



April 2023

Brett Wolff, Editor
Christy Cassady, Editor/Designer

Selling at farmers markets? Check out these trainings

What's inside

Hydroponics info 4
MarketReady Buyer Tour .. 7
KY Cut Flower Month 9

Coming up

May 2 - Fruit Grower Orchard Meeting, 10 a.m.-2:30 p.m. EDT. Matt and Amanda Gajdzik. 1330 Mulberry Pike, Shelbyville, KY. Preregister by emailing or calling John Strang (jstrang@uky.edu, 859-396-9311) by May 1. For details, see Page 3 of the [March-April issue of Fruit Facts](#).

May 3 - MarketReady Advanced Topic Training: Packaging and Labeling. 11:30 a.m.-1 p.m. EDT via Zoom. For more information and to register, [click here](#).

May 5 - Pawpaw Grafting Workshop, Kentucky State University Harold R. Benson Research & Demonstration Farm, 1525 Mills Lane, Frankfort. 1-4 p.m. EDT. Free. Registration is required. To register, [click here](#).

Farmers market season is officially underway in some parts of Kentucky. If you sell directly to consumers at a farmers market, the Center for Crop Diversification (CCD) encourages you to consider accepting cashless payments. Extension Specialist Brett Wolff with the CCD and Extension Associate Emily Spencer with the UK Department of Agricultural Economics offered a training on how to create a Square account and why you should accept cashless payments at the recent Kentucky Horticulture Council Direct Marketing Summit. Get up to speed on the process by checking out the recording at <https://www.youtube.com/watch?v=LpjW7WwPj8A>.



Growers selling at farmers markets should make sure their Google Business profile is up to date. When customers meet you at the market, they often want to learn more about your farm business when they get home, which can translate into farm visits and more income for your farm business. You can learn how to add your business to Google Maps in a training provided by CCD Senior Extension Associate Joshua Knight at <https://www.uky.edu/ccd/content/adding-your-farm-business-google-maps>. For information about other recorded trainings, visit the [CCD Facebook page](#).

Meanwhile, the CCD has started its weekly [farmers market price reports](#) from around Kentucky. These reports are made possible by people who are willing to provide the high and low prices as well as the number of vendors selling various products at their farmers market each week. For details on how to participate, see **Page 2**. Also look for the [Tennessee farmers market price report](#) to return in May.



GOT A FARMERS MARKET?

**WANNA JOIN OUR
PRICE REPORT?**



CENTER FOR
CROP



DIVERSIFICATION

IT'S EASY!

