In This Issue

- From The Editor's Desk
- Managing Daily Light Integral to Improve Vegetable Transplant Quality
- Data-Driven Decisions: Choosing Vegetable Varieties with Midwest Trial Results
- Specialty Crop Opportunity: First-Year Results of Scotch Bonnet Pepper Trials
- Safety Considerations of Freeze-dried Foods: Learnings From the Consumer Food Safety Education Webinar Series
- Italian vs. Asian Eggplant Cultivars: Performance Comparison for Indiana Commercial Production
- Horticulture Research Manager Position at Purdue University
- Purdue Extension to Host Virtual Farmers Market Certificate
- How Much is Your Specialty Crop Worth?
- Considerations for Choosing Tomato Cultivars
- Southwest Purdue Agriculture Center Field Day: June 26, 2025
- Tri-State High Tunnel School on March 14, 2025
- Survey about Slug and Snail Pests Affecting Horticultural Crops
- Sharpen® Herbicide Now Labeled For Use in Mint in Select States
- A False Sense of Spring?
- Tomato Grafting Resources

From The Editor's Desk

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

Dear Valued VCH Readers,

Welcome to issue 749, the second edition of the 2025 Vegetable Crops Hotline newsletter!

Spring is certainly making its presence felt! The weather has been very mild to hot this past week. It's a great time to start working ground that has thawed and drained. Don't get too eager to start warm-season vegetables that will be planted in an open-field setting. Where I am in west-central Indiana, I usually start my pepper and eggplant transplants the third week of April. Use your long-term last freeze date data to determine when you can start planting outside.

I'm excited to continue our tradition of providing timely, research-based information to support Indiana's vegetable-growing community. Our mission remains steadfast: to deliver crucial updates on pest management, production practices, food safety, and marketing opportunities that directly impact your farming operations.

Growers and Purdue Extension Educators

Your input and expertise make this newsletter a truly useful resource. If you have hot topics you'd like us to cover, success stories to share, or questions for our Extension specialists, please get in touch with us at plangenh@purdue.edu or contact the specialist directly. We also welcome high-quality photos of pest issues, unusual symptoms, or innovative production practices you've implemented on your farm.

Subscription Information

Hard Copy Subscribers

There is still time to sign up for a hard copy subscription. If you need a hard copy subscription form and don't have access to the internet, please contact your nearest Purdue Extension office. Extension Educators, please download the hard-copy subscription form at HERE.

Digital Subscribers

If you receive the newsletter via email, you do not need to take any action. You will continue to receive the newsletter on the issue date.

New digital subscribers can register their email address HERE

In addition, digital subscribers 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/).

Website Links in Newsletter Articles

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

Midwest Vegetable Production Guide

The 2025 Midwest Vegetable Production guide is now available for growers to visit online at **mwveguide.org**, or you can download

and print a guide from your computer at **mwveguide.org/guide**. The guide can also be purchased for $15 a copy. Contact your Extension Office or Stephen Meyers (slmeyeres@purdue.edu) directly to buy a copy.

Midwest Vegetable Trial Reports

Are you still considering purchasing vegetable seeds? The Midwest Vegetable Trial Report features many articles to help you make an informed decision. The resource also hosts production-related research results.

Here's to a productive spring season ahead!

Best regards,

Petrus Langenhoven
Clinical Assistant Professor and Vegetable Extension Specialist
Department of Horticulture and Landscape Architecture
Purdue University

Managing Daily Light Integral to Improve Vegetable Transplant Quality

(Lark T. Wuetcher, wuetcher.1@osu.edu) & *(W. Garrett Owen, owen.367@osu.edu)*

Optimizing light management is crucial for producing high-quality vegetable transplants in greenhouse environments.

As greenhouse growers gear up for the spring production season, managing light conditions becomes a critical factor in producing high-quality vegetable transplants. With varying natural light levels and the challenges posed by greenhouse structures, understanding and optimizing daily light integral (DLI) is essential for success. This e-GRO Alert focuses on the importance of DLI in vegetable transplant production, its impact on plant quality, and strategies for effective light management in greenhouse environments.

Figure 1. A greenhouse-grown tomato transplant that is robust and healthy. (Photo by: W. Garrett Owen, OSU).

Understanding Daily Light Integral

Daily light integral (DLI) plays a vital role in the greenhouse production of seed-propagated vegetable transplants. Daily light integral is an integrated measurement of light intensity and photoperiod, representing the total amount of photosynthetically active radiation (PAR) received by plants over a 24-hour period, typically expressed in moles of photons per square meter per day ($mol \cdot m^{-2} \cdot d^{-1}$). Understanding and managing DLI is essential for greenhouse growers to produce robust, healthy transplants (Figure 1).

Impact of DLI on Transplant Quality

Low DLI conditions can significantly affect transplant quality and growth. During early spring months, ambient outdoor DLIs can range from 5 to 25 $mol \cdot m^{-2} \cdot d^{-1}$ for most of the United States. However, light transmission into the greenhouse can be reduced by 60% or more due to glazing material, infrastructure shading, overhead equipment, and hanging baskets. Under low DLIs, seedlings often experience uneven or delayed germination, increased production time, poor root growth (Figure 2), stretched and weak hypocotyls (Figure 3), and increased susceptibility to damage during handling and transplanting. Conversely, maintaining optimal DLI levels (10 to 15 $mol \cdot m^{-2} \cdot d^{-1}$) for vegetable transplant production offers several benefits, including reduced production time, compact growth with short and thick hypocotyls (Figure 4), smaller leaves, well-developed root systems (Figure 5), and increased overall vigor and stress tolerance. For greenhouse growers, achieving the right DLI is crucial for producing sturdy, well-developed transplants that can withstand the stresses of transplanting and establish quickly in the field, greenhouse, or

home garden.

Figure 2. Poor root growth and development often occur under low daily light integrals, as seen here in bell pepper transplants (Photo by: W. Garrett Owen, OSU).

Figure 3. Stretched and weak hypocotyls often occur under low daily light integrals, as seen here in jalapeño pepper transplants (Photo by: W. Garrett Owen, OSU).

Figure 4. Maintaining optimal daily light integrals results in compact growth with short and thick hypocotyls, as seen here in bell pepper transplants (Photo by: W. Garrett Owen, OSU).

Figure 2. Poor root growth and development often occur under low daily light integrals, as seen here in bell pepper transplants (Photo by: W. Garrett Owen, OSU).

Crop-Specific DLI Ranges for Vegetable Transplants

Understanding the optimal DLI ranges for specific vegetable crops is crucial for producing high-quality transplants. Different species have varying light requirements, which can significantly impact their growth and development. Here are the suggested DLI ranges for common vegetable transplants, grouped by DLI:

- Lettuce: 10-15 $mol \cdot m^{-2} \cdot d^{-1}$
- Cucumber: 10-15 $mol \cdot m^{-2} \cdot d^{-1}$ (Figure 6)

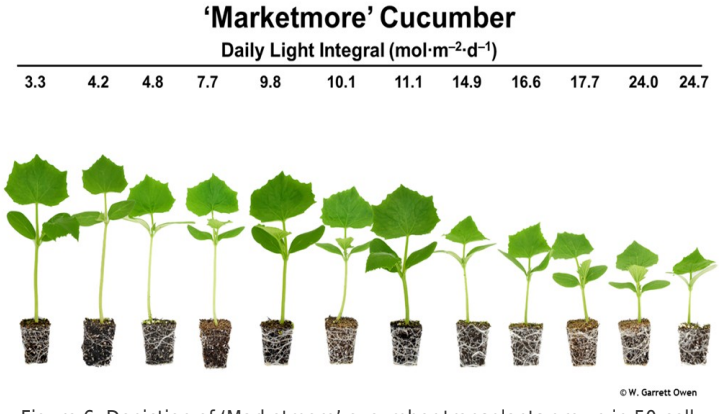

Figure 6. Depiction of 'Marketmore' cucumber transplants grown in 50-cell count trays under increasing daily light integrals ranging from 3.3 to 24.7 mol·m–2·d–1. Photos were taken 10 days after transfer to daily light integral treatments. Figure by: W. Garrett Owen, OSU.

