana. My work focuses on open-field and indoor production (high tunnel and greenhouse) of vegetables and peppermint. And I am particularly fascinated by peppers, my favorite vegetable crop. I am very interested in sustainable agricultural practices and how to use them to

optimize production and increase farm sustainability. I am also the Co-Director of the Purdue Student Farm.

The VCH will publish sixteen newsletter issues during 2023. A hard copy of the year's first issue is sent to all who subscribed to VCH via US-mail in 2022 and all new subscribers for 2023. To continue receiving future copies through US-mail, 2022 subscribers must renew their Hotline subscriptions using the form attached to this issue. Don't know which year you subscribed for? Check the envelope you receive this newsletter in. The year that your subscription is paid through is at the bottom right-hand corner of your envelope.

There is no need for any action if you receive the newsletter through email. You will continue to receive the newsletter on the issue date. In addition, you will receive emails with information about articles or announcements that need your immediate attention. These articles will be posted under Hot Topics on the VCH webpage and will be included in the next issue. All previous articles published in the VCH newsletter are available on the VCH website (<https://vegcropshotline.org/>).

Frequently we include links to websites or publications available online. If you can't access these resources, don't hesitate to contact your local Extension office or us to request a hard copy of the information.

Do not hesitate to contact me at [plangenh@purdue.edu](mailto:plangenh@purdue.edu) if you have any questions or suggestions to improve the newsletter. Let me know if there are specific topics you would like to see more of in the newsletter. Also, let us know if things are not working for you. We want to improve the newsletter, and your input is valuable.

We hope you enjoy the newsletter and have a happy and productive season in 2023.

## Adapting and Planning for Farm Businesses in Uncertain Times

*(Renee Wiatt, [reneewiatt@purdue.edu](mailto:reneewiatt@purdue.edu)) & (Maria Marshall, [mimarsha@purdue.edu](mailto:mimarsha@purdue.edu))*

Farms and agribusinesses are not immune to a variety of shocks and business disruptions that can occur. In fact, it could be argued that farms and agribusinesses are more vulnerable than many other small businesses. If you and or your spouse were to develop a life-threatening illness tomorrow, would your farm

business be at risk of collapsing? What would happen if your most valuable employee were to walk off the job? Do you have a plan to notify customers if your product is contaminated? What will you do if market prices drop by fifteen percent? What happens if your computer crashes and you lose your financial records? Do you have a social media policy for your business? These situations illustrate some of the risks that farm businesses can face.

Farms and agribusinesses can be impacted by production, marketing, financial, legal, and human resource (Marshall and Alexander, 2005), and even social media risks. It is likely that any operational farm has experienced a business disruption in the form of the recent pandemic (COVID-19), a recession, a market downturn, a natural disaster, or even the effects of climate change. However, little is known about how farms are managed through the recovery process.

Farms are specifically vulnerable to weather-related (production) and human resource (people-related) risks. However, many risks can be minimized or avoided with proper planning. Proper planning is not limited to contingency planning. It also extends to being prepared overall in the business, such as having an updated business plan and set of financial records stored in an accessible place and having updated business contacts and passwords in a secure location.

Formalized contingency planning and efficient management can improve business performance and minimize damages when your business has an interrupting event. Benefits of contingency planning can include: allowing you to focus on the right priorities in your family and business, allowing the business to function during the illness or absence of a key person, and giving employees a better opportunity to plan their own lives.

What is a contingency plan? A business contingency plan is a set of procedures that defines how a business will continue or recover its critical functions in the event of an unplanned disruption to normal activities. No other process does a better job of making a business assess its operations and processes. It's a structured exercise of planning what to do when key operations are not available. The following components are included in a contingency plan:

1. **Risk Assessment.** The risk assessment component of plan allows businesses to identify and exclude activities in the business that expose the business to unacceptable risk. The risk assessment increases the likelihood that you will select the best possible combination of risk management strategies.
2. **Business Impact Analysis.** During this step of contingency planning, you analyze the impact that events could have on your business in terms of operating impact (loss of the business or operating efficiency), financial impact (loss of customers, business credit rating, increased cost of temporary help, or cash flow problems), and legal impact (unfulfilled contracts with suppliers, customers, and/or vendors). During this phase, you need to identify the critical functions within the business to fully analyze

business impact. For any event that you can see occurring in your business, consider both probability and consequences so that you can decide which strategy to use.

3. **Risk Management Strategies and Tools.** Be sure to document procedures for handling an incident (i.e. who performs what critical business functions). You should have a checklist for employees that details the procedures for each critical business function and for handling financial issues. There are four main strategies for dealing with risk:
  1. Risk avoidance requires a business to take actions to evade risky situations.
  2. Risk reduction includes businesses taking actions that build an extra degree of safety into a situation with an identified level of risk.
  3. Risk anticipation (retain the risk) promotes self-insurance.
  4. Risk transfer depends on the use of insurance.
2. **Risk Management Goals.** Goals provide targets to aim for and provide a basis for evaluating business performance. Be sure to involve family and key employees in the planning process to create a sense of group ownership in the business goals.
3. **Document the Plan.** Write down the plan, share it with family and employees, and update it annually.

Contingency planning may initially seem like a large ask in terms of focused time, but when (not if) your business experiences a disruption, you will be glad that you have your plan.

*This article was adapted from "Contingency Planning for Your Farm Business" by Renee Wiatt and Maria Marshall, found in PIFB Quarterly Newsletter, 2021 Winter Edition (<https://ag.purdue.edu/departments/agecon/fambiz/newsletters.html>).*

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## Digital Farm Records – Easy Conversion from Notebook

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

"My guess is that almost all are still using a dashboard notebook of some sort in combination, of course, with the farm management information system," says Dennis Buckmaster, Professor of Agricultural and Biological Engineering at Purdue as well as a Dean's Fellow for Digital Agriculture, "but some of those records that were handwritten or in a folder... don't get used in combination with the farm management information system," Dennis spoke at the Digital Ag Showcase on September 8, 2022, in West Lafayette (Hoosier Ag Today).