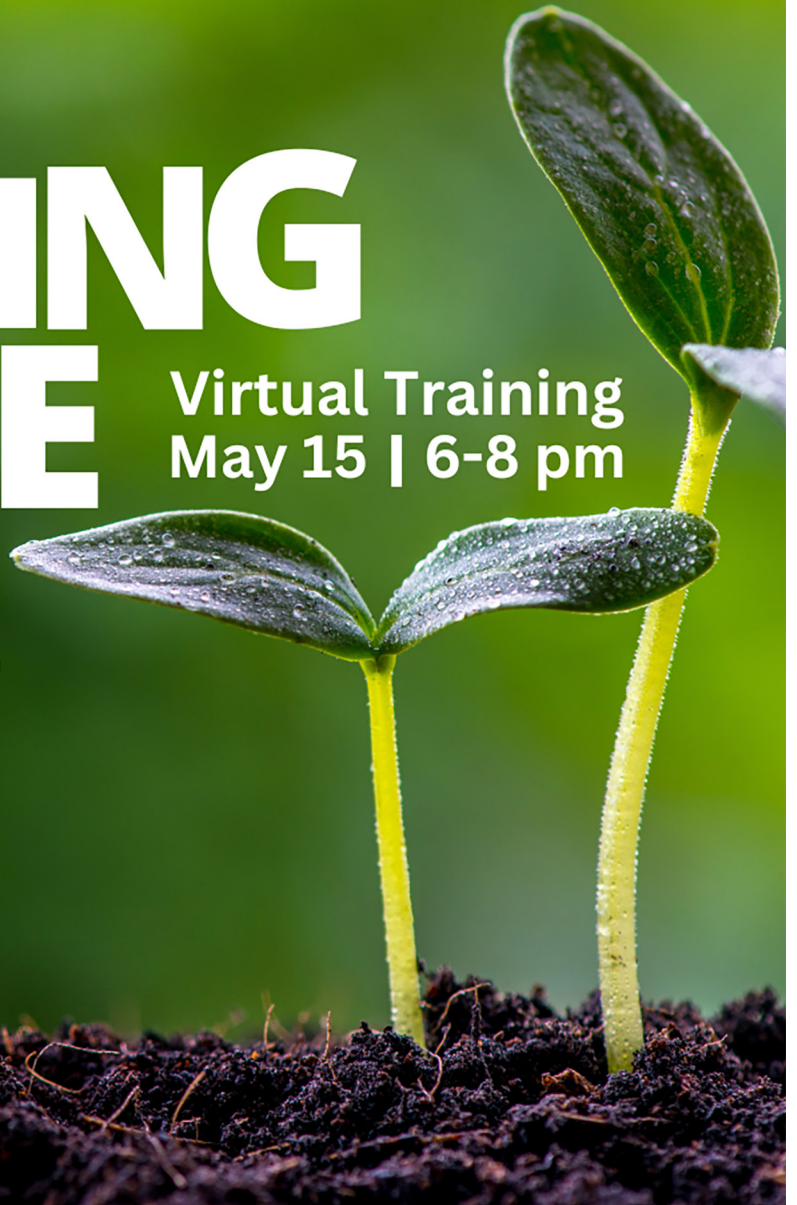
EMAIL: BRETT.WOLFF@UKY.EDU FOR DETAILS



GROWING ONLINE

Virtual Training
May 15 | 6-8 pm

Web Design
Digital Marketing
Understanding &
Using Analytics



Ohio Pawpaw Conference scheduled for May 20th in Columbus

From the North American Pawpaw Growers Association Facebook page

The Ohio State University and the North American Pawpaw Growers Association are sponsoring the Ohio Pawpaw Conference, set for May 20th at the Nationwide & Ohio Farm Bureau 4-H Center in Columbus, OH. Speakers will include pawpaw experts, industry leaders, and OSU faculty. Topics

will include planting, grafting, fruit processing, and marketing. Cost is \$25 per person, and registration is required. The registration deadline is May 13th. To see the conference schedule and to register, visit https://osu.az1.qualtrics.com/jfe/form/SV_bO51zWdPIax7MLc.

For additional information, please contact Dan Lima at 740-695-1455 or lima.19@osu.edu.

Water management in hydroponics

By Arundathi Sharma, UK Horticulture Extension Associate – Controlled-Environment Agriculture
Illustrations by Josh Knight, UK Horticulture Senior Extension Associate

This article is part of a series that will answer common questions about controlled-environment growing and provide growers with guidance and tools to explore different growing methods and technology.

INTRODUCTION

Hydroponics is defined by soilless cultivation of plants. Soil serves two main purposes: it provides support and traction for the roots themselves, and it is a source of nutrients, which are absorbed through the roots. In hydroponic systems, a soilless growing medium provides root support, while nutrients are supplied through the water, which is absorbed or channeled through the media. Sometimes the growing medium itself can also provide nutrients.

One of the most noticeable differences an experienced field grower will find when experimenting with soilless cultivation will be in the crop's day-to-day water/irrigation and nutrient management. Closed-system hydroponics (systems that store and reuse nutrient solution) offers growers more control to avoid abiotic crop disorders associated with nutrient deficiency or excess (toxicity), and it can save time and money spent on water and fertilizer.

