Kentucky Nursery LISTSERV Bulletin

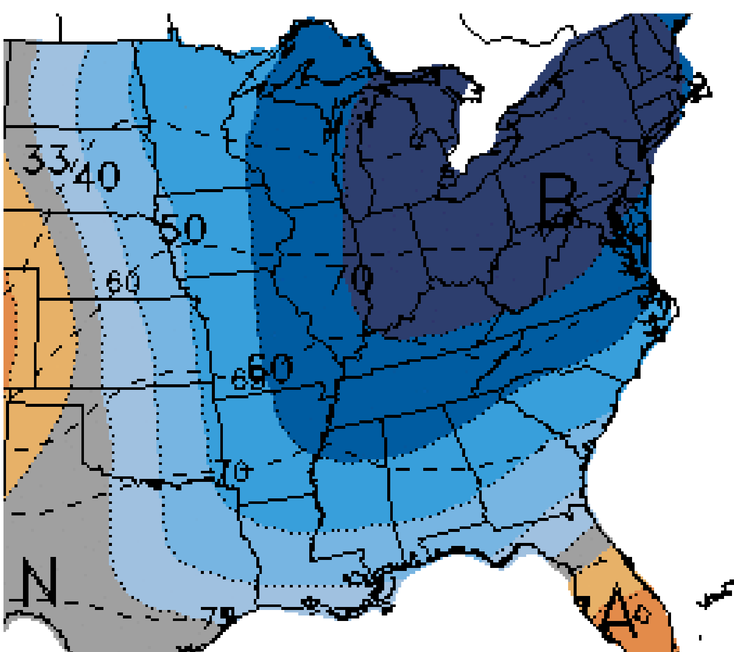
University of Kentucky Nursery Crops Team — **End of April 2020**

Cooler Than Average in First Half of May

The NOAA's Climate Prediction Center is calling for an above normal likelihood of cooler than average weather for the first half of May for this part of the US. This pattern is forecast to giveway to more typical temperatures as we move into the latter half of the month.

Generally speaking, precipitation rates could be above normal for the entire month, especially for the western part of the Commonwealth.

See **UKAg Weather's Long Range Outlooks** for a variety of forecasts of temperature and precipitation probabilities.



May 7-13, 2020, Temperature Probability
Image: NOAA Climate.gov, 29 APR 2020

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- **The Importance of Sprayer Calibration**
- **Using Temperature to Know When Bugs will Arrive**
- **Black Knot of Stone Fruit**

The Importance of Sprayer Calibration

Joshua Kight, Extension Associate, Nursery Crops

Sprayer calibration is important for all applications of pesticides, fungicides, and herbicides. Calibration of the sprayer allows the operator to know how much chemical is being applied on a per acre basis. When the sprayer is not properly calibrated, it can have negative impacts on the environment by applying too much chemical and can cause damage or a loss of nursery stock. Using too much chemical can impact a nursery financially, not just from the loss of nursery stock and excessive chemical purchasing, but also from fines that can be imposed by the state and federal governments. Alternatively, applying too little chemical can lead to a lack of effectiveness in pesticides, fungicides, and herbicides.

Photo: University of Arkansas Cooperative Extension

There are several methods available to calibrate a sprayer. Some examples are the 1/128th method, the output over area method, and the 5940 method.

The **1/128th method** is based on 2 facts 1.) there are 128 fluid ounces in a gallon and 2.) 1/128th of an acre (43,560 square feet divided by 128) is 340 square feet.

Output over area is a simple method that uses the width of a spray boom, nozzle spacing, timing of the length of area to travel, and several other factors to determine gallons per acre.

The **5940 method** uses the number of 5940 as a constant in the calculation. This calibration method takes into consideration the gallons per minute, gallons per acre, and the miles per hour of the spray rig.

These methods of calibration all work well to calibrate a sprayer; it is up to the operator as to which method to use. After the sprayer is calibrated, it is important to read the label of the chemical to determine how much active ingredient to apply on a per acre basis. All three of these calibration methods are explained in detail at http://www2.ca.uky.edu/agcomm/pubs/AGR/AGR239/AGR239.pdf.

To calibrate, the operator will need personal protective equipment and tools for calibration, including latex gloves, eye protection, tape measurer, stopwatch, and a measuring container in fluid ounces. In addition to calibration, it is important to know what types of spray nozzles are on your spray rig, and what nozzle works best for the application intended. For example, a flat-fan nozzle works well for a broadcast spray. All nozzle sizes and shapes are different and all should be replaced when worn in order to deliver the proper amount of pesticide.

