

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)

Dear Valued Vegetable Crops Hotline Readers,

Welcome to the second edition of the 2026 Vegetable Crops Hotline newsletter! Our mission remains steadfast: to deliver crucial updates on pest management, production practices, food safety, and marketing opportunities that directly impact your farming operations.

In upcoming issues, we'll cover several critical topics, including emerging pest challenges, innovative irrigation management strategies, the latest developments in high-tunnel production, and many more. We'll also feature updates on food safety regulations affecting our vegetable industry.

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 email [Petrus langenhoven](mailto:Petrus.langenhoven) or reach out to the [specialist](#) directly. We also welcome high-quality photos of pest issues, unusual symptoms, or innovative production practices you've implemented on your farm.

What's Inside This Issue

Spring is in full swing, and this week's Vegetable Crops Hotline covers timely topics to help growers make the most of the season. We take a look at a soil temperature climatology tool that can help guide planting decisions and pest management timing, and share early lessons from Purdue Extension's cut-flower demonstration sites across Indiana for growers interested in diversifying into that market. A timely article on plasticsulture

strawberry production addresses frost and freeze risk management amid Indiana's notoriously unpredictable spring weather. Finally, don't miss the announcement for the MarketReady Producer Training on May 14 in Shelbyville — a great opportunity for growers looking to expand into wholesale markets.

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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 [Vegetable Crops Hotline website](#).

Website Links in Newsletter Articles

We frequently include links to websites or online publications. 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 [2026 Midwest Vegetable Production guide](#) is now available for growers, or you can [download and print a guide from your computer](#). The guide is also available for \$20 per copy. Contact your Extension Office or [Stephen Meyers](#) 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.

Best regards,

Petrus Langenhoven, Editor

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A Look at Soil temperature Climatology

(Beth Hall, hall556@purdue.edu)

Soil temperatures are often a guide for various timing decisions in agriculture. In the spring, once soil temperature (often at 4" depths) is sustained above a particular threshold (e.g., 50°F), field preparations and planting can progress, for example.

Temperatures may also relate to pest and weed emergence. The [Midwestern Regional Climate Center](#), in partnership with the [USDA's Midwest Climate Hub](#), developed a [soil temperature climatology tool](#) that provides historical 4" soil temperature summaries based on data from 1991-2020. A user can select a temperature threshold between 30° F and 60° F to see the earliest, average and latest dates when the 7-day average temperature either rose above (e.g., spring) or fell below (e.g., fall) that value (see Figure 1 for an example). In contrast, a user can select a particular date (e.g., April 20th) and view the coldest, average, and warmest 4" 7-day average soil temperatures. To view current observed 4" soil temperatures, the [Purdue Mesonet](#) provides real-time observations for multiple locations around the state.

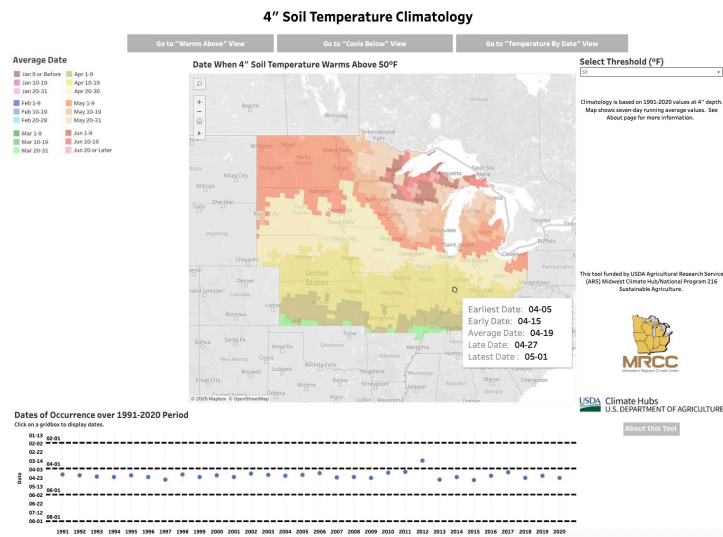


Figure 1. Screenshot of the 4" soil temperature climatology tool using a 50°F temperature threshold.

Over the past 2 weeks, precipitation amounts have been slightly above normal in northern Indiana, whereas they have been slightly below normal in central and southern Indiana (Figure 2). This has allowed conditions across north-central Indiana to stay in

the "Abnormally Dry (D0)" category for the U.S. Drought Monitor, whereas southwestern Indiana's "Abnormally Dry (D0)" area has slightly expanded (Figure 3). The 7-day precipitation forecast has rain continuing into the early part of this weekend, then offering us a break for a few days before the next round is expected at the end of next week (with some chillier overnight lows). Total amounts over the 7-day period (April 16-23) are predicted to be around an inch across most of the state.