This article will present three common closed-system hydroponic "irrigation" methods for growing leafy greens: deep water culture (DWC), nutrient film technique (NFT), and ebb-and-flow (also known as flood-and-drain). These methods can also be used for other crops, and it is possible to build any of these systems using common equipment from hardware stores, or to buy turn-key solutions that use these methods once you are ready to scale up the operation. Commercial growers may be able to get financial assistance for purchasing more specialized and critical components, such as pH and EC meters. Treat the included diagrams as conceptual guides, rather than construction schematics.

NUTRIENT MANAGEMENT

Before choosing what type of hydroponics set-up to start with, you should know how to condition your water (prepare and monitor the nutrient solution), as this is a key common factor among all techniques. The fertilizer solution will be the crop's chief source of nutrients, so it is important to get this right. Reusing nutrient solution requires careful and constant monitoring, as well as periodic "refreshing" to avoid excess salinity in the nutrient solution.

Oklahoma State Extension has prepared a useful manual for getting started with hydroponic nutrient solutions (<https://extension.okstate.edu/fact-sheets/electrical-conductivity-and-ph-guide-for-hydroponics.html>). Once you have a system for preparing and monitoring the nutrient solution, you're ready to start feeding your crops using one of the following methods:

HYDROPONIC "IRRIGATION" SYSTEMS Deep Water Culture (DWC, aka Float Bed)

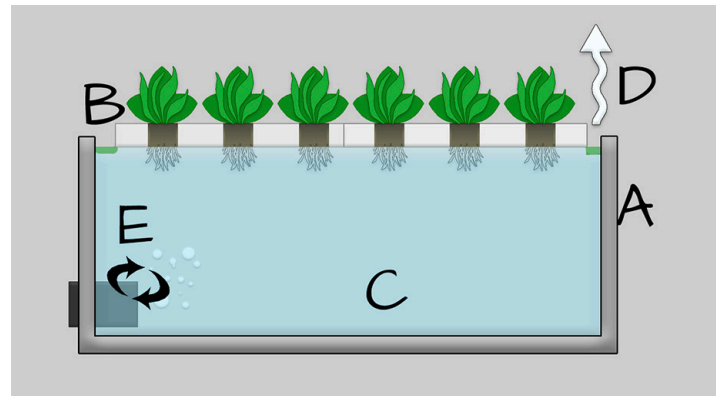


Figure 1: The DWC/float bed method may look familiar to growers who have raised tobacco transplants. A. Water tank can be a simple frame lined with suitable plastic sheet; B. Trays hold the growing medium (and plants) in place and can be made of low-cost buoyant insulation board; C. Nutrient solution should be monitored regularly and periodically refreshed; D. Evaporation and algal buildup tends to occur wherever the water surface is exposed; E. Air pump may be added for increasing dissolved oxygen in the nutrient solution

In this method of hydroponic growing, trays populated with the crop are floated atop a deep pool-like structure, which is filled with a nutrient-water solution (see Figure 1). Similar float bed

Continued on Page 5

Continued from Page 4

systems are commonly used for growing tobacco transplants. It is important to note that in this kind of system, water is not pumped or stored, but rather stays in the open tank. This can lead to algae buildup and increased evaporation losses of water compared to other hydroponic methods. For that reason, it is important to closely and regularly monitor water temperature, pH, EC, and salt levels to make sure that nutrient concentrations will meet the crop's needs, and to add water and fertilizer as necessary. Once the salinity becomes too high, the entire nutrient bath must be dumped and refreshed. It may be beneficial to keep a small air pump or water circulation pump in the bath to ensure that roots have access to (dissolved) oxygen.

Nutrient Film Technique (NFT)

In this method of hydroponic growing, trays sit in a shallow channel through which nutrient solution is continually pumped. This ensures a constant thin layer of nutrient solution for the roots to access - hence the name "Nutrient Film Technique." As shown in figure 2, a downward slope in the channel reduces stress on the pump and ensures water is always moving; this technique requires robust pumps and pump management, as a broken pump can leave plants without water and lead to crop damage.