Buckmaster is doing very interesting work on free digital toolkits that are available to farmers. [Airtable](#), an online platform, runs the toolkits. The toolkits are designed to improve farm data sorting, aggregation, and analysis. It also helps with reporting. He has worked on several toolkits during the past year. Read more

and watch demonstration videos about these toolkits. Links to database templates are also included in these articles.

### Digital Field records: An Easy Way

<https://ag.purdue.edu/news/2022/04/digital-field-records.html>

### Digital records for FSMA: Free Toolkit

<https://ag.purdue.edu/news/2022/02/digital-records-for-fsma.html>

### Digital Horticultural Crop Activity Records

<https://ag.purdue.edu/news/2023/01/digital-horticulture-crop-activities-records.html>

For further inquiries, please reach out to Dennis Buckmaster at [dbuckmas@purdue.edu](mailto:dbuckmas@purdue.edu)

## Grafted Tomatoes for High Tunnel Production

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

Grafted tomatoes show advantages, particularly for high tunnel production. A Purdue extension publication, [Techniques for Tomato Grafting](#), and the [video](#) provide a step-by-step guideline for small growers to explore this technique.

I am often asked. When should I start to plant the seeds to produce grafted plants? The chart below shows a general timeline and materials needed to produce small amounts of grafted tomatoes. Generally, the younger the plants are grafted, the faster it recovers. Plant growth delay during graft healing should be less than seven days if plants recover smoothly. The delay does typically not make a noticeable difference in the size of seedlings compared to standard tomato transplants after the grafted plants are grown in a greenhouse for more than two weeks before transplant. Grafted plants could grow faster than normal transplants after fully recovering, assuming cell size does not limit their growth. That said, there is no need to start seeds much earlier than you would normally.

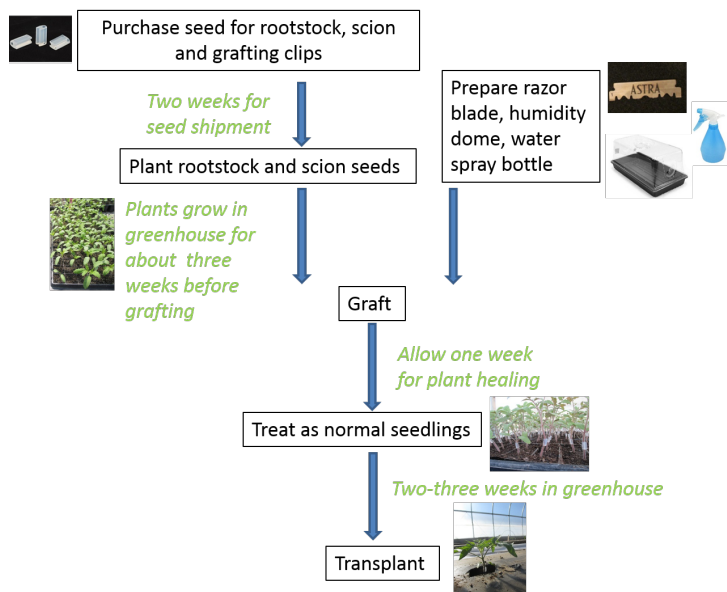


Figure 1. A general timeline and materials needed for producing grafted tomatoes on small scale.

Graft tomatoes with some of the most vigorous rootstocks may cause plants to grow too bushy because of their vigor. The more significant vegetative growth (grow leaves and shoots) could delay flowering and fruit set. Sometimes, grafted plants might delay harvest for about a week compared to typical tomato plants, although yields of the grafted tomato plants quickly catch up.

Several other factors, such as rootstock selection, tomato variety, fertility management, pruning, and trellis technique, can affect the balance between vegetative and reproductive growth.

It is important to note that grafting will not control foliar diseases. Because grafted plants tend to grow more vigorously than normal plants, they are more likely to create a microclimate suitable for the development of foliar diseases such as leaf mold. When fungicides are not used, it is more critical to use cultural practices to suppress disease development. Giving plants plenty of space, timely pruning and trellising, and maintaining good airflow is vital when growing grafted plants.

If you have questions about tomato grafting and growing grafted plants, please do not hesitate to contact me at [guan40@purdue.edu](mailto:guan40@purdue.edu)

## Optogen® - a New Herbicide Available in Select Vegetables and Strawberry

(Stephen Meyers, [slmeyers@purdue.edu](mailto:slmeyers@purdue.edu), (765) 496-6540)



### What is Optogen®?

The active ingredient in Optogen® (Figure 1) is bicyclopyrone. Corn growers may recognize bicyclopyrone as one of the four ingredients in Acuron® herbicide. Bicyclopyrone is a Group 27 herbicide with pre- and post-emergence activity on select weed species. Group 27 herbicides inhibit an enzyme known as “HPPD”, resulting in an inhibition of carotenoid synthesis. Ultimately, symptomatic plants exhibit “bleaching” injury (white plant tissues) (Figure 2). This is the only Group 27 herbicide labeled for many of the registered crops. Rotating among herbicide Groups is one way to slow the onset of herbicide resistance.





Figure 2. Mild and temporary Optogen® bleaching symptoms on a watermelon leaf.

#### **On what crops can Optogen® be used?**

The current label includes broccoli, garlic, horseradish, onion, strawberry, sweet potato, and watermelon. It is anticipated that additional crops will be added in the coming years.

#### **Important Notes:**

The use on onions should be limited to muck soils. Use on mineral soils will result in crop injury.

Applications made to emerged weeds should target weeds 2" tall or less and include a non-ionic surfactant or crop oil concentrate.

Applications made to row middles should be directed or applied with a hooded sprayer to keep the herbicide off the crop.

