Kentucky Fruit Facts

May-June 2024
https://www.uky.edu/hort/documents-list-fruit-facts

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University of Kentucky

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Fruit Crop News

Daniel Becker, UK Extension Associate

This has been another fraught winter and spring for fruit growers in Kentucky, especially those in the western part of the state. I was surprised that cold temperatures between January 15 and 21 dropped lows overnight well below zero in the Bluegrass and Mountain regions (Figure 1). Especially, since it barely broke zero in much of western and Purchase areas where I am based. Where the minimum exceeded negative 10°F some injury to peach and thornless blackberry buds may have occurred.

Despite the brief cold spell, winter 2023-2024 was very mild and transitioned quickly into another early spring. Warm temperatures in February pushed plant growth and bud development (phenology) roughly two weeks ahead of normal. First bloom of some peach and nectarine cultivars at the UKREC at Princeton occurred as early as March 4. Dr. Shawn Wright reported first bloom of 'Yum Yum' nectarine and 10% bloom of 'Saturn' peach on March 12. According to Dr. Brent Arnoldussen, some cider apples were at green tip with some others at silver tip at the time in Lexington.

An advancing cold front on March 17 and 18 brough with it gusty winds and drier air. Lows on the morning of March 19 fell into the mid-teens to 20's across the western end of the state while in much of the

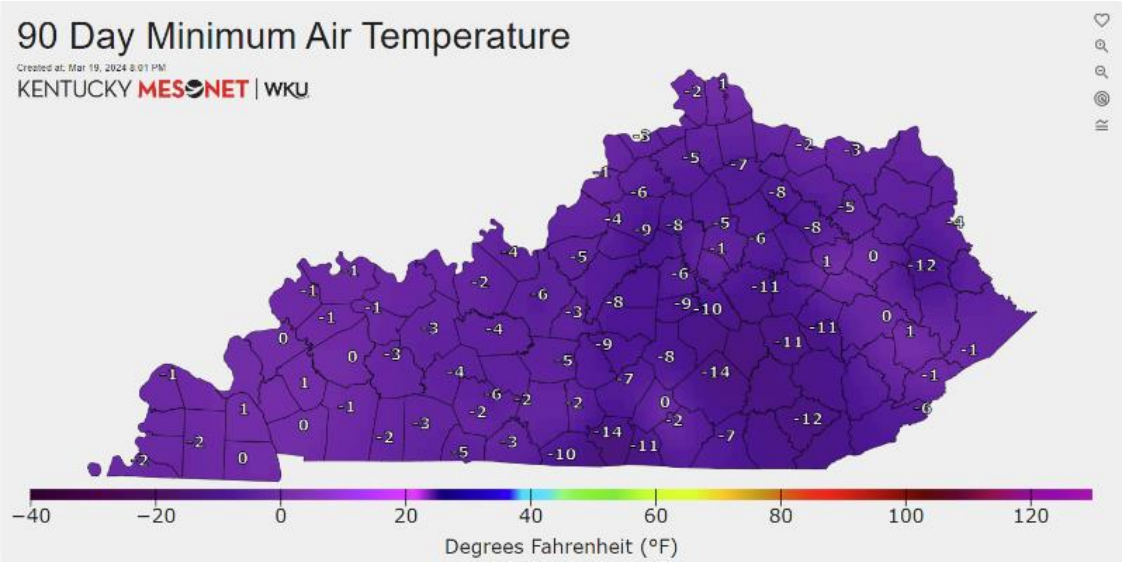


Figure 1. *Minimum air temperature between December 21, 2023 and March 19, 2024. (Courtesy: Kentucky Mesonet, Western Kentucky University)*