- Squash: 10-15 $mol \cdot m^{-2} \cdot d^{-1}$ (Figure 7)

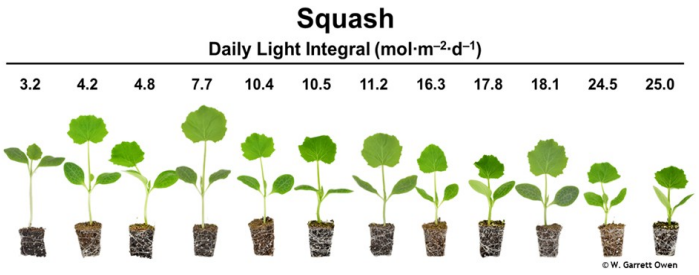

Figure 7. Depiction of straight neck squash transplants grown in 50-cell count trays under increasing daily light integrals ranging from 3.2 to 25.0 mol·m^{-2}·d^{-1}. Photos were taken 7 days after transfer to daily light integral treatments (Figure by: W. Garrett Owen, OSU).

- Cabbage: 10-15 mol·m^{-2}·d^{-1} (Figure 8)

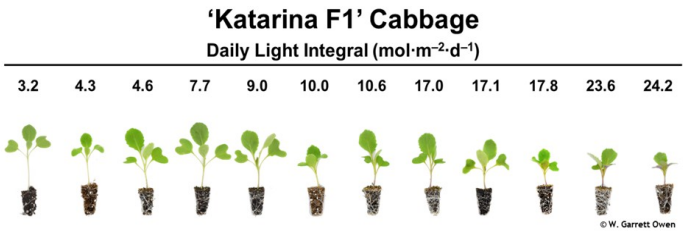

Figure 8. Depiction of 'Katarina F1' cabbage transplants grown in 126-cell count trays under increasing daily light integrals ranging from 3.2 to 24.2 mol·m^{-2}·d^{-1}. Photos were taken 10 days after transfer to daily light integral treatments (Figure by: W. Garrett Owen, OSU).

- Eggplant: 15-20 mol·m^{-2}·d^{-1} (Figure 9)

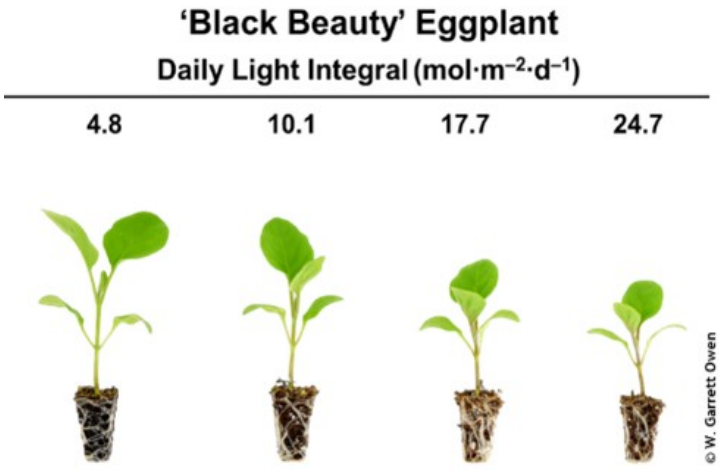

Figure 9. Depiction of 'Black Beauty' eggplant transplants grown in 126-cell count trays under increasing daily light integrals ranging from 4.8 to 24.7 mol·m^{-2}·d^{-1}. Photos were taken 10 days after transfer to daily light integral treatments (Figure by: W. Garrett Owen, OSU).

- Pepper: 15-20 mol·m^{-2}·d^{-1} (Figure 10)

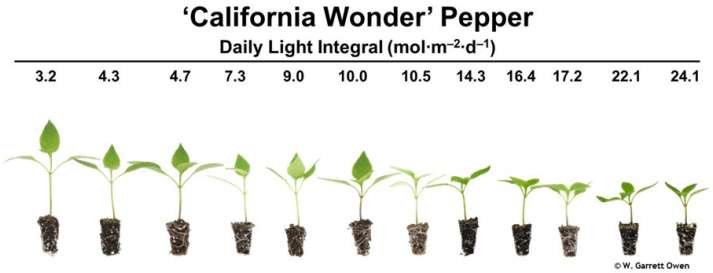

Figure 10. Depiction of 'California Wonder' bell pepper transplants grown in 126-cell count trays under increasing daily light integrals ranging from 3.2 to 24.1 mol·m^{-2}·d^{-1}. Photos were taken 10 days after transfer to daily light integral treatments (Figure by: W. Garrett Owen, OSU).

- Tomato: 15-20 mol·m^{-2}·d^{-1} (Figure 11)

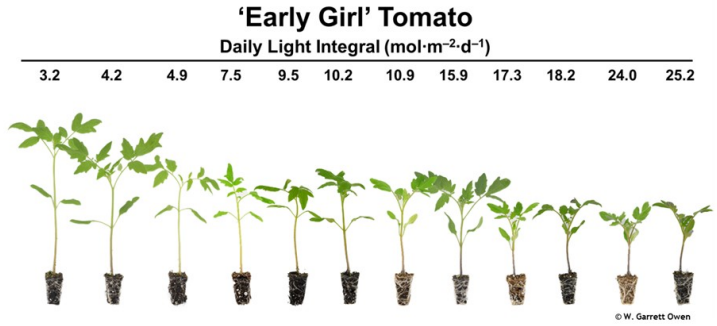

Figure 11. Depiction of 'Early Girl' tomato transplants grown in 126-cell count trays under increasing daily light integrals ranging from 3.2 to 25.2 mol·m^{-2}·d^{-1}. Photos were taken 14 days after transfer to daily light integral treatments (Figure by: W. Garrett Owen, OSU).

Growers should aim to maintain DLI within these ranges to optimize transplant quality. However, it's important to note that these are general guidelines, and factors such as temperature, humidity, and cultivar can also influence the optimal DLI. Regular monitoring and adjustment of light conditions based on plant response will help achieve the best results for each crop.

Strategies to Increase DLI

To improve transplant quality under light-limiting conditions, growers can implement several strategies. Supplemental lighting or the addition of electrical lighting to ambient solar light is highly effective (Figure 12). Growers can deploy high-pressure sodium (HPS) lamps, light-emitting diode (LED) arrays, or a combination of both (hybrid; Figure 13) to boost DLI levels, especially during winter months or in northern latitudes. Maximizing ambient solar light penetration is also crucial, which can be achieved by keeping greenhouse glazing clean (Figure 14), limiting overhead obstructions, re needed, removing whitewash during low-light seasons, and optimizing plant spacing to reduce mutual shading. If possible, removing hanging baskets suspended above the transplants can minimize shading. Additionally, using white ground cover or reflective materials on bench tops can increase light reflection to plant canopies.

Figure 12. Example of supplemental lighting from high-pressure sodium lamps to increase daily light integral (Photo by: W. Garrett Owen, OSU).

Figure 13. Example of hybrid supplemental lighting from high-pressure sodium lamps and light-emitting diode arrays deployed to increase daily light integral (Photo by: W. Garrett Owen, OSU).

Figure 14. Dirty twinwall polycarbonate limits ambient solar light into the greenhouse environment thereby reducing daily light integral and negatively influencing transplant growth and development (Photo by: W. Garrett Owen, OSU).

Managing High Light Conditions

While low light is often a concern, there may be times when DLI needs to be decreased due to high light conditions. In such cases, growers can cease supplemental lighting, adjust the photoperiod, or use exterior shade cloth (Figure 15) or deploy retractable shade curtains to reduce light intensity during peak hours. Applying greenhouse whitewash (Figure 16) or seasonal shade paint on the glazing can effectively lower DLI levels. Employing evaporative cooling can help manage temperature and reduce plant stress under high light conditions. When reducing light, care should be taken not to over-shade, as this can negatively impact plant quality.

Figure 15. Exterior shade cloth utilized to limit solar ambient light into the greenhouse environment, thereby reducing daily light integral. Photo by: W. Garrett Owen, OSU.

Figure 16. Seasonal application of greenhouse whitewash utilized to limit solar ambient light into the greenhouse environment, thereby reducing daily light integral.
Photo by: W. Garrett Owen, OSU.

Monitoring and Adjusting DLI

Effective light management requires continuous monitoring of DLI levels. Greenhouse growers should utilize greenhouse environmental control systems or quantum sensors, data loggers with light measurement capabilities, or portable DLI meters (Figure 17) to accurately measure and monitor light intensity,

photoperiod, and daily light integral (DLI) at plant canopy level, enabling informed decisions about supplemental lighting, shading, and overall greenhouse management for optimal plant growth and energy efficiency. Regular assessment of plant quality and adjustment of lighting strategies is essential. It's important to consider the specific light requirements of different vegetable crops, as some may require higher or lower DLI ranges for optimal growth. By actively managing DLI, greenhouse growers can optimize conditions for vegetable transplant production. This results in higher-quality plants with improved post-transplant performance, whether in the field, greenhouse, or home garden.