#### **What weeds are controlled by Optogen®?**

Optogen® is supposed to provide control of pigweeds, velvetleaf, common ragweed, eastern black nightshade, and lambsquarters. Partial control of numerous other weed species is also expected. Like most herbicides, Optogen® will work best in an integrated weed management program. For example, in 2022 research trials, we used Optogen® as a layby application in plasticulture-grown watermelon. This followed a pre-plant application of Chateau® and Dual Magnum® (Figure 3). This combination of herbicides resulted in excellent control of pigweeds, velvetleaf, and annual grasses.



Figure 3. Plots from 2022 research trials in watermelon: A) Weedy control and B) Chateau plus Dual Magnum pre-transplanting followed by Optogen at layby.

## **Insects Traps as a Monitoring Tool**

(Laura Ingwell, [lingwell@purdue.edu](mailto:lingwell@purdue.edu), (765) 494-6167)

There are many traps available to help with monitoring insect populations. As you prepare for the 2023 growing season, I would like to review some of them in case you want to implement trapping on your own farm to help improve your pest management programs.

**Trap Design.** Traps come in a variety of shapes, sizes, and colors. Much research has gone into the design, taking advantage of the behaviors of each insect that the trap is created to capture. Some insects are attracted to specific colors, others various shapes, and some move in a predictable manner in response to certain stimuli. For example, pests like aphids, thrips, and whiteflies are attracted to the color yellow, hence the reason why many sticky cards are yellow. Pollinators are also attracted to yellow because of the occurrence of this color in plant flowers. Therefore, you can unintentionally catch pollinators in yellow traps. Broadly, moths fly in an upward direction when they encounter a stimulus or to navigate based on the moonlight; therefore, cone-shaped traps are often used to collect moths. In orchards, red balls coated in pheromones and a sticky substance are used to monitor pests that attack developing fruits; the trap mimics the shape and color of the fruit. The three main trap types used to monitor vegetable insects include bucket traps (Figure 1), delta traps (Figure 2), and cone traps (Figure 3).



Figure 1. Bucket-style trap. These come in various colors and



hold a pheromone lure in the basket below the lid. Insects fall inside the bucket and cannot get out. Often a kill strip is placed inside the bucket, but this can be omitted or replaced with soapy water if you are an organic grower.



**Figure 2.** Delta trap. This trap is coated on the inside with a sticky substance that traps the insect to the surface. A pheromone lure is often placed on the sticky surface inside the trap and the trap is suspended in the crop canopy. The trap is often white but can come in other colors depending on the target insect. (Photo from Gemplers.com)



**Figure 3.** Cone trap. The one pictured here is called a Hartstack trap. Another version of a cone trap can be seen below. The pheromone lure is attached at the wide base of the cone. There is a collection chamber at the top of the trap that can be removed and emptied. (Photo by John Obermeyer).

The benefits of trapping are numerous. Depending on the pest-crop complex, traps can be used to monitor the emergence of a pest population so that you may alter your planting, usually after the emergence, to avoid damage to young seedlings/transplants. Traps can also be used to time the application of pesticides or the release of natural enemies. By using traps as a monitoring tool, you can detect when a pest population is active in the landscape and present in your crop. It is the best practice to monitor a trap first, then when the pest is detected, scout the crop to confirm its presence. You can then make applications of pesticides or release natural enemies at a time to get the most bang for your buck. Below I will provide a few examples of pest insects and traps that are available to integrate into your IPM program.

**Corn earworm.** The corn earworm, *Helicoverpa zea*, is a common pest of sweet corn. To monitor this pest, we pair a cone-shaped trap with a pheromone lure that smells like the female moth. When male moths are present on the landscape and looking for a mate, they fly around ‘sniffing’ the air for a female. The trap is designed to capture males, which we can use to indicate that the population is present in the crop and looking to mate and lay eggs. It is the egg laying on the silk of the developing corn that causes the damage. Therefore, we can monitor the stage of the crop (i.e., is silk present) and the population of the moths (how many we catch in our traps) to time insecticide applications more effectively. A statewide trapping network is established for this pest, which can be found here: <https://extension.entm.purdue.edu/veg/cornearworm/>. You can use the trapping location nearest your farm to monitor the population or erect a trap on your own farm. Spray applications should consider three factors: 1. Trap catches, 2. Presence of silk in the crop, 3. Stage of surrounding field corn. More information can be found on the above-mentioned website.



**Figure 4a.** Corn earworm adults will be captured in the trap (Photos by John Obermeyer).



**Figure 4b.** Larvae that cause damage to the crop. (Photos by John Obermeyer).

**Squash vine borer.** The clearwing moth, *Melittia cucurbitae*, can be devastating in cucurbit production. This moth typically has two generations per year in our region. The damage they inflict on the crop occurs when the females deposit their eggs at the base of the crop. The eggs hatch and the caterpillars bore into the stem. The most effective way to manage this pest is to target insecticide applications at the time of egg hatch so that the larvae consume a lethal dose as they take their first few bites before boring into the stem. The best way to monitor this is to use a pheromone-baited trap, much like the CEW described above. Again, we have a lure that smells like the female moths. When the adult males are present in the landscape and looking for a

mate, they can be lured into a trap using the scent of the female. You can time your pesticide application to a few days after you begin catching adult male moths, ensuring good coverage at the base of the plant. For this pest, a statewide trapping network is established, which can be found here:

<https://extension.entm.purdue.edu/veg/squash-vine-borer/>. This year we will use a new trap design to reduce the by-catch of pollinators we get when using the yellow bucket traps. A better design is a cone trap that can also be used for corn earworm (pictured below). There are other species of clear-winged moths that you may catch in the traps, including peach tree borer and grape root borer. Specific pheromones for these species are available, but sometimes they can be attracted to the smell of their relatives (i.e., other clearwing moths).