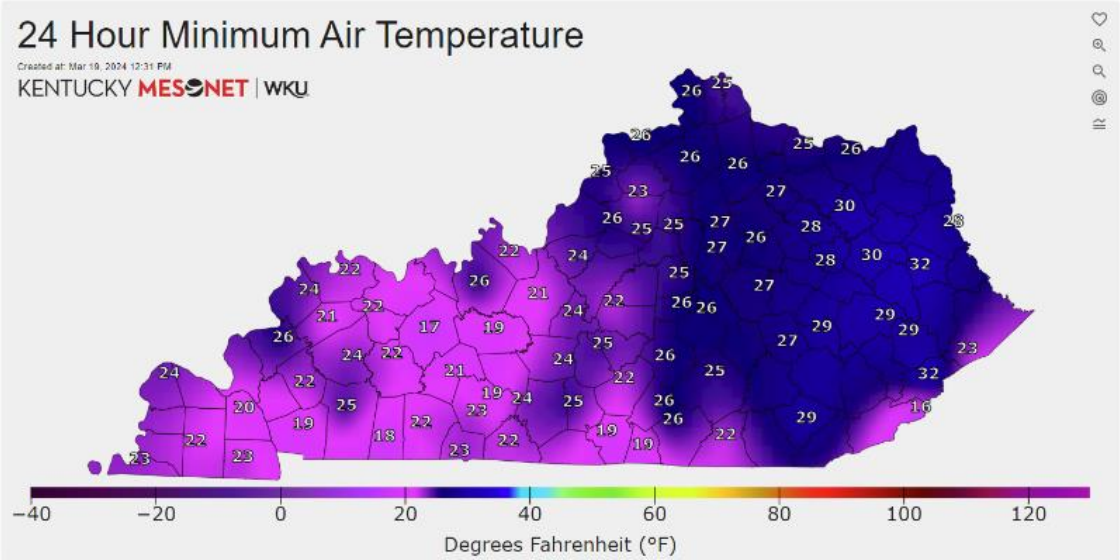


Figure 2. *Minimum 24-hour air temperature for March 19, 2024 (Courtesy: Kentucky Mesonet, Western Kentucky University)*

central and mountain east lows remained in the mid-20's to low 30's (Figure 2). At Princeton, the Caldwell County Mesonet station recorded that the temperature was below 25°F for over four and a half hours, between 2:40 am and 7:15 am, with a low of 22.5°F. The difference from west to east was due to cloud cover. Early clearing in the west increased radiative heat losses which along with a low dewpoint resulted in temperatures dropping more than expected. Weather forecasts were only predicting overnight lows in the mid-20's at the lowest. Cloud cover persisted a bit longer in the east which helped to retain heat.

At the time, peaches were at full bloom to petal fall while apples were at tight cluster to first bloom in area orchards. Plasticulture strawberries had many open blooms and green fruits. Northern highbush blueberries were at tight cluster to early pink bud stages. Our planting of 'Ponca' blackberries had 1 inch to 1 ½ inch flower stalks emerged from the floricanes. Critical temperatures for different growth stages of tree fruits can be found here and small fruits here. Later stages of growth are at greater risk of injury and crop reduction from cold injury due to the higher amount of water inside the cells. For instance, peaches at the first pink stage can experience 90% kill at 15°F, while at full bloom the critical temperature for 90% kill becomes 24°F.

Samples of 4 one-year-old shoots (2 about 6" long and 2 longer than 12") were collected from two 'Redhaven' trees and one 'Contender' at the UKREC as well as several 'Redhaven' and 'Laurol' trees from an orchard in McCracken County to assess flower survival. 'Redhaven' and 'Contender' at the UKREC had 47% and 57% survival (218 and 141 bud samples) while "Redhaven' and 'Laurol' samples from McCracken County had 33% and 27% survival. With some light, strategic thinning, and care to space out fruits along the shoots it looks like we will still have a full crop. Other growers I have talked with in other parts of the state estimate that they will have at least a partial crop of peaches this year.