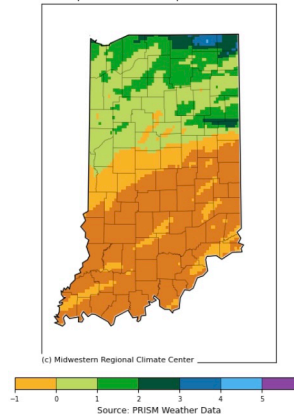
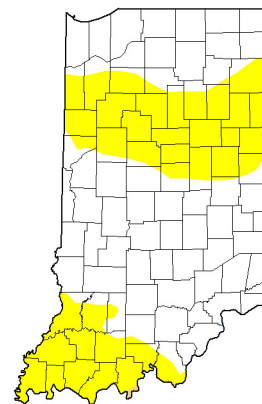


Figure 2. Precipitation departures (in inches) from normal (1991-2020) for April 2-15, 2026.

U.S. Drought Monitor Indiana

April 14, 2026
(Released Thursday, Apr. 15, 2026)
Valid 8 a.m. EDT



	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	83.54	36.46	0.14	0.00	0.00	0.00
Last Week 04-07-2025	71.36	28.64	0.00	0.00	0.00	0.00
3 Months Ago 01-13-2025	31.92	68.08	36.17	26.30	9.40	0.00
Start of Calendar Year 01-01-2026	31.30	68.62	36.17	26.30	9.40	0.00
Start of Water Year 09-30-2025	7.66	92.14	82.86	13.87	1.04	0.00
One Year Ago 04-15-2025	85.07	14.93	0.02	0.00	0.00	0.00

Intensity:
 None (white) D2 Severe Drought (orange)
 D0 Abnormally Dry (yellow) D3 Extreme Drought (red)
 D1 Moderate Drought (light orange) D4 Exceptional Drought (dark red)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Brian Fuchs
National Drought Mitigation Center



Figure 3. U.S. Drought Monitor status for conditions as of early Tuesday, April 14, 2026.

Looking ahead to the 6-to-14-day (April 21-29) climate outlooks, temperatures are slightly favored to be above normal early in the period, then return to normal by the end. Precipitation is expected to be above normal across Indiana for the period, with great confidence in above-normal amounts in southern counties.

Starting Cut-Flower from Seeds: Lessons Learned from Demonstration Sites

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Diversified produce growers and u-pick operations are increasingly exploring cut-flower production as a way to broaden their markets and increase revenue. To support this interest, our

team of Extension specialists and educators is establishing demonstration sites in Lafayette, Indianapolis, and Vincennes, spanning north-south Indiana. In this article, we share lessons we've learned from our vegetable-growing experience about starting cut-flower transplants from seed. We started with cool-season cut flower species; those we have explored include dianthus, stock, centaurea, snapdragon, lisianthus, ornamental cabbage, and delphinium. Seed germination begins in winter. Since a few small-scale produce growers operate heated greenhouses during this period, most rely on indoor setups with shelving units and LED lights to start seedlings—an approach we used at two of our three demonstration sites (Figure 1). The third site utilized a growth chamber with a more advanced controlled environment.



Figure 1. An indoor setup with shelves and LED lights for growing cut flower seedlings (Photo by: Jayde Marie Grisham).

We quickly realized that growing the above cut flower seedlings is not the same as growing vegetable transplants. For most of these cut-flower species, seed germination and seedling growth take longer compared to growing vegetable transplants. As a result, the same substrate, irrigation water, and management practices used to grow vegetable transplants may not be suitable for growing some cut-flower seedlings. We have seen that seed germination and plant growth are more sensitive to environmental conditions than many vegetable seedlings; thus, temperature, moisture, and light need to be adjusted accordingly.

Seed germination

Among the species we explored, ornamental cabbage and centaurea germinated the fastest across all locations. Stock, dianthus, and snapdragon had generally acceptable germination. In contrast, lisianthus and delphinium had the lowest germination at all sites.

Several common cut-flower species are light-sensitive during germination, whereas light is seldom a limiting factor for vegetable seeds except lettuce. Seeds that require light to germinate should be surface-sown or covered only very lightly so that light can reach the seed. At our three demonstration sites, seeds were surface-sown without covering at one location, while at the other two, they were covered with a thin layer of vermiculite or germination mix. Because lisianthus requires light to germinate, we suspect that excessive covering may have reduced germination.

Delphinium germination was slow and uneven, and no germination was observed at one site. Delphinium performs best at cooler germination temperatures (64°F to 71°F). At the site where temperatures were maintained at 75-85 °F, germination was particularly poor. In addition, pre-chilling seeds at 35 to 40 °F for several weeks prior to sowing can improve germination rate and reduce germination time, a process mimicking natural environmental conditions, known as stratification.