**Figure 5.** Scentry Heliiothis trap for squash vine borer trap. (Photo by Alan Eaton, University of New Hampshire)



**Figure 6.** Squash vine borer adult that will be captured in the trap. (Photo by John Obermeyer).

**Tomato pinworm.** This is a ‘new’ pest of Indiana and is becoming a problem, specifically in tomatoes cultivated in high tunnels. This microlepidopteran pest is problematic because the adults are very small and difficult to detect. The larvae are leaf miners or fruit borers, meaning they are protected within the plant tissue for much of their lifecycle. You can purchase tomato pinworm lures that are placed inside a delta trap to monitor this pest in your crop. Place them around the perimeter and check weekly. If you detect adult moths, then scout the crop, beginning with the leaves and stems, to look for damage. If you are interested in joining a state-wide monitoring network for this pest in 2023, don’t hesitate to contact me directly.



**Figure 7a.** Tomato pinworm adult that will be captured in the traps (photo by GNORLY)



**Figure 7b.** Larvae damaging the plant (photo by Dan Egel).

A variety of other traps are available for monitoring specific pests, many of which are common for orchard crops. If you have a pest on your farm that you struggle to detect or manage, I recommend you look into available options for pheromone trapping/monitoring.

## FAQs

1. Will pheromone-baited traps lure a pest into my crop, making it more of a problem?

No, in most instances, these traps only work within a few feet of the monitoring station and will only pull in local populations. That is, those that are already on your farm and foraging for a suitable crop. The only exception is Japanese beetles. I DO NOT recommend using these traps. This pest is so widespread and mobile that we do see that placing a trap on your farm/in your yard can increase the pest pressure, pulling in your neighbor’s beetles. They are great for research when we need to catch hundreds but are not recommended as a management/monitoring tool.

2. How often should I check my trap?

I recommend checking twice a week, especially when your crop is in a vulnerable stage (seedling emergence or after transplant, or silking for corn production). Empty/replace the traps as you begin to catch the pest. This will make it easier for you to distinguish new catches from old.

3. How often do I have to change the lure?



This depends on the lure and the manufacturer, but it is an important detail to pay attention to. If the lure is in the field beyond the recommended time, the scent declines and no longer effectively pulls in the target pest.

#### 4. Where do I get trapping supplies?

There are a variety of suppliers, so check with those from whom you have already purchased your pest management tools. If you are looking for others, check out Great Lakes IPM, Gemplers, or other agricultural supply retailers.

If you are interested in participating in any of the state-wide trapping networks or would like to see a new pest added, please email me at [lingwell@purdue.edu](mailto:lingwell@purdue.edu) or call (765) 494-6167.

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## Selecting Vegetable Varieties for your Farm

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

Are you still thinking about varieties for the upcoming season? Purdue has been keeping a record of vegetable variety trials in the Midwest since 1999. *The Midwest Vegetable Trial Report* series includes reports of applied research relevant to vegetable and melon production in the Midwest. Here are some abstracts of the most recent reports. Visit the [Midwest Vegetable Trial Report](https://docs.lib.purdue.edu/mwvtr/) webpage (<https://docs.lib.purdue.edu/mwvtr/>) for more information.

### Colored Sweet Bell and Tapered Pepper Cultivar Evaluation for High Tunnel Production in West-Central Indiana, 2022 (Petrus Langenhoven, Lian Duron, and Eduardo Miranda)

Colored sweet bell-shaped and tapered peppers are a staple at the farmers' market. Many small and medium-sized farming operations in Indiana grow this summer crop. High tunnels allow growers to protect their crops and extend their growing season. Sweet peppers, in particular, benefit from the unique growing environment created by the high tunnel. Planting of peppers can start at least 2-4 weeks earlier in the spring, and production can continue into the fall until the first hard freeze. Pepper variety performance data for Indiana is not readily available. We are working hard to change that. Currently, we have evaluated twenty-five pepper varieties, and each variety is assessed in two production cycles. This paper reports on five sweet bell and five tapered pepper entries.

### 2022 Seedless Pickling Cucumber Cultivar Trial (Ben Phillips and Jenny Schoonmaker)

A pickling cucumber cultivar trial was planted at the Southwest Michigan Research and Extension Center (42.088261, -86.351980, Benton Harbor, Michigan). Bejo (BJ), Nunhems (NU), and Rijk Zwaan (RZ) seed companies donated parthenocarpic (seedless) cultivars for mechanical once-over harvest. Overall, trial quality was marginal due to being the first trial on a new research farm with different equipment parameters, task procedures, and responsibilities. Factors affecting trial quality were logged for next year's trial, and include machine planting, incorporating the entire

nitrogen recommendation ahead of planting, and adjusting the final plant population to 30-inch row spacings.

### 2022 Summer Squash Cultivar Trial (Ben Phillips and Jenny Schhomaker)

A summer squash cultivar trial was planted at the Southwest Michigan Research and Extension Center (42.081985, -86.354087, Benton Harbor, Michigan). HM Clause (HM), PanAmerican (PA), Rupp (RP), Sakata (SK), and US Agriseeds (UA) seed companies donated four zucchini cultivars, three patty pan cultivars, and one yellow summer squash cultivar for plastic-mulch bedded hand harvest. Trial quality was excellent.

### No-till Pumpkin after Winter Rye Cover Crop, Northern Indiana, 2021 (Elizabeth Maynard)

No-till planting of pumpkin into a killed winter rye cover crop is a system used by growers in several states, including Indiana. Advantages mentioned by producers in addition to soil health benefits from the cover crop include cleaner pumpkins at harvest, and in rainy seasons, less mud in the field at harvest time. This paper reports on a project to develop a workable no-till system at a university research farm that can be used for demonstration and in future research to better understand and improve production practices. The trial included two methods for killing rye in no-till systems: herbicide applied at the boot stage of rye and roller-crimping at the time of planting.

