

VEGETABLE CROPS HOTLINE

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

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From the Editor's Desk

(Petrus Langenhoven, 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.

In this issue, we feature some of the educational events offered during the spring and summer of 2024 and launch our **Spotlight** articles. This week, the **Weed Spotlight** is cast on Henbit, and the **Insect Spotlight** is cast on Cornseed Maggot. This issue also includes important updates from the Indiana State Chemist Office, a look at a new soil fertility amendment calculator developed by the SWCD, strawberry freeze protection, solar eclipse information, and Clearspring Produce Auction price update.

Subscription Information

We are continuously working to increase our subscriber base. Please promote the Vegetable Crops Hotline newsletter. ANR Educators, print our registration form for those growers who do

not have access to digital media. Educators can download the hard copy subscription form at https://vegcropshotline.org/wp-content/uploads/2024/02/VCH-Sub_Form_2024.pdf.

VCH promotional material can be downloaded [HERE](#).

[VegCropsHotline_Promotional Packet_Standard_8.5x11"](#)

Hard Copy Subscribers

A hard copy of the first 2024 issue was sent to all who subscribed to VCH via US mail in 2023 and all new subscribers for 2024. To continue receiving future copies through US mail, 2023 subscribers must renew their Hotline subscriptions using the form that was attached to issue 731. Fill out the form and return it to **Barb Joyner** at **Southwest Purdue Ag Center, 4369 N. Purdue Road, Vincennes, IN 47591**, or call (812) 886-0198.

Digital Subscribers

Digital subscribers receive the newsletter through email. The VCH publication schedule is available at

<https://vegcropshotline.org/schedule/>. New digital subscribers can subscribe online at <https://vegcropshotline.org/subscribe/>

Timeless Articles

IHC 2022 Educational Session Recordings Now Available!

<https://vegcropshotline.org/article/ihc-2022-educational-session-recordings-now-available/>

Ethylene Damage on Tomato

<https://vegcropshotline.org/article/ethylene-damage-on-tomato-2/>

Fungicide Applications During Rainy Weather

<https://vegcropshotline.org/article/fungicide-applications-during-rainy-weather/>

The Purdue Plant and Pest Diagnostic Lab – Ready to Serve You

<https://vegcropshotline.org/article/the-purdue-plant-and-pest-diagnostic-lab-ready-to-serve-you/>

Defining Your Dreams

<https://vegcropshotline.org/article/defining-your-dreams/>

Overwintering Pests

<https://vegcropshotline.org/article/overwintering-pests/>

Cladosporium of Spinach

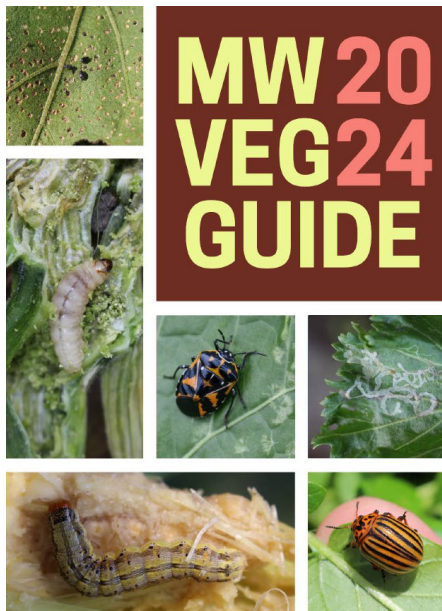
<https://vegcropshotline.org/article/cladosporium-of-spinach/>

Website Links

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.

Midwest Vegetable Production Guide

The Midwest Vegetable Production guide is now available for growers to visit online at mwvegguide.org. You can also download a free copy of the guide from your computer at mwvegguide.org/guide. You may also purchase a hard copy for \$12 from Stephen Meyers. Contact him at slmeyers@purdue.edu for further information.



Do not hesitate to contact me at 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. Happy reading!

Weed Spotlight: Henbit

(Jeanine Arana, jcordone@purdue.edu, (765) 588-7787) & (Stephen Meyers, slmeyers@purdue.edu, (765) 496-6540)

Common names: Henbit, henbit dead nettle, henbit nettle, blind nettle, bee nettle, and giraffe head.

Latin name: *Lamium amplexicaule*.

- "*Lamium*" is derived from the Latin for "throat," referencing the flower tube's elongated shape.
- "*amplexicaule*", also derived from the Latin, means "embracing the stem," describing the upper leaves of henbit that encircle the stem.

Family: Lamiaceae – "the mint family".

Life cycle: In Indiana, henbit is a winter annual. Plants emerge as

small seedlings in the fall and overwinter (Figure 1). In late winter and early spring, plants mature and flower, producing seeds by late spring. After setting seeds, the plant dies.



Figure 1. A henbit seedling growing in February 2024 in West Lafayette, IN (Photo by Jeanine Arana).

Identification

- **Seedling:** Henbits have two seed leaves ("cotyledons") that are round with hairy petioles. The base of the cotyledon exhibits two lobes, notched where it connects to the petiole, while the tip may be flat or shallowly indented (Figure 2). Young leaves have hairy petioles (Figure 3). Stems are characterized by a square shape (Figure 4) and hairs pointing downward.

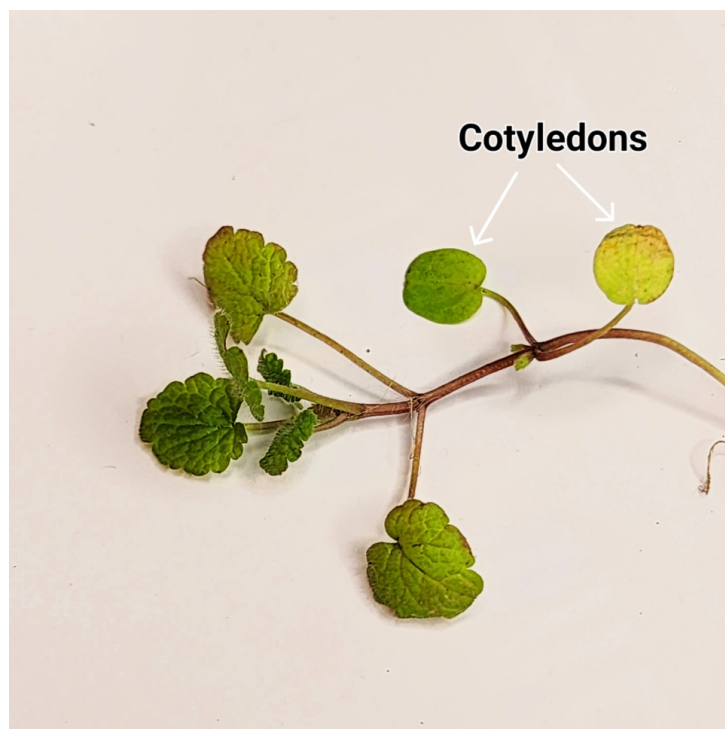


Figure 2. Henbit seedling cotyledons are round (Photo by Jeanine Arana).