Figure 17. Examples of portable data loggers with light measurement capabilities utilized by greenhouse growers to monitor and manage daily light integral in the greenhouse environment (Photos by: W. Garrett Owen, OSU).

Data-Driven Decisions: Choosing Vegetable Varieties with Midwest Trial Results

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

Planning your vegetable varieties for the upcoming season? Purdue University has maintained comprehensive records of vegetable variety trials throughout the Midwest since 1999. The Midwest Vegetable Trial Report series offers valuable applied research findings specifically relevant to vegetable and melon production in the Midwest region. Below, you'll find abstracts from the most recent reports. For more extensive information, visit the Midwest Vegetable Trial Report webpage (https://docs.lib.purdue.edu/mwvtr/).

Evaluation of High Tunnel Tomato Cultivars for Yield and Quality (Wenjing Guan) https://docs.lib.purdue.edu/mwvtr/277/

Tomatoes are a highly popular crop in Indiana's local food markets. They are most commonly grown in high tunnels to extend the harvest season and enhance yields. Beyond yield, fruit quality is a key factor for market success. This study evaluated the performance of eight determinant tomato cultivars grown in a high tunnel at the Southwest Purdue Agricultural Center in 2023.

Colored Sweet Bell and Tapered Pepper Cultivar Evaluation for High Tunnel Production in West-Central Indiana, 2024 (Petrus Langenhoven and Sofia Catucuamba) https://docs.lib.purdue.edu/mwvtr/275/

Currently, comprehensive pepper variety performance data specific to Indiana has been limited. Recognizing this gap, we have initiated a systematic evaluation process. To date, we have conducted thorough assessments of 35 different pepper varieties, with each variety being carefully studied through two distinct production cycles. This research paper presents findings from five sweet bell pepper varieties and five tapered pepper varieties, which were grown and evaluated at the Purdue Student Farm in West Lafayette, Indiana.

2024 Standard-sized Seedless Watermelon Cultivar Evaluation in Indiana (Wenjing Guan)
https://docs.lib.purdue.edu/mwvtr/274/

The annual watermelon cultivar evaluation trial is conducted at Southwest Purdue Agricultural Center (SWPAC) in Vincennes, Indiana. It evaluates yield, fruit quality, and overall plant performance of commercial watermelon cultivars and advanced breeding lines. Purdue Extension and seed companies financially support the trial. The 2024 standard-sized triploid watermelon cultivar trial evaluated 32 cultivars.

2024 Personal-sized Seedless Watermelon Cultivar Evaluation in Indiana (Wenjing Guan)
https://docs.lib.purdue.edu/mwvtr/273/

The annual watermelon cultivar evaluation trial is conducted at Southwest Purdue Agricultural Center (SWPAC) in Vincennes, Indiana. It evaluates yield, fruit quality, and overall plant performance of commercial watermelon cultivars and advanced breeding lines. Purdue Extension and seed companies financially support the trial. The 2024 personal-sized triploid watermelon cultivar trial evaluated 18 cultivars.

2024 Seeded Watermelon Cultivar Evaluation in Indiana (Wenjing Guan) https://docs.lib.purdue.edu/mwvtr/272/

The annual watermelon cultivar evaluation trial is conducted at Southwest Purdue Agricultural Center (SWPAC) in Vincennes, Indiana. It evaluates yield, fruit quality, and overall plant performance of commercial watermelon cultivars and advanced breeding lines. Purdue Extension and seed companies financially support the trial. The 2024 seeded watermelon cultivar trial evaluated 15 cultivars.

Evaluation of Five Jack-O-Lantern Pumpkin Cultivars in Southwest Michigan in 2024 (Ben Phillips)
https://docs.lib.purdue.edu/mwvtr/271/

A jack-o-lantern pumpkin cultivar trial was planted at the Southwest Michigan Research and Extension Center (42.081985, -86.354087, Benton Harbor, Michigan). Rupp (RP) seed company donated pumpkin seeds. Overall trial conditions were excellent, and the crop was harvested early due to the environmental conditions compounded with black plastic mulch pushing the plants to produce and ripen fruit early.

Evaluation of 18 Bell Pepper Cultivars in Southwest Michigan in 2024 (Ben Phillips)
https://docs.lib.purdue.edu/mwvtr/270/

A bell pepper cultivar trial was planted at the Southwest Michigan Research and Extension Center (42.081985, -86.354087, Benton Harbor, Michigan). Bejo (BJ), Clifton (CL), Enza Zaden (EZ), Sakata (SK), Seminis (SE), and United Genetics (UG) seed companies donated bell pepper cultivars for plastic-mulch bedded and trellised hand harvest. Overall trial conditions were excellent, however our pre-plant fertilizer mixing was outsourced this year, and a spreader was rented from the same company. Due to either a mixing error or a misapplication with a piece of unfamiliar or malfunctioning equipment, the plots received a toxic level of boron, which remained in plant tissues for the whole season.

Evaluation of 10 Specialty Pepper Cultivars in Southwest Michigan in 2024 (Ben Phillips)
https://docs.lib.purdue.edu/mwvtr/268/

A specialty pepper cultivar trial was planted at the Southwest Michigan Research and Extension Center (42.081985, -86.354087, Benton Harbor, Michigan). Tozer (TZ) and United Genetics (UG) seed companies donated specialty pepper cultivars for plastic-mulch bedded and trellised hand harvest. Overall trial conditions were excellent, however our pre-plant fertilizer mixing was outsourced this year, and a spreader was rented from the same company. Due to either a mixing error or a misapplication with a piece of unfamiliar or malfunctioning equipment, the plots received a toxic level of boron, which remained in plant tissues for the whole season.

Evaluation of 23 Pickling Cucumber Cultivars for Machine Harvest in Southwest Michigan in 2024 (Ben Phillips)
https://docs.lib.purdue.edu/mwvtr/267/

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), Rijk Zwaan (RZ), and US AgriSeed (UA) seed companies donated parthenocarpic (seedless) cultivars for mechanical once-over harvest. Overall, trial quality was good despite a droughty start, though picking could have started sooner.

Specialty Crop Opportunity: First-Year Results of Scotch Bonnet Pepper Trials

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

After a family vacation to Jamaica in 2023, Dr. Langenhoven at Purdue University recognized the potential for Scotch Bonnet peppers as a high-value specialty crop for diversification on Indiana farms. This led to a 2024 research trial at the Meigs Horticulture Facility (Throckmorton Purdue Ag Center) near Lafayette to evaluate the commercial production potential of this Caribbean staple in our Midwest growing conditions.

Figure 1. A variety of Scotch Bonnet pepper fruits (Photo by: Petrus Langenhoven).

Market Analysis

The hot sauce industry continues to show strong growth in the U.S. market, with IBISWorld's 2024 industry report indicating:

- Current revenue of $2.7 billion
- Projected compound annual growth rate of 2.1%, reaching $3.0 billion by 2029
- Changing consumer preferences driving demand, particularly among younger generations and growing immigrant populations
- Manufacturers focusing on product innovation and brand differentiation

While profit margins average 3.6% and competition from foreign manufacturers presents challenges, the demand for high-quality specialty peppers continues to increase. Caribbean production faces limitations from extreme weather events, high pest and disease pressure, and limited productive land—creating opportunity for Midwest growers.

Crop Overview

Scotch Bonnet peppers (*Capsicum chinense*) are known for:

- Heat levels between 100,000-350,000 Scoville Heat Units (though our trials found wider variation)
- Distinctive fruity, aromatic flavor profile that sets them apart from other hot peppers
- High nutritional value, including vitamins A and C, magnesium, flavonoids, and folate
- Multiple product possibilities: hot sauce, seasoning blends, pickled peppers, dried pepper mash, dehydrated powders, and pepper paste

Production Trial Results

Our 2024 trial at Meigs Horticulture Facility included 18 different Scotch Bonnet cultivars.