High EC and damping off

At one location, we used soil blocks made with peat, black cow compost, perlite, vermiculite and soluble fertilizers. This recipe has been used successfully in growing several vegetable transplants. However, we observed significant challenges when using it for lisianthus and dianthus.

Because lisianthus germinates very slowly, the soil blocks remained under high moisture conditions for an extended period. This led to the development of algal and saprophytic fungal growth on the surface, which likely inhibited germination. Among the seeds that did germinate, lisianthus and dianthus seedlings showed poor growth, and many failed to survive. We suspect that elevated electrical conductivity (EC) in the mix may have suppressed seedling growth and made the slow-growing seedlings more susceptible to damping-off pathogens.

A common concern when incorporating compost into potting mixes is an increase in EC. Plant species vary in their tolerance to EC, and highly sensitive crops such as lisianthus and dianthus are more likely to be negatively affected by high-EC media. At the other two locations, commercial potting mixes with main ingredients including peat, perlite, vermiculite, or bark were used. No saprophytic fungal growth was observed, and dianthus performed well.

Ensuring vigorous seedling growth is essential for reducing the risk of damping-off. Careful moisture management is particularly important. To better balance moisture needs during germination and early growth, we found that using smaller soil blocks or germinating seeds in flat trays followed by transplanting into larger soil blocks or cell trays produced better results, despite the additional labor required. This approach allows growers to use a medium with high water-holding capacity during germination and switch to a better-drained medium for seedling growth. It also avoids maintaining the same medium under prolonged wet conditions. Some growers may also incorporate biological products containing beneficial microorganisms, such as *Bacillus spp.* or *Trichoderma*, to suppress damping-off pathogens and support plant growth. These products were not used at our three locations.

Among the cut-flower species we evaluated, lisianthus was the most challenging to grow from seed. Due to these difficulties, many growers choose to purchase plugs instead. Ordering larger quantities is typically more cost-effective, so groups of growers may benefit from placing a combined order and sharing the cost.

Nutrient deficiency

Growing cut-flower seedlings generally requires more time than producing vegetable transplants. Because of this longer production period, the interaction between irrigation water and substrate becomes more influential, making the chemical characteristics of both especially important.

At the trial location, where we used a commercial bark-based potting soil and 72-cell trays, the substrate initially measured a

pH of 5.7, 172 ppm nitrate, and 40.6 ppm phosphorus, values considered acceptable for a general potting soil. However, the irrigation water had a pH of 7.6 and an alkalinity of 240 mg/L. Without acidification, this water is likely to raise substrate pH over time. Although we typically do not have issues when growing vegetable transplants with potting soil and irrigation water, stock and centaurea seedlings at this site developed symptoms consistent with micronutrient deficiencies (Figure 2). At another location, the substrate contains very low initial nutrient levels, and nutrient deficiencies were observed across multiple species. In both situations, supplemental fertilization should be added to produce healthy seedlings. The optimal fertilizer solution depends on the potting soil's starting nutrient content, irrigation frequency, and the quality of the irrigation water. No nutrient deficiency symptoms were observed in plants grown in the compost-containing medium.



Figure 2. Symptoms consistent with micro nutrient deficiency was observed on stock seedlings (Photo by: Wenjing Guan).

Stem elongation

Stem elongation was observed across multiple species at one of the three locations (Figure 3). Seeds were initially germinated under full-spectrum LED tube lights. After elongation was noted, supplemental blue LED lighting was introduced 12 days after seeding. Under the combined lighting, intensity ranged from 300-700 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ and 16-hr photoperiod, and temperatures were maintained between 77-85°F. While inadequate light quality and

intensity may contribute to plant stretching, elevated moisture levels and high temperatures may also have played a role. Additional studies are planned to better understand how indoor light quality and its interactions with other environmental factors influence stem elongation in low-cost production systems commonly used by small-scale growers.



Figure 3. Stem elongation of centaurea seedlings (Photo by: Laura Ingwell)

The authors thank Emily Evers, Macon Ann Beck, and Cesar Escalante for their contributions to this article. The Purdue AgSeed program provides financial support for the project.

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[Germination requirements for annuals and vegetables](#). Iowa State University Extension and Outreach.

[Delphinium cut flower production in Utah](#). Utah State University Extension.

Spread out Flower Timing to Reduce Spring Frost/Freeze Risks in Plasticulture Strawberry Production

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When growers are asked about the top challenges in plasticulture strawberry production, frost/freeze damage is almost always at the top of the list. Anyone living in Indiana understands how unpredictable spring weather can be. This year, in southern Indiana, we experienced warm periods with average daily temperatures exceeding 60°F in mid-February, followed by sharp drops to below 20°F over a few nights. A similar pattern occurred again in March—after average temperatures approached 70°F in early March, they plunged to below 20°F in a single night by mid-month. These roller-coaster temperature fluctuations are not

unusual. They can occur at any point from late February to April, and their timing and intensity vary from year to year.