Figure 3. Henbit seedlings have hairy leaves and petioles (Photo by Jeanine Arana).



Figure 4. Henbit has square stems (Photo by Jeanine Arana).

- **Mature plants** are branched throughout the length of the primary stem (Figure 5), forming a mat up to 1 foot wide. Upper leaves lack petioles; instead, the base of the leaf directly attaches to and encircles the stem (Figure 6). Henbit flowers are elongated, tube-like, and pink-to-purple (Figure 7).



Figure 5. Henbit has many branches throughout the length of the primary stem (Photo by Jeanine Arana).



Figure 6. The upper leaves of mature henbit plants are directly attached to the stem without a petiole. Views from above (left) and below (right) (Photos by Jeanine Arana).



Figure 7. Mature henbit plants flowering (Photos by Jeanine Arana).

Reproduction

Six to 10 pink-to-purple flowers per leaf pair appear in the spring.

Flowers can self-pollinate and may produce seeds without opening. Each flower produces four seeds, and each plant can produce from 200 to 2,000 seeds. Seeds can remain viable for more than 25 years.

Integrated weed management strategy

Cultural and mechanical practices:

- Scouting: Conduct monitoring in the fall after tilling (if applicable) or spring to identify henbit patches and plan control strategies accordingly.
- Cover crops: Utilize cover crops to outcompete henbit for resources and provide a physical barrier to its growth. Integrating fall-planted cover crops can disrupt henbit's life cycle.
- Plastic mulch: Acting as a physical barrier, plastic mulch hinders germinating henbit seedlings from reaching the soil surface. Ensure that planting holes are sized to fit only your transplant. Excessively large planting holes can allow weeds to emerge next to the crop.
- Silage tarps: Silage tarps prevent germinating weeds from receiving sunlight. Tarps placed in the fall and removed in the spring will provide effective control of henbit. Alternatively, tarps can be placed in the spring prior to henbit seed set and allowed to remain in place for three weeks.
- Hand-weeding, hoeing, and cultivation: Eliminate seedlings before seed production to prevent an increase in the weed seed bank.
- Flame weeding: Use flame weeding to control henbit in its early stages of growth.

Chemical control

- Pre-emergence (PRE) herbicides: Because henbit emerges in the fall, the use of PRE herbicides in annual vegetable crops may not be advisable, especially if fall/winter cover crops will be planted.
- Post-emergence (POST) herbicides: Apply POST herbicides to henbit in the spring before planting/transplanting. Depending on your production system, this can be done instead of, or in addition to, spring tillage.
- Visit the [Midwest Vegetable Production Guide](#) to learn which herbicides are labeled for the crops you intend to grow.

For some, no management is also an option. Henbits provide living roots during the fall, winter, and early spring when many vegetables are not in the field. They will naturally senesce before many summer vegetable crops are planted. They also provide an early source of pollen for pollinators.

Continue learning: To find more henbit pictures for identification, visit the Weed Science Society of America (WSSA) [Weed Identification](#) tab.

References

DeFelice, M. 2005. Henbit and the Deadnetties, *Lamium* spp. – Archangels or Demons? *Weed Technology*.

Mohler, C.L., Teasdale, J.R., DiTommaso, A. 2021. *Manage Weeds on Your Farm – A Guide to Ecological Strategies*. Sustainable Agriculture Research and Education (SARE).

Neal, J.C., Uva, R.H., DiTommaso, J. M., DiTommaso, A. 2023. *Weeds of the Northeast*. Second edition by Cornell University.

Insect Spotlight: Seedcorn Maggot

(Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

The seedcorn maggot, *Delia platura*, is one of the first pests that will cause damage to vegetables in the spring in our region. This fly, which resembles a house fly but is smaller (Figure 1), begins to emerge from the overwintering pupal stage in the soil in early spring. Upon emergence, the flies quickly aggregate over suitable habitats, mate, and begin to lay eggs within 2-3 days. Despite its name, this insect can feed on a wide range of plants, which includes corn, beans, cucurbits (Figure 2), peas, garlic (Figure 3), onions (Figure 4), spinach, brassicas, and solanaceous crops. The most suitable sites for egg laying will be areas that have recently been tilled, planted, or transplanted (Figure 5). High amounts of organic matter decomposing on the soil surface are a major attractant. The eggs are laid on/near the soil surface and hatch within 2- 10 days, depending on soil temperatures; the warmer the soil, the more quickly they develop. The larvae will then travel into the soil in search of a germinating seed or transplant. They will feed on tissues at or below the soil surface. Their damage can sometimes be misdiagnosed as damping off (fungal infections), wireworm damage, or simply poor stand germination. If the damage is apparent on the above-ground portion of the plant, you can sometimes find the maggot feeding inside the root or shoot at the soil surface. This larva is a white, legless maggot.



Figure 1. An adult seedcorn maggot next to the pupal casing it emerged from (Photo by John Obermeyer).



Figure 2. Seedcorn maggot damage on a young garlic bulb (Photo by John Obermeyer).



Figure 3. Seedcorn maggot damage on a melon transplant (Photo by John Obermeyer).



Figure 4. Seedcorn maggot damage on an onion transplant (Photo by John Obermeyer).



Figure 5. Onion transplants wilted on the soil due to seedcorn maggot feeding damage on the roots and developing onion bulbs (Photo by John Obermeyer).