Variety	Color	Seed Company	Code
Scotch Bonnet Chocolate	Chocolate	Bohica Pepper Hut	BPH-3
Chocolate Scotch Bonnet Pepper	Chocolate	Sistah Seeds	Sis-1
Orange Scotch Bonnet	Orange	Totally Tomato	Ttom-1
Orange Scotch Bonnet Hot Pepper Seeds	Orange	Pepper Joe's	PeppJ-2
Scotch Bonnet Peppers [Orange]	Orange	Florida Seed & garden	FLS-3
Scotch Bonnet Freeport Orange	Orange	Bohica Pepper Hut	BPH-4
Orange Scotch Bonnet Pepper	Orange	Ohio Heirloom Seeds	Heir-1
Sweet Bonnet Pepper	Red	HPS Seeds	HPS-1
Red Scotch Bonnet Hot Pepper Seeds	Red	Pepper Joe's	PeppJ-3
Scotch Bonnet Red Pepper Seeds	Red	Seeds n Such	SnS-1
Scotch Bonnet Peppers [Red]	Red	Florida Seed & garden	FLS-2
Scotch Bonnet MOA Red	Red	Bohica Pepper Hut	BPH-2
Red Mushroom	Red	Territorial seeds	Ter-1
Yellow Scotch Bonnet Pepper Seeds	Yellow	Pepper Joe's	PeppJ-1
Jamaican Scotch Bonnet	Yellow	Rare Seeds	Rare-1
Scotch Bonnet Peppers [Yellow]	Yellow	Florida Seed & garden	FLS-1
MOA Scotch Bonnet - yellow	Yellow	Bohica Pepper Hut	BPH-1
Hot Pepper Seeds - Jamaican Hot Yellow	Yellow	Eden Brothers	Eden-1

Figure 2. Scotch Bonnet cultivars evaluated in 2024.

Trial Management:

- Seeded in greenhouse: April 11
- 72 cell plug trays were placed on Redi-Heat HD heat mats at 80°F to facilitate even and faster germination
- Transplanted to raised beds: May 14
- Plant spacing: 1.5 feet between plants, 6.5 feet between rows (4,468 plants/acre)
- First harvest: September 12 (119 days after transplanting)
- Final harvest: October 3

Figure 3. Scotch Bonnet plants 4 weeks after transplanting (Photo by: Petrus Langenhoven).

Crop Management

- Weed control: Pre-plant applications of Liberty (May 8) and Dual Magnum II (May 10)
- Plant support: Wooden stakes and string installed four weeks after transplanting
- Irrigation: Single drip tape per row (Rivulis T-tape 5/8″ with 12-inch emitter spacing, 0.22 GPM/100 ft flow rate)
- Pest management: No insecticide or fungicide applications were necessary due to low pest and disease pressure

Figure 4. Scotch Bonnet plants 12 weeks after transplanting (Photo by: Petrus Langenhoven).

Figure 5. Cultivar SnS-1, 17 weeks after transplanting (Photo by: Petrus Langenhoven).

Key Observations:

- Initial growth (first four weeks) was slow until temperatures consistently reached the preferred 70-95°F range (approximately 5 weeks after transplanting)
- Minimal disease presence and low insect pressure throughout the growing season

- August-September drought conditions helped maintain fruit quality
- Yields ranged from 11,000 to 24,000 lb/acre
- Individual fruit weight varied between 0.29-0.60 ounces
- Scoville heat units showed significant variation (5,000-500,000 SHU)
- Freeze-dried fruits produced attractive, marketable colored powders

Cultivar	Yield (lb/plant)	Yield (lb/A)	Fruit Weight (oz)	Fruit per plant	Fruit/A
Rare-1	2.5	10,964	0.55	69.5	310,340
Sis-1	2.6	11,401	0.58	69.9	312,212
PeppJ-1	2.8	12,344	0.44	99.8	445,868
FLS-3	3.0	13,531	0.46	105.5	471,308
BPH-1	3.1	13,665	0.57	85.6	382,570
FLS-2	3.2	14,271	0.48	104.1	464,907
FLS-1	3.2	14,381	0.46	113.4	506,733
Ter-1	3.3	14,739	0.49	110.3	492,719
Heir-1	3.4	15,134	0.41	136.1	607,977
Eden-1	3.4	15,373	0.49	111.8	499,568
BPH-3	3.7	16,528	0.37	161.7	722,576
PeppJ-2	3.9	17,440	0.43	143.3	640,347
HPS-1	4.1	18,152	0.29	226.0	1,009,603
BPH-4	4.3	19,271	0.60	114.9	513,367
SnS-1	4.6	20,748	0.40	187.8	838,943
BPH-2	4.8	21,224	0.59	139.2	621,738
Peppj-3	4.9	22,074	0.45	175.6	784,622
Ttom-1	5.4	23,998	0.41	205.8	919,707

Figure 6. Marketable yield of Scotch Bonnet cultivars evaluated in 2024.

Cultivar	Capsaicin (mg/g)[z]	Scoville Heat Units
HPS-1	0.25	5,072
Ttom-1	1.80	35,286
PeppJ-1	2.06	44,167
PeppJ-2	1.77	34,454
PeppJ-3	3.20	65,930
Rare-1	10.39	195,642
SnS-1	2.72	55,411
FLS-1	2.10	43,336
FLS-2	1.93	40,920
FLS-3	2.54	52,888
BPH-1	7.07	144,578
BPH-2	11.28	214,506
BPH-3	26.95	502,320
BPH-4	8.57	167,762
Sis-1	7.56	152,950
Eden-1	2.52	51,546
Ter-1	2.07	41,941
Heir-1	2.07	43,577

Figure 7. Scotch Bonnet cultivar capsaicin content and Scoville heat units.

Production Considerations for Indiana Growers

Growing Requirements:

- Well-drained, fertile loam or clay loam soil with pH 6.0-7.5
- Soil temperatures must reach at least 65°F before transplanting
- Optimal growing temperatures: 70-95°F
- Maturity range: 80-120 days, depending on cultivar
- Continued fruit set occurs when temperatures remain favorable

Challenges in Midwest Production:

- Short growing season requires careful timing of transplants
- Early planting is not recommended based on our observations
- Post-harvest handling and processing infrastructure may require investment

Recommendations for Commercial Growers

1. **Start Small**: Begin with a small pilot program to test systems and markets before scaling up
2. **Timing Matters**: Avoid early transplanting; wait until soil and air temperatures are consistently warm
3. **Market Development**: Connect with potential buyers before initiating production
    - Direct contracts with hot sauce manufacturers
    - Development of local and regional specialty markets
    - Cooperative marketing efforts with other specialty crop producers
2. **Processing Considerations**: Research requirements and costs for FDA-approved processing facilities if planning value-added products
3. **Utilize Available Resources**: Consult with Purdue Extension for technical support on production techniques, available commercial kitchens, food safety, and marketing
4. **Network**: Visit successful pepper operations in similar climate zones to gain practical insights

Conclusion

Our preliminary research indicates that Scotch Bonnet peppers show strong potential as a high-value specialty crop for Indiana commercial vegetable operations. While production challenges exist, the expanding market and successful trial results suggest this crop could offer profitable diversification opportunities for Midwest growers. Further research will address remaining questions about our region's optimal varieties, precise timing, and post-harvest handling. A followup trial is planned for 2025.

Contact Petrus Langenhoven at plangenh@purdue.edu if you have any questions.

Acknowledgements

I want to thank Sofia Catucuamba, visiting research scholar, and the Purdue Student Farm Organization for helping harvest the peppers. I would also like to thank Ximena Yepez and Amanda Deering for their postharvest analysis of pepper color and capsaicin content and the staff of Meigs, Chloe Henscheid, and Wil Browm-Grimm for their support during the production phase of the experiment.

Safety Considerations of Freeze-dried Foods: Learnings From the Consumer Food Safety Education Webinar Series

(Suyapa F. Rojas, srojasor@purdue.edu) & (Yaohua (Betty) Feng, yfengchi@purdue.edu)

Numerous educators and extension volunteers took advantage of the annual Summer School for Consumer Food Safety Education program.

The 2024 speakers of the second webinar session were Carla Schwan, an Extension food safety specialist from the University of Georgia, and Melissa Rupp, an Extension educator from Ohio State University. They focused their presentation on safety considerations of freeze-dried foods.

Several factors influence microbial survival in freeze-dried foods, including food matrix, water activity, temperature, pH, and oxygen requirements. Water activity is a particularly crucial factor for controlling microbial growth. However, freeze-drying inhibits but does not eliminate pathogens. Therefore, following proper food safety practices is important to prevent foodborne illness. Carla Schwan explained the freeze-drying process in which water is removed through sublimation. Pre-treatment of produce, cleaning surfaces, and correct food packaging are important to maintain safety and extend shelf life.

Melissa Rupp focused on the growing trend of freeze-drying at home. She discussed the resources needed to start a freeze-drying business, including machines and storage options tailored to different food types and available resources. She also highlighted the importance of following food safety practices and maintaining accurate records. She noted that resources for consumers and small businesses are limited and pointed out the need for further research into food safety in this industry.

You can watch this session and previous webinars on the Food Safety Human Factor Lab Website.