It has been noted by Dr. Rich Marini, former Professor of Horticulture at Pennsylvania State University that peaches which have lost a crop or had a light crop the year prior to a severe mid-winter freeze or spring frost were more tolerant of low temperatures and had better flower survival compared to those that were cropped. This could be part of the reason flower survival was higher than expected this year compared to the percentage predicted in critical temperature tables. Another reason is that flowers on the same plant rarely develop at the same rate. I have noticed peaches with open blossoms and flower buds at the quarter-inch green stage on the same tree.

On the other side of the spectrum, minimally thinned or overcropped trees were observed to have more injury and dieback than those where the crop load has been managed through bloom or fruit thinning. I have noticed this in the past working with many other fruit crops, those that were overcropped frequently

suffered dieback or death from temperatures that would normally not be a problem for plants in good health. Good cultural management practices, therefore, assist in fruits performing as expected.

Apple flower bud survival ranged from 69% to 91% depending on whether trees were in the first bloom stage or still at tight cluster. I did not notice any injury to the few sweet cherries we have planted as a demo which were at the tight cluster to white bud stages. Northern highbush blueberries had minimal injury along with the thornless blackberries sampled. Plasticulture strawberries that were covered ahead of the event came through just fine, I only noticed flower kill at the edge of fields were the row cover got blown off plants. Another round of chilly weather on the mornings of March 27 and 28 meant that row covers had to be pulled over beds to protect open blooms and green fruit, the fourth or fifth of the season.

Upcoming Meetings

*Times are listed in Central Time (**CT**) or Eastern Time (**ET**) depending on location.*

Apr. 30. KSHS Fruit Grower Orchard Meeting. Eckert's Country Store and Orchard. 1390 Pinckard Pike, Versailles, KY 40383. Megan Fields hosting: megan.fields@eckerts.com, 859-509-7228 (mobile).

Program: *all times **ET***

10:00 a.m. Registration

10:15 a.m. Disease Updates – *Nicole Gauthier*

10:45 a.m. Wildlife Control – *Matt Springer*

11:15 a.m. KY Weather Update – *Matt Dixon*

11:45 a.m. Lunch will be available at cost for those that pre-register. Please pre-register to ensure that we have enough! **To pre-register for lunch email or call Delia Scott, delia.scott@uky.edu, 859-257-8605, by Friday, April 26.**

12:30 p.m. Tour of Eckert's Orchard – *Megan Fields, John Strang, Brent Arnoldussen*

2:00 p.m. Grower Round Table Discussion – *Kevan Evans*

May 4. Pecan Grafting Demonstration. 10:00 a.m. – 2:00 p.m. **CT**. Skip & Jennie Shearouse Pecan Farm, 3474 State Route 1684, Boaz, KY 42027 (Graves County). Bring a lawn chair, pecan scion wood to swap, and your picnic lunch. If you have questions contact: John Strang, 859-396-9311, jstrang@uky.edu; Jennie Shearhouse, 270-210-3169, shearouse@wk.net; Miranda Rudolph, miranda.rudolph@uky.edu, 270-247-2334.

Jul. 18. Purdue University Fruit and Vegetable field Day. Purdue Meigs Ag Center, 9101 S. 100 E., Lafayette, IN 47909. Schedule TBD.

Sept. 13-15. Ohio Pawpaw Festival. 5900 US-50, Albany, OH 45710. For details about the event visit https://ohiopawpawfest.com/venue/. Schedule TBD.

Jan. 5-7, 2025. Kentucky Fruit and Vegetable Conference. Venue and schedule TBD.

Jan. 29-31. From Food to Flowers: Illinois Everything Local Conference. Bank of Springfield Center, 1 Convention Center Plaza, Springfield, IL 62701. Schedule TBD.

Fungicide Tank Mixes

Commonly Used Fungicides for Fruit Diseases: Their Compatibilities and Incompatibilities

Nicole Gauthier, Plant Pathology Extension Specialist

This topic came up at a recent fruit grower orchard meeting, and the information might be helpful as the growing season progresses. Comments and compatibilities listed are per label recommendations; thus, terminology and language may vary from one product to another.