Indiana has 3-5 generations of this pest per year, but the first is the most economically damaging. The key to managing this pest relies on cultural strategies. To this end, we can use predictive models to estimate when the climatic conditions are suitable for the adults to emerge from the soil. We do this by tracking the cumulative growing degree days under which the pupal form completes its development to adulthood. The University of Wisconsin maintains a Vegetable Disease and Insect Forecasting Network tool that includes the upper Midwest region, including *most* of Indiana. You can access the tool [here](#). As of March 11, the southernmost portion of the state has accumulated enough growing degree days to predict a high to very high likelihood of pest presence and damage to young transplant/seedlings. If possible, you should delay planting at least 10 days beyond peak emergence and avoid going into freshly tilled soil. Plant at a time when the soil and air conditions are going to promote plant growth; if the seeds or transplants can't grow quickly, they are more susceptible to damage. Check out this video to learn more about scouting and prevention found on the Purdue Extension Entomology YouTube Channel: [Maggot damage to onion transplants](#). Refer to the [Midwest Vegetable Production Guide](#) for the most recent regional recommendations.

Food Safety for Produce Growers

(Crystal Van Pelt, cvanpelt@purdue.edu)



If you grow fruits and vegetables for sale, you should consider attending the Produce Safety Alliance Grower Training on Tuesday, March 19. It will be held from 9 a.m. to 5 p.m. at the Elkhart County Community Center on the Elkhart County 4-H

Fairgrounds, 17746 County Road 34, Goshen, Indiana. For growers across the state, three virtual training opportunities will also be available on April 25, May 22, and June 6.

Thanks to sponsorship by the Indiana Farmers Market Community of Practice, these trainings are offered free of charge. The normal cost would be \$100 per person. Lunch will be provided for up to 30 people who register by March 9th. Individuals can still register after March 9th but may not get lunch provided.

Who should attend? Fruit and vegetable growers, specifically farmers, market vendors, and managers interested in learning about produce safety, the Food Safety Modernization Act (FSMA) Produce Safety Rule, Good Agricultural Practices (GAPs), and co-management of natural resources and food safety.

This training is one way to satisfy the FSMA Produce Safety Rule requirement outlined in the federal produce safety laws § 112.22(c).

That law requires at least one supervisor or responsible party for your farm to have successfully completed food safety training at least equivalent to that received under a standardized curriculum recognized as adequate by the Food and Drug Administration. Participants will receive a course manual and certificate of course attendance.

The trainers will spend approximately seven hours of instruction time covering the content in these seven modules: Introduction to Produce Safety; Worker Health, Hygiene, and Training; Soil Amendments; Wildlife, Domesticated Animals, and Land Use; Agricultural Water (Part I: Production Water; Part II: Postharvest Water); and Postharvest Handling and Sanitation.

To register, go to the [Indiana Farmers Market Community of Practice](https://infmcp.org) website (infmcp.org) or call Christina Ferrolli at (317) 403-2801.

Farmers Market Program for Vendors and Managers

(Sarah Hanson, sspeedy@purdue.edu)

Farmers market managers and vendors can join [Purdue Extension for the Farmers Market Certificate Program](https://cvent.me/QIRIPn) online. The cost is \$75. Learn how to navigate food safety regulations, understand legal issues of markets, improve market stability, offer food assistance programs, manage conflict, and more. This program will meet in four (4) sessions on Thursdays from 6:30-8:30 pm EST, April 11 – May 2. The course is conducted virtually via Zoom and Google Classroom.

Registration includes either the Purdue Extension Market Manager Toolkit or Market Vendor Toolkit publication to guide participants through the training.

Market Managers and Vendors can register via this link: <https://cvent.me/QIRIPn>

Purdue Extension Educators and CWCs can register via this link: https://purdue.ca1.qualtrics.com/jfe/form/SV_0ibmn6dGtXY7RI4

If you have questions, please reach out to Sarah Hanson

sspeedy@purdue.edu

Download the flyer [HERE](#) [2024 Farmers Market Certificate Program for Vendors and Managers Flyer](#)

FARMERS MARKET CERTIFICATE

2024 VIRTUAL TRAINING FOR FARMERS MARKET MANAGERS AND VENDORS



4 SESSIONS VIA ZOOM

Thursdays, April 11 - May 2
6:30pm EDT / 5:30pm CDT

In these 2-hour sessions you will learn how to navigate food safety regulations, understand legal issues of markets, improve market stability, offer food assistance programs, manage conflict, and more.

REGISTRATION/MORE INFO AT:
<https://cvent.me/QIRIPn>

\$75
Includes market manager or market vendor manual, which you select during registration. Questions can be directed to Sarah Hanson at sspeedy@purdue.edu
https://extension.purdue.edu/anr/_teams/dffs/

PURDUE UNIVERSITY
Extension - Agriculture and Natural Resources

2024 Purdue Fruit and Vegetable Field Day

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)

Purdue Extension presented its second Fruit and Vegetable Field Day post-pandemic at the Throckmorton Purdue Agriculture Center's Meigs Horticulture Research Farm, located in Lafayette, on July 20th, 2023. Extension Specialists and Graduate Students presented specialty crop research to 90 attendees. Attendees had only good things to say about the event. 'It was an interesting program, I learned quite a bit.' "Excellent information and material." "Excellent information and resources on new horticultural technology and techniques." "Diversity of the tales, well explained and some topics never heard of before." "I learned new techniques and gained some new ideas for the future". As a result of the Fruit and Vegetable Field Day, 96% of survey respondents indicated (agree or strongly agree) that they learned something they didn't know before, nearly half indicated they plan to adopt practices for horticulture and the environment (41%), and a third plan to adopt practices that increased yields (36%) and conserve resources (32%). Nearly three-quarters of past field day participants (71%) indicated that they had adopted new, recommended practices for their farm or operation. When asked what new practice they had adopted, participants responded: alteration of insect control program, refrain from using pesticides in high tunnels, and new ideas of types of trees to plant. All of the participants (100%) reported that they had

experienced financial improvements because of adopting new, recommended practices from information presented at past field days.

Below are some of the production topics presented at the field day. We expect to have a similar lineup for the 2024 field day.

- Black Soldier fly composting and specialty crop production
- Collard insect management trial
- High tunnel diversification and biological control
- Plasticulture strawberry research
- Silage tarps for weed management in potatoes
- Soil health and pepper yield
- Sweet corn pest management
- Unmanned aerial vehicle demonstration
- Watermelon weed management

We are happy to announce that Purdue Extension is presenting its annual Fruit and Vegetable Field Day on July 18, 2024, at the Throckmorton/Meigs Horticulture Farm, Lafayette, IN.