Figure 1. Blooming and fruit set of strawberry plants grown on a plasticulture system (Photo by: Wenjing Guan).

The extent of frost/freezing damage in strawberries depends largely on the developmental stage. Open blooms are the most sensitive, with injury occurring around 30-32°F. Developing fruit may be injured at about 28°F. Popcorn and tight bud stages are more tolerant, with critical temperatures ranging from approximately 22 to 27°F. Spring temperatures are generally not a concern before flower clusters have emerged from the crown.

In general, plants bloomed earlier are associated with a higher risk of frost/freezing injury. However, there are situations in which plants that bloomed earlier and had already set fruit experienced minimal damage, whereas plants that were actively blooming at the time of a frost event suffered the greatest injury. Since we cannot control the timing and intensity of these events, a practical approach is to prevent plants from blooming too early and spread the blooming period across plants. Doing so can reduce overall risk and allow us to focus frost-protection measures, such as row covers, on plants at the most susceptible developmental stages. Additionally, spreading out the blooming period also extends the harvest window, which can provide marketing advantages. In this article, we will discuss a few practical approaches to help distribute bloom timing more evenly.

Plastic mulch color

The choice between black and white plastic mulch can influence bloom timing. For the same cultivar, plants grown on black plastic mulch typically bloom about one week earlier than those grown on white mulch, due to the greater soil-warming effect of black plastic in the spring. However, this difference tends to diminish when plasticulture strawberries are carried into a second harvest year. This is likely because mulch color also affects plant growth and development in other ways, complicating its overall impact on bloom timing after plants have developed multiple branch crowns.

Winter management

Both straw mulch and row covers are commonly used to protect plasticulture strawberries during the coldest part of winter in our region, and growers often ask when to remove these coverings. While there is no single definitive answer, some general considerations can help guide decision-making.

In the coldest period in the winter, we often experience minimum temperatures of < 10°F or even < 0°F. These extreme cold events could occur in December, January, or February. Once the coldest period has passed, typically in February, row covers can be removed to slow spring growth and help prevent plants from blooming too early. For example, this year we experienced temperatures below 0 °F in late January. Row covers at our trial were removed in early February, even though nights below 20 °F were still expected. At that point, plants that have already acclimated to winter conditions are less likely to suffer crown damage from those temperatures.

Straw mulch functions differently from row covers. Because straw blocks light, it inhibits plant growth even during warm periods in early spring. After the straw is removed, plants typically require more time to resume active growth compared to those previously covered with row covers. As a result, using row covers and straw mulch to cover different patches can be a strategy to spread out the spring blooming period. Delaying straw removal until late March, for example, can result in much later blooms. However, this approach may come with tradeoffs, including reduced yields due to the loss of early-season growing degree days.

Select a combination of early, middle, and late-season cultivars

Genetics can be used to separate the blooming period, and planting a combination of early-, mid-, and late-season cultivars is one of the most common approaches to spreading out harvest. Plant suppliers often provide information on cultivar characteristics; however, growers should recognize that these descriptions are relative. First, there are limited side-by-side comparisons that include a wide range of varieties from different sources. Second, performance data generated under a specific production system may not translate directly to other environments or management practices. Growers are encouraged to consult cultivar evaluations conducted in their region and under similar production systems, trial multiple cultivars on their own farms, and keep good records to identify the combinations that best fit their conditions.

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[Frost Damage](#). NC State Extension

Arana, J. Meyers, S.L. Guan, W. 2025. Evaluation of June-bearing strawberry cultivars under a two-year plasticulture system using black and white mulch colors in the lower Midwest. HortTechnology. DOI: [10.21273/HORTTECH05781-25](https://doi.org/10.21273/HORTTECH05781-25)

Purdue Extension MarketReady Producer Training – May 14, Shelbyville

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Diversified Farming and Food Systems



MarketReady Producer Training

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Purdue Extension is hosting a Market Ready workshop on May 14 (9 am–2:30 pm) at the Shelby County Extension Office, 20 W. Polk St., Suite 201, Shelbyville.

Market Ready is a nationally recognized program that helps local food and farm entrepreneurs enter wholesale market channels — including schools, restaurants, distributors, and grocery stores —

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through sessions covering product readiness, food safety, insurance, and buyer expectations. A buyer panel will be included, and lunch is provided.

Thanks to sponsorship from the Indiana State Department of Agriculture, registration is free for eligible applicants (local food/farm businesses currently selling or intending to expand into wholesale markets). Others may register for \$50. Participation is open to anyone regardless of location. Registration deadline is May 7.

[Register here](#)



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