Jack-o-lantern pumpkins produced greater yield in conventional tillage than in no-till in this trial. The effects of tillage treatment on marketable yield were similar for direct-seeded and transplanted crops, with conventional plots producing 40% more by number and 58% more by weight than no-till plots. In direct-seeded plots, the conventional treatment produced the largest marketable pumpkins, 22% heavier than in no-till plots. In transplanted plots, pumpkin size was not affected by tillage treatments. Weed pressure differed among the tillage treatments before in-season control measures in July: herbicide-killed rye and conventional tillage had more weed pressure than roller-crimped rye.

For direct-seeded crops, emergence was slower and more variable in no-till treatments than in conventional tillage. The longest delay in emergence occurred when rye was killed by roller-crimping. Key challenges that remain for direct-seeded no-till pumpkins are achieving good furrow closure and reducing seed predation. For both direct-seeded and transplanted pumpkins, the next steps include exploring ways to overcome other factors that reduce growth and yield. Certainly, pumpkin yield is not the only measure of success in this system—the benefits of reduced tillage and biomass input to the soil that many others have documented also have much value.

### No-till Sweet Corn after Winter Rye Cover Crop, Northern Indiana, 2021 (Elizabeth Maynard)

No-till planting of sweet corn into a killed winter rye cover crop is not a widely used practice in Indiana. Still, it has the potential to provide soil health benefits such as reduced compaction, improved soil water-holding capacity, and reduced evaporation



from the soil surface, in addition to other benefits. This paper reports on the second year of a project to develop a workable system at a university research farm that can be used for demonstration and in future research to better understand and improve production practices. The trial included two methods for killing rye in no-till systems: herbicide at the boot stage of rye and roller-crimping either before or after seeding. Emergence and stand establishment problems in no-till plots last year led to changes in methods this year: weight was added to planter units for no-till plots, and irrigation was applied soon after seeding. An early and main season sweet corn cultivar responded similarly to treatments. Compared to conventional tillage, the marketable ear number was reduced for sweet corn no-tilled planted into rye. When rye was killed by rolling, the number of marketable ears per plant was less than when rye was killed with herbicide. Marketable yield differences appear related to differences in emergence timing and uniformity. In rolled plots, harvest was delayed approximately 10 days. Future work on the no-till system should include continued improvement in stand establishment as well as considering whether changes in nutrient and other management practices are warranted.

#### **2022 Standard-sized Triploid Watermelon Cultivar Evaluation in Indiana (Wenjing Guan, Dean Haseman, Dennis Nowaski, and Dan Egel)**

A total of 6,600 acres of watermelons were planted in southern Indiana in 2021, making Indiana the sixth largest watermelon production state in the US, following Florida, Texas, Georgia, California, and North Carolina (USDA, 2022). Farmers select cultivars based on yield, disease resistance and fruit quality. This annual watermelon cultivar evaluation trial aims to provide watermelon producers and seed companies with information on the performances of different watermelon cultivars in southern Indiana.

#### **2022 Personal-sized Triploid Watermelon Cultivar Evaluation in Indiana (Wenjing Guan, Dean Haseman, Dennis Nowaski, and Dan Egel)**

Personal-sized (mini) watermelons refer to fruit weighing 4.4 to 8.8 lb (Vinson et al., 2010), with 6-7 lb considered the ideal size. Both seeded and seedless personal-sized cultivars are commercially available. In the annual cultivar trial, we evaluate the performance of personal-sized triploid watermelons in southern Indiana.

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## **Low Temperatures in December Hurt January and February Markets**

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

A common approach in winter production is to allow crops to reach maturity or harvestable size by the end of November. High tunnels are then used as a 'living refrigerator' from December to around the middle of February. Crops are harvested as needed in the darkest and coldest periods. This approach, however, did not work well at some Indiana farms this winter because unexpectedly low temperatures occurred around Christmas.

Temperatures reached -20°F (without wind chill) at farms across Indiana. Even though tunnels provided some protection, temperatures as low as -15°F were recorded inside the structures. With such extreme temperatures, many winter crops scheduled to be harvested and sold in January and February were lost in December. As such, some farms were forced to be out of the winter market for several weeks. After the frost killed or damaged the crops (Figures 1 and 2), we tend to replant immediately, hoping to recover from the loss as soon as possible. However, this approach proved to have little effect. One farmer showed me that lettuce transplanted at the end of December had almost no growth in the past two months, while the ones transplanted a few days ago looked healthier and were likely to outgrow the ones transplanted at the end of December. At another farm, spinach transplanted in December did not survive. These stories reiterated the importance of the combined effects of light and temperatures on winter growth. Even though we suffered losses from frost in December, it may not be a good idea to plant in the deep winter. Refer to [Scheduling Fall and Winter Vegetable Production](#) for more information about fall and winter planting. The recent warm temperatures and increased day length in February are very welcome. Many farms are busy planting. Those leafy vegetables will soon fill the spring market.



Figure 1. Temperatures inside the caterpillar tunnel in southern Indiana dropped to -15 °F on Dec. 23, 2022, killing various crops (a farmer provided the photo).



Figure 2. Kale and spinach grown in a high tunnel were damaged by the low temperatures on Dec. 22, 2023, in central Indiana.

This work is supported by a USDA/NIFA Specialty Crop Research Initiative (SCRI) [grant no. 2021-51181-35858/project accession no. 1027430].

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## What is Purdue Extension?

(Miranda Purcell, [mrpurcell@purdue.edu](mailto:mrpurcell@purdue.edu))

The Cooperative Extension Service is one of the nation's largest scientific research-based information and education providers. It's a network of colleges, universities, and the U.S. Department of Agriculture, serving communities and counties across America. Purdue Extension is a service tailored to meet the needs of Indiana, needs we know firsthand. Our educators, specialists, and volunteers live and work in all 92 Indiana counties. We provide the link between Land Grant research and Indiana citizens. In doing that, we provide practical solutions to local issues. We provide information and expertise that's available in the form you want when you want it. That's Purdue Extension, Indiana's home team advantage.