More information about the upcoming field day will be available in May 2024.

Contact [Lori Jolly-Brown](#) or [Petrus Langenhoven](#) if you have any questions.



2024 Purdue Small Farm Education Field Day

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

The 2023 [Purdue Small Farm Education Field Day](#) was held at the Purdue Student Farm in West Lafayette, Indiana. With 105 participants registered, the in-person event featured an array of on-farm demonstrations and was a resounding success.

Nearly 84% of attendees reported that they learned something they didn't know before. A third (34%) indicated they plan to adopt recommended practices for diversified farming systems, and a quarter (24%) plan to adopt recommended practices for creating, improving, or strengthening their business. Nearly half (45%) indicated they plan to adopt practices for horticulture and the environment or practices that will increase efficiency (42%). Over a third plan to adopt practices/technologies for the conservation of resources (37%). Nearly half (46%) of past field

day attendees indicated that they had adopted new, recommended practices for their farm or operation. When asked what new practice they had adopted, participants responded:

- Alternate BT and Spinosad on brassicas.
- Pest scouting.
- Applied BT for brassica caterpillar complex control.
- Integrated pest management

Over three-quarters (80%) of participants reported that they had experienced financial improvements because of adopting new, recommended practices from the information presented at past field days.

Attendees commented

- "I recommend this event to any beginner small-scale producer.
- I brought my sons and my father to this event. It was a family education day for sure, and each one of us learned several things we didn't know. Please continue to offer these events. It's very helpful!
- Good information and a fun, interesting presentation
- I like the wide variety of topics, and I think that so much could be covered in such a short amount of time.
- Lots of helpful information covering a wide variety of topics.
- Always learn, gain knowledge, and learn from questions others ask. When I get home, I can read the literature provided and share it with family in Virginia who farm.
- Very informative and builds on previous research.
- Everyone should learn about these topics.
- It was a good way to be exposed to a variety of horticultural crops.
- I am just beginning to develop my vegetable garden. The information given at the Field Day program was very useful, and I am confident I will create a beautiful garden space with plants that will give me a great yield. Also, I appreciate learning what insects I should keep an eye on."

The event featured an array of "demonstration stations" on the farm where participants learned about a variety of topics:

- High Tunnel Pepper Production and Variety Selection
- High Tunnel Table Grape Production
- Silage Tarps and Their Potential Uses on Small Farms
- Growing Grains on the Small Farm – Dry Edible Bean Variety Trial
- Predator-Prey Dynamics in High Tunnel Crop Production
- Biorational Pesticide Efficacy for Controlling Caterpillars and Flea Beetles in Crucifer Crop Production
- Black Soldier Fly Composting and Specialty Crop Production
- Raised Garden Beds for Vegetable Production
- Postharvest Food Safety Demonstration
- Choosing Fertilizer Injectors for Drip Irrigation for Small Plots

Save the date for the next field day – July 25, 2024

Educational topics for the 2024 field day will be available in May. To learn more about the field day, visit our [webpage](https://www.purdue.edu/hla/sites/studentfarm/events/) at www.purdue.edu/hla/sites/studentfarm/events/ or contact [Lori Jolly-Brown](#) or [Petrus Langenhoven](#).



Comparison of Microenvironment between Caterpillar Tunnels and Permanent High Tunnels

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198) & (Samantha Willden, swillden@purdue.edu)

Over the past year, we conducted a comparative study on microclimate conditions within caterpillar tunnels and high tunnels at five farms in Indiana. This initiative was prompted by the growing interest in employing caterpillar tunnels for season-extension vegetable production among small and diversified farms.

Caterpillar tunnels, typically lower in height than permanent high tunnels, stand at around 5 to 6 feet tall at the center of the hoops. They are varied in length with some extending up to 200 feet. Most caterpillar tunnels are narrower in width compared to permanent high tunnels. Unlike permanent high tunnels, caterpillar tunnels may lack end walls, with their covers either tied off to stakes at both ends or left open for ventilation.

Compared with permanent high tunnels, caterpillar tunnels are more affordable and easier to assemble and relocate. They offer some of the same benefits as permanent high tunnels but provide more flexibility in addressing various crop needs. During summer, the structure can be adapted for specific crops by using shade cloth or insect netting, enhancing versatility.

Although caterpillar tunnels have numerous advantages, it's crucial to acknowledge the limitations of caterpillar tunnels in environmental control compared to permanent high tunnels. Caterpillar tunnels have little effect in improving minimum temperatures in the winter, similar to unheated high tunnels. When the tunnels are fully closed, the temperatures in caterpillar tunnels tend to increase faster and reach higher levels than those in high tunnels on sunny days, which may create more significant temperature fluctuations inside caterpillar tunnels than high tunnels in the winter, potentially posing challenges to winter crop

production. Moreover, we observed prolonged periods of high relative humidity within caterpillar tunnels, attributed to limited ventilation compared to permanent high tunnels, which may include supplemental ventilation or air circulation fans. The prolonged periods of high relative humidity favor diseases. Higher light intensity was monitored inside caterpillar tunnels compared to permanent high tunnels. Although the same type of plastic was used, reduced usage of the plastic on caterpillar tunnels may potentially extend the plastic lifespan.

Looking ahead, we aim to continue this project, focusing on evaluating how different structures and modified environments impact the production of various crops, particularly in the winter.

We welcome suggestions for future research directions. For further information, please contact Wenjing Guan at guan40@purdue.edu

This work is supported by the Specialty Crop Research Initiative (SCRI) [grant no. 2021-51181-35858/project accession no. 1027430] from the USDA National Institute of Food and Agriculture

Plasticulture Strawberry Crop Status in Southern Indiana

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

Strawberry growers are at the forefront of the battle against spring frost/freeze challenges. This task undoubtedly is getting more complicated with the current weather.

We will have a few cold nights next week with forecasted temperatures around the middle 20s °F in Vincennes. Strawberry growers in Southern Indiana are considering whether to implement frost/freeze protection on plasticulture strawberries.