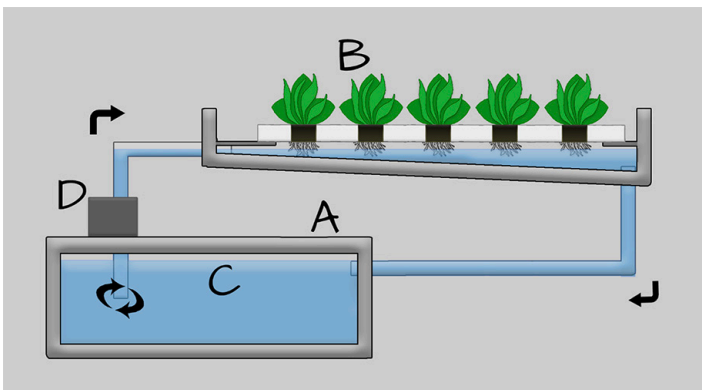


Figure 2: A continuously running pump in NFT systems keeps a thin layer of nutrient solution moving constantly over the roots, allowing them to access air, water, and nutrients at all times. A. Nutrient solution is stored in a central tank; B. Trays that hold the growing medium (and plants) are supported above a channel where the nutrient solution flows through. Trays must be positioned such that the growing medium/roots can access the solution in the channel. The gutter itself has a downward slope, ensuring water is always able to drain from the channel; C. Stored/reused nutrient solution should be monitored and refreshed periodically; D. A pump keeps the nutrient solution flowing to the plants. It is wise to invest in robust pump hardware and management for an NFT system.

Ebb and Flow/Flood and Drain

In this method of hydroponic growing, the roots and growing media are flooded with the nutrient solution, they are allowed to soak for some time, and then the nutrient solution is drained back into the catchment tank. This can be achieved in several ways. One method is shown in figure 3, where all the crops sit in the same irrigation channel. Other methods (e.g., Bato/Dutch Bucket or bag cultivation, shown in figure 4) may use a drip line to flood individual buckets or sacks, which all share a common drain. The soak time and frequency of the flood-and-drain cycle are variables that a grower can adjust and that can vary with crop size and growing conditions.