Italian vs. Asian Eggplant Cultivars: Performance Comparison for Indiana Commercial Production

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

2024 Field Trial Shows Yield Differences Between Italian and Asian Cultivars

As part of Purdue University's Field Production of Horticulture Crops class, Dr. Langenhoven established a comprehensive eggplant cultivar demonstration at the Meigs Horticulture Facility near Lafayette during the 2024 growing season. This hands-on educational project served a dual purpose: providing students practical crop management experience while generating valuable performance data on eight diverse eggplant cultivars under Indiana growing conditions. The results from this demonstration offer commercial vegetable growers throughout the state evidence-based insights to guide their cultivar selection decisions for maximum productivity and market appeal in the coming season.

Table 1: Eggplant cultivar characteristics.

Cultivar	Seed Company	Days to Maturity[z]	Fruit Length (inches)
Asian Type			
Ping Tung	Baker Creek Heirloom Seeds	70	14
Orient Express	Johnny's Selected Seeds	58	8-10
Chinese String	Baker Creek Heirloom Seeds	75	10-15
Shikou	Harris Seeds	75	6-8
Italian Type			
Nigral	Johnny's Selected Seeds	65	8-10
Dancer	Johnny's Selected Seeds	65	7-8
Annina	Johnny's Selected Seeds	65	6-8
Rolandia	Territorial Seeds	65	8

[z] Days to maturity from transplanting to mature fruit

Nigral Rolandia Dancer Annina

Figure 1. Italian eggplant varieties included in demonstration planting (Photo by: Petrus Langenhoven).

Chinese String Ping Tung Orient Express Shikou

Figure 2. Asian eggplant varieties included in demonstration planting (Photo by: Petrus Langenhoven).

Demonstration Setup and Management

The class evaluated four Italian-type and four Asian-type eggplant cultivars using the following production system:

Soil Conditions and Fertility

- Drummer soil series with 2.7% organic matter and pH 6.5

- Pre-plant soil test results: 24 ppm P, 111 ppm K, 190 ppm Mg, 1,800 ppm Ca
- Cation exchange capacity: 12.1 meq/100g
- Fertilization: 1000 lb/A of 9-23-30 and 150 lb/A of Urea (46-0-0), providing 159 lb N/A, 230 lb P_2O_5/A, and 300 lb K_2O/A applied during bed formation

Planting Schedule and Layout

- Seeding date: April 16, 2024
- 72 cell plug trays were placed on Redi-Heat HD heat mats at 80°F to facilitate even and faster germination
- Transplant date: May 14, 2024
- Planting density: 1.5 ft between plants, 6.5 ft between beds (center-to-center), achieving 4,468 plants per acre
- Demonstration configuration: Two 180-foot rows with 30 plants per cultivar (non-replicated demonstration trial)

Crop Management

- Weed control: Pre-plant applications of Liberty (May 8) and Dual Magnum II (May 10)
- Plant support: Wooden stakes and string installed four weeks after transplanting
- Irrigation: Single drip tape per row (Rivulis T-tape 5/8″ with 12-inch emitter spacing, 0.22 GPM/100 ft flow rate)
- Pest management: No insecticide or fungicide applications were necessary due to low pest and disease pressure
- Harvest period: Weekly harvests from weeks 8-18 after transplanting, concluding on September 13

Key Findings by Cultivar Type

Italian-Type Eggplants: Higher Overall Yields

Italian-type cultivars consistently outperformed Asian types in terms of total marketable yield per acre:

Table 2. Marketable yield of Italian eggplant cultivars

Cultivar	Fruit per plant	Yield (lb/plant)	Fruit Weight (oz)	Fruit per acre	Yield (lb/acre)
Nigral	17.7	12.4	11.2	79,049	55,446
Dancer	17.5	9.2	8.4	78,041	41,161
Annina	18.8	10.9	9.2	83,917	48,495
Rolandia	15.2	11.7	12.3	67,914	52,320

Table 3. Unmarketable yield of Italian eggplant cultivars

Cultivar	Fruit per plant	Yield (lb/plant)	Yield (lb/acre)	Number of Fruit (%)
Nigral	0.3	0.2	894	1.7
Dancer	1.3	0.5	2,160	6.8
Annina	0.6	0.3	1,222	2.9
Rolandia	0.3	0.1	618	1.7

Performance Highlights

- **Nigral** produced the highest overall yield (55,446 lb/A) with excellent fruit quality
- **Rolandia** grew the heaviest individual fruits (12.3 oz) with minimal unmarketable yield
- **Annina** produced well but also had the second highest unmarketable yield. Marketable yield losses were due to color fading, which might have been due to the fruit having passed its best harvest date (weekly harvest schedule)
- **Dancer** showed higher unmarketable yield (2,160 lb/A) primarily due to color fading from sun exposure

Asian-Type Eggplants: Specialized Production Options

Asian varieties offered different characteristics suitable for specialty markets:

Table 4. Marketable yield of Asian eggplant cultivars

Cultivar	Fruit per plant	Yield (lb/plant)	Fruit Weight (oz)	Fruit per acre	Yield (lb/acre)
Ping Tung	26.8	8.7	5.2	119,621	38,892
Orient Express	23.3	9.8	6.7	104,253	43,721
Chinese String	35.2	7.3	3.3	157,125	32,507
Shikou	26.0	9.8	6.0	116,354	43,706

Table 5. Unmarketable yield of Asian eggplant cultivars

Cultivar	Fruit per plant	Yield (lb/plant)	Yield (lb/acre)	Number of Fruit (%)
Ping Tung	1.7	0.6	2,701	6.1
Orient Express	1.9	0.6	2,895	7.6
Chinese String	8.0	1.2	5,203	18.5
Shikou	1.3	0.5	2,281	4.7

Performance Highlights

- **Orient Express** and **Shikou** both achieved top yields among Asian types (approximately 43,700 lb/A)
- **Chinese String** produced the highest number of fruits per plant (35) but with smaller individual fruit size (3.3 oz). It performed well early in the season, up to 92 days after transplanting, but showed reduced tolerance to extreme heat later
- **Shikou** demonstrated the lowest unmarketable yield and excellent quality, emerging as a favorite
- **Ping Tung** performed well. However, it only started to produce significant yields about 10 days later (at 78 days after transplanting) than the other cultivars

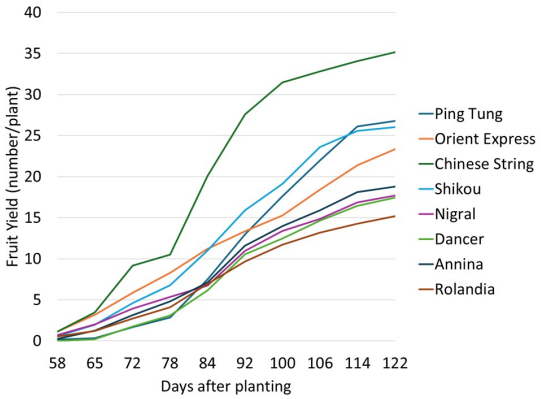

Figure 3. Cumulative marketable fruit yield per plant of eight eggplant

cultivars.

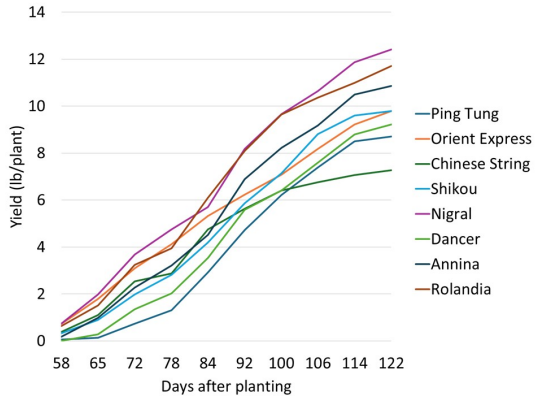

Figure 4. Cumulative marketable yield of eight eggplant cultivars.

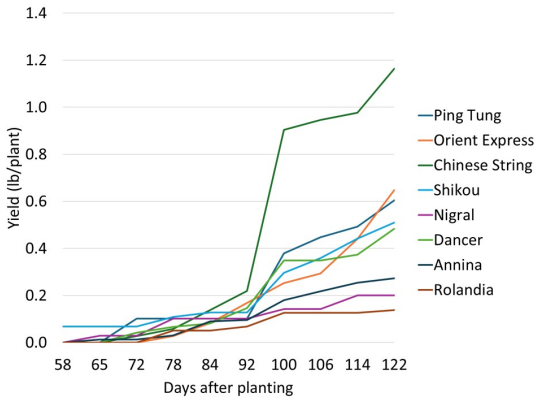

Figure 5. Cumulative unmarketable yield of eight eggplant cultivars.