During my recent visits to several plasticulture fields in southern Indiana, I observed varying stages of crop development. The most advanced crops have reached the popcorn stage, while others are at the tight bud stage or have recently recovered from the winter. Although early open blooms were observed during my visits, they are unlikely to develop into viable fruit.

It is important to note that different flowering stages exhibit varying tolerances to cold temperatures. Fully open strawberry flowers cannot withstand temperatures below 32°F, popcorn stage flowers can endure temperatures as low as 26°F, and tight buds can tolerate temperatures in the lower 20s°F.

For fields with crops entering the popcorn stage, I recommend covering them with floating row covers if farmers have the floating row covers handy. I do not think there is a high chance those flowers are in danger, but cover in case the temperatures are lower than expected. I do not foresee the upcoming temperatures posing a threat to fields with crops in earlier growth stages than those with popcorn-stage flowers.

In a previous [article](#), I discussed how the timing of removing row covers can impact crop development stages. My suggestion is to uncover the fields soon after the extremely cold days have passed. Then, I was asked whether winter protection is absolutely

necessary for plasticulture strawberries in southern Indiana.

In the past winter, we tested the idea at the Southwest Purdue Agricultural Center, where the second-year plasticulture strawberries were left uncovered throughout the winter. The plants survived well in the winter, and without the winter covering, the plant development stage was delayed. This delay may potentially reduce the risk of spring frost and freeze damage. However, further evaluation over multiple years is necessary to comprehensively understand the advantages and disadvantages of winter protection for plasticulture strawberries in this region.

Due to the impact of climate change, many longstanding agricultural practices need to be reassessed. As we navigate these changes, we will have to continuously evaluate and adapt farming practices; strawberry production would be an example in this case.

Consider reading this article

[Strawberry Spring Frost Protection—Considerations in March](#), previously published in issue 715, March 13, 2023.

Strawberry Chat Plasticulture Production Q&A and Recent Research Update

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

Dear Strawberry Chat listeners, I apologize for not updating the Strawberry Chat Podcast since the beginning of the year. We will be continuing the program. The next episode will be recorded on March 22nd, 12:00-1:00 pm EST.

Over the winter break, I received many good questions, primarily about plasticulture strawberry production. In the upcoming episode, I will share my thoughts on these questions, as well as discuss what I learned in winter meetings and some of the recent research findings. If you are interested in participating in the next Strawberry Chat and join an open Q&A session on March 22nd, 2024, please register [here](#)

The poster for Strawberry Chat features a black background with the text "STRAWBERRY CHAT" in large, bold, white and yellow letters. Below this, it says "March 22, 12:00-1:00 pm EST" in white. A photograph of several ripe strawberries is shown. To the right of the photo, the text "Plasticulture Strawberry Research Update and Q&A" is written in white. Below that, the name "Wenjing Guan" is listed, followed by "Extension Specialist" and "Horticulture and Landscape Architecture Purdue University". At the bottom left is the Purdue University Extension logo. At the bottom right is a QR code with the text "Register by scanning the QR code" next to it.

STRAWBERRY CHAT

March 22, 12:00-1:00 pm EST

Plasticulture Strawberry Research Update and Q&A

Wenjing Guan
Extension Specialist
Horticulture and Landscape Architecture
Purdue University

Register by scanning the QR code

PURDUE UNIVERSITY Extension

Indiana Nutrient Management Tool

(Kevin Allison, kevin-allison@iaswcd.org)



The **Indiana Nutrient Management Tool** is a new Excel workbook that provides fertilizer and amendment recommendations for vegetables commonly grown in Indiana. Whether for a backyard garden or a market farm, the tool allows the user to create a plan for the amount of products needed to meet the nutrient goals, which can be based on soil test results or custom entries. Additionally, the inclusion of a compost tab enhances its utility, allowing users to convert between the volume and depth of compost applications and obtain an estimated nutrient contribution.

Based on a farmer needs assessment, a recent Purdue University Diversified Farming and Food Systems [publication](#) lists "nutrient management for plant health" and "nutrients, pH, and amendments" as top production challenges in urban agriculture. This new calculator hopes to provide a framework to more efficiently manage the nutrient needs of diverse vegetable crops on our Indiana farms.

This tool was developed by the Marion County Soil and Water Conservation District in partnership with the USDA-NRCS-Indiana Urban Soil Health Team and with input from local growers and Purdue University professors. A special thanks to the grower focus groups and to Ashley Adair and Nathan Shoaf, and Drs. Maynard and Langenhoven for providing comments and suggestions during its development. The data, math, and recommendations are derived from Michigan State University's [Nutrient Recommendations for Vegetable Crops in Michigan](#), Purdue University resources, the [New England Vegetable Management Guide](#), and Oregon State University.

The tool can be accessed at:

<https://marionswcd.org/indiana-nutrient-management-tool/>

Please join Kevin Allison, Soil Health Specialist, Marion County SWCD, for in-depth training on how to utilize it.

Location: Virtual

Day/Time: Wednesday, May 27, 11:00 AM to 12:00 PM

Register here:

<https://us06web.zoom.us/join/register/tZUuceiorDgoH90hx5klSRY06ICAQe546wQI>

Join the SWCD newsletter for information on more upcoming workshops and programs at www.marionswcd.org/connect/

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Legislative Changes Regarding the Use of Pesticides in Indiana

(Leo Reed, reedla@purdue.edu)

Below, you will find documents outlining the legislative changes that the governor signed this week regarding the use of pesticides in Indiana. These changes will go into effect July 1, 2024, but OISC will implement the less stringent measures immediately. [Cheri Janssen](#), [Purdue Pesticide Programs](#) Curriculum Development Specialist, is already working on updating materials to reflect these changes. The main changes are:

- There is now an option for Commercial applicators of NON restricted-use pesticides to become RT's by several different options including watching a video as well as passing the core exam or attending in-person training.
- Restricted Use Pesticides can be applied by non-certified individuals (non-credentialed as well) if the federal direct supervision rules are followed (see the attached document for the complete list of actions required).
- Less restrictive bulk containment rules (containers of ag pesticides of 500 or greater as opposed to 55 gallons).

Below is information about 'Direct Supervision of Noncertified Applicators Using Restricted Use Pesticides'. More documents are available at the end of this article.