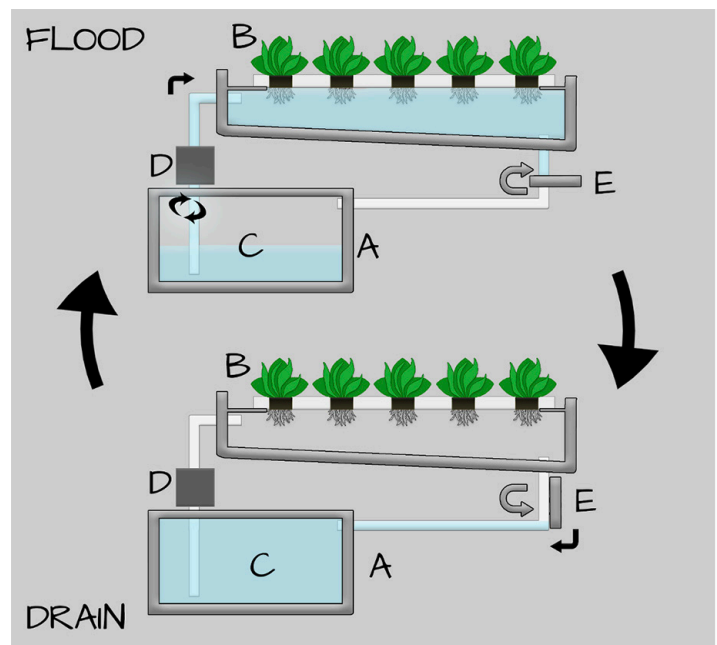


Figure 3: This Flood and Drain system uses a similar setup to the one shown for NFT. However, instead of running continuously, the pump periodically floods the roots with nutrient solution, then the roots and growing medium soak for some time to absorb the solution, and finally the channel is drained to allow the roots to access air again. This sequence is repeated periodically. A grower may tinker with the soak-time and the frequency of this cycle repetition. A. Nutrient solution is stored in a central tank; B. Trays that hold the growing medium (and plants) are supported above a channel that will periodically fill up with nutrient solution. The trays should be positioned such that the growing medium can soak in the nutrient solution when the channel is filled; C. Stored/reused nutrient solution should be monitored and refreshed periodically; D. At the start of an irrigation cycle, the pump should run until the channel is filled with water; E. At the start of an irrigation cycle, the drain valve is closed, to allow the channel to fill up with water while the pump runs. When the pump stops, the valve remains closed to allow the growing medium and roots to soak. At the end of the soak time, the valve opens again to allow the nutrient solution in the channel to flow back into the tank. It remains open until the beginning of the next irrigation cycle.

Continued on Page 6

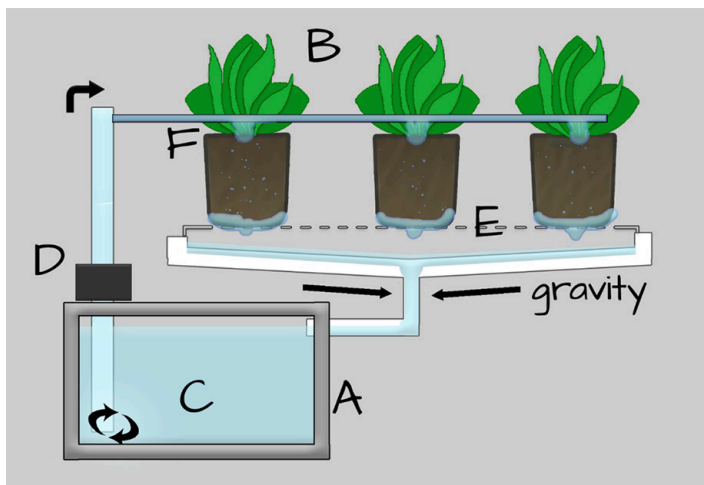


Figure 4: In this Flood and Drain system, plants are carried in individual containers (e.g., bags, buckets) filled with soilless media, rather than in trays. Nutrient solution is transported through an irrigation line and floods each container individually. The containers are placed atop a common gutter and have holes at the bottom, which allow the excess nutrient solution to drain from the bag for later reuse. A. Nutrient solution is stored in a common tank; B. Plants grow in larger containers filled with soilless media, which allow free flow of nutrient solution through holes in the bottom; C. Stored/reused nutrient solution should be monitored and refreshed periodically; D. At the start of an irrigation cycle, the pump pushes water from the tank through the irrigation line, then stops once the media should be allowed to drain; E. The containers share a common gutter and can sit atop a drain cover; F. Irrigation hardware (drip line, emitters) can be similar to what might be used in traditional field cultivation.

UK Extension and Kentucky Horticulture Council (KHC) are collaborating on an effort to characterize the controlled-environment growing (CEA) industry in Kentucky, and we are still accepting responses to this [two-minute survey](#). Help us create better programs in the future! Reach out to Arundathi Sharma with any feedback or CEA questions at arundathi.sharma@uky.edu. Thank you for your participation!