Production Timing Observations

All cultivars demonstrated excellent yield potential during the first five weeks of harvest (58 to 92 days after transplanting). Most cultivars maintained good quality throughout the season, with Rolandia, Nigral, and Annina showing particularly consistent marketable production even during later harvest weeks.

Recommendations for Indiana Growers

1. **For traditional markets seeking large fruits**
    - Nigral offers exceptional yield combined with good fruit size
    - Rolandia provides premium-sized fruit with minimal cullage
2. **For specialty and ethnic markets**
    - Shikou and Orient Express provide excellent options for Asian-type eggplant production
    - Chinese String is ideal for stir-fry applications but may require more careful management during heat waves
2. **Harvest timing considerations**
    - More frequent harvesting than our weekly schedule may reduce color fading issues observed in some cultivars, particularly Dancer
    - Early-season production (July-early August) showed strongest performance across all varieties

Acknowledgements

This demonstration trial was supported by Chris Adair (Purdue Student Farm Manager), Purdue Student Farm Interns, and visiting scholar Sofia Catucuamba, and the staff of Meigs, Chloe Henscheid, and Wil Browm-Grimm for their support during the production phase of the experiment.

For more information about this trial or eggplant production recommendations for Indiana, contact your local Purdue Extension office or visit Midwest Vegetable Production Guide.

Horticulture Research Manager Position at Purdue University

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

The Purdue Ag Center is seeking a Specialty Crops Systems Specialist. In this role, you will provide expertise and assistance to faculty and graduate students in the Departments of Horticulture and Landscape Architecture, Botany and Plant Pathology, Entomology, and others by implementing and maintaining applied field research trials related to fruit, vegetable and specialty crops at the Samuel Meigs Horticulture Facility located within the Throckmorton Purdue Ag Center. Key responsibilities include: Interpreting research protocols, assisting with trial design and installation, managing field trials for a large variety of specialty crops, and creating and implementing disease and pest management practices.

What You'll Be Doing:

- Supervising support staff, temporary and all student hires related to Meigs
- Budget analysis oversight – scrutinizing Meigs balance sheet of expenses, cost savings measures, and income opportunities
- Providing professional high-level support for Principal Investigators and others within the college of Agriculture
- Communicating field trial protocols to ag center staff and work closely with lead principal investigators to achieve successful results
- Coordinating and implementing trials across the Purdue Ag Center system with minimal oversight and direction
- Utilizing knowledge of field plot research to manage overall production of fruit, vegetable and specialty crops being grown in the field trials
- Working closely with ag center Superintendent to maintain adequate supplies of crop inputs, pest management products, field trial supplies and equipment on an annual basis
- Providing field scouting, when requested, to monitor disease and pest management needs of each field trial.
- Providing timely updates to faculty utilizing the ag center

for their research efforts
- Operating specialty crop equipment in a research capacity such as tractors, sprayers, transplanters, plastic layers and other tillage equipment
- Operating combines, trucks, front-end loaders, backhoes, trenchers, planters, transplanters and other land improvement tools necessary to accommodate complex and unique research requests
- Engaging in professional develop opportunities to enhance knowledge of crop production techniques, field trial methods and technology advancements
- Participating in the planning and implementation of various field days, grower workshops and specialized field events at the ag center organized by lead researchers presenting data and plot results the growers in Indiana
- Assisting ag center staff in the overall operations of the ag center. This includes rotation field crop production, and the maintenance of equipment, buildings and infrastructure of the ag center
- Performing routine research equipment maintenance
- Participating in various educational programs and tours as needed; may include transporting industry visitors and local stakeholders, identifying routes, conducting presentations, etc.

What We're Looking For:

- Bachelor of Science in Horticulture or related area
- 4 years of experience with unmanned aerial vehicles, including flight plans, operation, maintenance, FAA rules, and pesticide applications
- In lieu of degree, consideration will be given to an equivalent combination of related education and required experience (Associate's degree + 6 years of experience; HS/GED + 8 years of experience)
- Knowledge of both Midwest fruit and vegetable production methods and ability to apply and practice
- Knowledge in the design, management, and overall care of vegetable, fruit tree, and specialty crop field studies
- Ability to exercise independent judgment and problem solve
- Ability to develop and maintain continuous working relationships
- Basic computer skills, good communication, good organization, and ability to operate farm equipment
- Excellent time management with proven ability to handle multiple responsibilities
- Ability to assist with horticultural extension outreach prJobsograms
- Ability to work extended seasonal hours beyond 40 hours per week as needed
- Commercial pesticide applicator license is obtained within 12 months of employment
- A drone license 107 for flying and a drone license 137 aerial applicators license should also be obtained within 12 months of employment
- Successful applicant must submit to MVR report

To apply, follow this link https://careers.purdue.edu/job/Horticulture-Research-Manager/36356-en_USEmploymentJobs

Purdue Extension to Host Virtual Farmers Market Certificate

(Sarah Hanson, sspeedy@purdue.edu)

Purdue Extension is offering the Farmers Market Certificate, a virtual training designed to equip market managers, vendors, and community leaders with the knowledge and skills necessary to operate successful and sustainable farmers markets. This program will provide essential insights into best practices, food safety regulations, legal considerations, marketing strategies, conflict management, and customer engagement techniques to help strengthen local food systems.

Farmers markets play a critical role in connecting local producers with consumers, fostering community engagement, and promoting access to fresh, healthy foods. The Purdue Extension Farmers Market Certificate is tailored to support both new and experienced market stakeholders by offering expert guidance on market management, food safety, legal considerations, and vendor relations.

The virtual training sessions will take place via Zoom on Tuesdays, April 1, April 8, April 15, and April 22 from 6:30-8:30 pm. Registration is $75 and includes a market manager or market vendor manual, which participants will select during registration. Registration and more information are at https://bit.ly/fmc2025.

For questions, please contact Sarah Hanson at sspeedy@purdue.edu. If you require special accommodations to

attend this event or need an interpreter or translator, please reach out to Sarah Hanson at sspeedy@purdue.edu by March 25. Anyone under 18 must be accompanied by a parent or guardian.

About Purdue Extension: Purdue Extension is dedicated to providing practical, research-based education and resources to individuals, businesses, and communities across Indiana. Through various programs, Purdue Extension supports economic development, agriculture, health and wellness, and environmental stewardship. Purdue University is an equal opportunity/equal access/affirmative action university.

Download the flyer HERE

How Much is Your Specialty Crop Worth?

(Elizabeth Carter, carter14@purdue.edu)

Let's face it, growing a specialty crop is hard work and expensive. Battling mother nature, insects and disease are just a few of the obstacles growers face. Pesticide drift shouldn't be one of them.

DriftWatch offers a reliable and FREE mapping tool that promotes communication between specialty crop producers and pesticide applicators. (Beekeepers can also register their hives.) When you map your sensitive site on DriftWatch, applicators can see where they might need to take some extra care or start a conversation with a grower. Some pesticide labels now even require applicators to check the site before making an application. This information can be especially helpful for aerial or right-of-way applicators who might not be familiar with the area.

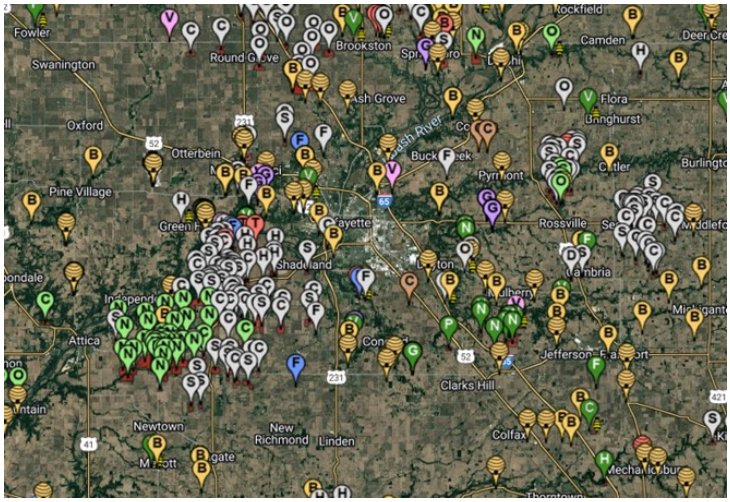

Figure 1. DriftWatch map (Source: https://in.driftwatch.org/map).