Direct Supervision of Noncertified Applicators Using Restricted Use Pesticides

Effective July 1, 2024, the Indiana General Assembly adopted Senate Enrolled Act No. 216 to amend and clarify direct supervision requirements for noncertified applicators using Restricted Use Pesticides (RUPs). SEA #216 adopted the federal requirements for direct supervision in 40 CFR 171.201 <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-171/subpart-C/section-171.201>. Following is a summary of the new requirements.

1. Use of a Restricted Use Pesticide (RUP)

1. Any individual that uses any RUP for any purpose or on any property must be:
 - at least 18 years of age; and
 - a certified and licensed applicator; or
 - operating under the direct supervision (see #5 below) of a certified and licensed applicator employed by the business, organization, or farm operation.
2. To qualify as a commercial certified applicator, an individual must pass a written:
 - core exam; and
 - category-specific exam
2. To qualify as a private applicator (uses a RUP on property personally owned or controlled for producing an agricultural commodity), an individual

must pass a written core exam but must also pass a category specific exam to use fumigants (category 7D) or to apply aerially by plane, helicopter, or drone (category 11).

2. Direct Supervision of a Noncertified Individual Using a Restricted Use Pesticide (RUP)

1. The certified and licensed supervisor shall be legally responsible for all requirements and activities by the noncertified applicator.
2. The noncertified individual must complete one of the following mandatory training options annually, listed at https://oisc.purdue.edu/pesticide/training_nca_rups.html.
3. The certified and licensed supervisor must keep records for two years for the training in item 5b above, that includes the following:
 - Noncertified individual's name and signature.
 - Date of the training.
 - Name of the trainer.
 - Title of specific annual training, i.e.

- WPS Pesticide Handler Training.
- Pesticide Safety Training for Non-Certified Applicators Using RUPs.

2. The certified and licensed supervisor must ensure the following for the noncertified individual:

- Access to product labeling at all times during use.
- Personal protective equipment is available, clean, and is being worn correctly.
- Understandable site-specific instructions covering precise location, precautions, use directions, and potential adverse effects.
- Daily proper operation verification of all mixing, loading, transferring, and application equipment.
- Means of immediate communication between the noncertified applicator and the certified and licensed supervisor.
- Physical presence of certified and licensed supervisor at the work site, if required by label.

Questions regarding certification requirements should be addressed by Leo Reed, Certification Manager, OISC, 765494-1588, reedla@purdue.edu. Bulk Storage of Pesticides and Fertilizer questions can be asked of the Fertilizer Section of OISC at fertregistration@groups.purdue.edu

Download all the documents here or visit the OISC website:

These documents have been posted on the OISC website <https://oisc.purdue.edu/pesticide/index.html> under the **News** section.

1. [Direct Supervision of Noncertified Applicators Using Restricted Use Pesticides](#)
2. [Bulk Storage & Containment Requirements for Fertilizers & Pesticides](#)
3. [Training, Certification & Licensing Requirements for Indiana Pesticide Users](#)

Volunteer Weather Observers Needed to Help Measure Rain, Hail, and Snow

(Beth Hall, hall556@purdue.edu)

Precipitation is one of the most variable weather phenomena with such an incredible local impact on communities. Too little can lead to drought and water supply issues, whereas too much can lead to flooding and infrastructure damage. Across Indiana, there are approximately 120 volunteer observers (Figure 1) who provide daily temperature and precipitation data to the National Weather Service (NWS) as part of the national [Cooperative Observer Program](#) (COOP). However, there are significant spatial gaps throughout the state, with quite a few counties having no COOP weather observers!

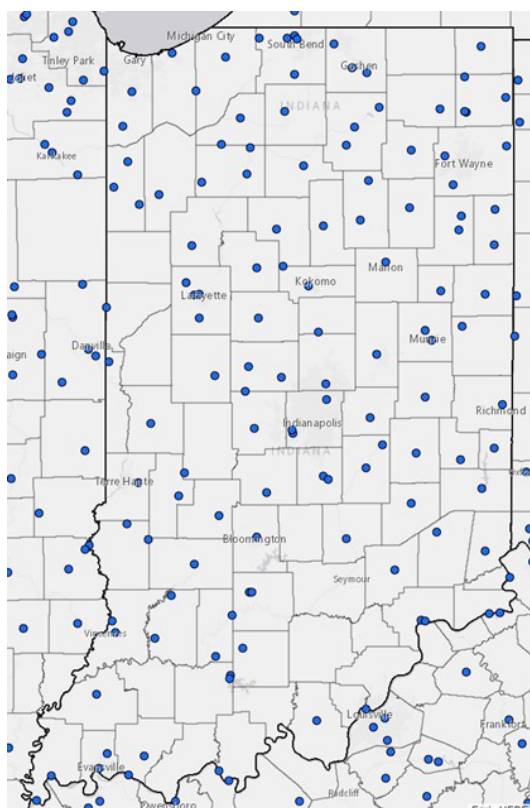


Figure 1. Map of current 120 CoCoRaHS observers.

In 1998, a community citizen science program developed in Colorado invited weather enthusiasts to add to this precipitation data network by making their own daily observations and uploading the data online for the NWS and other public users to

access. This program is the [Community Collaborative Rain, Hail, and Snow](#), or **CoCoRaHS**, program. It originally began in response to a devastating flash flood that occurred in Colorado the year prior. As with many flash floods, a lack of ground truth precipitation observations was apparent. Since that time, **CoCoRaHS** has spread across the country as well as Canada and the Bahamas. A dense and reliable precipitation gauge network can be critical to not only understanding and predicting floods, but snow and drought events as well.

CoCoRaHS is looking for volunteers to take and report valuable rain, hail, and snow measurements. This non-profit precipitation observing network is the combined effort of many different groups and individuals nationwide. While **CoCoRaHS** is not an official National Weather Service nor Indiana State Climate Office program, they support **CoCoRaHS** through education, outreach, and promotion to potential volunteers. The network's website, www.CoCoRaHS.org, provides information on how to join, training materials, and access to the precipitation observations.

New observers are needed in every county since precipitation is highly variable. Figure 2 illustrates where there are still spatial gaps of **CoCoRaHS** observers in Indiana. Anyone interested in joining – even those with many other observers nearby – is always welcome. As we all know, it can rain on one side of the street and miss the other side entirely! In addition to daily precipitation observations, CoCoRaHS observers are also able to report real-time occurrences of hail, heavy snow, and flooding in their area, which can aid in the issuing and verifying of life-saving warnings. The **CoCoRaHS** network continues to be a valuable asset in monitoring precipitation and climate.