The Purdue University Cooperative Extension Service program areas are Agriculture and Natural Resources, Health and Human Sciences, Economic and Community Development, 4-H Youth Development. Extension educators with agricultural and natural resource specialties offer programs and information on agricultural production and financial management for farmers, food and fiber processors, manufacturers, and consumers. We also provide expertise in environmental issues, natural resource conservation, and land use.

### Where are we located?

Extension Educators can be found at your local [County Extension Office](#);

Specialists can be found on campus or at [Purdue Agricultural Centers](#) throughout the state

### Fruit & Vegetable Extension Specialists



Peter Hirst  
Tree Fruit Specialist



Miranda Purcell  
Viticulture Specialist



Ashley Adair  
Organic Agriculture



Laura Ingwell  
Fruit & Vegetable  
Pest Management



Wenjing Guan  
Vegetable & Melon  
Production



Liz Maynard  
Commercial Vegetable  
Production



Petrus Langenhoven  
Commercial Horticulture  
Production



Ariana Torres  
Specialty Crops  
Marketing



Stephen Meyers  
Weed Management  
in Specialty Crops



Janna Beckerman  
Ornamental & Fruit  
Diseases



Elizabeth Long  
Fruit & Vegetable  
Pest Management



Dan Egel  
Plant Pathologist



Krishna Namali  
Controlled  
Environment

### Resources

[Midwest Fruit Pest Management Guide](#) (updated annually)

[Midwest Vegetable Production Guide](#) (updated annually)

The Purdue Education Store- [Horticulture Extension Publications](#)

### Upcoming Events

[Fruit Pruning Workshop](#) | March 1, Lafayette, IN

[Indiana Small Farms Conference](#) | March 2-3, Danville, IN

[Purdue Fruit and Vegetable Field Day](#) | July 20, Lafayette, IN

[Small Farm Education Field Day](#) | July 27, West Lafayette, IN

### How can you get involved?

Sign-up for the [Facts for Fancy Fruit Newsletter](#)

Sign-up for the [Vegetable Crops Hotline](#)

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## News from the Office of Indiana State Chemist and Seed Commissioner

(Leo Reed, [reedla@purdue.edu](mailto:reedla@purdue.edu))

There are two important notices that you need to be aware of.

### Revisions to Indiana Pesticide Regulations - January 5, 2023

As you may already be aware, Indiana has recently made several changes to the state pesticide regulations. The Office of the Indiana State Chemist (OISC) and the Indiana Pesticide Review Board (IPRB) have been working with stakeholders and regulated industries since 2018 to identify needed rule changes and to gather input on how best to structure those changes. Formal and informal outreach to stakeholders on the details of the proposed rule revisions has been occurring since 2021. [Read more](#) at [https://oisc.purdue.edu/pesticide/pdf/2023\\_new\\_pest\\_rules\\_outreach.pdf](https://oisc.purdue.edu/pesticide/pdf/2023_new_pest_rules_outreach.pdf)

### 2023 Rule Revision - Frequently Asked Questions - updated February 10, 2023

The following questions have been asked of OISC regarding the interpretation and implementation of the pesticide applicator certification and training rules that became effective on January 4, 2023. As new questions are posed to OISC, this [FAQ document](#) will be updated accordingly and posted at [https://oisc.purdue.edu/pesticide/pdf/2023\\_rule\\_changes\\_021023.pdf](https://oisc.purdue.edu/pesticide/pdf/2023_rule_changes_021023.pdf)

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## Sustainable Agriculture Research and Education (SARE) News

### NCR-SARE Funded Awards

### NCR-SARE Announces 2022 Research and Education Awards - February 1, 2023

NCR-SARE is pleased to announce the projects selected for funding for the 2022 Research and Education competitive grant program. Seventeen (17) projects were awarded a total of more than \$3.8 million through this NCR-SARE grant program for researchers and educators involved in projects that explore and promote environmentally sound, economically viable, and socially

responsible food and/or fiber systems.

The following awarded projects are in order by state and then by last name:

Matthew O'Neal with Iowa State University in Ames, IA, was awarded \$248,659 for the project, "Prairie Strips for Enhanced Honey Production: Can Conservation Improve Apiculture?"

Jill Kostel with The Wetlands Initiative in Chicago, IL, was awarded \$143,480 for the project, "Collaborative Outreach and Demonstration of Farm-based Tile-Treatment Wetlands for Water Quality Improvement."

**Kathryn Orvis with Purdue University in West Lafayette, IN, was awarded \$245,116 for the project, "Urban Farming Entrepreneurship Program: Providing Minority Youth Entrepreneurship Training to Increase Employment and Food Access."**

Jaymelynn Farney with Kansas State University in Parsons, KS, was awarded \$ 249,932 for the project, "Evaluating Virtual Fences for Cattle in Regards to Water Resources, Forage Management, Invasive Weed Control, and Wildlife Systems."

Krista Isaacs with Michigan State University in East Lansing, MI, was awarded \$249,932 for the project, "Evaluating an Under-utilized Species for Climate Resilient Forage and Cover Crop Options in North Central Region Cropping Systems."

Meghan Milbrath with Michigan State University in East Lansing, MI, was awarded \$114,625 for the project, "Taking the Sting out of Honey Bee Medicine: Training and Tools for Veterinarians to Increase Access to Care for Beekeepers."

Nicolas Jelinski with the University of Minnesota in Saint Paul, MN, was awarded \$249,852 for the project, "Exploration of Shredded Cardboard as a Mulch and Compost Resource to Improve Soil Health and Water Management by Urban Growers in the Twin Cities."

Robert Koch with the University of Minnesota in Saint Paul, MN, was awarded \$239,682 for the project, "Biological Control for Sustainable Management of Soybean Gall Midge, a New Pest of Soybean in the North Central Region."

Courtney Kowalczak with Fond du Lac Tribal and Community College in Cloquet, MN, was awarded \$250,000 for the project, "Bimaaji'idiwin Gitigaaning Producer Training Program and Manoomin Hull Research."