- Topsin M (thiophanate-methyl, FRAC 1)
  - Do not tank mix with highly alkaline materials such as Bordeaux mixture or lime sulfur
  - Do not tank mix with copper
- Inspire Super (difenconazole + cyprodinil, FRAC 3 & 9)
  - Do not tank-mix with surfactants or foliar fertilizers
- Rally (myclobutanil, FRAC 3)

    - Compatible with oil
    - Stable at a wide range of pH
- Revus Top (mandipropamid + difenoconazole, FRAC 3 & 40)
    - Do not tank-mix with surfactants or foliar fertilizers
- Topguard (flutriafol, FRAC 3)
    - Compatible with surfactants
- Fontelis (penthiopyrad, FRAC 7)
    - Compatible with surfactants and oil
- Pristine (pyraclostrobin + boscalid, FRAC 7 & 11)
    - Compatible with oil (except on pear)
    - Do not use surfactants when applying by air (hops)
    - Do not tank mix with adjuvants, nutrients, or other pesticide products (except captan) and additives when applying to blueberries
- Scala (pyrimethanil, FRAC 9)
    - Not compatible with captan
- Vangard (cyprodinil, FRAC 9)
    - Compatible with most tank additives
    - Adjust pH to 5.0 – 7.0 when tank-mixed with Rovral (stone fruit, small fruit)
- Cabrio (pyraclosrobin, FRAC 11)
    - Compatible with most additives or adjuvants
- Flint (trifloxystrobin, FRAC 11)
    - Compatible with most insecticides, fungicides, and foliar nutrients
- Souvran (kresoxim-methyl, FRAC 11)
    - Can be tank-mixed with most recommended insecticides, fungicides, plant growth regulators, adjuvants, or additives
- Captan (FRAC M)
    - Do not mix with oil or within 14 days of an oil application
    - May be phytotoxic when tank-mixed with emulsifiable concentrate (EC) formulations (Aprovia, Fontelis, and several insecticides)
    - May be phytotoxic when tank-mixed with certain penetrating surfactants, particularly under poor drying conditions
    - Do not mix with strongly alkaline materials (reduces fungicidal activity) such as Bordeaux mixture or lime
    - Captan's stability is dependent on water pH: pH 5 = 32 hrs.; pH 7 = 8 hrs.; pH 8 = 10 mins.
- Abound (azoxystrobin, FRAC 11)
    - May be phytotoxic when mixed with emulsifiable concentrates (EC's) and some adjuvants under cool, cloudy conditions
    - Abound is extremely phytotoxic to certain apple cultivars, do not spray where drift may reach apple trees
- Copper (FRAC M)
    - Not compatible with Topsin M
    - Do not apply under cool, slow drying conditions
    - Do not tank mix with phosphorus acids
    - Tank-mixing with mancozeb may cause phytotoxicity
- Dithane (mancozeb, FRAC M)
    - Compatible with most insecticides, fungicides, or growth regulators
    - Mancozeb's stability is dependent on water pH: pH 5 = 20 days; pH 7 = 17 hrs.; pH 9 = 34 hrs.
- Sulfur (FRAC M)
    - Do not mix with oil or use within 2 weeks of each other
    - Do not mix with Bt
    - Phytotoxic to apple when mixed with captan
    - Do not apply to sensitive crop cultivars
    - Do not use at temperatures above 80°F
- Syllit (dodine, FRAC M)
    - Do not mix with Bordeaux mixture or lime
- Ziram (FRAC M)
    - Compatible with most commonly used adjuvants

Pesticide Calculations for Small Acreages

By Ric Bessin, Entomology Extension Specialist

Most agricultural pesticide labels list use rates on a per acre basis, but this can pose an issue for many producers of specialty crops. Often only a small fraction of an acre needs to be treated and it is important to apply these pesticides at the correct dose. Over-application is illegal as it may result in excessive residues on the harvested produce and injury to plants; it would also be a waste of money. Under-application can result in ineffective control, foster the development of resistance, and also be a waste of money. So, determining the correct amount for the proper dosage is required. While there are many different methods to do this, this article outlines the simple process I use to determine amounts of products needed for small acreages.