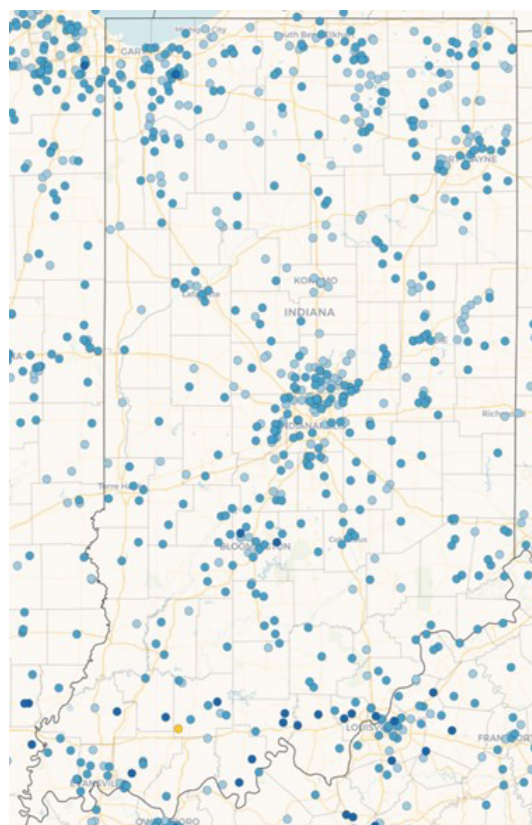


Figure 2. Spatial gaps of CoCoRaHS observers in Indiana.

Eclipse Citizen Scientists Call-Out

(Ginger Davis, gindavis@iu.edu)



INDIANA GEOLOGICAL & WATER SURVEY INDIANA UNIVERSITY

Solar energy is responsible for so many processes on Earth's surface. From growing plants and driving water movement across the planet to providing heat and powering solar panels, solar energy plays a central role in almost everything. On April 8, 2024, the total solar eclipse will be viewed across the Hoosier State. Find out how you can help the Indiana Geological and Water Survey as a citizen scientist during the eclipse.

The Indiana Geological and Water Survey (IGWS) is measuring the energy from the sun at all the [water balance stations](https://igws.indiana.edu/research/iwbn) (<https://igws.indiana.edu/research/iwbn>) in the Indiana Water Balance Network. As part of the partnership with Purdue University's [State Climate Office](https://ag.purdue.edu/indiana-state-climate/purdue-mesonet/purdue-mesonet-data-hub/) and the [Purdue Mesonet](https://ag.purdue.edu/indiana-state-climate/purdue-mesonet/purdue-mesonet-data-hub/) (<https://ag.purdue.edu/indiana-state-climate/purdue-mesonet/purdue-mesonet-data-hub/>), we are gathering data about the sun's energy at 30 stations around the state, but there are many places in Indiana where there are no stations. IGWS needs your help to populate a data set of light data across the state. The eclipse on Monday, April 8, will be a unique period when we will lose several minutes of light during totality (3:01 pm EDT start of Totality in Western Indiana to 3:12 pm EDT end of totality in Eastern Indiana) and only a portion of the light during the partial eclipse running from 1:45 pm EDT start of partial on the west side of Indiana to 4:25 pm EDT end of partial on the east side of Indiana. This is a rare opportunity to research the associated loss of energy from the sun. We need data from days leading up to the eclipse to determine normal light levels this time of year during both sunny and cloudy days, from all hours of the day.

IGWS needs citizen scientists to capture information from the sun starting on the spring equinox (March 21) through a few days after the eclipse (April 10). Hourly data is preferred, but any data will help. Several free "lux meter" apps are available for iPhones and Androids. Collect it on a lux meter app anytime you are outside and just make a note of the time; you can go back and report all data collections while at home or do it directly from your cellphone on our [citizen survey](https://survey123.arcgis.com/share/cf416cd852814d61b25546352e80d6bf) (<https://survey123.arcgis.com/share/cf416cd852814d61b25546352e80d6bf>).

The results of this data can help us see variations in solar energy across the state, relate solar energy to light intensity, and provide data sets for school lessons about the sun, solar energy, and light.

The Indiana Geological and Water Survey (IGWS) is doing some unique science surrounding the eclipse. Visit the [IGWS Eclipse Website](https://igws.indiana.edu/eclipse) (<https://igws.indiana.edu/eclipse>) to learn more. Read more about it [here](https://legacy.igws.indiana.edu/newsletter/read/special-announcement:%20eclipse%20data%20gathering) (<https://legacy.igws.indiana.edu/newsletter/read/special-announcement:%20eclipse%20data%20gathering>) and sign up for the

IGWS newsletter (<https://legacy.igws.indiana.edu/newsletter>).

Press Release written and provided by Ginger Davis, Research Geologist at Indiana Geological and Water Survey (contact: gindavis@iu.edu)

Seasonal Insect Pressure Forecast – Update for Indiana

(Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

I have been asked a lot about what the unusually high temperatures we have been experiencing lately will mean for insect pests this season. I don't have a good answer and often must respond with "it depends," which is not very satisfying to those who ask. However, in exploring the question, I found the seasonal forecast models produced by NOAA. I thought that this is a useful tool and one that many of you may want to look at and consider as you prepare for the upcoming growing season.

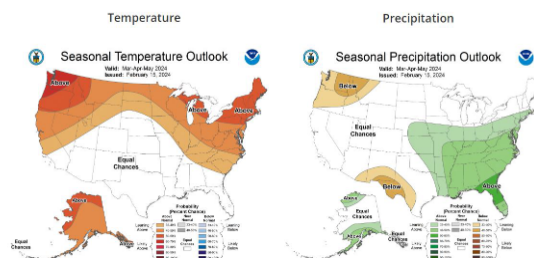


Figure 1. Seasonal temperature and precipitation outlook for Spring 2024, retrieved from <http://agroclimate.org/forecasts/seasonal-forecast/>.