Lindsay Pease with the University of Minnesota in Crookston, MN, was awarded \$249,839 for the project, "Planting Green in the Frozen North."

Kyungsoo Yoo with the University of Minnesota in Saint Paul, MN, was awarded \$249,939 for the project, "Optimizing Agricultural Use of Diverse Soil Landscapes: Small Organic Vegetable Farms in the Driftless Area."

Ryan Tenney with Sankara Farm in Kansas City, MO, was awarded \$249,352 for the project, "Black Emancipatory Agriculture Asset Map (BEAAM) and Returning Generation Black Farmer Mentorship Program."

Amy Gerdes with Community Crops in Lincoln, NE, was awarded

\$72,446 for the project, "Marketing and Business Skills for Beginning, Refugee, and Immigrant Farmers in Lincoln, Nebraska."

Rhoda Burrows with South Dakota State University in Rapid City, SD, was awarded \$249,935 for the project, "Comparing Soil Tarping and Solarization for Early Season Weed Control in Vegetable Crop Systems – a Research and Demonstration Study."

Luis Peña-Lévano with the University of Wisconsin in River Falls, WI, was awarded \$249,945 for the project, "Financial Feasibility and Environmental Implications of Adopting Automatic Milking Systems by Dairy Farms in Wisconsin and Minnesota."

Gregg Sanford with the University of Wisconsin in Madison, WI, was awarded \$249,738 for the project, "The Soil Organic Carbon network (SOCnet): Farmers building soil assets to help mitigate and adapt to climate change in the North Central US."

Kate Wersan with the Savanna Institute in Madison, WI, was awarded \$249,597 for the project, "Novice-to-Producer Agroforestry Education: Linking Demonstration Farms to Online Learning, Apprenticeships, and Communities of Practice."

You can view NCR-SARE's 2022 funded projects along with their descriptions at

<https://northcentral.sare.org/grants/apply-for-a-grant/>.

### **New SARE Bulletins**

#### **Transitioning to Organic Production - January 9, 2023**

Sean McGovern

Since the 1990 Organic Foods Production Act passed, the market for organic products has steadily risen. In 2020, organic sales skyrocketed to an all-time high, motivating many farmers to consider transitioning their farms to organic production. While organic production can help farmers gain access to new markets, improve soil and increase profits, the transition process can be both challenging and risky.

SARE's newest bulletin, Transitioning to Organic Production, explains how many farmers adopt organic production to increase profits while improving the resilience and environmental impact of their production systems. Long-term success requires patience, flexibility, good record-keeping and a commitment to stewardship.

Transitioning to Organic Production lays out basic transition strategies for livestock, field crop and horticultural systems, including a summary of the certification process and the National Organic Program standards. Practices common to all organic systems are also addressed, including:

- crop rotation
- cover cropping
- addition of organic fertility sources
- disease prevention
- integrated pest and weed management
- conservation tillage

Transitioning to Organic Production also outlines how these research-based practices, paired with sound transition strategies such as flexible timelines, using alternative labels and



coordinating with NRCS programs, can help farmers successfully navigate the transition process. Download or order your free print copy of [Transitioning to Organic Production](https://www.sare.org/transition-to-organic) at <https://www.sare.org/transition-to-organic> or by calling (301) 779-1007.

### **Scaling Up Your Vegetable Farm for Wholesale Markets - November 29, 2022**

Lisa O’Fiesh

With the popularity of local foods spreading to the largest retailers in the country, many producers now see an opportunity to grow their farms by scaling up and expanding to wholesale markets. Selling to the wholesale market can help smaller-scale farmers to connect with more customers to increase brand recognition and profitability.

SARE’s newest bulletin, *Scaling Up Your Vegetable Farm for Wholesale Markets*, provides a variety of strategies and tools to help owners of small- to mid-scale operations branch out into wholesale markets.

*Scaling Up Your Vegetable Farm for Wholesale Markets* features a range of effective strategies for business planning, working with wholesale buyers and increasing production capacity. Producers Shakera and Juan Raygoza of Terra Preta Farm in Edinburg, Texas, share how they scaled up from 1.5 acres of diversified vegetables to growing 15 acres of organic radishes for local wholesale markets. Raygoza says that transitioning to wholesale markets was a “game changer” for the farm and for the surrounding community.

Specialized crop production, combined with smart investments in equipment, appropriate marketing strategies and improved postharvest handling, can help farmers to scale up to sell their products more efficiently and consistently. In some cases, working together can give producers the opportunity to expand by overcoming barriers that have previously limited access to profitable wholesale markets.

Download or order your free print copy of [Scaling Up Your Vegetable Farm for Wholesale Markets](https://www.sare.org/wholesale-marketing) at [www.sare.org/wholesale-marketing](https://www.sare.org/wholesale-marketing) or by calling (301) 779-1007.

#### **New Video Series**

#### **Manage Weeds on Your Farm Video Series**

SARE Outreach

In this series, experienced farmers from around the country talk about how they have found success controlling weeds by following ecological principles, and without resorting to the use of herbicides. To do so, they rely on a range of cultural and mechanical practices, including diverse crop rotations, well-timed cultivation and targeting weeds when they’re at vulnerable growth stages. They are:

- Johnson Farms, Madison, S.D. (grains)
- Burroughs Family Orchards, Denair, Calif. (almonds)
- Terra Preta Farm, Edinburg, Texas (horticulture)
- The Martens Farm, Penn Yan, N.Y. (grains and legumes)

The videos are available at

<https://www.sare.org/resources/manage-weeds-on-your-farm-video-series/>

Learn more with the book **Managing Weeds on Your Farm** <https://www.sare.org/resources/manage-weeds-on-your-farm/>

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## **Indiana Natural Resources Conservation Services News**

### **Indiana NRCS accepting applications for Farmers Helping Hellbenders RCPP project - February 17, 2023**

Applications are being accepted through March 31 from farmers and forestland owners in portions of Washington, Harrison, Crawford, and Floyd counties.