1. Select the rate per acre

While this sounds simple and straight forward, select the rate listed on the label for the crop to be treated; many labels list a range of rates allowing the user to select a rate within the range. Generally, the low rate is used for small plants and light insect or disease pressure. As the plants get larger or insect and disease pressure increases, higher rates within the range should be selected. However, do not apply more than what is listed on the pesticide labelling.

2. Determine the area to be treated

The simplest method is to measure the width and length of the area to be treated and multiply those two numbers together. For example, if the area to be treated is 24 feet by 150 feet, then the area would be 3,600 square feet (24 x 150 = 3,600). There are 43,560 square feet in an acre, so in this example, the acreage to be treated would be 3,600 divided by 43,560, or 0.0826 acre (3,600 / 43,560 = 0.0826).

While this method works well for rectangular fields, it can be difficult to determine the area of some irregular-shaped fields. On-line mapping programs, like Google Maps, can calculate the area of irregularly shaped objects (Figure 1). Bring up the field with the mapping program and right click on the edge of the area to be treated and select 'measure distance.' Add more points around the perimeter by right clicking on those points until the object is encircled. The area of the object will be provided in square feet. Convert square feet to acres by dividing the number by 43,560 square feet.

Figure 1. *Mapping program, like Google Maps, can be used to determine the area of irregular-shaped fields (Photo: Ric Bessin, UK).*

3. Determine the amount of product needed for the area to be treated

Take the rate per acre you selected in #1 and multiply that by the acreage you calculated in #2. For example, you want to apply 5.2 fluid ounces per acre and the area to be treated is 0.0826 acres, then the amount of product needed would be 0.43 fluid ounces (5.2 x 0.0826 = 0.43). You would need to put the 0.43 fluid ounces in the correct amount of water and apply it evenly to the area to be treated. But it can be difficult to measure 0.43 fluid ounces, so I would convert this to milliliters (ml) so I can use a plastic syringe for accuracy. There are 29.6 ml in a fluid ounce, so in our example, you would multiply 0.43 by 29.6 to get 12.7 ml. This is the amount of pesticide needed to treat the field and this can be measured easily and accurately with a syringe.

Another way to measure small amounts of fluids is to use teaspoons or tablespoons. A teaspoon is

approximately 5 ml, and a tablespoon is 15 ml. So, 12.7 ml would be about 2 1/2 teaspoons. But keep in mind that these spoons must be dedicated to only measure pesticides and not used for other purposes.

4. Determine the amount of water needed

The method I use is to completely fill the sprayer I plan to use with plain water, and then spray a known area. Then, I measure the amount of water needed to refill the sprayer. For example, I measure out an area 3 feet wide by 100 feet in length (300 square feet). I fill my sprayer and apply water to that area in the same way I plan to apply the pesticide (same speed, pressure, nozzles, etc.). Suppose it took a quart of water to refill the sprayer. To determine the water per acre, take the water needed and multiply by 43,560, and then divide by the area we treated. So, in this example, 1 quart x 43,560 / 300. The result is 145.2 quarts per acre which equals 36.3 gallons per acre. Multiply this by the area to be treated from #2 to determine the amount of water you need to mix with the pesticide. Here we would need 0.0826 acres x 36.3 gallons. The total amount of water needed would be 3 gallons of water (0.0826 x 36.3 = 3.0).

So, to apply the pesticide in this example, put 12.7 ml in 3 gallons of water to treat an area 24 by 150 feet in size. The same process can be used with dry pesticides, but the conversion from ounces to grams would be 1 ounce equals 28.35 grams.