Sign up for DriftWatch is free and takes less than 5 minutes. https://in.driftwatch.org/map. If you already have a site, don't forget to renew each growing season. Only commercial sensitive crop producers qualify. Need help? Email carter14@purdue.edu for assistance.

Don't delay, sign up with DriftWatch today!

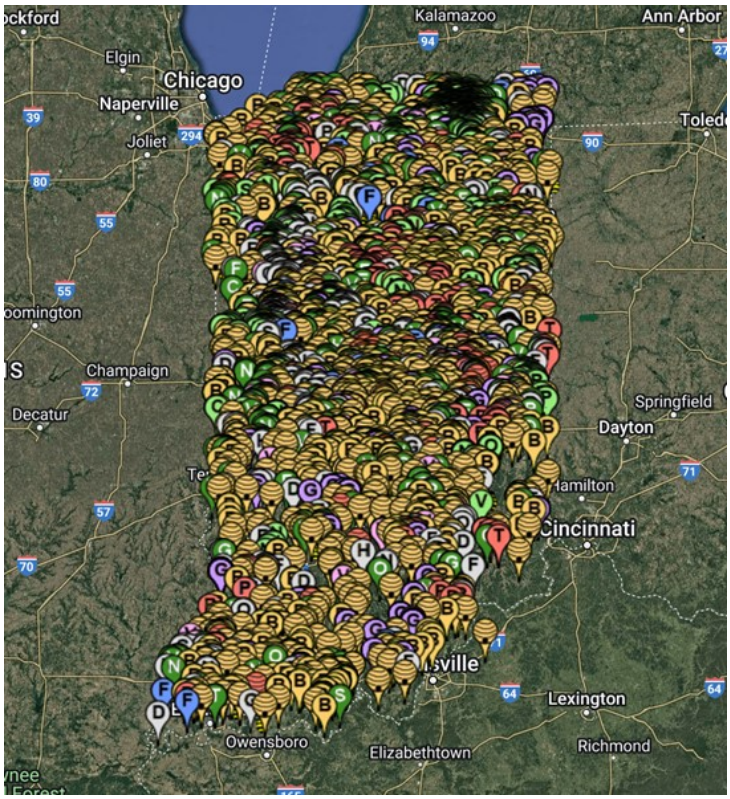

Figure 2. DriftWatch map (Source: https://in.driftwatch.org/map).

Considerations for Choosing Tomato Cultivars

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

Selecting tomato cultivars can be both exciting and challenging, simply because there are so many options to choose from. Some growers settle on a few favorite cultivars and focus on fine-tuning their production practices to suit them. Others prefer to explore

new cultivars every year, selecting those that best fit their evolving production systems. Regardless of the approach, growers understand that no single cultivar outperforms every parameter across different production systems. The key often comes down to which traits or parameters the grower values the most.

We recently conducted a tomato cultivar trial comparing six determinate tomato cultivars. We selected these cultivars based on grower feedback—each one was mentioned as a favorite by at least one grower. Although the list of potential cultivars was much longer, space limitations allowed us to include only six: Celebrity Plus, Mountain Fresh Plus, BHN 589, Red Deuce, STM2255, and a yellow tomato cultivar, Carolina Gold.

We conducted replicated trials at the Southwest Purdue Agricultural Center, comparing performance in two distinct production systems. One was a high tunnel system with frequent irrigation and fertilization management; the other was an open-field system that depended on preplant fertilizers, and a few irrigation events that applied only during the excessive dry period. Soils were loamy sand, similar between the high tunnel and the open field.

Unsurprisingly, the same cultivars grown in high tunnels produced much higher yields (28-58 lbs/plant) and had a significantly longer harvest season than those grown in the open field (11-16 lbs/plant). The primary factors contributing to unmarketable fruit were blossom end rot (BER) in the open-field system and fruit cracking in the high tunnel system. The likely cause of BER in the open field was large fluctuations in soil moisture, while high soil moisture contents, especially during the harvest period, likely contributed to fruit cracking in the high tunnels.

Celebrity Plus had the highest incidence of BER in the open field and the most cracking in the high tunnels. In contrast, STM2255 had the lowest incidence of BER in the open field, and one of the cultivars had the fewest cracked fruits in the high tunnel. STM2255 had the highest marketable yields in the high tunnel. The same cultivar also had the highest yield in open-field, but it was not significantly different from Red Deuce, BHN589, and Carolina Gold.

Fruit quality was evaluated for high tunnel-grown tomatoes. We measured the total soluble solids of vine-ripe and counter-ripe fruit. As expected, vine-ripe tomatoes generally had a higher sugar content compared to counter-ripe fruit. Interestingly, cultivar differences in °Brix values appeared more pronounced in counter-ripe tomatoes than in vine-ripe ones. BHN589 had the highest °Brix value among the counter-ripe samples—significantly higher than those of Red Deuce, STM2255, and Mountain Fresh Plus. Notably, consumers also rated BHN589 and Celerity Plus as having the best flavor.

Internal white tissue is an undesirable trait in tomatoes. It is often associated with high temperatures and varies among cultivars. Among the six cultivars evaluated, Celebrity Plus stood out by showing the least incidence of internal white tissue.

More information about the tomato cultivar evaluation in high tunnels can be found in the published trial report Evaluation of High Tunnel Tomato Cultivars for Yield and Quality.

Figure 1. Tomato slices of six cultivars evaluated in the trial (Photo by: Wenjing Guan).

Southwest Purdue Agriculture Center Field Day: June 26, 2025

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

Register for the Southwest Purdue Ag Center field day HERE
https://tinyurl.com/2025SWPACFieldDay

Save the date, June 26, 2025, SWPAC Field Day

Tri-State High Tunnel School on March 14, 2025

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

Join us for an exciting new endeavor, the Tri-State High Tunnel School, focused on high tunnel production with information to benefit commercial growers, beginning farmers, and educators, among others. It is hosted by Extension Specialists and Educators with Michigan State University, Purdue University, and The Ohio State University.

Indiana host locations and contacts:

Goshen, IN (Purdue Elkhart County Extension)
17746 County Road 34 Ste E, Goshen, IN 46528
Contact: Mark Evans
Email: mevans@purdue.edu
Phone: (574) 533-0554

Richmond, IN (Purdue Wayne County Extension)
861 Salisbury Road North, Richmond, IN 47374
Contact: Jonathan Ferris
Email: ferrisj@purdue.edu

Phone: (765) 973-9281

More information about this event can be found on Tri-State High Tunnel School

Survey about Slug and Snail Pests Affecting Horticultural Crops

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

University of Florida researchers developed this survey to investigate issues associated with slugs and snails in horticultural crops. Your survey participation can assist researchers in developing Extension and research control methods. For more information about this survey, please check the survey link.

Sharpen® Herbicide Now Labeled For Use in Mint in Select States

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

A new supplemental label allows for Sharpen® herbicide to be applied to mint in Idaho, Indiana, Michigan, Oregon, Washington, and Wisconsin. This registration follows several years of field trials conducted across the Pacific Northwest and Midwest, including research at Purdue University. This research was supported by local mint farmer organizations, the Mint Industry Research Council, and the IR-4 Project. Below I answer some questions about this new registration.

What type of mint can this be used on?

This label is for any *Mentha* species, including peppermint and spearmint. It can be used on mint harvested for fresh leaves and stems, as well as mint processed into oil.

What type of use is allowed?

Sharpen® can only be applied to dormant, established stands of mint. Established is defined as at least one year after planting. The use rate is 1 to 2 fluid ounces per acre. Sequential applications can be made at least 14 days apart as long as the total in one dormant season does not exceed 2 fluid ounces per acre.

Is an adjuvant needed?

Yes. In our trials we included 2% liquid ammonium sulfate (AMS) and 1% methylated seed oil (MSO). BASF recommends that MSO not be substituted with non-ionic surfactant (NIS).

What is the pre-harvest interval (PHI)?

There is no minimum PHI when applied to dormant mint.

How does Sharpen® work and what weeds will it control?

Sharpen® is a WSSA Group 14 herbicide. It is rapidly absorbed by roots and shoots. Although it can be moved throughout targeted weeds, the symptoms resemble contact herbicide injury, resulting in necrosis (dead plant tissue) within a few days of application.

Targeted weeds are generally winter annuals that emerge in the fall, over-winter, and finish their life cycle the following spring. In the Midwest, this includes chickweed and marestail. We have found it to be highly effective against common winter annual weeds in Indiana (Figure 2 and 3).