Additional Resources

How to calculate a backpack sprayer
http://www2.ca.uky.edu/agcomm/pubs/AGR/AGR220/AGR220.pdf

Calibrating an airblast sprayer
https://www.uky.edu/hort/sites/www.uky.edu.hort/files/documents/calibration.pdf

Conversion factors
http://teejet.it/english/home/tech-support/nozzle-technical-information/conversion-factors.aspx

Calculations and conversion factors from the USDA
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd497001.pdf

Using Temperature to Know When Bugs will Arrive

Jonathan L. Larson, Extension Professor, Entomology

Insects are cold blooded creatures, which means that their body is the same temperature as their surroundings. They have some behaviors, like beating their wings, that may manipulate their body temperature but mostly they just have to deal with however cold or hot it is in their immediate area. This temperature will impact the speed with which they develop through their various life stages. To move from one stage to the next, i.e. to hatch from an egg as a nymph or to move from one larval stage to the next, they must accumulate a certain number of "degree days". Degree days are a method of measuring the growth of an insect that helps with predicting when we might have to start dealing with pests. Development for insects can only progress when the temperature is above a certain temp (the lower threshold) and below another temperature (the upper threshold).

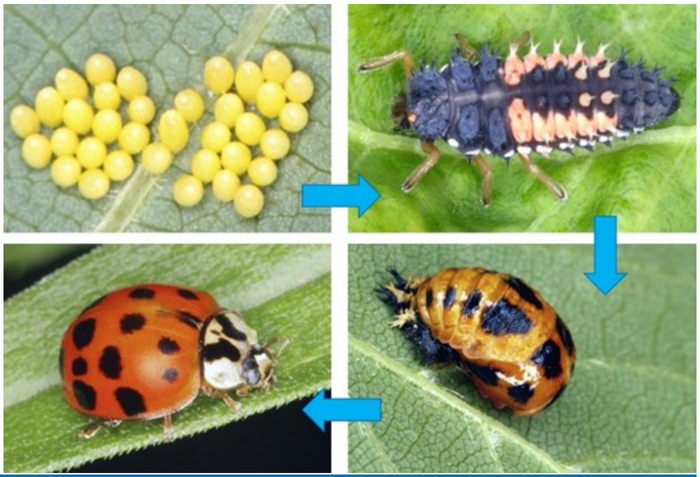

Figure 1. For this lady beetle to develop between each of the lift stages (clockwise from top left—egg, larva, pupae, adult) it will need to accumulate degree days at each stage. Temperature can cause insects to be early or late compared to historical experience.

Photo: Jim Kalisch, University of Nebraska-Lincoln

While that sweet spot can be very specific to particular insect species, we can use an average model that will help us to broadly know when pests may start to appear. This model is called the Average Method, because scientists are not known for their creativity. It works by taking the high temperature for a day, the low temperature, and 50°F as a basic assumed lower threshold for all insects and plugging them in to this equation:

$$\left(\frac{\text{(High temperature + Low temperature)}}{2} \right) - 50\,^\circ\text{F} = \text{Degree Days}$$

So, for example let's say that a given day has a high of 75 and a low of 55, we can plug them in to find that day offered 15 degree days to the development of an insect.

$$\left(\frac{(75 + 55)}{2} \right) - 50\,^\circ\text{F} = \text{15 Degree Days}$$

First you would add 75 and 55, then divide by 2. Take that resulting number and subtract the 50 degrees to get to 15 degree days being accumulated that day. Alternatively, if a day is too cool to offer an accumulation of degree days the insect's development is merely arrested. They do not go backwards in development, just stay in place.

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For general purposes, we can start measuring and adding degree day accumulation starting on January 1st or March 1st. Different insects will need different numbers of accumulated degree days for egg hatch, adult emergence, etc. There are lots of sources out there that show 5-year averages of research on when pests emerge, below is a link to one possible example. To just take one species and demonstrate, that source indicates that eastern ten caterpillar needs, on average, 47 accumulated degree days to emerge. So, if we start with January 1st and use weather data from Fayette County that we plug into our equation above, we can find the estimated emergence day for eastern tent caterpillars in central Kentucky. Based on data from the National Weather Service, on March 11th we were at 46 degree days and on March 12th we had 50, so egg hatch likely occurred in that time frame.