Pest Priorities on KY Berry Crops

Nicole Gauthier, Plant Pathology Extension Specialist

Hi Berry Growers, we are setting priorities for small fruit research, Extension resources, and work-shops. We need your help in setting those priorities.

Please take a moment to give us feedback for berry crop pest challenges and management decisions. Also, there's a separate survey on post-harvest storage and handling. This helps us understand how long growers are holding their produce before selling. Again, your feedback helps us prioritize. We appreciate you!

Commercial Berry Grower Surveys

Do you grow blueberries, brambles, or strawberries commercially? If so, the University of Kentucky Extension Specialists need your help! In order to determine future priorities and grower needs for disease, insect, and weed management, more information about the current challenges that growers face is needed. Information can be submitted through a survey for blueberry, brambles, and strawberry, independently. Each survey is quick and takes approximately 5-7 minutes to complete. All submissions are anonymous. Responses to these surveys will assist in the development of new resources and trainings for growers.

Blueberry Growers Survey

Bramble Growers Survey

Strawberry Growers Survey

Postharvest Survey

Apogee Label Supplement

A supplement to the standard label for Apogee has been posted for Kentucky and other states. Apogee is a plant growth regulator which contains the active ingredient prohexadione calcium and is used in the management of the shoot infection phase of fire blight. Prohexadione calcium inhibits gibberellin synthesis, which is the primary plant hormone that promotes cell elongation. As a result, shoot internode length is reduced and vegetative growth is suppressed for a few weeks after a spray is made. Application also thickens the cell walls which helps to prevent the invasion fire blight bacteria into the tissue.

The FIFRA Section 2(ee) Recommendation permits use in a manner not specifically described on the label included with the product. All other directions for use remain in force as the recommendation is not intended to replace any product labeling. Users must have a copy of the recommendation in their possession at the time of application.

The first application of Apogee is now allowed between the pink stage of flower development and 1 to 3 inches of new growth. This is earlier than the 1-to-3-

inch application timing permitted on the label. The basis for allowing earlier application is based on the research of Anna E. Wallis and Kerik D. Cox of Cornell University. They found that treating trees with Apogee beginning at pink stage reduced the incidence of blossom and shoot blight. There was evidence of cell wall thickening of fruitlet pedicels (stalks) compared to untreated trees which supports the proposed mechanism of protection against fireblight.

Plant Disease Diagnostic Lab Sample Courier Service from Princeton Research & Education Center – 2024

Julie Beale, Plant Disease Diagnostician/Director; Sara Long, Plant Disease Diagnostic Assistant; and Jason Travis, Agricultural Extension Associate

Courier service for plant disease diagnostic samples from the UK Princeton Research and Education Center to the Plant Disease Diagnostic Lab on the Lexington campus will begin on April 18 and run once a week through September.

The normal pick-up day and time will be Wednesdays at 8 a.m. CDT. Samples should be dropped off at Jason Travis's office in Office Trailer A by close of business the day before. County Extension agents impacted by the courier service have been sent an exact schedule.

Best wishes to all for a productive growing season!

8th Warmest Winter Ever Recorded

Matt Dixon, Senior Meteorologist, UK Ag Weather Center

Meteorological winter is officially in the rearview mirror! Looking at the data, if you thought it was a warm one, you're correct! Overall, it was the 8th warmest winter in Kentucky history (data back to 1895), bookended by the 11th warmest December and 4th warmest February ever recorded. We weren't alone either looking at the map of statewide temperature ranks, absent from the southeast nearly everyone across the U.S. landed in the top-10, which resulted in the warmest winter ever recorded for the continental United States (Figure 1).