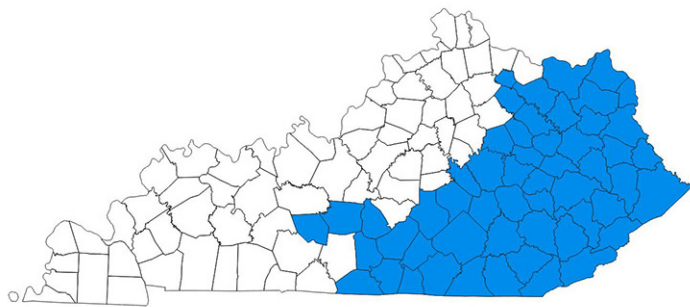
USDA commits greater assistance for transitioning to organic production

From the Organic Association of Kentucky (OAK)

On April 10th, the U.S. Department of Agriculture (USDA) announced details about its \$75 million investment in conservation assistance for producers transitioning to organic production. The Natural Resources Conservation Service (NRCS) is dedicating financial and technical assistance to a new organic management standard and partnering with new organic technical experts to increase staff capacity and expertise. NRCS will dedicate \$70 million to assist producers with a new organic

UK Horticulture seeks controlled environment extension associate

The College of Agriculture, Food and Environment's Department of Horticulture seeks an agriculture extension associate that will focus on controlled environment horticulture production systems such as greenhouses and high tunnels. The qualified candidate will be expected to design, develop, and deliver extension and educational programs, as well as collaborate with extension faculty to meet the needs of this rapidly emerging industry. This position is funded through a two-year grant that will potentially be funded for a third year. The title of the grant is Growing Eastern KY's Controlled Environment Production Ecosystem, and the extension associate will work with growers in 54 counties in Appalachian Kentucky (see map below) to increase the sustainability of controlled environment horticulture production systems. The position will require travel in Eastern Kentucky and interacting with a range of stakeholders to address needs through extension programming. To see the job listing, visit <https://ukjobs.uky.edu/postings/463081>.



management standard under the Environmental Quality Incentives Program (EQIP). This program is for farmers who are beginning or in the process of transitioning to organic certification.

OAK is in conversation with NRCS Kentucky and will work to communicate with farmers about the opportunity to apply for this new Organic Management Practice when it is available.

[Click here](#) to access a factsheet on certified organic production created by NRCS-Kentucky.



MARKETREADY'S

BOWLING GREEN BUYER TOUR

MAY 25, 2023 | 10:00AM - 3:00PM
MEET @WARREN COUNTY
COOPERATIVE EXTENSION OFFICE

This program is free-of-charge but space IS limited. Visit marketready.uky.edu to register! Must RSVP by May 20th.

Cooperative Extension Service



AN ALL-INCLUSIVE TOUR OF LOCAL FOOD BUYERS!

DON'T MISS OUT ON THIS EVENT

During the tour, we will visit 3 or 4 buyers in the area to see what happens behind the back doors! We will visit a restaurant, a grocery/retail market, and a farm-to-school buyer. The Buyer Tour allows producers to get a behind-the-scenes look at what happens at these various marketplaces. You will be able to ask questions, talk with buyers, and get first-hand experience with what it is like to sell to a restaurant, grocery/retail store, or farm-to-school buyer.

This event is free-of-charge and includes lunch at a locally sourced restaurant. Producers as well as tech. assistance providers are encouraged to join.

For registration, questions, and concerns, email savannah.columbia@uky.edu. More information is available at marketready.uky.edu.