Funding is now available to producers in the Blue River-Sinking Watershed to implement conservation practices on their land to assist with the recovery of Eastern Hellbenders and improvement of aquatic resources. This funding is provided through USDA’s Natural Resources Conservation Service’s (NRCS) Regional Conservation Partnership Program (RCPP) and will assist farmers in implementing practices designed to keep nutrients and soil resources on fields and improve their watershed.

The Farmers Helping Hellbenders RCPP project is led by Purdue University with assistance from 13 collaborating public and private organizations on the state and local level, including NRCS. Eligible producers and forestland owners who wish to implement conservation practices on their land should discuss their options with their local district conservationist.

While NRCS accepts program applications year-round, Indiana producers and landowners should apply by March 31, 2023, to be considered for the current RCPP-Hellbender funding cycle. Applications received after March 31 will automatically be considered during the next funding cycle. For more information or to submit an application, contact your local district conservationist by visiting [farmers.gov/service-locator](https://farmers.gov/service-locator) (<https://www.farmers.gov/working-with-us/service-center-locator>).

Read more at

<https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/indiana/news/indiana-nrcs-accepting-applications-for>

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## **Warm, Wet Spring Predicted for Indiana**

(Hans F Schmitz, [hschmitz@purdue.edu](mailto:hschmitz@purdue.edu), (812) 385-3491)

As we near springtime in Indiana, the more things change, the more they stay the same. Much like the winter season, which has produced warm and relatively wet conditions across most of the state, the [Climate Prediction Center](#) calls for continued above-average temperatures and precipitation. The one exception is northwest Indiana in a line from Terre Haute to South Bend, where temperatures are too close to call one way or the other.

The continuing La Nina conditions in the El Nino Southern Oscillation influence the March, April, and May outlook. Unlike

previous seasons, models show growing certainty that La Nina conditions will give way to ENSO-neutral conditions during the springtime, which removes the certainty of increased precipitation. For this reason, the bulk of the wetter-than-average predictions are likely early in the spring period, through March and potentially April, with May giving less certainty to wet or dry conditions. Potential precipitation anomalies are predicted to be at least one inch greater than average precipitation across the state, with higher amounts in the south.

Temperature is affected similarly, with the glut of the warmth over the southeastern US spilling northward into Indiana. With the removal of La Nina conditions, this warming signal will also weaken toward the end of the spring. Predicted temperature anomalies are very low across the state, with a warming anomaly of 0.2 degrees Fahrenheit in the southern part of the state and 0.05 degrees Fahrenheit in the north.

Any areas of the state currently in abnormally dry conditions in the US Drought Monitor are likely to be removed in the near future as these predictions play out. The Climate Prediction Center does not expect drought development anywhere in Indiana over the next three months.

For those with intentions of planting outdoors, lack of drought is good, but planting windows may be shorter in the early spring period, making producers capitalize on any gaps in rainfall and planning to spend some time indoors planning when intentions to plant cannot be made real. For more information, don't hesitate to get in touch with the [Indiana State Climate Office](mailto:hschmitz@purdue.edu) at (765) 494-8060 or [hschmitz@purdue.edu](mailto:hschmitz@purdue.edu).

## Career Opportunity at Purdue Extension – Food Systems Coordinator

The Food Systems (FS) Coordinator leads a state extension program with the main focus on realizing value-added opportunities for local food systems. These systems include clusters of producers, processors, distributors, sellers, consumers, and supporting organizations that have proven to enhance the rural and urban economy, the environment, food access and nutrition, and strengthen producers and markets.

The FS Coordinates a multidisciplinary team formed of educators, specialists, students, practitioners, industry and non-profit partners to meet Food Systems' clientele needs. The main clientele of the FS Coordinator is small farmers in the state of Indiana with a special focus on underserved, resource-limited, socially disadvantaged, military veterans and urban clientele. The FS Coordinator is a critical part of and an active contributor to the Diversified Farming and Food Systems (DFFS) team. This position reports to the Agricultural and Natural Resources Program Leader at Purdue University.

The FS coordinator works closely with ANR Educators and Extension Specialists in developing and implementing a strategic path in support of FS clientele and leverage on current Purdue

investments such as the Indiana Small Business Development Center Agribusiness Initiative, the Food Entrepreneurship and Manufacturing Institute (FEMI), and the Purdue Initiative for Family Firms (PIFF). The FS coordinator generates funding from external sources, develops and facilitates a network of local food producers, and provides training and mentoring opportunities to new extension staff.

For more details, please visit [Purdue Careers](#)

## Indiana Small Farms Conference, March 2-3

(Laura Ingwell, [lingwell@purdue.edu](mailto:lingwell@purdue.edu), (765) 494-6167)

Registration is open for the 2023 Indiana Small Farm Conference! Join us for the event at the Hendricks County 4-H Fairgrounds and Conference Center in Danville. Gain practical, hands-on guidance from leaders and experts at the 2023 Indiana Small Farm Conference. This 11th annual event takes place in Danville on March 2-3. If you haven't yet registered for the 2023 Indiana Small Farms Conference, the deadline is Friday! [Register now!](#) <http://purdue.ag/sfc>



## Indiana Vegetable Growers Association Annual Meeting

**INDIANA VEGETABLE GROWERS ASSOCIATION ANNUAL MEETING**

**March 1, 2023  
5:30 pm  
Tuttle's Orchard  
5717 N 300 W, Greenfield, IN 46140**

**This is open to all vegetable growers to learn more about the association [www.lvga.org](http://www.lvga.org).  
Registration is required.**

**The association will have a short business meeting and an introduction to what they do in the state.**

**Urban Soil Health Program  
[www.urbansoilhealth.org](http://www.urbansoilhealth.org) and Purdue Extension will join us to learn about their work with producers throughout the state in soil health.**

**Call John Young to register: 317-752-0559**

**PURDUE UNIVERSITY** Extension - Hancock County

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