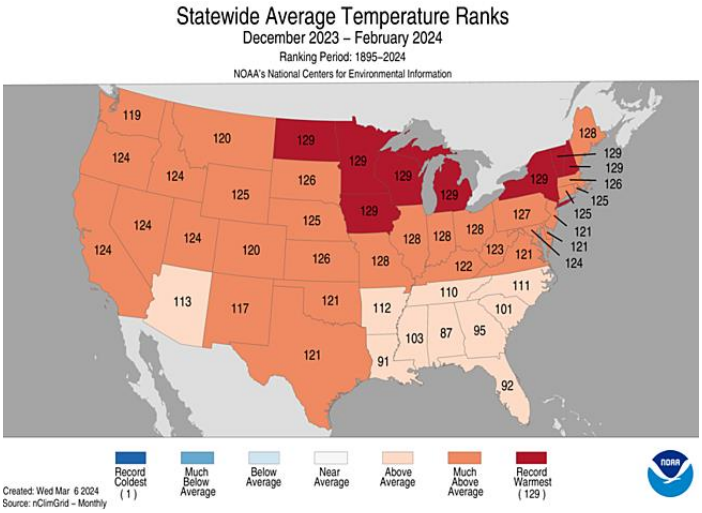


Figure 1. *Statewide winter temperature ranks. (Matt Dixon, Senior Meteorologist, UK Ag Weather Center)*

These warm winters have been nothing new to the Bluegrass State. In fact, seven of the past ten winter seasons have run above normal in Kentucky. The more eye-opening stat is that all seven are among the top-20 warmest winters ever recorded. Six of those are in the top-10 (Figure 2). Bottom-line, our climate is definitely trending warmer. As I've been telling folks in presentations across the state, we all need to take a step back and think about how warmer winters will impact your own operation in the future. We're all weather nerds, but we need to be climate nerds, too, and think long-term!

The warm winter has led to a head start on the 2024 growing season. One way to track vegetative or pest development is by calculating heat units or, in other words, growing degree days (GDDs). Just like last year, we've been accumulating GDDs at a very rapid pace in 2024. The base temperature required for growth will vary among different crops, but in the graph, I used a base temperature of 50°F when calculating GDDs (Figure 3). As of April 21, Bowling Green has accumulated 513 GDDs which is on-par with where we were in 2023. Only one year has exceeded this number at this point in the season over the past decade, 2017. In other words, it makes a lot of sense that we're seeing so much growth. This is just

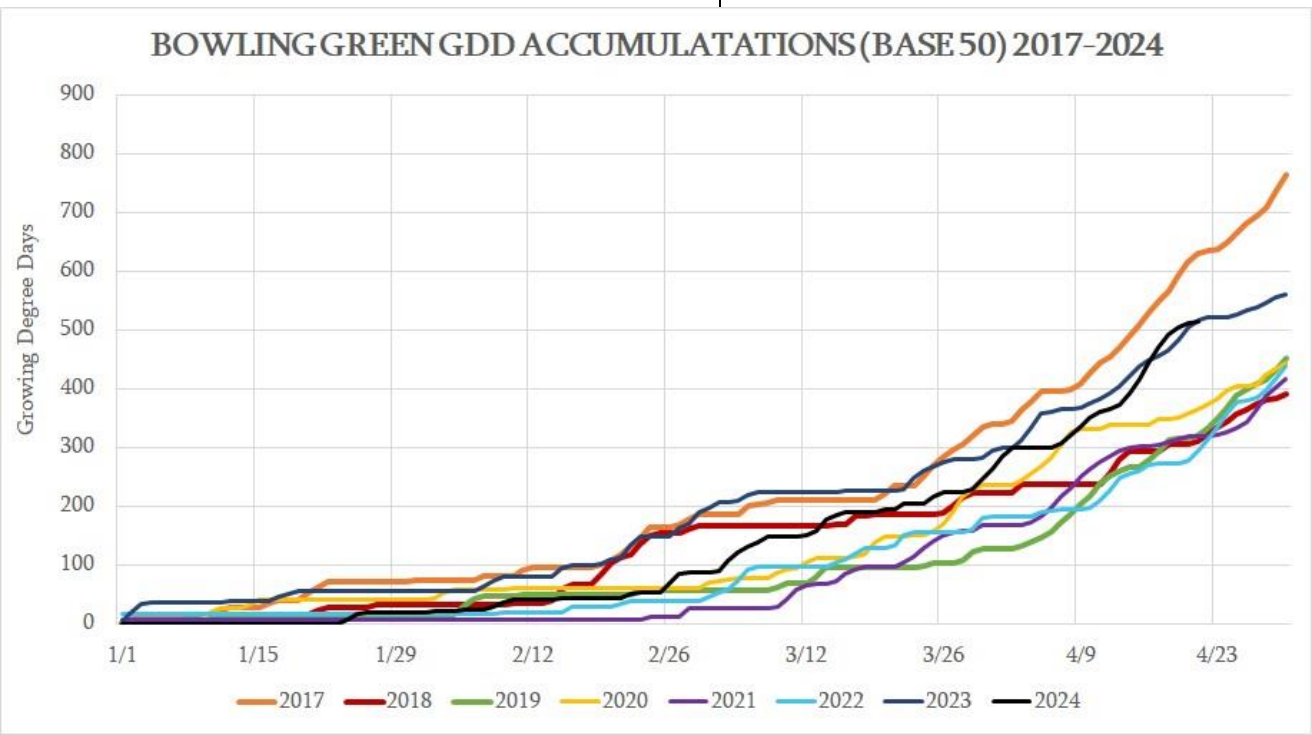
one example across the state, but everyone is ultimately in the same boat.