Figure 2. Research plots in a peppermint field in Fair Oaks, Indiana in 2021 with no herbicide application. The light green vegetation is a combination of chickweed, small-leaf buttercup, henbit, and marestail. Dark green vegetation is emerging peppermint (Photo by: Stephen Meyers).

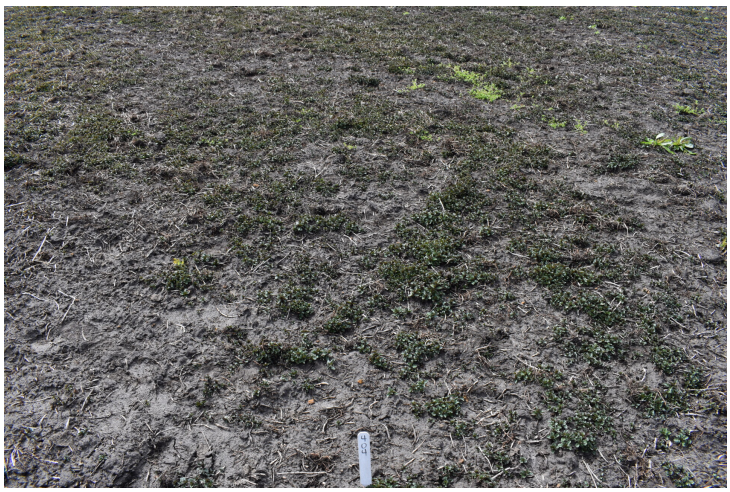

Figure 3. Research plots in a peppermint field in Fair Oaks, Indiana in 2021 with 2 fluid ounces per acre of Sharpen® applied during dormancy (right). The light green vegetation is a combination of chickweed, small-leaf buttercup, henbit, and marestail. Dark green vegetation is emerging peppermint (Photo by: Stephen Meyers).

As with any new practice, if you are interested in applying

Sharpen® to your mint, we recommend you trial a small area first to know how the application will work in your particular environment.

Where can I find the label?

The label can be viewed here:
https://www.cdms.net/ldat/ld99E022.pdf

Or scan this QR code:

A False Sense of Spring?

(Beth Hall, hall556@purdue.edu)

It happens every year. A warm wave moves into the area, and I immediately get the urge to run to the nursery and start planting for the spring. Of course, there is another little voice inside my head warning me not to fall for it. There are plenty of other things I can do outside to start prepping for spring. Perhaps I'm just anxious to liven things up a bit; break out of the winter hibernation. This past week was certainly one of those weeks. Are we passed the point of having any more freeze events? When does the last freeze event typically occur for my area? For curious readers, the Midwestern Regional Climate Center has a tool – the Freeze Date Tool (https://mrcc.purdue.edu/freeze/freezedatetool) – that can help answer this question (Figure 1). Utilizing historical observation data that has been gridded to the county level, users can select their temperature of interest (e.g., 28°F) and which historical statistic (e.g., latest date on record) for either the last "freeze" event of the cold season or the first "freeze" event. For example, the earliest last 28°F event of the season in Tippecanoe County occurred March 22, 1967, whereas the latest last 28°F event occurred May 9, 2020. Given there's several more days until March 22nd this year, I think I'll wait before buying a bunch of flowers.

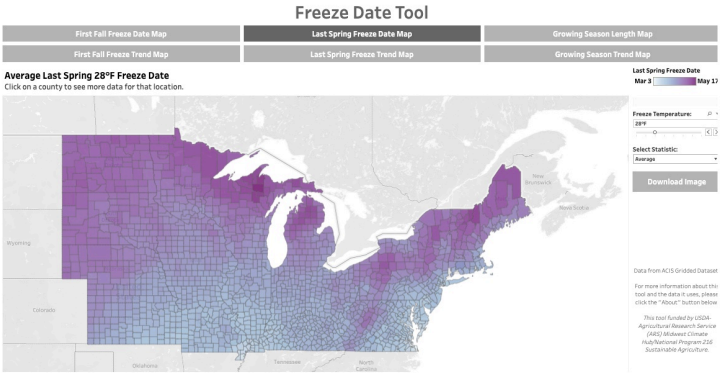

Figure 1. Screenshot of the Freeze Date Tool home page for the average date of the last 28°F freeze of the cold season.

High temperatures over the last 30 days (February 10 – March 11, 2025) have been either near or below normal across Indiana. Remember that cold spell just a few weeks ago? Southern Indiana had the greatest departures from normal with temperatures over the period ranging from 1 to 3 degrees (F) below normal. Over that same period, southern and northwestern counties have received up to an inch above normal precipitation whereas counties across central Indiana were 1 to 2 inches below normal. In fact, the latest U.S. Drought Monitor has those counties in Moderate Drought (D1) with surrounding counties categorized as Abnormally Dry (D0) (Figure 2).

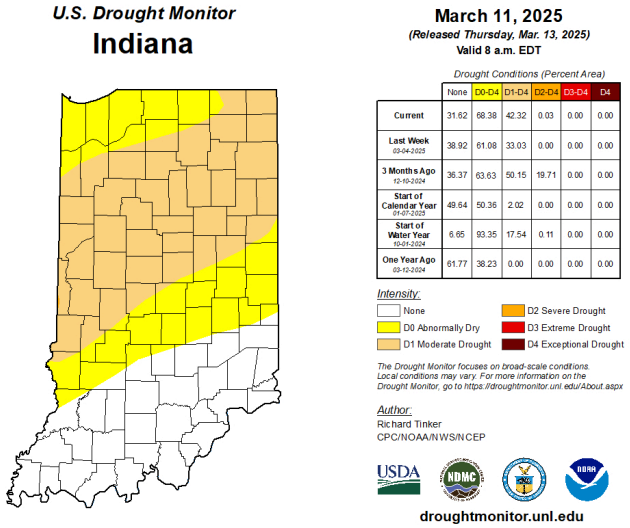

Figure 2. U.S. Drought Monitor status for conditions as of Tuesday, March 11, 2025.

Climate outlooks over the next two weeks (through March 26) are favoring above-normal temperatures and above-normal precipitation. There is still a La Niña pattern in the tropical Pacific Ocean which tends to favor above normal precipitation over the Michigan-Indiana region. However, the La Niña is expected to weaken soon, in which case that precipitation pattern is likely to go away. It is still too soon to be able to strongly predict weather conditions for this upcoming planting season. Stay tuned!

Tomato Grafting Resources

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

Many growers have heard about or tried tomato grafting at some

point. Some have found that grafted plants make a noticeable difference in plant vigor and yield, and have adopted the practice. Others may not have seen the same benefits and felt the extra effort wasn't worthwhile. But regardless of initial experiences, grafting is a valuable tool to improve tomato production—and it's becoming more accessible for most growers.

Figure 1. Grafted tomato plants under healing (Photo by: Wenjing Guan).

One important observation is that grafted plants are more likely to outperform non-grafted plants in high tunnel systems compared to open fields. The benefit also tends to be more pronounced in high tunnels that have been used for tomato production over multiple years, where biotic or abiotic stresses may have built up. In contrast, grafting may offer less of an advantage in newer high tunnels with healthier soil.

I've spoken with growers who tried grafting years ago and didn't see much improvement at the time. However, after experiencing a gradual decline in tomato yields over years of repeated production, they revisited grafting—and found it to be an effective solution.

It's also worth noting that tomato scions respond differently to vigorous rootstocks. Your experience grafting one cultivar may not apply to another. Because there are so many tomato cultivars—and new ones are introduced regularly—researchers often don't have complete data on how each scion interacts with each rootstock. This variability means that testing grafting on your farm of your favorite tomato cultivars is worthwhile.

Adding to the complexity of grafting is the choice of rootstocks. While seed companies typically provide information on the disease resistance traits of each rootstock, there is often limited information available about seed germination performance. In our recent evaluation of different tomato rootstocks, we observed clear differences in germination—even though all seeds were recently purchased and labeled with high germination rates on the package.

Some rootstocks showed poor germination and uneven seedling growth, significantly complicating the grafting process. It's unclear whether these issues were due to poor seed quality from a specific seed lot or inherent genetic traits of the rootstock cultivars. Regardless, this variability can be problematic since successful grafting relies on having rootstock and scion plants at similar growth stages and sizes. Because of this, conducting a small germination test before planting larger batches can be a helpful step, especially when working with new or unfamiliar rootstock varieties.

Lastly, if you're interested in learning more about grafting tomatoes, I hope you'll find our instructional video and Extension publication useful.

It is the policy of the Purdue University that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue is an Affirmative Action Institution. This material may be available in alternative formats. 1-888-EXT-INFO Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.

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