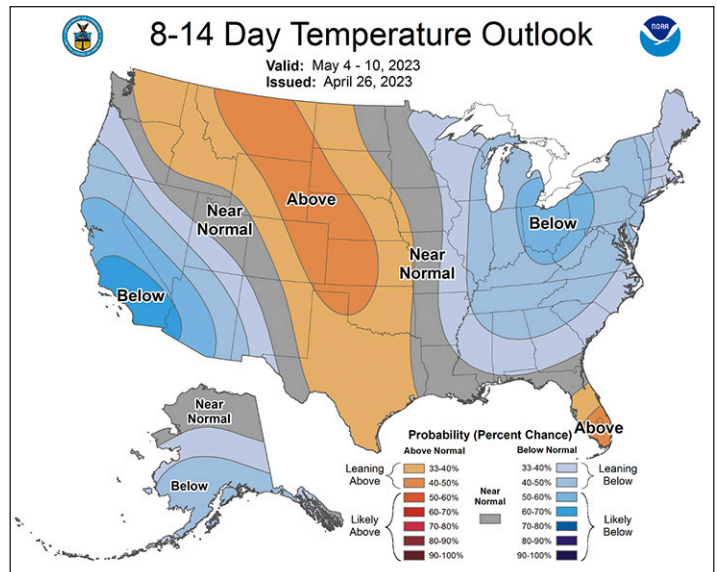


Expect start of May to be cooler, drier than average in Kentucky

By Joshua Knight, Senior Extension Associate, Horticulture

The NOAA's Climate Prediction Center indicates a likelihood of below normal temperatures for the first week to 10 days of May, seemingly centered on a cooler air pattern among the eastern Great Lakes. Further into the month, as temperatures are predicted to rise above normal for the east coast, another cool front is likely to form in the upper Midwest, with Kentucky in the middle making an "equal chance" for above or below average temperatures in later May.

The picture for precipitation shows below normal rates of precipitation likely for the first week of May in the Commonwealth and much of the region. This may present good opportunities for tillage and other fieldwork. That pattern should continue for northern Kentucky as part of drier air in the



Great Lakes region moving toward the middle of the month. In the second half of May, the precipitation forecast is complicated by drier than average air to the northwest and wetter than average conditions to the southeast, putting Kentucky in the middle of two very different weather patterns.



Beneficial Insects Webinar

with **Janet Meyer** from Berea College

**THURSDAY
MAY 11TH
2023**
6:00pm ET/
5:00pm CT

Janet Meyer will discuss the relationship between organic production & beneficial insects on the farm at Berea College.

REGISTER FOR **FREE** ON
EVENTBRITE



This webinar series is part of a Southern Region Sustainable Agriculture Research and Education (SARE) project.

Showcase your farm during KY Cut Flower Month in July

By Dakota Moore, Kentucky Horticulture Council

The Kentucky Horticulture Council and our partners at local University of Kentucky Cooperative Extension Service offices and UK Center for Crop Diversification are preparing once again for our annual July Kentucky Grown Cut Flower Month Promotion. We celebrate American Grown Flower Month locally by shining a spotlight on the amazing cut flower farms here in Kentucky! All year long, KHC and UK extension agents work with farmers to support commercial production and marketing of locally grown cut flowers, and each day in July, KHC features growers on Facebook, Instagram and Twitter. On Facebook, all farm promos are posted in our [Kentucky Grown Cut Flower Promotion Facebook Group](#).



If you would like to be featured in this July's pro-

motion, please follow the link below to the self-nomination form. Please include one or two photos and fill out before the end of June.

[2023 KY CUT FLOWER PROMOTION NOMINATION FORM](#)

Last year KHC added a special treat for cut flower fans and local customers by creating five floral design videos using flowers from five different farms across the state. KHC will continue this new tradition with four new design videos. Be sure to indicate you would like a to participate in the farm visit and video on the nomination form. You can find the past videos on [KHC's YouTube Playlist](#).

Kentucky Grown Cut Flower Geographic Directory

Check out this [interactive map](#). If you would like your cut flower farm to be featured on the interactive map, please send an email to info@kyhortcouncil.org. For additional cut flower resources, check out the KHC website at <https://kyhortcouncil.org/kycut-flower-grower-resources/>, and the Center for Crop Diversification website at <https://www.uky.edu/ccd/production/crop-resources/nursery-ornamental/cut-flowers>.

Thanks for reading!

If you know someone who would enjoy our newsletter, or you're not subscribed yet yourself, visit www.uky.edu/ccd/newsletter and click "Subscribe Now." Or call Brett Wolff at 859-218-4384 , or Christy Cassidy at 859-257-5635. Stay up to date with the Center on Facebook at <https://www.facebook.com/ccduky/>

Christy Cassidy

Christy Cassidy, Extension Specialist