Indiana is predicted to have above-normal temperatures and precipitation in the coming months. What does this mean for you? Well, depending on your location in the state, the probability of experiencing the above-normal averages is different. In the southernmost portions of the state, you are more likely to have increased precipitation (40-50% chance) compared to the northern portion (33-40% chance). How does that translate to production? It may be more difficult to get into the field to plant between precipitation events. As for temperature, the inverse is true. The northern portion of the state has a higher probability (40-50% chance) of experiencing above-normal temperatures than the lower portion of the state (33-40% chance). Temperatures can impact the planting date, the speed at which your transplants/seeds grow, and the speed at which insects develop and become active on the landscape.

Regardless of your predicted seasonal forecast, I think we can all agree that anything is possible in Indiana. To be prepared, have your pest management plan in place, traps set out in advance of planting if you use them, and start scouting the fields as soon as you are ready to plant.

Water and Climate

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)



**United States
Department of
Agriculture**

Natural Resources Conservation Service

The Natural Resources Conservation Service produces this weekly report using data and products from the National Water and Climate Center and other agencies. The report focuses on seasonal snowpack, precipitation, temperature, and drought conditions in the U.S.

This report was published on March 14, 2024, and can be downloaded [HERE](#)

<https://www.nrcs.usda.gov/sites/default/files/2024-03/dmrpt-20240314.pdf>



United States Department of Agriculture

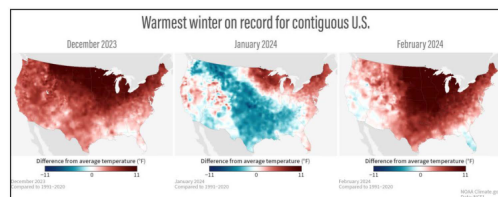
Water and Climate Update

March 14, 2024

The Natural Resources Conservation Service produces this weekly report using data and products from the [National Water and Climate Center](#) and other agencies. The report focuses on seasonal snowpack, precipitation, temperature, and drought conditions in the U.S.

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Contiguous U.S. experiences the warmest winter on record



According to the National Oceanic and Atmospheric Administration (NOAA), the contiguous U.S. experienced the warmest meteorological winter (December-February) and the third warmest February on record. One noticeable implication has been the record-low amount of ice coverage throughout the Great Lakes. Per the March 8 report from NOAA:

"The average temperature across the contiguous U.S. last month was 41.1 degrees F, 7.2 degrees F above the 20th-century average and ranking as the third-warmest February in NOAA's 130-year climate record. Iowa, Minnesota, Missouri, and Wisconsin each had their warmest February on record. An additional 20 states saw their top-10 warmest February on record. Persistent winter warmth resulted in a steady decrease in ice coverage across the Great Lakes, which reached a historic low of 2.7% on February 11 — the lowest amount of ice coverage on record during mid-February."

Related:

[The U.S. had its warmest winter on record](#) – NOAA

[Lake Minnetonka just misses breaking 100-year record, ice remains after warm winter](#) - USA Today

[New Lows for Great Lakes Ice Cover](#) – NASA

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

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Vegetable Crops Hotline © Purdue University - vegcropshotline.org

Editor: Petrus Langenhoven | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907 | (765) 496-7955

Clearspring Produce Auction Price Update

(Jeff Burbrink, jburbrink@purdue.edu)

The Clearspring Produce Auction is located just 2 miles south of US 20 in Clearspring Township in the Heart of the LaGrange-Elkhart Amish Settlement. It is within easy driving distance of the towns of Shipshewana, Topeka, Emma, and LaGrange.

Produce is sold 3 days a week throughout most of the growing season (Tuesday, Thursday, Friday), with a hay sale on Saturdays. Office hours are Monday and Wednesday, 1 to 4 pm, and Tuesday, Thursday, and Friday, 8 am to 4 pm. An auction report can be heard by calling (260) 463-4131. Besides the produce and hay auctions, Clearspring has an equipment and supply business operating onsite for growers.

Are you curious about vegetable pricing?

In an effort to communicate more market information, we are publishing Clearspring Produce Auction volumes and prices. You will be able to view volumes and pricing below:

March 14, 2024



Market Report for

Clearspring Produce Auction

2050 S 300 W

LaGrange, IN 46761

* Phone (260) 463-4131

* Fax (260) 463-4362

* Market Report (260) 463-4131

Order Buyers:

David Schrock & Richard Yoder

Date of Report:	14-Mar	2024
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			Price	
Description of Product	Unit	Units Sold	Average	High
10 inch baskets		40	\$ 2.85	\$ 4.00
Amaryllis		12	\$ 0.65	
Bacopia		750	\$ 0.13	\$ 0.30
Begonia		400	\$ 0.30	
Calibrachoa		2850	\$ 0.05	\$ 0.08
Coleus		650	\$ 0.18	\$ 0.55
Combo Liners		200	\$ 0.25	
Coreopsis		200	\$ 0.13	\$ 0.15
Daisy		500	\$ 0.17	\$ 0.20
Dianthus		240	\$ 0.10	\$ 0.15
Dichondra		100	\$ 0.15	
Ferns		164	\$ 0.16	\$ 2.00
Fushia		50	\$ 0.12	\$ 2.00
Geraniums		1963	\$ 0.28	\$ 0.47
Gyposphia		150	\$ 0.05	\$ 0.05
herbs		928	\$ 0.37	\$ 1.00
Impatiens/Sunpatiens		3900	\$ 0.16	\$ 0.47
Lantana		100	\$ 0.05	
Lisiauthus		34	\$ 1.00	
Lobelia		400	\$ 0.13	\$ 0.30

Lysimachia			100	\$ 0.14	\$ 0.22
Marigold			640	\$ 0.11	\$ 0.35
Million Bells			300	\$ 0.10	
Pansy			100	\$ 0.12	
Percallis			350	\$ 0.12	\$ 0.20
Petunias			7550	\$ 0.08	\$ 0.45
Silver Nickel Vine			50	\$ 0.04	
Spikes			558	\$ 0.07	\$ 0.20
Strawberry			40	\$ 0.23	
Succulents			808	\$ 0.33	\$ 0.95
Sweet Potato Vine			700	\$ 0.11	\$ 0.22
Thunbergia			145	\$ 0.20	
Vegetables		Flat	12	\$ 7.25	\$ 15.00
Verbena			1000	\$ 0.06	\$ 0.10
Vinca Vine			344	\$ 0.05	\$ 0.10
Wandering Jew			300	\$ 0.05	