Kentucky Top-10 Warmest Winters on Record (December - February)(1895 - 2024)				
Rank	**Year**	**Avg.**	**Normal**	**Dep.**
1	1931-1932	44.2	36.9	7.3
2	2022-2023	42	36.9	5.1
3	2016-2017	41.4	36.9	4.5
4	1948-1949	41	36.9	4.1
5	1949-1950	40.8	36.9	3.9
6	2019-2020	40.7	36.9	3.8
7	2011-2012	40.3	36.9	3.4
8	2023-2024	40.2	36.9	3.3
9	1997-1998	39.9	36.9	3
9	1998-1999	39.9	36.9	3
10	2015-2016	39.7	36.9	2.8
Data Courtesy: Midwestern Regional Climate Center cli-MATE toolkit: *https://mrcc.purdue.edu/CLIMATE/*				

Figure 2. *Top-10 warmest winters on record for Kentucky. (Matt Dixon, Senior Meteorologist, UK Ag Weather Center)*

While it's nice to see vegetation coming to life in March, it's not necessarily a good thing. For one, this leaves a lengthy period of susceptibility as frost and freezing temperatures will surely come back into the picture as we saw across the state on the morning of April 22 when temperatures dropped into the upper 20's to 30's. Secondly, pests are starting to make their 2024 debut. Dr. Ric Bessin reported that high numbers of oriental fruit moth were captured in pheromone baited traps in central Kentucky the first week of April with first captures of coddling moth following during the week of the 19th. One last downside of the early spring temperatures is the return of crabgrass and other warm season weeds. Soil temperatures are running well above normal for this time of year, leading to germination and emergence getting ever closer.

Figure 3. *Bowling Green growing degree days accumulation base 50°F for 2024 and past years. (Matt Dixon, Senior Meteorologist, UK Ag Weather Center)*



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Martin-Gatton
College of Agriculture,
Food and Environment

PECAN GRAFTING DEMONSTRATION

May 4, 2024

10:00 a.m. - 2:00 p.m.

Skip & Jennie Shearouse
Pecan Farm
3474 State Route 1684
Boaz, KY 42027
(Graves County)

Bring a lawn chair, pecan scion wood to swap, and your picnic lunch!

If you have questions, contact:

John Strang
Mobile: 859-396-9311
jstrang@uky.edu
Jennie Shearouse
Mobile: 270-210-3169
shearouse@wk.net
Miranda Rudolph
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Lexington, KY 40506

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