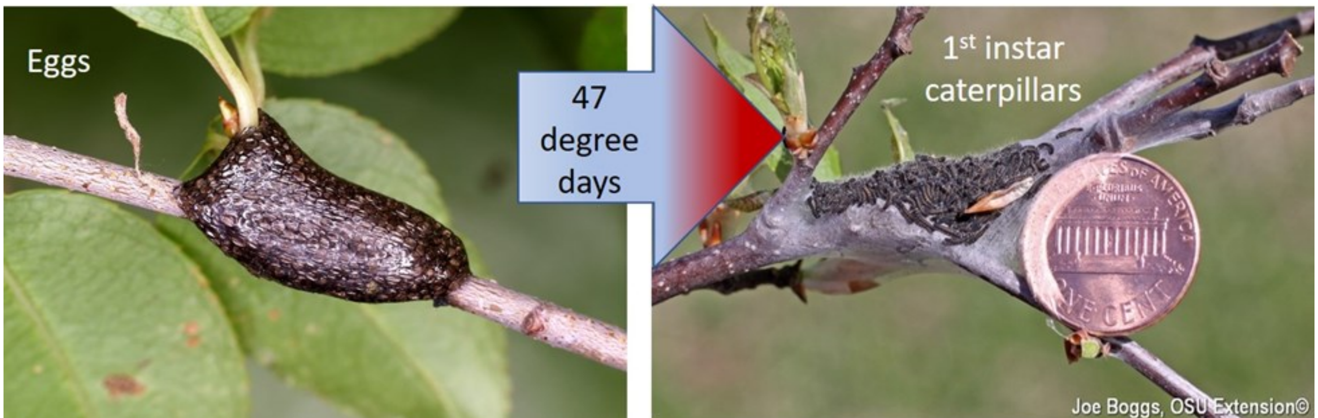

Figure 2. Eastern tent caterpillar eggs will hatch after they accumulate about 47 degree days. In 2020, we likely reached this point around mid-March for Kentucky

Photo: Jim Kalisch, University of Nebraska-Lincoln and Joe Boggs, Ohio State Extension

Knowing when a pest is emerging can help to time sprays for scale insect crawlers, for the smallest and easiest to control caterpillars, or when to begin hanging pheromone traps for adults. If you want to learn more consider checking out:

- https://entomology.ca.uky.edu/ef123
- https://www.canr.msu.edu/news/use_degree_days_and_plant_phenology_to_anticipate_timing_of_pest_problems_t
- http://cues.cfans.umn.edu/old/Web/049DegreeDays.pdf
- https://www.usanpn.org/data/forecasts

Black Knot of Stone Fruit

Kimberly Leonberger, Extension Associate, Plant Pathology
Nicole Ward Gauthier, Extension Professor, Plant Pathology

Black knot is a common, often serious, disease of plums and cherries in Kentucky. Trees in both commercial and residential plantings are susceptible to the disease. Black knot results in knotty growths that, over time, encircle limbs and result in branch death. Pruning and sanitation are the primary means for reducing or eliminating black knot.

Figure 1. Symptoms of black knot begin as small, light brown, irregular swellings or knots on limbs..

Photo: John Strang, University of Kentucky

Black Knot Facts

- Symptoms begin as small, light brown, irregular swelling or knots on limbs (Figure 1). The next year, enlarging knots become olive-green with a velvety surface and progress to become hardened, brittle, black swellings (Figure 2), and can reach lengths of 6 inches. Knots continue to expand each year until girdled branches eventually die.
- Only actively growing twigs of the current season's growth are susceptible.
- While infection takes place in spring, knot development is not evident until autumn.
- The pathogen overwinters in knots on previously infected twigs and branches, and spores are spread by wind and rain.
- Caused by the fungus *Apiosporina morbosa* (syn. *Dibotryon morbosum*).

Management Options

- Cultural practices such as pruning and sanitation are the primary means for reducing or eliminating black knot.
- Prune out knots in autumn or winter after leaves fall when infected branches are easy to recognize. Inspect trees again in April and remove any newly formed knots.
- Remove any trees with girdled trunks and/or large limbs.
- Destroy or discard all diseased wood.
- Remove wild plum and cherry trees in the vicinity.

Figure 1. Symptoms of black knot begin as small, light brown, irregular swellings or knots on limbs..

Photo: John Strang, University of Kentucky

Fungicide applications may be used in conjunction with the cultural practices listed previously, but are often not warranted.

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- Fungicides can be applied in spring to protect young, expanding twigs.
- Homeowners should refer to Extension publication, *Disease and Insect Control for Home Grown Fruit in Kentucky* (ID-21) for specific fungicide recommendations.
- Commercials growers should refer to the *Midwest Fruit Pest Management Guide* (ID-232) for current fungicide recommendations.
- Always follow all label directions when utilizing fungicides.

Additional Information

- Black Knot (PPFS-FR-T-04)
- Disease and Insect Control Program for Homegrown Fruit in Kentucky, including Organic Alternatives (ID-21)
- Backyard Peach & Stone Fruit Disease, Pest, and Cultural Practices Calendar (PPFS-FR-T-22)
- Homeowner's Guide to Fungicides (PPFS-GEN-07)
- Commercial Fruit Pest Management Guide (ID-232)

The University of Kentucky's **Nursery Crop Extension Research Team** is based out of two locations across the bluegrass to better serve our producers.

The **University of Kentucky Research and Education Center (UKREC)** in **Princeton** serves western Kentucky producers while our facilities and personnel on main campus in **Lexington** serve central and eastern Kentucky producers.

Check out our YouTube Channel!

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